MANDATORY DISCLOSURE

1.	**NAME OF THE INSTITUTION**	:	**PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY**
	ADDRESS	:	AT/P.O./P.S.-CHHENDIPADA, DIST.-ANGUL PIN — 759124, ODISHA
	TELEPHONE NO.	:	06761-252307
	MOBILE	:	9438253319, 9438772261
	E-Mail	:	pciet.cpd@gmail.com, pciet_cpd@rediffmail.com
2.	**NAME AND ADDRESS OF THE TRUST/SOCIETY/COMPANY AND THE TRUSTEES**	:	**PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY TRUST**
	ADDRESS	:	AT/P.O./P.S.-CHHENDIPADA, DIST.-ANGUL PIN — 759124, ODISHA
	TELEPHONE NO.	:	06761-252307
	MOBILE	:	9438253319, 9438772261
	E-Mail	:	pciet.cpd@gmail.com, pciet_cpd@rediffmail.com
		:	
	TRUSTEES	:	(1) ER. LAMBODAR PRADHAN – SECRETARY AT/P.O./P.S.-CHHENDIPADA, DIST.-ANGUL, ODISHA, PIN-759124 MOBILE : 9438253319, 9438772261 E-mail : lpradhan2009@gmail.com
			(2) ER. HEMANTA KUMAR PRADHAN – CHAIRMAN AT/P.O./P.S.-CHHENDIPADA, DIST.-ANGUL, ODISHA, PIN-759124 MOBILE : 9438253318 E-mail : hpradhan1978@gmail.com
			(3) MRS. MANJUBHASINI PRADHAN AT/P.O./P.S.-CHHENDIPADA, DIST.-ANGUL, ODISHA, PIN-759124 MOBILE : 9439537392 E-mail : manjubhasinipradhan@gmail.com
			(4) MRS. KABITABHASINI PRADHAN AT/P.O./P.S.-CHHENDIPADA, DIST.-ANGUL, ODISHA, PIN-759124 MOBILE : 9861386263 E-mail : kabita.cpd@gmail.com
			(5) JYOTIRMAYEE PRADHAN AT/P.O./P.S.-CHHENDIPADA, DIST.-ANGUL, ODISHA, PIN-759124 MOBILE : 8895231293 E-mail : jyotirmayee62@gmail.com
3.	**NAME AND ADDRESS OF THE VICE CHANCELLOR/ PRINCIPAL/DIRECTOR**	:	(1) DIRECTOR- DR. BASANTA KUMAR SAHOO AT/P.O./P.S.-CHHENDIPADA DIST.-ANGUL, ODISHA, PIN-759124 MOBILE : 9437493399 E-mail : drbksahoo008@gmail.com
			(2) PRINCIPAL – ER. HEMANTA KUMAR PRADHAN AT/P.O./P.S.-CHHENDIPADA DIST.-ANGUL, ODISHA, PIN-759124 MOBILE : 9938052112 E-mail : hpradhan1978@gmail.com

4. NAME OF THE AFFILIATING UNIVERSITY : STATE COUNCIL FOR TECHNICAL EDUCATION & VOCATIONAL TRAINING (SCTE&VT), ODISHA, BHUBANESWAR.

5. GOVERNANCE :

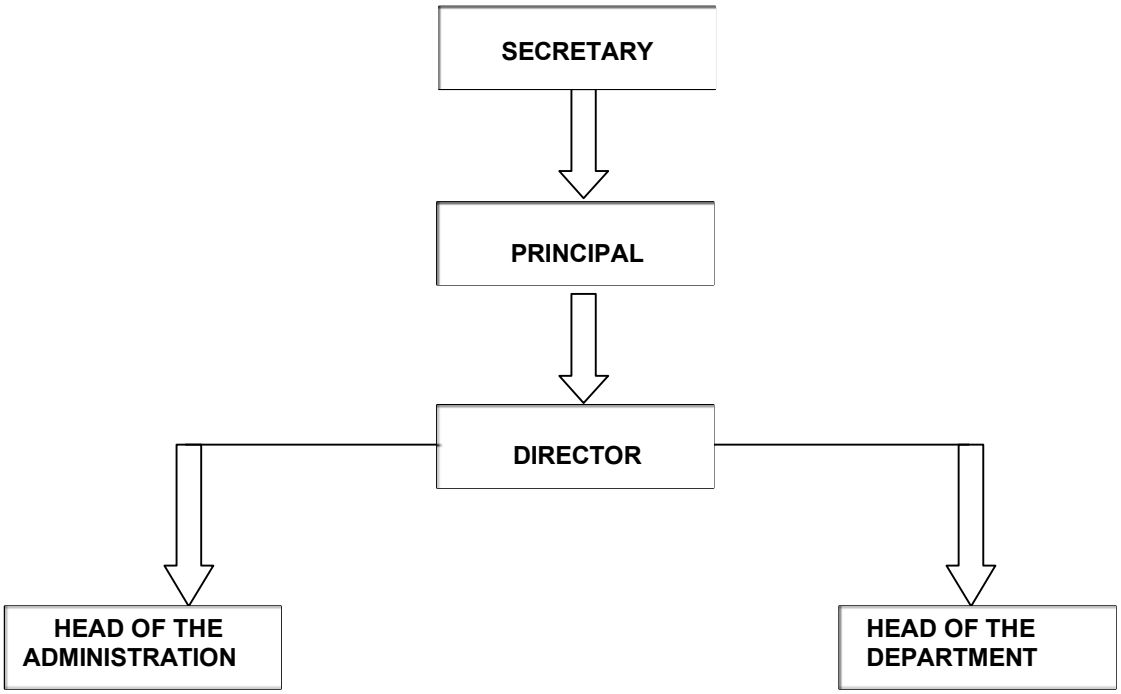
- Members of the Board and their brief background :
  (1) ER. LAMBODAR PRADHAN, SECRETARY
  (2) ER. HEMANTA KUMAR PRADHAN, CHAIRMAN
  (3) MRS. MANJUBHASINI PRADHAN, MEMBER
  (4) MRS. KABITABHASINI PRADHAN, MEMBER
  (5) ER. JYOTIRMAYEE PRADHAN, MEMBER

Most of the members of the Trust Board are qualified engineers having adequate experience in managing & promoting other technical & educational institutes with a mission to produce quality Diploma Engineers customize with changing scenario of our nation.

- Members of the Academic Advisory Body :
  (1) ER. HEMANTA KUMAR PRADHAN, PRINCIPAL
  (2) DR. BASANTA KUMAR SAHOO, DIRECTOR
  (3) ER. SUBHASHREE PRADHAN, HOD, ELECT.
  (4) ER. TARANISEN MOHANTY, HOD, MECH.
  (5) ER. BABITA SAHU, HOD, CIVIL
  (6) ER. DILLIP KUMAR DEHURY, HOD, MINING
  (7) MR. KSHIRA MOHAN BEHERA, HOD, MATH.& SCI.
  (8) MR. ASWINI KUMAR PRADHAN, LECT. IN COMP.

- Frequency of the Board Meeting and Academic Advisory Body : The regular meeting of the Trust Board & Academic Advisory Body has been held at least two times in each semesters & 04 times in a year.

- Organisational Chart & Processes :



- Nature and Extent of involvement of Faculty and students in academic affairs/improvements : The institute has been taking regular feedback relating to academic activity from the faculty & students in each semesters & taking corrective steps for its improvements of quality of teaching related activities through Departmental Academic Committee & monthly review & monitoring committee of the institute.

- Mechanism/Norms and Procedure for democratic/good Governance : Our institute constituted e-grievance redressal system for students, staffs & guardians as per A.I.C.T.E. norms & for redressal of grievances to provide good governance of the institute.

- Students Feedback on Institutional Governance/Faculty performance : The institute has been taking regular feedback on institutional governance & faculty performance & taking Corrective steps to eradicate the shortcomings on priority.

- Grievance Redressal mechanism for Faculty, staff and students : The institute has been constituted a Grievance Redressal Committee since inception of the institute from the session 2009-10 as per A.I.C.T.E. norms for redressal of grievances & faculty staffs & students. The Grievance redressal committee for faculty, staff & students re-constituted for the session 2024-25 by vide Order No. PCIET/Estt/2637/24 dated 16.08.2024.

- Establishment of Anti Ragging Committee: : The institute has constituted Anti-Ragging Committee since the inception of the institute from the session 2009-10 as per A.I.C.T.E. norms to prohibits & prevent completely any type of ragging in our institute. The ragging is strictly prohibited in our institute. The anti-ragging committee of PCIET reconstituted for the session 2024-25 by vide Order No. PCIET/Estt/ 2629/24 dated 16.08.2024.

ANTI RAGGING COMMITTEE

Sl. No.	Name	Designation	Chairman/Member of the Committee	Contact No.
1.	Er. Hemanta Kumar Pradhan	Principal	Chairman	Ph : 06761-252307 Mob : 9938052112
2.	Dr. Basanta Kumar Sahoo	Director	Member	
3.	Er. Taranisen Mohanty	H.O.D., Mech. Engg.	Member	
4.	Mr. Aswini Kumar Pradhan	Lecturer in Comp.Sc.	Member	
5.	Mr. Subhendu Kumar Pani	Lecturer in English	Member	
6.	Mr. Kshira Mohan Behera	H.O.D. Math. & Sci.	Member	
7.	Er. Subhashree Pradhan	H.O.D., Elect. Engg.	Member	
8.	Er. Gouri Sankar Pradhan	Lecturer, Mech. Engg.	Member	
9.	Er. Dewan Kumar Sahu	Lecturer, Mech. Engg.	Member	
10.	Er Swarnaprava Parida	Lecturer, Civil Engg.	Member	
11.	Mr. Suryakanta Behera	Instructor, W/S.	Member	
12.	Mr. Satyajit pattanaik	Comp. Prog.	Member	
13.	Er. Babita Sahu	H.O.D., Civil Engg.	Member	
14.	Mr.Tapan Kumar Sahu	Lecturer in Chemistry	Member	
15.	Er. Ramesh Chandra Pradhan	Lecturer in Elect. Engg.	Member	
16.	Er. Dillip Kumar Dehury	H.O.D., Mining Engg.	Member	
17.	Mr. Dolagobind Sahoo	Lecturer in Physics	Member	
18.	Er. Rashmita Gadanayak	Lect. in Elect. Engg	Member	
19	Er. Sidhanta Sekhar Mahar	Lect in Civil Engg	Member	
20	Mr. Lalatendu Sahu	Lect in Physics	Member	
21	Ms. Nirupama Behera	Lect. in Chemistry	Member	
22	Er. Diptimayee Pradhan	Lect in Computer Sci	Member	
23	Mr. Saroj kumar sahu	Lect. in Mathematics	Member	

24	Mr. Prasanta Kumar Behera	Office Asst.	Member	
25	Mr. Santha Pradhan	Office Asst.	Member	
26.	Mr. Susanta Kumar Sethy	Office Asst.	Member	
27	Representative of Tahasildar, Chhendipada		Member	

28	Representative of Chhendipada Police Station		Member	
29.	Representative of Local Media		Member	
30.	Representative of Guardians/ Parents		Member	
31	Representative of Students (Freshers & Seniors)		Member	

ANTI RAGGING SQUAD

Sl. No.	Name	Designation	Chairman/Member of the Committee	Contact No.
1.	Dr. Basanta Kumar Sahoo	Director	Chairman	06761-252692
2.	Mr. Aswini Kumar Pradhan	Lecturer, Comp.Sc.	Member	
3.	Er. Taranisen Mohanty	H.O.D., Mech. Engg.	Member	
4.	Mr. Subhendu Kumar Pani	Lecturer in English	Member	
5.	Mr. Kshira Mohan Behera	H.O.D., Math. & Sci.	Member	
6.	Er. Dewan Kumar Sahu	Lecturer, Mech. Engg.	Member	
7.	Er. Gouri Sankar Pradhan	Lecturer, Mech. Engg.	Member	
8.	Er. Subhashree Pradhan	H.O.D., Elect. Engg.	Member	
9.	Mr. Suryakanta Behera	Instructor, W/S.	Member	
10.	Mr. Satyajit Pattanaik	Comp. Prog	Member	
11.	Er. Babita Sahu	H.O.D., Civil Engg.	Member	
12.	Er. Swarnaprava Parida	Lecturer in Civil Engg.	Member	
13.	Er. Dillip Kumar Dehury	H.O.D., Mining Engg.	Member	
14.	Er. Ramesh Chandra Pradhan	Lecturer in Elect. Engg.	Member	
15.	Er. Sidhanta Sekhar Mahar	Lecturer in Civil Engg.	Member	
16	Mr. Laltendu Sahu	Lect. in Physics	Member	
17	Mr. Saroj Kumar sahu	Lect. in Mathematics	Member	
18	Er. Diptimayee Pradhan	Lect. in Comp. Sci. & Engg	Member	
19	Er. Rashmita Gadanayak	Lect. in Electrical Engg	Member	
20.	Mr. Tapan Kumar Sahu	Lecturer in Chemistry	Member	
21.	Mr. Prasanta Kumar Behera	Office Asst.	Member	
22.	Mr. Santha Pradhan	Office Asst.	Member	
23.	Mr. Susanta Kumar Sethy	Office Asst.	Member	

- Establishment of Online Grievance Redressal Mechanism :

  In pursuance to A.I.C.T.E. Regulation, 2012, published vide Notification F. No. 37-3/Legal/2012 dated 25.05.2012 & A.I.C.T.E. Regulation F. No. 01-101/ DRG/ AICTE/ Regulation/2017 dated 20.02.2017, the e-grievance redressal mechanism system of P.C.I.E.T., Chhendipada, Dist.-Angul has been installed & implemented by Orell Software Solutions Pvt. Ltd. with effect from dt.13.08.2018 having its webportal : pciet.edugrievance.com for the session 2018-19 & has been renewed in subsequent years. The E-grievance redressal committee of PCIET for the session 2024-25 reconstituted by vide Order No. PCIET/Estt/2643/24 dated 16.08.2024.The objective of the e-grievance redressal mechanism is to ensure transparency by the institute, in admission & preventing unfair practices & to provide a mechanism to innocent students, faculties & staffs for redressal of their grievances.

- Establishment of Internal Complaint Committee (ICC) :

  In pursuance to the A.I.C.T.E. Regulations 2016 vide F. No. : AICTE/WH/2016/1 dated 10.06.2016 & A.I.C.T.E. F. No. 1-PC/AICTEG.P./2016 dated 08.07.2016, an Internal Complaint Committee (ICC) of PCIET, Chhendipada, Dist. — Angul has been constituted for the session 2018-19 vide Order No. PCIET/Estt/533/2018 dated 19.07.2018& has been reconstituted in subsequent years. The Internal Complaint Committee of PCIET Chhendipada reconstituted for the session 2024-25 by vide Order No. PCIET/Estt/2649/24 dated 16.08.2024. The objective of the above committeeis for redressal of any grievances of the girls students studying in the institute & women employees

working in the institution and preventing & prohibiting any type of gender sensitization, discrimination, corporal punishment & sexual harassment in the institute campus & hostel and create safe, conducive study atmosphere for all students especially girls students.

- Establishment of Committee for SC/ST :

  In pursuance to the A.I.C.T.E. Regulation 2012 vide F.No. 37-3/Legal/2012 dated 25.05.2012 & as per SC/ST Act 1989 vide No. 363 of 1989 dated 11.09.1989 a Grievance Redressal Committee for SC/ST students of PCIET, Chhendipada, Dist. — Angul is hereby re-constituted for the session 2024-25 by vide Order No. PCIET/Estt/2647/2024 dated 16.08.2024. The objective of this committee is to work for preventing any type of intimidation, discrimination, atrocities and harassment of SC/ST students studying in the institute.

- Internal Quality Assurance Cell :

  In pursuance to the National Quality Assurance Policy & A.I.C.T.E. Regulation (Appendix-06) for the session 2019-20, an Internal Quality Assurance Cell (IQAC) of PCIET, Chhendipada, Dist.- Angul has been constituted vide Order No. PCIET/Estt./777/2019 dated 07.01.2019 & has been Reconstituted for the session 2024-25 by vide Order No.PCIET/Estt/2638/2024 dated 16.08.2024.

  The objective of IQAC is to develop a quality system for conscious, consistent & catelic action to improve the academic & administrative performance of the institute & to promote measures for institutional function towards quality enhancement.

  Equal Opportunity Facilities Cell :

  In pursuance to A.I.C.T.E. F. No. AICTE/P & AP/MISC/ 2022 dated 27.09.2022 relating to follow-up-action for inclusive education for all including persons with disabilities and AICTE vide its Circular No. AICTE/P & AP/MISC/2022 dated 08.05.2022 relating to guidelines for inclusive education for all inclusive persons with disabilities to be followed by all AICTE approved institution, an “Equal Opportunity Facilitation Cell” (EQFC) of PCIET, Chhendipada, Dist. — Angul has been reconstituted for the session 2024-25 by vide Order No. PCIET/Estt/2656/24 dated 16.08.2024. In the above cell the Principal, PCIET functioning as Nodal Officer/Co-ordinator of EQFC. All HOD’s & other senior staffs and students representatives are as member.

6. PROGRAMMES :

- Name of Programmes approved by AICTE :
  1) DIPLOMA IN CIVIL ENGG.
  2) DIPLOMA IN ELECTRICAL ENGG.
  3) DIPLOMA IN MECHANICAL ENGG.
  4) DIPLOMA IN MINING ENGG.
- Name of the Programmes Accredited by AICTE : NOT ACCREDIATED
- Status of Accrediation of the Courses : NOT ACCREDIATED
- Total Number of Courses : -
- No. of Courses for which applied for Accrediation : -
- Status of Accrediation — Preliminary / Applied for SAR and results awaited/Applied for SAR and visits completed/Results of the visits awaited/Rejected/ Approved for … Courses : -

- For each Programme the following details are to be given :

  - Name : DIPLOMA IN CIVIL ENGINEERING
  - Number of Seats : 60
  - Duration : 3 Years
  - Cut off marks/rank of admission during the last three years : 2022 - 330
2023 - 348
2024 - 365
  - Fee : Tuition Fee Per Year - Rs. 31,000/-
Hostel Cost – Rs.24,000/- per year per student
Transportation Cost – Rs.12,000/- upto 20 Kms. Rs. 17,000/- for more than 20 Kms.
Caution Money – Rs.500/- (one time refundable)
  - Placement Facilities : The institute has Training & Placement Cell to guide the students for their better placement,
  - Campus placement in last three years with Minimum salary, maximum salary and :

Year	Number of Company Visited	Number of Eligible Students	Total Placement	Lowest Package	Highest Package
2022	1	10	03	2 Lakh	2 Lakh
2023	1	61	06	1.8 Lakh	2 Lakh
2024	1	45	05	1.8 Lakh	2 Lakh

  - Name : DIPLOMA IN ELECTRICAL ENGINEERING
  - Number of Seats : 120
  - Duration : 3 Years
  - Cut off marks/rank of admission during the last three years : 2022 - 349
2023 - 353
2024 - 362
  - Fee : Tuition Fee Per Year - Rs. 31,000/-
Hostel Cost – Rs.24,000/- per year per student
Transportation Cost – Rs12,000/- upto 20 Kms. Rs. 17,000/- for more than 20 Kms.
Caution Money – Rs.500/- (one time refundable)
  - Placement Facilities : The institute has Training & Placement Cell to guide the students for their better placement,
  - Campus placement in last three years with Minimum salary, maximum salary and :

Year	Number of Company Visited	Number of Eligible Students	Total Placement	Lowest Package	Highest Package
2022	1	12	02	2 Lakh	2 Lakh
2023	4	116	22	1.8 Lakh	2 Lakh
2024	1	75	18	1.7 Lakh	2 Lakh

- Name : DIPLOMA IN MECHANICAL ENGINEERING
- Number of Seats : 120
- Duration : 3 Years
- Cut off marks/rank of admission during the last three years : 2022 - 348
2023 - 352
2024 - 371
- Fee : Tuition Fee Per Year - Rs. 31,000/-
Hostel Cost – Rs.24,000/- per year per student
Transportation Cost – Rs.12,000/- upto 20 Kms. Rs. 17,000/- for more than 20 Kms.
Caution Money – Rs.500/- (one time refundable)
- Placement Facilities : The institute has Training & Placement Cell to guide the students for their better placement,
- Campus placement in last three years with: Minimum salary, maximum salary and

Year	Number of Company Visited	Number of Eligible Students	Total Placement	Lowest Package	Highest Package
2022	1	18	04	2 Lakh	2 Lakh
2023	4	122	24	1.8 Lakh	2 Lakh
2024	1	80	17	1.8 Lakh	2 Lakh

- Name : MINING ENGINEERING
- Number of Seats : 120
- Duration : 3 Years
- Cut off marks/rank of admission during the last three years : 2022 - 375
2023 - 382
2024 - 385
- Fee : Tuition Fee Per Year - Rs. 31,000/-
Hostel Cost – Rs.24,000/- per year per student
Transportation Cost – Rs.12,000/- upto 20 Kms. Rs. 17,000/- for more than 20 Kms.
Caution Money – Rs.500/- (one time refundable)
- Placement Facilities : The institute has Training & Placement Cell to guide the students for their better placement,
- Campus placement in last three years with Minimum salary, maximum salary and :

Year	Number of Company Visited	Number of Eligible Students	Total Placement	Lowest Package	Highest Package
2022	1	22	04	2 Lakh	2 Lakh
2023	5	127	21	1.8 Lakh	2 Lakh
2024	1	110	08	1.9 Lakh	2 Lakh

- Name and duration of programme(s) having: Twinning and Collaboration with Foreign University(s) and being run in the same Campus along with status of their AICTE approval. If there is Foreign Collaboration, give the following details : NOT APPLICABLE

7. FACULTY :

- Branch wise list Faculty Members : **BRANCH – CIVIL ENGINEERING**

1) ER. BABITA SAHU
2) ER. SUNIL KUMAR SAHU
3) ER. PRITAM SAGAR SAHOO
4) ER. NANDINI PRADHAN
5) ER. SWARNAPRAVA PARIDA
6) ER. SIDHANTA SEKHAR MAHAR
7) ER. SUMANTA KUMAR SAHOO
8) ER. SUMANTA PRADHAN

- Permanent Faculty : 8 Nos.
- Adjunct Faculty : Nil
- Permanent Faculty : Student Ratio : 1 : 20
- Number of Faculty employed and left during last three years :

YEAR	EMPLOYED	LEFT
2022-23	01	01
2023-24	01	01
2024-25	-	-

- Branch wise list Faculty Members : **BRANCH – ELECTRICAL ENGINEERING**

1) ER. SUBHASHREE PRADHAN
2) ER. BIBHUTI BHUSAN SAHU
3) ER. BIJAYA KUMAR BEHERA
4) ER. SUVENDU SEKHAR BEHERA
5) ER. BISWARANJAN JENA
6) ER. SUSHIL SAHOO
7) ER. SAKTIDATTA PRADHAN
8) ER. SUGYANI SAHOO
9) ER. RAMESH CHANDRA PRADHAN
10) DEBABRATA DIBYARANJAN
11) PRADYUMNA GARNAIK
12) RASHMITA GADANAYAK
13) SUSHIL KUMAR MAJHI
14) SWAGAT SAHOO
15) BISHNUPRIYA SAHOO

- Permanent Faculty : 15 Nos.
- Adjunct Faculty : Nil
- Permanent Faculty : Student Ratio : 1 : 20
- Number of Faculty employed and left during last three years :

YEAR	EMPLOYED	LEFT
2022-23	02	02
2023-24	02	02
2024-25	-	-

- Branch wise list Faculty Members : **BRANCH – MECHANICAL ENGINEERING**

1) ER. HEMANTA KUMAR PRADHAN
2) ER. TARANISEN MOHANTY
3) ER. MANAS RANJAN BEHERA
4) ER. GOURI SANKAR PRADHAN
5) ER. BIKASH RANJAN SAHU
6) ER. HIMANSU SEKHAR SAMAL
7) ER. LAKIN KUMAR SAHOO
8) ER. RASABIHARI SAHU
9) ER. DEWAN KUMAR SAHU
10) ER. ABINASH SAHOO
11) ER. KAMALAKANTA TRIPATHY
12) ER. SAMIR PRASAD SAHU
13) ER. SATYANARAYAN MAJHI
14) ER.SUBHASMITA JENA
15) ER. SHUBHAM PRADHAN

- Permanent Faculty : 15 Nos.
- Adjunct Faculty : Nil
- Permanent Faculty : Student Ratio : 1 : 20
- Number of Faculty employed and left during :

last three years

YEAR	EMPLOYED	LEFT
2022-23	03	01
2023-24	-	-
2024-25	-	-

- Branch wise list Faculty Members : **BRANCH – MINING ENGINEERING**

1) ER. DILLIP KUMAR DEHURY
2) ER. AJAY KUMAR
3) ER. CHANDAN SAHOO
4) ER. GOBINDA CHANDRA SETHY
5) ER. JAGANDEEP MAHATO
6) ER. LIPUN DEHURY
7) ER. PRABIN KUMAR SAHOO
8) ER. PRANAYA KUMAR BEHERA
9) ER. PRATYUSH ROUT
10) ER. PRITAN KUMAR PRADHAN
11) ER. SIBASUNDAR MAIKAP
12) ER. SRIKANTA SAMAL
13) ER. SUNIL KUMAR SAHU
14) ER. PRATYUSHA PRAVANJAN BEHERA
15) ER. UDAYA BISWANATH PRADHAN

- Permanent Faculty : 15 Nos.
- Adjunct Faculty : Nil
- Permanent Faculty : Student Ratio : 1 : 20
- Number of Faculty employed and left during :

last three years

YEAR	EMPLOYED	LEFT
2022-23	05	04
2023-24	-	-
2024-25	-	-

- **FIRST YEAR/OTHER FACULTIES :**

1) DR. BASANTA KUMAR SAHOO,DIRECTOR
2) TAPAN KUMAR SAHU, LECT.IN CHEM.
3) DOLAGOBIND SAHOO, LECT. IN PHYSICS
4) KSHIRA MOHAN BEHERA, LECT. IN MATH.
5) SUBHENDU KUMAR PANI, LECT. IN ENGLISH
6) JYOTIRMAYEE PRADHAN, LECT. IN COMP.
7) ASWINI KUMAR PRADHAN, LECT. IN COMP.
8) ANUPAMA BEHERA, LECT. IN MGMT.
9) NIRUPAMA BEHERA, LECT. IN CHEM.
10) LALATENDU SAHU, LECT. IN PHYSICS
11) SAROJ KUMAR SAHOO, LECT. IN MATH.
12) BHAKTA BATSALA NAIK, LECT. IN MGMT.
13) DIPTIMAYEE PRADHAN, LECT. IN COMP.

- Permanent Faculty : 13 Nos.

- Adjunct Faculty : Nil

- Permanent Faculty : Student Ratio : 1 : 20

- Number of Faculty employed and left during:

  last three years

YEAR	EMPLOYED	LEFT
2022-23	04	02
2023-24	-	01
2024-25	-	-

8. PROFILE OF VICE CHANCELLOR/ DIRECTOR / PRINCIPAL / FACULTY :

i)	Name	:	**DR. BASANTA KUMAR SAHOO DIRECTOR**
ii)	Date of Birth	:	14/10/1960
iii)	Unique Id	:	1-463358455
iv)	Educational Qualifications	:	M.Sc., M.Phil, Ph.D (Math.)
v)	Work Experience	:	
	• Teaching	:	31 Years
	• Research	:	5 Years
	• Industry	:	-
	• Others	:	Administrative – 29 Years
vi)	Area of Specialization	:	(1) DIFFERENTIAL EQUATIONS (2) HIGHER ANALYSIS (3) THEORY OF RELATIVITY & COSMOLOGY (4) THEORY OF NUMBERS
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Diploma Level	:	ENGG. MATHEMATICS-I ENGG. MATHEMATICS-II ENGG. MATHEMATICS-III
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	4
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	4
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. HEMANTA KUMAR PRADHAN** **PRINCIPAL**
ii)	Date of Birth	:	14/07/1978
iii)	Unique Id	:	1-4364864697
iv)	Educational Qualifications	:	M.TECH.
v)	Work Experience	:	
	• Teaching	:	16 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	Administrative – 8 Years
vi)	Area of Specialization	:	PRODUCTION ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Diploma Level	:	1) PRODUCTION TECHNOLOGY 2) MANUFACTURING TECHNOLOGY 3) ADVANCE MANUFACTURING PROCESS
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. BABITA SAHU** **H.O.D. IN CIVIL ENGG.**
ii)	Date of Birth	:	05/01/1985
iii)	Unique Id	:	1-3612596034
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	7 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	TRANSPORTATION ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1) RAILWAY & BRIDGE ENGG 2) BUILDING MATERIAL & CONSTRUCTION TECHNOLOGY . 3) HIGHWAY ENGG. 4)CONSTRUCTION MANAGEMENT .
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. SUNIL KUMAR SAHU** **LECT. IN CIVIL ENGG.**
ii)	Date of Birth	:	11/02/1985
iii)	Unique Id	:	1-3614692743
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	9 Years
	• Research	:	-
	• Industry	:	2 Years
	• Others	:	-
vi)	Area of Specialization	:	STRUCTURAL ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1) STRUCTURAL MECHANICS 2) ESTIMATION & COST EVALUATION-II 3) LAND SURVEY - II 4) HIGHWAY ENGINEERING
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. PRITAM SAGAR SAHOO** **LECT. IN CIVIL ENGG.**
ii)	Date of Birth	:	04/06/1990
iii)	Unique Id	:	1-2899870919
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	9 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	STRUCTURAL ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1) STRUCTURAL MECHANICS 2) ESTIMATION & COST EVALUATION -I 3) LAND SURVEY -I 4) LAND SURVEY -II
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. NANDINI PRADHAN** **LECT. IN CIVIL ENGG.**
ii)	Date of Birth	:	15/07/1993
iii)	Unique Id	:	1-2900768901
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	9 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	GEO TECHNICAL ENGG
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1) GEO TECHNICAL ENGG. 2) STRUCTURAL DESIGN -II 3) HYDRAULIC IRRIGATION ENGG. HYDRAULICS & IRRIGATION ENGG. 4) CONCRETE TECHNOLOGY
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. SWARNAPRAVA PARIDA** **LECT. IN CIVIL ENGG.**
ii)	Date of Birth	:	09/03/1994
iii)	Unique Id	:	1-7521136446
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	5 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	GEO TECHNICAL ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1) GEO TECHNICAL ENGG. 2)WATER SUPPLY &WASTE WATER ENGG. 3) ADVANCED CONSTRUCTION TECHINIQUES & EQUIPMENTS 4) HYDRAULIC IRRIGATION ENGG.
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER.SIDHANTA SEKHAR MAHAR** **LECT. IN CIVIL ENGG.**
ii)	Date of Birth	:	23/06/1999
iii)	Unique Id	:	1-43489013740
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	2 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	STRUCTURAL ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1) ESTIMATION & COST EVALUATION - 2) STRUCTURAL DESIGN -I 3) STRUCTURAL DESIGN -II 4) CONCRETE TECHNOLOGY 5) CONSTRUCTION MANAGEMENT
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER.SUMANTA KUMAR SAHOO** **LECT. IN CIVIL ENGG.**
ii)	Date of Birth	:	17/08/1999
iii)	Unique Id	:	1-11149725261
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	4 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	ENVIRONMENTAL ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1) ENVIRONMENTAL STUDIES 2) WATER SUPPLY & WASTE WATER ENGG. 3) LAND SURVEY -
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER.SUMANTA PRADHAN** **LECT. IN CIVIL ENGG.**
ii)	Date of Birth	:	05/02/1998
iii)	Unique Id	:	1-43804933155
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	1
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	STRUCTURAL ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1) STRUCTURAL MECHANICS 2) STRUCTURAL DESIGN -II 3) CONCRETE TECHNOLOGY 4) LAND SURVEY -II
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. SUBHASHREE PRADHAN** **H.O.D. IN ELECTRICAL ENGG.**
ii)	Date of Birth	:	18/06/1997
iii)	Unique Id	:	1-7444782685
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	7 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	1) POWER ELECTRONICS ENGG. 2) POWER SYSTEM ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1) POWER ELECTRONICS & PLC 2) CIRCUIT & NETWORK THEORY 3) ANALOG ELECTRONICS & OP-AMP 4) ELECTRICAL INSTALLATION & ESTIMATING
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. BIBHUTI BHUSAN SAHU** **LECT. IN ELECTRICAL ENGG.**
ii)	Date of Birth	:	07/02/1994
iii)	Unique Id	:	1-3620679256
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	8 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	POWER ELECTRONICS ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1) CONTROL SYSTEM ENGG. 2) ELECTRICAL MEASUREMENT & INSTRUMENTATION 3) CIRCUIT & NETWORK THEORY
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. BIJAYA KUMAR BEHERA** **LECT. IN ELECTRICAL ENGG.**
ii)	Date of Birth	:	15/06/1985
iii)	Unique Id	:	1-2901265018
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	9 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	POWER ELECTRONICS ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1) POWER ELECTRONICS & PLC 2) ANALOG ELECTRONICS & OP-AMP
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. SUVENDU SEKHAR BEHERA** **LECT. IN ELECTRICAL ENGG.**
ii)	Date of Birth	:	28/06/1987
iii)	Unique Id	:	1-2901090962
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	9 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	POWER SYSTEM ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1) CIRCUIT & NETWORK THEORY 2) ENERGY CONVERSION-I 3) ENERGY CONVERSION-II 4) UTILIZATION OF ELECTRICAL ENERGY & TRACTION
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. BISWARANJAN JENA** **LECT. IN ELECTRICAL ENGG.**
ii)	Date of Birth	:	01/08/1985
iii)	Unique Id	:	1-2900984891
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	9 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	POWER SYSTEM ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1) UTILIZATION OF ELECTRICAL ENERGY & TRACTION 2) ENERGY CONVERSION-I 3) SWITCH GEAR & PROTECTIVE DEVICES
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. SUSHIL SAHOO** **LECT. IN ELECTRICAL ENGG.**
ii)	Date of Birth	:	04/09/1991
iii)	Unique Id	:	1-2900888788
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	9 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	POWER SYSTEM ENGG
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1) GENERATION TRANSMISSION & DISTRIBUTION 2) CIRCUIT & NETWORK THEORY
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. SAKTIDATTA PRADHAN** **LECT. IN ELECTRICAL ENGG.**
ii)	Date of Birth	:	07/04/1990
iii)	Unique Id	:	1-2900888486
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	9 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	POWER ELECTRONICS ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1) ANALOG ELECTRONICS & OP-AMP 2) POWER ELECTRONICS & PLC
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. SUGYANI SAHOO** **LECT. IN ELECTRICAL ENGG.**
ii)	Date of Birth	:	04/04/1992
iii)	Unique Id	:	1-2900888576
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	9 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	POWER SYSTEM ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1) RENEWABLE ENERGY 2) CONTROL SYSTEM ENGG.
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. RAMESH CHANDRA PRADHAN** **LECT. IN ELECTRICAL ENGG.**
ii)	Date of Birth	:	14/05/1986
iii)	Unique Id	:	1-4361047414
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	6 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	POWER SYSTEM ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1) ENERGY CONVERSION -I 2) ENERGY CONVERSION -II 3) SWITCH GEAR & PROTECTIVE DEVICES
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. DEBABRATA DIBYARANJAN** **LECT. IN ELECTRICAL ENGG.**
ii)	Date of Birth	:	29/04/1993
iii)	Unique Id	:	1-11275212793
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	3 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	POWER ELECTRONICS ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1) DIGITAL ELECTRONICS & MICROPROCESSOR 2) ANALOG ELECTRONICS & OP-AM 3) CONTROL SYSTEM ENGG.
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. PRADYUMNA GARNAIK** **LECT. IN ELECTRICAL ENGG.**
ii)	Date of Birth	:	23/07/1993
iii)	Unique Id	:	1-11149725304
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	3 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	POWER SYSTEM ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1) ENERGY CONVERSION-I 2) SWITCH GEAR & PROTECTIVE DEVICES 3) GENERATION TRANSMISSION & DISTRIBUTION 4) RENEWABLE ENERGY
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. RASHMITA GADANAYAK** **LECT. IN ELECTRICAL ENGG.**
ii)	Date of Birth	:	15/06/1996
iii)	Unique Id	:	1-43738565565
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	1 Year
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	POWER SYSTEM ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1) DIGITAL ELECTRONICS & MICROPROCESSOR 2) ELECTRICAL ENGG. MATERIAL 3) GENERATION TRANSMISSION & DISTRIBUTION 4) RENEWABLE ENERGY
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. SWAGAT SAHOO** **LECT. IN ELECTRICAL ENGG.**
ii)	Date of Birth	:	15/07/1991
iii)	Unique Id	:	1-43489014095
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	1 Year
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	POWER SYSTEM ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1) ENERGY CONVERSION-II 2) GENERATION TRANSMISSION & DISTRIBUTION 3) CIRCUIT & NETWORK THEORY
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. BISHNUPRIYA SAHOO** **LECT. IN ELECTRICAL ENGG.**
ii)	Date of Birth	:	29/06/1989
iii)	Unique Id	:	1-43795728641
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	1 Year
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	POWER ELECTRONICS ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1) CONTROL SYSTEM ENGG 2) ANALOG ELECTRONICS & OP-AMP 3) POWER ELECTRONICS & PLC
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. TARANISEN MOHANTY** **H.O.D. IN MECHANICAL ENGG.**
ii)	Date of Birth	:	12/07/1991
iii)	Unique Id	:	1-2906640916
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	9 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	MATERIAL ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1) ENGINEERING MATERIALS 2) COMPOSITE MATERIALS
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. MANAS RANJAN BEHERA** **LECT. IN MECHANICAL ENGG.**
ii)	Date of Birth	:	10/07/1979
iii)	Unique Id	:	1-2072020952
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	11 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	MECHANICAL SYSTEM DESIGN.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1) STRENGTH OF MATERIAL 2) DESIGN OF MACHINE ELEMENT 3) THEORY OF MACHINES
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. GOURI SANKAR PRADHAN** **LECT. IN MECHANICAL ENGG.**
ii)	Date of Birth	:	26/06/1993
iii)	Unique Id	:	1-2307981488
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	10 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	AUTOMOBILE ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1) AUTOMOBILE ENGG. & HYBRID VECHILES
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. BIKASH RANJAN SAHU** **LECT. IN MECHANICAL ENGG.**
ii)	Date of Birth	:	07/02/1991
iii)	Unique Id	:	1-2901652615
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	9 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	PRODUCTION ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1) PRODUCTION TECHNOLOGY 2) MANUFACTURING TECHNOLOGY 3) ADVANCE MANUFACTURING PROCESS
.			
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. HIMANSU SEKHAR SAMAL** **LECT. IN MECHANICAL ENGG.**
ii)	Date of Birth	:	15/06/1988
iii)	Unique Id	:	1-2901737966
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	9 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	INDUSTRIAL ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1) ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY 2)INDUSTRIAL ENGG. &MANAGEMENT
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. LAKIN KUMAR SAHOO** **LECT. IN MECHANICAL ENGG.**
ii)	Date of Birth	:	08/07/1991
iii)	Unique Id	:	1-3220113619
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	8 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	THERMAL ENGG
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1) THERMAL ENGG-I 2) THERMAL ENGG-II 3) REFRIGERATION & AIR CONDITIONING 4) POWER STATION ENGINNERING
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. RASABIHARI SAHU** **LECT. IN MECHANICAL ENGG.**
ii)	Date of Birth	:	07/04/1992
iii)	Unique Id	:	1-3613955847
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	7 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	MATERIAL TECHNOLOGY
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1) ENGINEERING MATERIAL 2) COMPOSITE MATERIALS
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. DEWAN KUMAR SAHU** **LECT. IN MECHANICAL ENGG.**
ii)	Date of Birth	:	16/06/1993
iii)	Unique Id	:	1-7446818189
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	6 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	MECHANICAL SYSTEM DESIGN
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1)STRENGTH OF MATERIALS 2)DESIGN OF M/C ELEMENT 3)THEORY OF MACHINE
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. ABINASH SAHOO** **LECT. IN MECHANICAL ENGG.**
ii)	Date of Birth	:	28/04/1995
iii)	Unique Id	:	1-11149725340
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	4 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	THERMAL ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	1) THERMAL ENGG.- I 1) THERMAL ENGG.- II 3) REFRIGERATION & AIR CONDITIONING 4) POWER STATION ENGG.
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. KAMALAKANTA TRIPATHY** **LECT. IN MECHANICAL ENGG.**
ii)	Date of Birth	:	23/06/1977
iii)	Unique Id	:	1-43488138283
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	6 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	INDUSTRIAL ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Undergraduate/ Post Graduate/Post Graduate Diploma Level	:	1) ENTREPRENEURSHIP & MANAGEMENT &SMART TECHNOLOGY 2) INDUSTRIAL ENGG. &MANAGEMENT
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. SAMIR PRASAD SAHU** **LECT. IN MECHANICAL ENGG.**
ii)	Date of Birth	:	03/04/1996
iii)	Unique Id	:	1-11149725370
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	3 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	AUTOMOBILE ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Undergraduate/ Post Graduate/Post Graduate Diploma Level	:	1) AUTOMOBILE ENGG. 2) HYBRID VEHICLES
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. SATYA NARAYAN MAJHI** **LECT. IN MECHANICAL ENGG.**
ii)	Date of Birth	:	12/05/1996
iii)	Unique Id	:	1-43489014211
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	3 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	THERMAL ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Undergraduate/ Post Graduate/Post Graduate Diploma Level	:	1) THERMAL ENGG.- I 1) THERMAL ENGG.- II 3) REFRIGERATION & POWER STATION ENGG.
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. SUBHASMITA JENA** **LECT. IN MECHANICAL ENGG.**
ii)	Date of Birth	:	04/06/1997
iii)	Unique Id	:	1-11149725322
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	3 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	COMPUTER AIDED DESIGN
vii)	Courses taught at Diploma/ Post Diploma/Undergraduate/ Post Graduate/Post Graduate Diploma Level	:	1) DESIGN OF M/C ELEMENT 2) MECHATRONICS 3) ADVANCE MANUFACTURING PROCESS
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. SHUBHAM PRADHAN** **LECT. IN MECHANICAL ENGG.**
ii)	Date of Birth	:	10/05/2000
iii)	Unique Id	:	1-11149725358
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	3 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	INDUSTRIAL ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Undergraduate/ Post Graduate/Post Graduate Diploma Level	:	1) FLUID MECHANICS 2) HYDRAULIC MACHINE 3) INDUSTRRIAL FLUID MECHANICS
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. DILLIP KUMAR DEHURY** **H.O.D. IN MINING ENGG.**
ii)	Date of Birth	:	05/05/1991
iii)	Unique Id	:	1-7447128222
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	7 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	1) SURFACE MINING TECHNOLOGY 2) MINE LEGISLATION AND GENERAL SAFETY
vii)	Courses taught at Diploma/ Post Diploma/Undergraduate Post Graduate/Post Graduate Diploma Level	:	1) SURFACE MINING TECHNOLOGY 2) MINE LEGISLATION AND GENERAL SAFETY (CMR2017) 3) MINES ACT 1952 MINES RULE 1955I 4) METALLIFERROUS MINES REGULATIONS 5) MLGS –I 6) MLGS –II
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. AJAY KUMAR** **LECT. IN MINING ENGG.**
ii)	Date of Birth	:	02/01/1995
iii)	Unique Id	:	1-43488273077
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	2 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	1) MINE MACHINERY 2) SURFACE MINING TECHNOLOGY
vii)	Courses taught at Diploma/ Post Diploma/Undergraduate/ Post Graduate/Post Graduate Diploma Level	:	1) MINE DEVLOPMENT 2) MINING METHOD (OPEN CAST / UNDERGROUND) 3) UNDERGROUND METAL MINING
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. CHANDAN SAHOO** **LECT. IN MINING ENGG.**
ii)	Date of Birth	:	21/06/1999
iii)	Unique Id	:	1-43488273049
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	2 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	1) UNDERGROUND COAL MINING. 2) MINE VENTILATION
vii)	Courses taught at Diploma/ Post Diploma/Undergraduate/ Post Graduate/Post Graduate Diploma Level	:	1) UNDERGROUND COAL MINING 2) MINE VENTILATION SYSTEM 3) NUMERICAL PROBLEMS ON VENTILATION
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. GOBINDA CHANDRA SETHY** **LECT. IN MINING ENGG.**
ii)	Date of Birth	:	29/04/1996
iii)	Unique Id	:	1-7444782831
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	5 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	1) SURFACE MINING TECHNOLOGY 2) MINE VENTILATION.
vii)	Courses taught at Diploma/ Post Diploma/Undergraduate Post Graduate/Post Graduate Diploma Level	:	1) MINE DEVELOPMENT 2) MINING METHOD BLASTING TECHNOLOGY & ACCESSORIES 3) MINE VENTILATION SYSTEM
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. JAGANDEEP MAHATO** **LECT. IN MINING ENGG.**
ii)	Date of Birth	:	24/06/1999
iii)	Unique Id	:	1-43488273135
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	1 Year
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	1) MINING LEGISLATION & GENERAL SAFETY. 2) MINES ACTS MINES RULES
vii)	Courses taught at Diploma/ Post Diploma/Undergraduate Post Graduate/Post Graduate Diploma Level	:	CMR 2017 MMR MINE ACTS MINE RULES 1) MLGS – I 2) MLGS - II
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. LIPUN DEHURY** **LECT. IN MINING ENGG.**
ii)	Date of Birth	:	18/04/1995
iii)	Unique Id	:	1-7444782837
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	6 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	1) MINE MACHINERY 2) MINE HAZARD & SAFETY
vii)	Courses taught at Diploma/ Post Diploma/Undergraduate Post Graduate/Post Graduate Diploma Level	:	1) MINE METHOD 2) MINE MACHINARIES 3) MINE HAZARD & SAFETY 4) MINE VENTILATION MINE GAS TESTING
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

	i)	Name	:	**ER. PRABIN KUMAR SAHOO** **LECT. IN MINING ENGG.**
	ii)	Date of Birth	:	05/03/1996
	iii)	Unique Id	:	1-4796541640
	iv)	Educational Qualifications	:	B.TECH.
	v)	Work Experience	:	
		• Teaching	:	6 Years
		• Research	:	-
		• Industry	:	-
		• Others	:	-
1)	vi)	Area of Specialization	:	1) MINE GEOLOGY 2) MINERAL DRESSING .
	vii)	Courses taught at Diploma/ Post Diploma/Undergraduate Post Graduate/Post Graduate Diploma Level	:	1) MINE GEOLOGY 2) MINERAL DRESSING PETROLOGY, STRATIGRAPHY
	viii)	Research guidance	:	
		• No. of papers published in National/International Journals/Conferences	:	-
		• Master	:	-
		• Ph.D.	:	-
	ix)	Projects Carried out	:	-
	x)	Patents	:	-
	xi)	Technology Transfer	:	-
	xii)	Research Publications	:	-
	xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. PRANAYA KUMAR BEHERA** **LECT. IN MINING ENGG.**
ii)	Date of Birth	:	04/08/1995
iii)	Unique Id	:	1-7492920067
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	4 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	1) MINE GEOLOGY 2) MINERAL DRESSING
vii)	Courses taught at Diploma/ Post Diploma/Undergraduate Post Graduate/Post Graduate Diploma Level	:	1) MINE GEOLOGY I 2) MINERAL DRESSING PETROLOGY, STRATIGRAPHY
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. PRATYUSH ROUT** **LECT. IN MINING ENGG.**
ii)	Date of Birth	:	07/06/1998
iii)	Unique Id	:	1-7493295536
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	4 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	1) MINE LEGISLATION & GENERAL SAFETY . 2) MINES ACTS MINES RULES
vii)	Courses taught at Diploma/ II Post Diploma/Undergraduate Post Graduate/Post Graduate Diploma Level	:	1)MLGS — I & CMR 2017 MMR MINES ACT 1952 MINES RULES 2)EXPLOSIVES ACT 2008
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

	i)	Name	:	**ER. PRATYUSHA PRAVANJAN BEHERA** **LECT. IN MINING ENGG.**
	ii)	Date of Birth	:	24/06/1990
	iii)	Unique Id	:	1-11150131896
	iv)	Educational Qualifications	:	B.TECH.
	v)	Work Experience	:	
		• Teaching	:	3 Years
		• Research	:	-
		• Industry	:	-
		• Others	:	-
1)	vi)	Area of Specialization	:	1) SURFACE MINING TECHNOLOGY 2) MINING METHOD
	vii)	Courses taught at Diploma/ Post Diploma/Undergraduate Post Graduate/Post Graduate Diploma Level	:	1) MINEDEVLOPMENT 2) SURFACE MINING TECHNOLOGY 3) EXPLOSIVES & BLASTING ACCESSORIES
	viii)	Research guidance	:	
		• No. of papers published in National/International Journals/Conferences	:	-
		• Master	:	-
		• Ph.D.	:	-
	ix)	Projects Carried out	:	-
	x)	Patents	:	-
	xi)	Technology Transfer	:	-
	xii)	Research Publications	:	-
	xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. PRITAN KUMAR PRADHAN** **LECT. IN MINING ENGG.**
ii)	Date of Birth	:	15/07/1999
iii)	Unique Id	:	1-43488273030
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	2 Year
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	1) MINE MACHINERY 2) MINE HAZARD & SAFETY
vii)	Courses taught at Diploma/ Post Diploma/Undergraduate Post Graduate/Post Graduate Diploma Level	:	1) MINE PUMPS HEMM 2) MINE HAZARDS &SAFETY 3) MINE GASES & TESTING OF GAS
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. SIBASUNDAR MAIKAP** **LECT. IN MINING ENGG.**
ii)	Date of Birth	:	11/04/1998
iii)	Unique Id	:	1-11150131866
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	3 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	1) MINE GEOLOGY 2) MINERAL DRESSING
vii)	Courses taught at Diploma/ Post Diploma/Undergraduate Post Graduate/Post Graduate Diploma Level	:	1) MINE GEOLOGY INDIAN STRATIGRAPHY PETROLOGY 2) MINERAL DRESSING
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. SRIKANTA SAMAL** **LECT. IN MINING ENGG.**
ii)	Date of Birth	:	23/04/1993
iii)	Unique Id	:	1-9470525032
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	3 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	1) MINERAL DRESSING . 2) MINES HAZARD &SAFETY
vii)	Courses taught at Diploma/ Post Diploma/Undergraduate Post Graduate/Post Graduate Diploma Level	:	1) MINERAL DRESSING 2) MINES HAZARD &SAFETY 3) MINE GASES & TESTING OF GASES
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. UDAYA BISWANATH PRADHAN** **LECT. IN MINING ENGG.**
ii)	Date of Birth	:	01/06/1995
iii)	Unique Id	:	1-4795726879
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	6 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	1) MINE DEVLOPMENT
vii)	Courses taught at Diploma/ Post Diploma/Undergraduate Post Graduate/Post Graduate Diploma Level	:	1) UNDERGROUND COAL MINING 2) UNDERGROUND METAL MINING OPEN CAST MINING
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. SUNIL KUMAR SAHU** **LECT. IN MINING ENGG.**
ii)	Date of Birth	:	15/04/1999
iii)	Unique Id	:	1-11150131844
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	3 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	1) MINE SURVEY & SURVEY
vii)	Courses taught at Diploma/ Post Diploma/Undergraduate Post Graduate/Post Graduate Diploma Level	:	1) MINE SURVEY GPS DGPS SURVEYING & LEVCING
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**MR.TAPAN KUMAR SAHU** **LECT. IN CHEMISTRY**
ii)	Date of Birth	:	28/12/1993
iii)	Unique Id	:	1-4363920014
iv)	Educational Qualifications	:	M.SC.
v)	Work Experience	:	
	• Teaching	:	8 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	INDUSTRIAL CHEMISTRY
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	ENGG. CHEMISTRY
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**MR.DOLAGOBIND SAHOO** **LECT. IN PHYSICS**
ii)	Date of Birth	:	25/04/1971
iii)	Unique Id	:	1-3614178950
iv)	Educational Qualifications	:	M.SC.
v)	Work Experience	:	
	• Teaching	:	8 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	PHYSICS
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	ENGG. PHYSICS
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**MR.KSHIRA MOHAN BEHERA** **LECT. IN MATHEMATICS**
ii)	Date of Birth	:	01/07/1977
iii)	Unique Id	:	1-7444782949
iv)	Educational Qualifications	:	M.SC.
v)	Work Experience	:	
	• Teaching	:	14 Years
	• Research	:	-
	• Industry	:	6 Years
	• Others	:	-
vi)	Area of Specialization	:	MATH.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	ENGG. MATH-I, MATH-II, MATH-III
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**MR.SUBHENDU KUMAR PANI** **LECT. IN ENGLISH**
ii)	Date of Birth	:	09/07/1978
iii)	Unique Id	:	1-3613956453
iv)	Educational Qualifications	:	M.A.
v)	Work Experience	:	
	• Teaching	:	9 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	ENGLISH
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	COMMUNICATIVE ENGLISH – I & II
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**ER. JYOTIRMAYEE PRADHAN** **LECT. IN COMP. SC. & ENGG.**
ii)	Date of Birth	:	02/05/1988
iii)	Unique Id	:	1-2911105979
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	10 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	DATA BASE MANAGEMENT
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	COMPUTER APPLICATION CAD/CAM LAB.
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**MR. ASWINI KUMAR PRADHAN** **LECT. IN COMP. SC. & ENGG.**
ii)	Date of Birth	:	12/06/1987
iii)	Unique Id	:	1-7438688300
iv)	Educational Qualifications	:	MCA
v)	Work Experience	:	
	• Teaching	:	11 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	JAVA
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	COMPUTER APPLICATION OBJECT ORIENTED COMP. PROGRAMMING CAD/CAM LAB. APPLICATION OF SOFTWARE IN MINES
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**MS. ANUPAMA BEHERA** **LECT. IN MANAGEMENT**
ii)	Date of Birth	:	06/06/1996
iii)	Unique Id	:	1-7493418600
iv)	Educational Qualifications	:	MBA
v)	Work Experience	:	
	• Teaching	:	5 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	MBA
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	ENTREPRENEURSHIP AND MANAGEMENT & SMART TECHNOLOGY .
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**MS. NIRUPAMA BEHERA** **LECT. IN CHEMISTRY**
ii)	Date of Birth	:	25/06/1998
iii)	Unique Id	:	1-43488273153
iv)	Educational Qualifications	:	M.SC. (CHEMISTRY)
v)	Work Experience	:	
	• Teaching	:	3 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	INDUSTRIAL CHEMISTRY
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	ENGINEERING CHEMISTRY .
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**MR. LALATENDU SAHU** **LECT. IN PHYSICS**
ii)	Date of Birth	:	10/05/1995
iii)	Unique Id	:	1-11150131831
iv)	Educational Qualifications	:	M.SC. (PHYSICS)
v)	Work Experience	:	
	• Teaching	:	3 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	PHYSICS
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	ENGG. PHYSICS .
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**MR. SAROJ KUMAR SAHOO** **LECT. IN MATH.**
ii)	Date of Birth	:	11/06/1998
iii)	Unique Id	:	1-43488273171
iv)	Educational Qualifications	:	M.SC. (MATH.)
v)	Work Experience	:	
	• Teaching	:	2 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	MATH
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	MATH-1, MATH-II, MATH-III .
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**MR. BHAKTA BATSALA NAIK** **LECT. IN MANAGEMENT**
ii)	Date of Birth	:	03/07/1998
iii)	Unique Id	:	1-43488273189
iv)	Educational Qualifications	:	MBA
v)	Work Experience	:	
	• Teaching	:	2 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	MBA
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	ENTREPRENEURSHIP AND MANAGEMENT & SMART TECHNOLOGY .
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

i)	Name	:	**DIPTIMAYEE PRADHAN** **LECT. IN COMP. SC. & ENGG.**
ii)	Date of Birth	:	22/05/1991
iii)	Unique Id	:	1-43795728418
iv)	Educational Qualifications	:	B.TECH. (COMP.SC.)
v)	Work Experience	:	
	• Teaching	:	1 Year
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	DATA BASE MANAGEMENT
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	COMPUTER APPLICATION CAD/CAM LAB .
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	-
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-

9. FEE :

- Details of fee, as approved by State Fee Committee, for the student Institution. : Tuition Fee Per Year - Rs. 31,000/-
  Hostel Cost (Rent) – Rs.24,000/- per year per
  Transportation Cost — Rs.12000/- upto 20 Kms.
  Rs. 17000/- for more than 20 Kms.
  Caution Money – Rs.500/- (one time refundable)

- Time schedule for payment of fee For entire programme. : From the beginning of each session.

- No. of Fee waivers granted with Amount and name of students. : 67 Nos.(Last 3 years)
  Rs, 6,500/- each students per annum

SL. NO.	NAME OF THE STUDENTS	BRANCH	YEAR OF ADMISSION
1.	ALFA SAHOO	CIVIL ENGG.-1ST SEM	2022
2.	IPSITA SAHOO	CIVIL ENGG.-1ST SEM	2022
3.	SHIKHA SAHOO	CIVIL ENGG.-1ST SEM	2022
4.	ABINASH DEHURY	ELECT. ENGG.-1ST SEM	2022
5.	ASHIRBAD ROUL	ELECT. ENGG.-1ST SEM	2022
6.	ASHIT KUMAR MAJHI	ELECT. ENGG.-1ST SEM	2022
7.	LIPUN SAHOO	ELECT. ENGG.-1ST SEM	2022
8.	PRIYANKA PRIYADARSHINI PRADHAN	ELECT. ENGG.-1ST SEM	2022
9.	SANDEEP MAHAPATRA	ELECT. ENGG.-1ST SEM	2022
10.	ANUPAM KHUNTIA	MECH. ENGG.-1ST SEM	2022
11.	ASHOK KUMAR BEHERA	MECH. ENGG.-1ST SEM	2022
12.	CHANDRAMANI SAHU	MECH. ENGG.-1ST SEM	2022
13.	MAMUN MAJHI	MECH. ENGG.-1ST SEM	2022
14.	SATYABRATA BEHERA	MECH. ENGG.-1ST SEM	2022
15.	SUBHAM SAHU	MECH. ENGG.-1ST SEM	2022
16.	BIPIN BIHARY SAHU	MINING ENGG.-1ST SEM	2022
17.	HIMANSU SEKHAR DEHURY	MINING ENGG.-1ST SEM	2022
18.	PAPUN SAHOO	MINING ENGG.-1ST SEM	2022
19.	SAJAN SAHU	MINING ENGG.-1ST SEM	2022
20.	SIDHANTA PRADHAN	MINING ENGG.-1ST SEM	2022
21.	SUDHIRA KUMAR SAHU	MINING ENGG.-1ST SEM	2022
22.	BIKASH KUMAR PRADHAN	CIVIL ENGG.-1ST SEM	2023
23.	GANESWAR PRADHAN	CIVIL ENGG.-1ST SEM	2023
24.	BISWAJIT SAHU	ELECT. ENGG.-1ST SEM	2023
25.	CHINMAYA KUMAR PRADHAN	ELECT. ENGG.-1ST SEM	2023
26.	DEBASHISH PRADHAN	ELECT. ENGG.-1ST SEM	2023
27.	RAHUL KUMAR SAMAL	ELECT. ENGG.-1ST SEM	2023
28.	TAPAN MAJHI	ELECT. ENGG.-1ST SEM	2023
29.	HIMANSU PRADHAN	MECH. ENGG.-1ST SEM	2023
30.	JAYANTA DEHURY	MECH. ENGG.-1ST SEM	2023
31.	PINU PRADHAN	MECH. ENGG.-1ST SEM	2023
32.	RITIK KIRTIRADITYA	MECH. ENGG.-1ST SEM	2023
33.	ROSAN SAHU	MECH. ENGG.-1ST SEM	2023
34.	BANKIM CHANDRA PRADHAN	MINING ENGG.-1ST SEM	2023
35.	JASHOBANTA PRADHAN	MINING ENGG.-1ST SEM	2023
36.	KAILASH PRADHAN	MINING ENGG.-1ST SEM	2023
37.	PRATAP BEHERA	MINING ENGG.-1ST SEM	2023
38.	RITESH KUMAR SAHOO	MINING ENGG.-1ST SEM	2023
39.	SOYANSHU SEKHAR BEHERA	MINING ENGG.-1ST SEM	2023
40.	DINESH KUMAR PRADHAN	ELECT. ENGG.-3RD SEM	2023

SL. NO.	NAME OF THE STUDENTS	BRANCH	YEAR OF ADMISSION
41.	SAGAR SAHOO	MECH. ENGG.-3RD SEM	2023
42.	SRITAM PRADHAN	CIVIL ENGG – 1ST SEM	2024
43.	MANJIT PRADHAN	CIVIL ENGG – 1ST SEM	2024
44.	PRABINA PRADHAN	CIVIL ENGG – 1ST SEM	2024
45.	SANGHAMITRA PRADHAN	CIVIL ENGG – 1ST SEM	2024
46.	BIKUN MAJHI	ELECT. ENGG. – 1ST SEM	2024
47.	PUPENDRA BEHERA	ELECT. ENGG. – 1ST SEM	2024
48.	GOBINDA CHANDRA SAHOO	ELECT. ENGG. – 1ST SEM	2024
49.	MITHUN PRADHAN	ELECT. ENGG. – 1ST SEM	2024
50.	TAPAS KUMAR PRADHAN	ELECT. ENGG. – 1ST SEM	2024
51.	CHANDAN BISWAL	ELECT. ENGG. – 1ST SEM	2024
52.	SUBHADARSAN MAJHI	ELECT. ENGG. – 1ST SEM	2024
53.	RAKESH BEHERA	MECH. ENGG. – 1ST SEM	2024
54.	JIBAN PRADHAN	MECH. ENGG. – 1ST SEM	2024
55.	RINKU PRADHAN	MECH. ENGG. – 1ST SEM	2024
56.	ANIRUDHA MOHAPATRA	MECH. ENGG. – 1ST SEM	2024
57.	KANHU CHARAN LAHARA	MECH. ENGG. – 1ST SEM	2024
58.	SUBHAKANTA BISWAL	MECH. ENGG. – 1ST SEM	2024
59.	SUKANTA SAHOO	MINING ENGG – 1ST SEM	2024
60.	BAPUN BEHERA	MINING ENGG – 1ST SEM	2024
61	CHINMAYA PRADHAN	MINING ENGG – 1ST SEM	2024
62	AMIT PRADHAN	MINING ENGG – 1ST SEM	2024
63	MAMUN PRADHAN	MINING ENGG – 1ST SEM	2024
64	KAJAL DEHURY	MINING ENGG – 1ST SEM	2024
65	DIKAN KUMAR BEHERA	ELECT ENGG – 3RD SEM	2024
66	GYANARANJAN SAHU	ELECT ENGG – 3RD SEM	2024
67	SUBHEN KUMAR PRADHAN	MECH ENGG – 3RD SEM	2024

- Number of scholarship offered by the Institution, duration and amount : -
- Criteria for fee waiver/scholarship : Poor & meritorious students
- Estimated cost of Boarding and Lodging in Hostels : Rs. 24,000/- per year.
- Any other fee please specify : -

10. ADMISSION :

- Number of seats sanctioned with the year of approval :

Sl. No.	Session/ Academic Year	A.I.C.T.E. Approved/Sanctioned Annual Intake				
		Civil Engg.	Electrical Engg.	Mechanical Engg.	Mining Engg.	Total Intake
1	2009 – 10	60	60	60	60	240
2	2010 – 11	60	60	60	60	240
3	2011 – 12	60	90	90	60	300
4	2012 – 13	60	90	90	60	300
5	2013 – 14	60	120	120	120	420
6	2014 – 15	60	120	120	120	420
7	2015 – 16	60	120	120	120	420
8	2016 – 17	60	120	120	120	420
9	2017 – 18	60	120	120	120	420
10	2018 – 19	60	120	120	120	420
11	2019 – 20	60	120	120	120	420
12	2020 – 21	60	120	120	120	420
13	2021 – 22	60	120	120	120	420
14	2022 – 23	60	120	120	120	420
15	2023 - 24	60	120	120	120	420
16	2024 - 25	60	120	120	120	420

- Number of students admitted under various categories each year in the last three years :

YEAR	BRANCH	APPROVED INTAKE	ADMISSION TAKEN IN 1ST SEM	ADMISSION UNDER TFW CATEGORY (1ST SEM)	TOTAL BOYS	TOTAL GIRLS	NO. OF GEN. STUDENTS		NO. OF S.T. STUDENTS		NO. OF S.C. STUDENTS		NO. OF MINORITY STUDENTS
							BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS	
2022 (1ST SEM)	CIVIL ENGG.	60	60	03	21	42	16	30	03	02	02	07	
	ELECT. ENGG.	120	120	06	122	04	94	03	11	-	12	-	
	MECH. ENGG.	120	120	06	126	-	100	-	12	-	08	-	
	MINING ENGG.	120	120	06	126	-	119	-	01	-	-	-	

YEAR	BRANCH	10% OF APPROVED INTAKE + 1ST SEM CARRY FORWARD VACANT SEATS	ADMISSION TAKEN IN 3RD SEM	ADMISSION UNDER TFW CATEGORY (3RD SEM)	TOTAL BOYS	TOTAL GIRLS	NO. OF GEN. STUDENTS		NO. OF S.T. STUDENTS		NO. OF S.C. STUDENTS		NO. OF MINORITY STUDENTS
							BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS	
2022 (3RD SEM)	CIVIL ENGG.	06	06	-	05	01	05	01	-	-	-	-	
	ELECT. ENGG.	18	18	-	18	-	16	-	01	-	01	-	
	MECH. ENGG.	18	18	-	18	-	16	-	01	-	01	-	
	MINING ENGG.	32	32	-	32	-	31	-	-	-	01	-	

YEAR	BRANCH	APPROVED INTAKE	ADMISSION TAKEN IN 1ST SEM	ADMISSION UNDER TFW CATEGORY (1ST SEM)	TOTAL BOYS	TOTAL GIRLS	NO. OF GEN. STUDENTS		NO. OF S.T. STUDENTS		NO. OF S.C. STUDENTS		NO. OF MINORITY STUDENTS
							BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS	
2023 (1ST SEM)	CIVIL ENGG.	60	46	02	29	19	26	19	01	-	-	-	
	ELECT. ENGG.	120	120	05	124	01	107	01	05	-	07	-	
	MECH. ENGG.	120	103	05	108	-	95	-	03	-	05	-	
	MINING ENGG.	120	120	06	120	06	110	06	02	-	02	-	

YEAR	BRANCH	10% OF APPROVED INTAKE + 1ST SEM CARRY FORWARD VACANT SEATS	ADMISSION TAKEN IN 3RD SEM	ADMISSION UNDER TFW CATEGORY (3RD SEM)	TOTAL BOYS	TOTAL GIRLS	NO. OF GEN. STUDENTS		NO. OF S.T. STUDENTS		NO. OF S.C. STUDENTS		NO. OF MINORITY STUDENTS
							BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS	
2023 (3RD SEM)	CIVIL ENGG.	07	07	-	06	01	-	-	-	-	-		
	ELECT. ENGG.	20	20	01	21	-	19	-	-	-	01	-	
	MECH. ENGG.	17	16	01	17	-	16	-	-	-	-	-	
	MINING ENGG.	18	18	-	18	-	16	-	-	-	02	-	

YEAR	BRANCH	APPROVED INTAKE	ADMISSION TAKEN IN 1ST SEM	ADMISSION UNDER TFW CATEGORY (1ST SEM)	TOTAL BOYS	TOTAL GIRLS	NO. OF GEN. STUDENTS		NO. OF S.T. STUDENTS		NO. OF S.C. STUDENTS		NO. OF MINORITY STUDENTS
							BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS	
2024 (1ST SEM)	CIVIL ENGG.	60	60	04	47	17	28	03	03	03	16	11	
	ELECT. ENGG.	120	120	07	125	02	111	02	06	-	08	-	
	MECH. ENGG.	120	120	06	126	-	102	-	10	-	14	-	
	MINING ENGG.	120	119	06	117	08	96	07	11	-	10	01	

YEAR	BRANCH	10% OF APPROVED INTAKE + 1ST SEM CARRY FORWARD VACANT SEATS	ADMISSION TAKEN IN 3RD SEM	ADMISSION UNDER TFW CATEGORY (3RD SEM)	TOTAL BOYS	TOTAL GIRLS	NO. OF GEN. STUDENTS		NO. OF S.T. STUDENTS		NO. OF S.C. STUDENTS		NO. OF MINORITY STUDENTS
							BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS	
2024 (3RD SEM)	CIVIL ENGG.	20	17	-	12	05	12	04	-	-	-	01	
	ELECT. ENGG.	13	13	02	15	-	15	-	-	-	-	-	
	MECH. ENGG.	30	30	01	31	-	29	-	-	-	02	-	
	MINING ENGG.	12	12	-	12	-	11	-	01	-	-	-	

- Number of applications received during last Two years for admission under Management Quota and number admitted. : NIL

11. ADMISSION PROCEDURE :

- Mention the admission test being followed, name and address of the Test Agency and its URL (website) : Admission of the students are done through online admission counseling by Diploma Admission Cell, Govt. of Odisha, under the Chairmanship of the D.T.E. & T, Odisha, Cuttack and its website URL is **:** **www.dtetrorissa.gov.in/** **www.samsodisha.gov.in**

- Number of seats allotted to different Test Qualified candidate separately (AIEE/CET (State conducted test)/University tests/ CMAT/GPAT)/Association conducted test : All the online admission counseling are done through Diploma Admission Cell, Govt. of Odisha.

- Calendar for admission against Management/vacant seats :

  - Last date of request for applications : 23.10.2024
  - Last of date of submission of applications: 23.10.2024
  - Dates for announcing final results :
  - Release of admission list : 16.07.2024
    (main list and waiting list shall be announced on the same day)
  - Date for acceptance by the candidate : 20.07.2024
    (time given shall in no case shall be less than 15 days)
  - Last date for closing of admission : 23.10.2024
  - Starting of the Academic session : 16.08.2024
  - The waiting list shall be activated only on the expiry of date of main list :
  - The policy of refund of the fee in case of withdrawal, shall be clearly notified : Strictly followed by the institute.

12. CRITERIA AND WEIGHTAGES FOR ADMISSION :

- Describe each criterian with its respective weightages i.e. Admission Test, marks in qualifying examination etc.
  Eligibility :-
  (i) **Admission to 1st Semester of Engineering & Technology :-**
  Pass in H.S.C. Examination/10th standard examination conducted/declared equivalent by B.S.E., Odisha with Mathematics, Science & English subject.
  (ii) **Admission to 3rd Sem. Under Lateral Entry scheme for eligible candidates :-**
  Pass in +2 Science examination from CHSE, Odisha or its equivalent examination with PCM/+2 Vocational (2 years course) in any Engineering Trade/2 years ITI in Engineering Trade with pass in HSC exam/10th standard conducted/declared equivalent by BSE, Odisha securing 30% marks in each subject at the qualifying examination.

  Age :- Minimum 14 years for all courses as on 1st July. No upper age limit.

- Mention the minimum level of acceptance, if any : -
  The candidate must be a Diploma Admission counseling rank holders.

- Mention the cut-off levels of percentage and percentile score of the candidates in the admission test for the last three years :

The minimum cut-ff levels of percentage and percentile score of the candidates in the admission test for the last three years is given below.

Session	Lowest Rank Nos.			
	Civil Engg.	Elect. Engg.	Mech. Engg.	Mining Engg.
2022-23	330	349	348	375
2023-24	348	353	352	382
2024-25	365	362	371	385

- Display marks scored in Test etc. and in aggregate : for all candidates who were admitted — Not Applicable

13. LIST OF APPLICANTS : Not Applicable

14. RESULTS OF ADMISSION UNDER MANAGEMENT SEATS/VACANT SEATS : Not Applicable

15. INFORMATION ON INFRASTRUCTURE AND OTHER RESOURCES AVAILABLE :

- Number of Class Rooms and size of each : 15 Nos. Classrooms

SL NO	ROOM TYPE	ROOM ID	AREA IN SQM	BLOCK	FLOOR
1	CLASS ROOM - 1 (SMART CLASS ROOM)	C-1	73.78	A	FIRST
2	CLASS ROOM - 2 (SMART CLASS ROOM)	C-2	73.78	A	FIRST
3	CLASS ROOM – 3 (SMART CLASS ROOM)	C-3	73.66	A	FIRST
4	CLASS ROOM – 4 (SMART CLASS ROOM)	C-4	74.29	A	FIRST
5	CLASS ROOM - 5	C-5	66	A	FIRST
6	CLASS ROOM – 6 (SMART CLASS ROOM)	C-6	85.94	A	FIRST
7	CLASS ROOM - 7 (SMART CLASS ROOM)	C-7	85.83	A	FIRST
8	CLASS ROOM - 8	C-8	75.67	B	FIRST
9	CLASS ROOM – 9 (SMART CLASS ROOM)	C-9	75.67	B	FIRST
10	CLASS ROOM - 10 (SMART CLASS ROOM)	C-10	90.96	B	FIRST
11	CLASS ROOM – 11 (SMART CLASS ROOM)	C-11	72.07	B	FIRST
12	CLASS ROOM – 12 (SMART CLASS ROOM)	C-12	73.47	B	FIRST
13	CLASS ROOM - 13	C-13	81.03	C	FIRST
14	CLASS ROOM – 14 (SMART CLASS ROOM)	C-14	82.49	C	FIRST
15	CLASS ROOM - 15 (SMART CLASS ROOM)	C-15	79.57	C	FIRST

- Number of Tutorial rooms and size of each : 05 Nos. Tutorial Rooms

SL NO	ROOM TYPE	ROOM ID	AREA IN SQM	BLOCK	FLOOR
57	TUTORIAL ROOM - 1	T-1	61.18	B	SECOND
58	TUTORIAL ROOM - 2	T-2	61.92	B	THIRD
59	TUTORIAL ROOM - 3	T-3	61.92	B	THIRD
60	TUTORIAL ROOM - 4	T-4	61.92	B	THIRD

61	TUTORIAL ROOM - 5	T-5	60.96	B	THIRD

- Number of Laboratories and size of each : Laboratories : 24 Nos.
  Workshops : 17 Nos.

SL NO	ROOM TYPE	ROOM ID	AREA IN SQM	BLOCK	FLOOR
1	ENGG. CHEMISTRY LAB	CHE LAB	105.73	A	GROUND
2	ENGG. PHYSICS LAB	PHY LAB	121.75	A	GROUND
3	COMPUTER LAB (CAD/CAM/MAT LAB)	CLAB	120	A	FIRST
4	COMPUTER CENTRE	COMP.C	239.08	B	SECOND
5	LANGUAGE LAB.	LANGL.	128.62	C	GROUND
6	CONCRETE & SOIL LAB	C&SL	118.57	B	GROUND
7	PUBLIC HEALTH LAB	PH LAB	66	A	SECOND
8	SURVEY LAB	S.L.	73.97	A	SECOND
9	CONSTRUCTION WORKSHOP PRACTICE LAB	CWSPL	73.97	A	SECOND
10	DIGITAL ELECTRONICS & MICRO PROCESSOR LAB	DE&MPL	83.82	A	GROUND
11	ELECTRICAL MACHINE LAB	EMLAB	96.25	A	GROUND
12	BASIC ELECTRONICS AND ANALOG LAB	BE&AL	85.47	A	GROUND
13	BASIC ELECTRICAL & MEASUREMENT LAB	BEML	81.25	A	GROUND
14	CIRCUIT THEORY LAB	CTL	66	A	SECOND
15	ELECTRICAL WORKSHOP PRACTICE LAB	EWSP	120	A	SECOND
16	ADDITIONAL ELECTRICAL WORKSHOP	EWSPL-1	120	C	GROUND
17	MATERIAL TESTING & MEASUREMENT MACHINE LAB	MTMML	122	B	GROUND
18	FLUID MECHANICS & HYDRAULIC MACHINES LAB	FMHML	121.2	B	GROUND
19	HEAT POWER & THERMAL ENGG. LAB	HP&TEL	110.4	B	GROUND
20	TRANSPORTATION LAB	TRPNL	117.41	B	GROUND
21	MACHINES SHOP	M SHOP	135.62	B	GROUND
22	CARPENTRY SHOP	CYSHOP	127.75	C	GROUND
23	FITTING SHOP	FGSHOP	128.62	C	GROUND
24	SHEET METAL SHOP	SMSHOP	128.62	C	GROUND
25	BLACKSMITH & FOUNDRY SHOP	BS&FS	107.36	C	GROUND
26	WELDING SHOP	WGSHOP	128.2	C	GROUND
27	TURNING SHOP	TGSHOP	67.02	C	GROUND
28	MOULDING SHOP	MGSHOP	77.51	C	GROUND
29	ADDITIONAL WORKSHOP (WELDING SHOP)	WGS-1	80	C	GROUND
30	ADDITIONAL WORKSHOP (FITTING SHOP)	FGS-1	77.91	C	GROUND
31	ADDITIONAL WORKSHOP (MACHINE SHOP)	MSHOP-1	75	C	GROUND

32	ADDL. CARPENTRY SHOP	CYS-1	78.07	C	FIRST
33	ADDL. SHEET METAL SHOP	SMS-1	145	C	FIRST
34	ADDL. BLACKSMITH & FOUNDRY SHOP	BS&FS-1	83.02	C	FIRST
35	ADDITIONAL WORKSHOP (TURNING SHOP)	TGS-1	67.02	C	GROUND
36	ADDITIONAL WORKSHOP (MOULDING SHOP)	MGS-1	77.28	C	GROUND
37	MINE MACHINERY LAB	MML	136.01	B	FIRST
38	MINE ENVIRONMENT & HAZARD LAB.	ME&HL	110.84	B	FIRST
39	GEOLOGY LAB	GEOLAB	94.02	B	SECOND
40	MINE VENTILATION LAB	MVENTL	94.02	B	SECOND
41	MINING SURVEY LAB	MSL	69.2	B	SECOND
42	ELECTRICAL EQUIPMENTS LAB	EEL	66	B	SECOND
43	CAD CENTRE	CAD.C	139.65	B	THIRD

- No. of Drawing Halls with capacity each : 01 No. Drawing Hall

SL NO	ROOM TYPE	ROOM ID	AREA IN SQM	BLOCK	FLOOR
1	DRAWING HALL - 1	D-1	140.87	B	THIRD

- No. of Computer Centres with capacity of each : 01 No.

SL NO	ROOM TYPE	ROOM ID	AREA IN SQM	BLOCK	FLOOR
1	COMPUTER CENTRE	COMP.C	239.08	B	SECOND

- Central Examination Facility, Number of rooms Nos. and capacity of each : Available & no. of rooms. — 23 (35 students in each room)
- Barrier Free Built Environment for disabled and Elderly persons : Available
- Occupancy Certificate : Obtained from Block Development Officer, Chhendipada.
- Fire and Safety Certificate : Available
- Hostel Facilities : Available
  Boys Hostel – 01 No.
  Girls Hostel – 01 No.

- **LIBRARY :**

  - Number of Library books/Titles/Journals Available (program-wise) : Total Volumes : 11432 Nos.
    Total Titles : 1827 Nos.
    Total No. of Journals: 15 Nos.

  - List of online National/International Journals subscribed : -

  - E-Library facilities : E-Library facilities available
    URL : pciet.kopykitab.com
    Total No. of Titles of Books : 48 Nos.

    National Digital Library (NDL) Subscription details : -

- **LABORATORY AND WORKSHOP :**

· **LIST OF MAJOR EQUIPMENTS / FACILITIES IN EACH LABORATORY / WORKSHOP**

ENGINEERING CHEMISTRY LAB

SL.NO.	NAME OF EQUIPMENTS	QUANTITY
1	Woulfs Bottle	10
2	Thistle Funnel	10
3	Reagent Bottle 250 Ml	60
4	Delivery Tube	2
5	Rubber Cork	30
6	Gas Jar With Lid	10
7	Test Tube Borosil	50
8	Test Tube Hard Glass	15
9	Spirit Lamp	10
10	Corck Borrer Set Of Six	2
11	Beaker Borosil 250 Ml	12
12	Funnel 3'	12
13	Filter Paper	5
14	Glass Rod	2
15	Porcelein Basin 3 '	10
16	Wire Gauge With Frame	15
17	Tripod Stand Heavy 6X4	20
18	Test Tube Holder	12
19	Test Tube Stand	20
20	Test Tube Brush	10
21	Burette 50 Ml	5
22	Burette Borosilicate Transparent	5
23	Conical Flask Borosil 250Ml	10
24	Wash Bottle 500 Ml	20
25	Pipette Borocilicate 10 Ml	10
26	Tile Porcelein	10
27	Burner With Stop Cock	5
28	Chemical Balance	1
29	Weight Box Brass 100Fgm	1
30	Hydrochloric Acid	2
31	Sulphuric Acid	2
32	Nitric Acid	2
33	Marble Chips	4
34	Solid Amonium Chloride	1
35	Calcium Carbonate	1
36	Litmus Paper	2
37	Magnesium Metal Ribbon	2
38	Nessler,S Reagent	1
39	Cobalt Nitrate	1
40	Borax	1
41	Ammonium Hydroxide	1
42	Acetic Acid	1
43	Lime Water	1
44	Ammonium Sulphate	1
45	Sodium Hydroxide	1

46	Calcium Sulphate	1
47	Magnesium Sulphate	1
48	Sodium Carbonate	1
49	Corck Borrer German Type	1
50	Ammonium Sulphide	1
51	Silver Nitrate	1
52	Copper Turning	1
53	Barium Chloride	1
54	Spatula 8" S S	3
55	Methyl Orange Indicator	1
56	Trangular File	1
57	Burret Stand With Clamp	5
58	Clamp Bosshead	5
59	Measuring Cylinder 50 Ml	1
60	Rubber Cork	24
61	Thermometer 110 C	1
62	Gas Jar With Lid	1
63	Spatula 8" Plastic	3
64	Sodium Hydroxide	1
65	Kolida Automatic Level	**2**
66	Edta Soln1/50	1
67	Ammonia Buffer Soln	1
68	Erichrome Blask T	1
69	Manganese Sulphate	1
70	Sodium Thiosulphate	1
71	Manganesium Sulphate	1
72	Calcium Chloride Dehyde	1
73	Distil Water	1
74	Pot. Dichromate	1
75	Ferrus Ammo. Sulphate	1
76	Ammonium Sulphate	1
77	Phenolpthalein Indicator	1
78	Pottasium Iodide	1
79	Bleaching Powder	1
80	Acetic Acid	1
81	Burette Stand Plastic	2
82	Litmus Paper	2
83	Marble Chips	1
84	Test Tube	1
85	Measuring Flask 100Ml Borosillicate	1
86	Pipette Borosillicate 5Ml	1
87	Physical Balance	1
88	Thistle Funnel	6
89	Test Tube Hard Glass	6
90	Test Tube (Ord)	3
91	Blowing Pipe	3
92	Charcoal Cavity	7
93	Copper Sulphate	1
94	Spirit Lamp	5
95	Test Tube Brush	10

96	Wash Bottle 500 Ml Plastic	15
97	Mercury	2
98	Sodium Hydroxide	2
99	Methyl Red Solution	1
100	P H Paper	4
101	Magnesium Metal Ribbon	2
102	Marble Chips	1
103	Lime Water	2
104	Magnesium Sulphate	1
105	Litmus Paper	2
106	Mercury	1
107	Aluminium Sulphate Merck	2
108	Aluminium Potassium Sulphate B. B	1
109	Nessler,S Reagent	1
110	Sulphuric Acid	1
111	Hydrochloric Acid	1
112	Sodium Hydroxide	1
113	Spirit Lamp	12
114	Marble Chips	1
115	Methyl Orange Indicator	1
116	Methyl Red Indcator Solution	1
117	Litmus Paper Red	1
118	Litmus Paper Blue	1
119	Dropper Big	3
120	Dropper Small	3
121	Magnesium Metal Ribbon	1
122	Rubber Cork	3
123	Rubber Cork	3
124	Glass Tube	2
125	Woulfs Bottle	2
126	Chain Disk 3 inch	3
127	Thistle Funnel	2
128	Gas Jar With Lid	2
129	Spirit Lamp	1
130	Test Tube Holder	10
131	Test Tube Brush	4
132	Burette 10 Ml	5
133	Bunsen Burner	5
134	Hydrochloric Acid	1
135	Magnesium Metal Ribbon	1
136	Lime Water	1
137	Dropper	3
138	Pipette 10 Ml	10
139	Calcium Oxide Quick Lime	1
140	P H METER COMBO 01	1
141	TDS METER DIGITAL	1
142	WINDSHIELD DIGITAL BALANCE	1
143	SEPARATIG FUNNEL	4

ENGINEERING PHYSICS LAB

SL.NO.	NAME OF EQUIPMENTS	QUANTITY
1	Water Heater	1
2	Ball 2"	12
3	Prism 50x50Mm Superior	12
4	Hair Pins	12
5	Hair Pins	120
6	Bar Magnet	12
7	Magnetic Needle	12
8	Screw Gauge	4
9	Physical Balance	1
10	Simple Pendulum	2
11	Slide Caliper	4
12	Turning For Set Of 8 Welch Type	1
13	Burette Stand Iron	10
14	Burette Stand With Clamp	10
15	Conical Flask Borosil 500Ml	15
16	Pipette Stand	3
17	Pipette 10 Ml	5
18	Marble Chips	3
19	File Trangular	2
20	Ammonium Chloride	1
21	Quick Line	1
22	Paraffin Wax	1
23	Chemical Balance	1
24	Copper Foil	1
25	Burner With Stop Cock	10
26	Round Bottom Flask 500 Ml	2
27	Round Bottom Flask 250 Ml	2
28	Reagent Bottle 500 Ml	6
29	Filter Clamp Plastic	2
30	Slide Caliper	12
31	Hollow Cylinder	12
32	Parad	500
33	Measuring Cylinder 100Ml Plastic	1
34	3D Solid Model No Ml 121	1
35	Volume Relationship Set Model No Ml 218	1
36	Bar Magnet	3
37	Compass (North/South)	24
38	Hollow Cylinder	30
39	Bar Magnet	16
40	Magnetic Needle	32
41	Glass Prism	50
42	Fixing Pins	4
43	Metalic Bob	20
44	Hair Pins	96
45	Vernier Caliper	40
46	Hollow Cylinder	40
47	Screw Gauge	40

48	Spherometer	40
49	Spherical Glass Plate	24
50	Plane Glass Plate	20
51	Glass Prism	20
52	Hair Pins	300
53	Fixing Pins	6
54	Drawing Board	40
55	Bar Magnet	30
56	Compass Needle	60
57	Simple Pendulum	30
58	Stop Watch Digital	10
59	Clamp Stand	10
60	Split Cork	60
61	Meter Bridge	6
62	Lechanche Cell	6
63	Physical Balance	6
64	Weight Box 100 Gm	6
65	Young Modules App	1

COMPUTER CENTRE

SL.NO.	NAME OF EQUIPMENTS	QUANTITY
1	HP CPU CORE I5 / 16 GB RAM / 512 SSD / WINDOWS 10 PRO / KEEYBOARD & MOUSE / 22” MONITOR	50
2	DEL CPU CORE I3 / 8GB RAM / 256 SSD / WINDOWS 10 PRO / KEYBOARD & MOUSE / 19.5” MONITOR	43
3	ACER CPU I3 / 4GB RAM / 256 SSD / WINDOWS 10 PRO / KEYBOARD & MOUSE / 18.5” MONITOR	27
4	D LINK 24 PORT GIGA ETHERNET / LAN SWITCH	06

LANGUAGE LAB

SL.NO.	NAME OF EQUIPMENTS	QUANTITY
1	Monitor Foxin 18.5 " Tft Led	61
2	Desktop Foxin	61
3	Head Set With Mic	10
4	Web Cam	1
5	Head Phone Mega Fronttech Jil-3442	61
6	ALL PCS ARE CONNECTED THROUGH LOCAL HOST & ORELL TALK SOFTWARE	

COMPUTER LAB (CAD/CAM LAB)

SL.NO.	NAME OF EQUIPMENTS	QUANTITY
1	Desktop Hcl Ac2V0121	25
2	Monitor Hcl 18.5 "	25
3	Desktop V 0150 Hcl	10
4	Desktop V 0126 Hcl	4
5	Monitor 18.5 Led Hcl	14
6	Desktop Hcl Ac2 V 0150	10
7	Monitor Hcl 18.5 Led	10
8	Ups Super Comp. 625 V	10
9	Monitor 18.5 Led Hcl	25
10	Desktop Ac2 V 0180 Hcl	25
11	Desktop Acer Variton M-200	35
12	Monitor Acer 18.5"Tft Led	35
13	Microsoft Lincense No 49956733	45
14	Ram Dynet 2 Gb D.D.R. 2	1
15	Kw 90031 -Win -10 Home	15
16	Fqc -0971-Win 10 Pro	15
17	021-01539-Office Std	15
18	Optical Fiber 6 Core Cable	1000
19	Giga Switch 24 Port	1
20	Office S.T.D/ 2019 Sngl/Olpnl	15

CONCRETE & SOIL LAB

SL.NO.	NAME OF EQUIPMENTS	QUANTITY
1	Oven	4
2	Vicat Apparatus With Complete Set	**3**
3	Trowel	10
4	Standard Spatula	10
5	Measuring Cylinder 500 Ml	10
6	Le Chatlier Apporatus Set Six Mould Complete With Glass Plate And Lead Wt	3
7	Enamel Tray 12"X8"	5
8	Water Bath	2
9	Cube Mould 7.06 Cm	10
10	Cube Mould 150 Mm	6
11	Vibrating Table 1 Meter	1
12	Compressing Testing Machine 100 Ton Cap	1
13	3 Ply Wood Sheet 9"X9"Set Of Two	4
14	Is Sieves 4.75/2.36/1.18Mm /600Mic/300Mic/150/75Mic Lid & Pan	2
15	Is Sieves100/80/63/40/20/16/12.5/10/4.75/2.36Mm With Lid & Pan	1
16	Is Sieves4.7/2.36/710/600/425/300/180/90/75Mic Lid & Pan	2
17	Sieve Shaker 200 Mm Dia	2
18	Therom Ststically Controlled Oven 18"X18"	5
19	Sample Drying Tray(600X600)	1
20	Sample Drying Tray(450X450)	2
21	Camel Hair Brush	2
22	Le-Chatelier Flask	5
23	Tamping Raw	10
24	Graduated Cylinder 500 Ml Cap	5
25	Cylindrical Metal Measur (3,15,30)Ltr	3
26	Slump Cone Complet Set	2
27	G.I. Sieves 12" Dia125/100/90/75/53/45/37.5/26.6/22.4/19/13.2/11.2/9.5/5.6 Mm Lid And Pan	1
28	G.I. Sieves 12" Dia 63/50/40/31.5/25/20/16/12.5/10/6.3 Mm Lid And Pan	1
29	Metal Cylinder Closed Cap 3 Ltr	5
30	Metal Sccop Cap 1 Ltr	5
31	Sample Container 2"X1"	20
32	Crushing Value Appt 150 Dia With Measurement & Temp.	2
33	Los Angles Abrassion Testing Machine With Abrasive	1
34	Impact Testing Machine	1
35	G.I Tray 600X600 Mm	2
36	G.I Tray 450X450 Mm	2
37	Compaction Factor Apparatus	2
38	Platform Weighing Machine (Digital) 200Kg	2
39	Vee Bee Consito Meter Apparatus Set (A+B+C+D)	1
40	Hydrolic Test Bench	1
41	Digital Stop Watch	10
42	Thermo Meter (0-50)C	10
43	Metal Cylinder	1
44	Hammer	**5**

45	Digital Balance Cap 1 Kg	2
46	Ball 2"	12
47	Cone Penetrometre H.T 303	1
48	Cube Mould 15 Mm	5
49	Cube Mould 20Mm	5
50	C.B.R. Testing Machine	1
51	Pata (civil)	1
52	Gulmira	6
53	MIXTURE MACHINE WITH HYDROLIC 10/7 CFT CPACIT	1
54	VIBRATING MACHINE WITH 1 HP CG MOTER	1
55	VIBRATOR	1
56	Cube Mould 100 Mm	5

PUBLIC HEALTH ENGINEERING LAB

SL.NO.	NAME OF EQUIPMENTS	QUANTITY
1	**BEAKER 1000ML**	**6**
2	**BEAKER 500ML**	**3**
3	**Blowing Pipe**	**4**
4	**Burette 50 Ml**	**10**
5	**Burette Stand**	**15**
6	**Deosicater With Plate**	**1**
7	**Durhams Tubes**	**1**
8	**EVAPORATING DISC**	**6**
9	**Flat Bottle Flask 250 Ml**	**14**
10	**Gas Jar With Lid**	**6**
11	**Geometrical Shape**	**1**
12	**Hot Plate**	**4**
13	**Jouls Calorimeter Teak Wood (4"X3")**	**1**
14	MEASURING CYLINDER	6
15	**Nesslers Tube**	**3**
16	**P H Paper**	**2**
17	**P H Paper With Indicator**	**2**
18	**P.H Meter**	**1**
19	**Pipette 10 Ml**	**8**
20	**Pipette Stand**	**10**
21	**Plane Glass**	**24**
22	**Reagent Bottle 250 Ml**	**20**
23	**Sample Test Tube**	**12**
24	**Separating Funnel Holder**	**2**
25	**SIX JAR APPARATUS**	**1**
26	**Spherometer**	**12**
27	**Spirit Lamp**	**15**
28	**Starch Iodide Paper**	**1**
29	**Steam Water Bath**	**1**
30	**Steel Rule**	**2**
31	**Test Tube Brush**	**30**
32	**Test Tube Hard Glass**	**12**
33	**Test Tube Holder**	**30**
34	**Test Tube Stand**	**20**
35	**Thermometer**	**2**
36	**Thermometer**	
37	**THERMOmeter**	**4**
38	**TURBID METER**	**1**
39	**Wash Bottle 500 Ml Plastic**	**30**
40	**Watch Glass 3"**	**24**

CIVIL ENGINEERING

SURVEY LABORATORY

SL.NO.	NAME OF EQUIPMENTS	QUANTITY
1	Abney Level	01
2	Abney Level	02
3	Abney Level	01
4	Arrows	05
5	Arrows	10
6	Auto Level Bosch Gol 26 D	01
7	Auto Level Bosch Gol 32 D	
8	Auto Level Model Nl 32	
9	Auto Level Nikon Ac 2S	01
10	Auto Level Sokkia B 40A	01
11	Auto Level Topcon At B4A	01
12	Auto Level With Al. Stand	01
13	Balancing Wt	
14	Beam Compass	02
15	Beam Compass	02
16	Box Sextent	01
17	Box Sextent	01
	Brass Knurling Terminal	30
	Chain 100 ft	05
	Chain 30 mtr	05
18	Clino Meter	01
19	Compass (North/South)	01
20	Compass (Propotional)	10
21	Cross Staff	01
22	Cross Staff	05
23	Cyclone Ghat Tracer	02
24	Cyclone Ghat Tracer	01
25	Digital Theodolite	02
26	Dumpy Level 12 inch dia with tripod	01
27	Dumpy Level	02
28	Dumpy Level	02
29	Engineers Chain 100 Ft	02
30	Engineers Chain 100 Ft	03
31	Fiber Tape 15 Mtr	10
32	Fiber Tape 15 Mtr	05
33	Fiber Tape 30 Mtr	10
34	Fiber Tape 30 Mtr	05
35	Fiber Tape 50 Mtr	05
36	French Cross Staff	05
37	French Curve	01
38	Hand Level	01
39	Hand Level	02
40	Hand Level	01
	Hammer	05
	Kolida automatic level	02
41	Levelling Staff 5 Mtr	01
42	Levelling Staff 6 Mtr	01

48	Line Ranger Sokia	01
49	Matric Chain 20 Mtr	05
50	Matric Chain 30 Mtr	02
51	Matric Chain 30 Mtr	03
52	Meatallic Tape Size 15 Mtr	05
53	Meatallic Tape Size 30 Mtr	05
54	Offset Rod 2 Mtr	05
55	Offset Rod 3 Mtr	05
56	Optical Square	05
57	Optical Square 12 "	01
58	Optical Square 6 "	01
59	Pantograph	02
60	Pantograph	01
61	Pantograph 24 "	01
62	Pantograph 30"	01
63	Plane Table P T A	02
64	Plani Meter	01
65	Plani Meter	01
66	Plani Meter (Digital)	01
67	Plani Meter (Mannual)	01
68	Prismastic Compas 100 Mm	03
69	Prismastic Compas 150 Mm	02
70	Prismastic Compas 5"	01
71	Ranging Rod 2 Mtr	05
72	Ranging Rod 2 Mtr	05
73	Ranging Rod 3 Mtr	05
74	Ranging Rod 3 Mtr	05
75	Revenue Chain 33 Ft	05
76	Steel Band	05
77	Steel Tape 15 Mtr	05
78	Steel Tape 30 Mtr	05
79	Steel Tape 5 Mtr	05
80	Surveyor Chain 66 Ft	05
81	Surveyor Compas S C A	01
82	Surveyor Compas S C A	01
	Surveyor Compas with Tripod	01
	South automatic level model NL 32	02
83	**Tachometer**	
84	Telescopic Alidade	01
85	Telescopic Alidade	02
86	Theodolite 20Sec With Stand	02
87	Tilting Level	01
88	Tilting Level	02
89	Total Station Prism	01
90	Total Station Topcon Model Es55	01
91	Transit Theodolite 20 Sec	02
92	Tripoid Stand	01
93	Transit Theodolite Erect Image	02
94	Wooden Peg	05
95	Woven Metal Wired Tape	05
96	Wye Level	01

BASIC ELECTRICAL AND MEASUREMENT LAB

SL.NO.	NAME OF EQUIPMENTS	QUANTITY
1	Pipe Cutter 2"	6
2	Screw Driver Contctor 4"	60
3	Soldering Iron Copper Bit	30
4	Tester Digital	1
5	R.C.B	1
6	Soldring Iron Elct.	**30**
7	Solding Iron Des	15
8	C.R.O (Diff)	**1**
9	Screw Driver Contctor 4"	60
10	Wireless Micro Phone	1
11	Wireless Micro Phone Stand	1
12	Wireless Micro Phone Clip	1
13	Wireless Microphone	1
14	Wireless Microphone Stand	1
15	Wireless Microphone Clip	1
16	MICROPHONE AHUJA	1
17	MICROPHONE STAND	1

BASIC ELECTRONICS AND ANALOG LAB

SL.NO.	NAME OF EQUIPMENTS	QUANTITY
1	Screw Driver 8"	60
2	Screw Driver 8"	60
3	Plier Sid Cutting	42
4	Screw Driver Contctor 4"	60
5	Load Bank 5Kw	**6**
6	Screw Driver Contctor 4"	60
7	Knife	60
8	I C	10
9	Series Resonance Model No B3	1
10	Analog To Dogital Converter Model No 32	1
11	Dogital To Analog Conveter Model No 33	1
12	Basic Logic Gate Model N-1	1
13	Digital Logic Traner Mod X 1	1
14	Half And Full Subtractor Kits	1
15	16 Line To 01 Line Multi Plexer Model N 13	1
16	4 Line To 6 Line Demulti Plexer Model N 14	1
17	Master Slave J.K Flip Flop Model No N 4	1
18	Binary 4 Bit Model N 21	1
19	Left/ Righe Shift Model N 42	1
20	Rapid M	1
21	Rheo Starter 05 Amp	3
22	Frequence Meter	1
23	Rheo Starter 01 Amp	3
24	Power Factor Meter	1
25	Stop Watch	5
26	Ohm 01 Amp 300	5
27	Ohm 01 Amp 50	2
28	Ohm 01 Amp 25	2
29	Ohm 01 Amp 10	2
30	Soldering Iron	20
31	I C	295
32	P C B Board	20
33	Diod	500
34	Capacitor	50
35	Solding Wire	500
36	Wire Flexible	2
37	Wire Copper	1
38	Transformer 6 V	15
39	Transformer 12 V	5
40	Starter D.O.L	1
41	Meter 300 V	3
42	R.C Coupled Amplifire Kit	2
43	Push Pull Amp Kit	2
44	Multi Vibrator Kit (Diff)	4
45	Colpits	1
46	Phase Shift	1
47	Hartley OSCILLATOR	1

48	Power Mosfet	1
49	Igbt Kit	1
50	Oscilloscope 30 Mhz	2
51	C.R.O (Diff)	2
52	Rectifier Kits	2
53	Voltage Regulator By Zener Diode Kit	1
54	V.L Characteristics Of Diode Kit	1
55	Gimlet	60
56	Hygrometer	8
57	Wireless Micro Phone	2

CIRCUIT THEORY LAB

SL.NO.	NAME OF EQUIPMENTS	QUANTITY
1	Maximum Power Transfer Theorom Model A4	1
2	Notch Filter Model No P 15	1
3	Variac	4
4	C.R.O (Diff)	**2**
5	Stepar Moter With Digital Controller	1
6	Therom Couple	1
7	Thermistor	1
8	Rectifier Kits	2
9	Transistor Charctories	3
10	Voltage Regulator By Zener	1
11	Voltage Regulator By Zener Diode Kit	1
12	V.L Characteristics Of Diode Kit	1
13	V.L Characteristics	1
14	Power Amplifire Kit	4
15	Wein Bridge	1
16	Mosfet Kits	1
17	Nand Nor Gate Kits (Diff)	2
18	Jeft Kits	1
19	Demux Ic	1
20	Half Adder And Full Adder Kits	4
21	Half And Full Subtractor Kits	4
22	Transistor Charctories	4
23	Comparator Kit	1
24	Varification Of Kcl,Kvl,Kits	2
25	Varification Of Superposition Norton ,Maximum,Power Transfer	4
26	Passive Filters	4
27	2 Port Network Kits	1
28	R.L.C Resonant Kit	2
29	Strain Guage	1
30	Lvdt Charcteristcs	1
31	Filter Circuite Kits	1
32	Oil Circuit Breakers	1
33	2 Port Network Kits	1
34	R.L.C Resonant Kit	2
35	Strain Guage	1
36	Lvdt Charcteristcs	1
37	Rectifier Kits Using Scr	1
38	Rectifier Kits	2
39	Filter Circuite Kits	1
40	Power Mosfet	1
41	Igbt Kit	1
42	Chopper Circuit Kit	1
43	Microprocessor 8085	2
44	Light Controller Kit (Trafic)	1
45	Sodium Mercury Vapour Lamps	4
46	Oil Circuit Breakers	1
47	S.F-6 Circuit Breakers	1

48	Gate And Box	2
49	Over Current Relay	1
50	Earth Fault Relay	1
51	Buchholz Relay	1
52	Relay Test Bench	1
53	H.R.C & Rewirable Fuses	4
54	Circuit Breakers Air	1
55	Circuit Breakers Oil	1
56	Megger Check The Continuly Winding	2
57	Dual Power Supply With Automatic Over Load	4
58	Function Generator	4
59	Oscilloscope 30 Mhz	2
60	Mux And Demux	2

DIGITAL ELECTRONICS & MICROPROCESSOR LAB

SL.NO.	NAME OF EQUIPMENTS	QUANTITY
1	Screw Driver 8"	30
2	Screw Driver 8"	30
3	Analog Oscileoscope 10 Mhz	1
4	Digitla Storageoscileoscope 20Mhz	1
5	Function Generator	1
6	Bread Board System	1
7	Linear I.C Trainer	1
8	Microprocessor 8085	2
9	Digital Multimetar 3.5	2
10	D.C Power Supply Regulator	5
11	Deasauty 'S Bridge	1
12	Anderson Bridge	1
13	Transistorised Wein Bridge Oscillator	1
14	Temp. Transducer Traner	1
15	Lvdt Charcteristcs	1
16	V.C.O Using P.L.L	1
17	Analog Multimeter	2
18	Const.Of Single Phase Half & Fully Controlled Bridge Rectifier Usuing Scr	1
19	Series Resonance Model No B3	1
20	Active Low Pass Filter Model No P 11	1
21	Active High Pass Filter Model No P 12	1
22	Active Band Pass Filter Model No P 13	1
23	Parallel Resonance Model No B4	1
24	Active Low Pass Filter Model No P 11	1
25	Active High Pass Filter Model No P 12	1
26	Active Band Pass Filter Model No P 13	1
27	Notch Filter Model No P 15	1
28	Parallel Resonance Model No B4	1
29	Digital I.C Traner	1
30	Master Slave J.K Flip Flop Model No N 5	1
31	Master Slave J.K Flip Flop Model No N 6	1
32	Oscilloscope 30 Mhz	2
33	Mod -10-Counter	1
34	Converter A/D&D/A	2
35	U.P. Down (Counter)	2
36	Shift Register	1
37	Seven Segment Display	1
38	Seven Segment Display Inter Facing Kits	1
39	Flip Flops Kits	5
40	Rectifier Kits Using Scr	1
41	Rectifier Kits	2
42	Chopper Circuit Kit	1
43	Microprocessor 8085	2
44	Light Controller Kit (Trafic)	1
45	Gate And Box	2
46	Mux And Demux	2

ELECTRICAL MACHINE LAB

SL.NO.	NAME OF EQUIPMENTS	QUANTITY
1	Load Box 5 K.W	3
2	Volt Meter	17
3	Megger 500 Volt	1
4	Wire Bound Registance	1
5	Current Transformer	2
6	Load Box Capacitance	2
7	Ammiter 16 Amp	23
8	D.C. Shunt Motor	1
9	D.C. Series Motor	1
10	D.C. Shunt Motor Couple With Alternater	1
11	Motor Converter	1
12	Slip Ring Induction Motor	1
13	A.C. Series Motor	1
14	Synchronces Motor	1
15	Induction Motor	1
16	Squirrel Cage Induction Motor	1
17	Pole Changing Induction Motor	1
18	Capacitor Motor Single Phase	1
19	Rectifire Set	1
20	Pannel Board Ac/Dc	1
21	Watt Meter 0-1-3Kw	5
22	Earth Tester	1
23	Ohm Meter	2
24	Single Phase Indicator	1
25	Potencial Transformer	2
26	Load Box Induction	1
27	Variac	2
28	D.C.Compound Motor With Generator	1
29	D.C.Shunt Motor With Series Generator	1
30	D.C.Shunt Motor With Shunt Generator	1
31	Deepth Micrometre	1
32	Transformer 3 Kva	2
33	Transformer 1 Kva	2
34	Transformer Auto 1 Kva	1
35	Rheo Starter 01 Amp	7
36	Rheo Starter 05 Amp	7
37	Tacho Meter With Stop Watch	3
38	Energy Meter (01Ph/5 Amp/230 Volt.)	3
39	Whealstone Bridge	1
40	Power Factor Meter	1
41	Screw Driver 4"	60
42	Screw Driver 6"	60
43	Screw Driver Contctor 4"	60
44	Hand Gloves (Rubber)	2
45	Limite Swhith	**6**
46	Screw Driver Contctor 4"	60
47	Starter Delta With Manual	1

48	Starter Star 3 Ph	1
49	Starter Dol 3 Ph	1
50	Tester Neon	60
51	Volt Meter	4
52	Tacho Meter With Stop Watch	3
53	Megger 500 Volt	3
54	Variac	1
55	Induction Coil	**1**
56	I.C.T.P.	**9**
57	I.C.D.P.	**8**
58	Oil Testing Kit	**1**
59	Clamp Meter(0-100)Amp	4
60	01 H P D.C. Series Motor With Brake	1
61	01 Kva 03 Ph Transformer 415/230V	2
62	1 H P D.C. Compound Motor With Break	1
63	1 H.P A.C Capacitor Motor With Break & Stater	1
64	1 K V A Single Phase Transformer 230/115 V	2
65	Synchronising Panel For 3 Phase Transformer	1
66	Synchronising Panel For Alternater	1
67	D.C Motor Control Panel	1
68	Control Panel For Alternator	1
69	Control Panel For D.C Generator	1
70	2 H.P A.C Squirrrel Cage3 Phase Motor	1
71	Rectifire Set 20 Amp	1
72	Starter For D.C Moter 3 Point	1
73	Starter For D.C Series 2 Point	2
74	Rheo Starter 01 Amp	2
75	Rheo Starter 05 Amp	2
76	Synchronces Motor 3 Ph Pannel And Brake	1
77	Power Factor Meter	1
78	Variac	2
79	Alternater Set 5 Hp 3 Kw	1
80	Water Tube Boiler	1
81	D.C Motor Panel With Exciter	2
82	Loading Rheostat 5 Kw 3 Ph	1
83	Loading Rheostat 3 Kw 1 Ph	1
84	Logic Probe	3
85	Earth Testing Megger (Analog)	1
86	Inductive Choke 1 Ph	1
87	Variable Capacitive Load 1 Ph	1
88	Cochoram Boiler	1
89	Laminated Education .Chart	37
90	S.F-6 Circuit Breakers	1
91	Over Current Relay	1
92	Earth Fault Relay	1
93	Buchholz Relay	1
94	Relay Test Bench	1
95	H.R.C & Rewirable Fuses	4
96	Circuit Breakers Air	1
97	Circuit Breakers Oil	1

98	Megger Check The Continuly Winding	2
99	Dual Power Supply With Automatic Over Load	4
100	Function Generator	4

ELECTRICAL WORKSHOP PRACTICE LAB

SL.NO.	NAME OF EQUIPMENTS	QUANTITY
1	Elct. Furnace Melting	2
2	Folding Rule (Wood)	30
3	Drill Sleve	2
4	Divider 6"	68
5	Screw Pitch Gouge	1
6	Royal Plug Tool & Bit	8
7	Steel Rule 6"	0
8	Screw Driver 6"	60
9	Pipe Cutter 2" Above	4
10	Pucker	60
11	Nose Plier	12
12	Plier Gase	15
13	Plier Cutting	6
14	Micro Meter (0-25)	4
15	Micro Meter (25-50)	4
16	Micro Meter (50-75)	4
17	Keeping Tools	4
18	Screw Driver Contctor 4"	60
19	Dril Bit 20 Mm	10
20	Royal Plug Tool & Bit	4
21	Sessiors Cold	10
22	Sessiors	8
23	Knife	60
24	Kettle Electrical	**2**
25	Cutting Plier(Side Bit)	60
26	Cutting Plier(Gose) 6"	60
27	Cutting Plier(Nose)	60
28	Pincer	60
29	Rotary Swithch	18
30	Screw Driver 6"	60
31	Soldering Iron	60
32	Wire Stipper 6"	**10**
33	Hand Drill Machine	6
34	Bradwal	16
35	Ammieter 6 Amp	15
36	Series Meter	2
37	Shunt Meter	2
38	Growler	4
39	Flux Meter	2
40	Hydro Meter	4
41	Frequence Meter	3
42	Stepar Moter With Digital Controller	1
43	Digital Thermo Meter	8
44	Twezere	16
45	Multi Tester	6
46	Digital Multimetar 3.5	23
47	Discrete Componate Traner	2

48	Micro Meter (0-25)	4
49	S.W.G.	7
50	Augur	60
51	Function Generator	2
52	Rheo Starter 01 Amp	4
53	Whealstone Bridge	1
54	Power Factor Meter	4
55	Energy Meter (01Ph/5 Amp/230 Volt.)	2
56	Rheo Starter 05 Amp	4
57	Screw Driver Contctor 4"	60
58	Contactor 32 Amp	4
59	Contactor 16 Amp	2
60	Knife	30
61	Micro Meter (25-50)	3
62	Micro Meter (0-25)	10
63	Screw Driver 4"	60
64	Screw Driver Contctor 8"	60
65	Scriber	60
66	Tester Neon	60
67	Portable A.C Voltmeter 0-150-300	4
68	Portable D.C Ammeter 0-1 A	1
69	Portable D.C Ammeter 0-5 A	2
70	Portable A.C Ammeter 0-5 A	2
71	Portable A.C Ammeter 0-10 A	2
72	Rectifier Set 70 Amp Capacity	1
73	Brass Knurling Terminal	30
74	Steel Rule 6"	100
75	Screw Pitch Gouge	10
76	Fillar Gouge	10
77	Royal Chart	5
78	Wire Stipper	1
79	Rod	100
80	Whealstone Bridge(W.D.W.M)	1
81	Sodium Mercury Vapour Lamps	4
82	Mcb 10 Amp	24
83	Switch 15 Amp	20
84	Socket 15 Amp	20
85	4 Pole 63 Amp	2
86	Ar 2L .2.5 Sq Mm Cable	3
87	Ar 3C 2.50 Sq Mm Multi Core Copper Cable	3
88	7X5 Fiber	150
89	4" Round Cover	150
90	13X5 Fiber	50
91	9X11 Fiber	10
92	1.5 Mm Wire 180 Mtr (Red)	6
93	1.5 Mm Wire 180 Mtr (Black)	4
94	1.5 Mm Wire 180 Mtr (Green)	2
95	6 Mm Coper Wire (Red)	1
96	6 Mm Coper Wire (Black)	1
97	Celling Rose	150

98	6 Mm Coper Wire (Red)	2
99	6 Mm Coper Wire (Blue)	2
100	6 Mm Coper Wire (Yellow)	2
101	6 Mm Coper Wire (Black)	2
102	Socket 16 Amp	10
103	Switch 16 Amp	10
104	E 32 Amp Sp Mcb	24
105	Switch 6 Amp	100
106	Socket 6 Amp	20
107	6 Mm Coper Wire (Yellow)	3
108	6 Mm Coper Wire (Black)	1
109	6 Mm Coper Wire (Blue)	1
110	6 Mm Coper Wire (Red)	1
111	Switch 6 Amp	40
112	Pvc Tape	30
113	10 Mmcoper Ring Socket	16
114	35 Mm Coper Wire Ring Socket	16
115	10 Mm Coper Wire 100 Mtr	4
116	Board 6X4	5
117	Board	5
118	Tester	2
119	Tape	1
120	Tube Light	90
121	T. Fitting	60
122	Mcv 32 Amp	12
123	Pvc Tape	30
124	Socket 16 Amp	30
125	Switch 16 Amp	20
126	Socket 3 Pin	2
127	Adopter	1
128	Street Light	1
129	Main Switch	1
130	Mcb Box 2 Pol	5
131	Dp Mcb 32 Amp	5
132	Switch 6 Amp	20
133	Socket 6 Amp	40
134	Pvc Tape	10
135	Pvc Box	5
136	Change Over 1000 Amp	1
137	Mcb 100 Amp	1
138	Rcb 100 Amp	1
139	Mcb Box	1
140	Coper V Socket	100
141	Coper Pen Socket	100
142	100 Amp Charger 4 Pole	1
143	200 Amp Switch	1
144	Wire Cable 10 Mm	1
145	5 Hp Motor Panel Board	2
146	Mcb Box 2 Polo	10
147	Mcb 32 Amp	12

148	Coper Wire 6 Mm	2
149	Coper Wire 6 Mm	2
150	Coper Wire 1.5 Mm	1
151	Mcb 4 Polo 100 Amp	1
152	Socket 16 Amp	20
153	3 Pin Top 16 Amp	10
154	Coper Link 6 Mm	200
155	Coper Link 10 Mm	50
156	COATED WIRE	5
157	LABLE PIPE	1
158	COATED WIRE	5
159	CASING 2"	100
160	WIRE 6 MM	2
161	WIRE 1.5 MM	3
162	MCB 32 AMP	5
163	ROUND COVER PVC 4"	15
164	MCB 32 AMP	10
165	COPER PIN 6 MM	38
166	COPER PIN 10 MM	10
167	75 WT LED STRIEET LIGHT	6
168	40 MM GI PIPE	6

BLACKSMITH AND FOUNDRY SHOP

SL.NO.	NAME OF EQUIPMENTS	QUANTITY
1	Hearth	8
2	Anvil-25 Kg	2
3	Spanner Adj.	6
4	Spanner D	6
5	Hand Blower	2
6	Chisel (Crome)	60
7	Chisel(Cold)	20
8	Chisel(Cross)	4
9	Soldering Iron	17
10	Swages (Top With Bottom)	2
11	Hammer D F Headed	2
12	Hammer Set	3
13	Chisel(Hot)	2
14	Chisel(Flat)	4
15	Hammer Cross Peen	60
16	Fuller (Top With Botom)	2
17	Flatter	4
18	Brass Rule 12 "	60
19	Hand Blower	4
20	Hammer D F S 3 Kg	60
21	5 H.P A.C Squirrrel Cage Induction Motor with blower	1
22	Anvil-50 Kg	3
23	Swage Block 50 Kg	2
24	Anvil 100 Kg	2
25	Fire Bricks 230*115*75 Mm	500
26	Fire Clay Motar	3
27	Leg Vice 10 Cm	6

CARPENTRY SHOP

SL.NO.	NAME OF EQUIPMENTS	QUANTITY
1	Augur	16
2	Gimlet	16
3	Rip Saw	19
4	Tennon Saw	6
5	Dovetail Saw	30
6	Compass Saw	11
7	Scraper Round	16
8	Scraper Half Round	16
9	Scraper Trangular	16
10	Oil Stone	2
11	File Rasp 6"	16
12	Jackplain Iron	1
13	Jackplain Wood	16
14	Chisel(Farmer)	30
15	Hammer Clay	20
16	Chisel(Bevelled)	30
17	Chisel(Farmer)	60
18	Folding Rule (Wood)	60
19	Chisel(Farmer)	60
20	Folding Rule (Wood)	30
21	File Card	10
22	File Rasp 6"	15
23	Iron Jackplain	15
24	Hand Saw	60
25	Augur	14
26	Chisel(Bevelled)	30
27	Anvil-25 Kg	1
28	File Half Round	70

FITTING SHOP

SL.NO.	NAME OF EQUIPMENTS	QUANTITY
1	Drilling Machine	8
2	Drilling Machine	1
3	Drilling Machine(Breast)	6
4	Drill Bit	16
5	Apron	6
6	Fire Extingusher	4
7	File Niddle	12
8	Center Punch 6"	60
9	Pipe Wrench 10"	1
10	Pipe Wrench 14"	1
11	Pipe Wrench 18"	2
12	Surface Plate	1
13	Sine Bar	2
14	Tap With Dies	1
15	Vernier Caliper	0
16	Bench Vice	32
17	Bevel Square	1
18	Caliper (Inside)	60
19	Caliper (Outside)	60
20	Dies With Handle (40 Mm)	1
21	Spanner Box	2
22	Surface Gouge	4
23	Vernier Height Gouage	2
24	Pincer	60
25	Grinder	2
26	File Trangular	7
27	Hammer Ballpin 1/2 Kg	60
28	Hammer Ballpin 3/4 Kg	0
29	Hacksaw Frame	60
30	Hand Vice	30
31	Letter Punch 1/8	2
32	C- Clamp 2"	3
33	C- Clamp 4"	16
34	C- Clamp 6"	7
35	File Round	21
36	File Half Round	23
37	File Flat Smooth	60
38	Number Punch	3
39	File Flat Bastard	60
40	Center Punch 6"	60
41	File Trangular	25
42	File Half Round	40
43	Bench Vice	50
44	Dot Punch	80
45	File Trangular	30
46	File Round	30
47	File Sqaure	30

48	Number Punch	5
49	Letter Punch	5
50	File Handle	50

FLUID MECHANICS AND HYDRAULIC MACHINES LAB

SL.NO.	NAME OF EQUIPMENTS	QUANTITY
1	Accessories For Hydrolic Test Bench	1
2	Hydrolic Test Bench Set	1
3	Centrifugal Pump	1
4	Reciprocating Pump	1
5	Pelton Wheele Turbine Test Rig 1 H.P	1
6	**Kaplan Turbine Testing**	1
7	**Fransic Turbine Testing**	1

HEAT POWER & THERMAL ENGG. LAB

SL.NO.	NAME OF EQUIPMENTS	QUANTITY
1	Puller (Pully)	2
2	Puller (Bearing	2
3	2 Stroke Petrol Engine (Model)	1
4	4 Stroke Petrol Engine (Model)	1
5	2 Stroke Disel Engine (Model)	1
6	4 Stroke Disel Engine (Model)	1
7	Cochoram Boiler model	1
8	Air Conditioner Trainer Test Rig	1
9	Refrigation Cycle Test Rig	1
10	Governor Apparatus	1
11	4 Stroke Peterol Engine Four Cylinder	1
12	Steam Power Plant Model	1
13	Thermal Oven Repairing	1
14	Penske Martins Flash Point &Fire Point Reparing	1
15	Cleveland Flash Point &Fire Point Reparing	1
16	I.C.Engine Test Rig To Find Out The Heat Balance 01 Nos	1
17	Flash & Fire Point Apprt	1
18	COMPRESSOR 2 STAGE	1
19	2 STROKE SINGLE CYLINDER PETROL	1
20	4 STROKE DISEL ENGINE	1
21	STEAM ENGINE MODEL	1
22	VERTICAL WATER TUBE BOILER MODEL	1

MACHINES SHOP

SL.NO.	NAME OF EQUIPMENTS	QUANTITY
1	Lathe Machine 4 1/2 '	4
2	Grinder	1
3	Dot Punch	45
4	Vernier Caliper	12
5	S.W.G.	3
6	Steel Rule 6"	43
7	Allen Key	4
8	Cutting Tools 1/4	10
9	Cutting Tools 3/8	10
10	Cutting Tools 5/16	10
11	Steel Rule 12"	60
12	Drill Bit	32
13	Shank Drill Bit	4
14	Cutting Tools 1/4	15
15	Cutting Tools 3/8	50
16	Cutting Tools 5/16	45
17	File Flat Smooth	30
18	Knurling Tools	50
19	Hammer Ballpin 3/4 Kg	60
20	Power Hacksaw	1
21	Lathe Machine 6'	2
22	Lathe Machine 6'	3
23	Universal Milling Machine	1
24	Shaping Machine 8"Cap	1
25	8" Slot Cutting Machine With Rotating Table *Motor	1
26	File Flat Rough	200
27	Universal Duty Block	4
28	File Round	30
29	C N C Lathe Traner With Servo Moters	1
30	Universal Sribing Block 22 Cm	6
31	Cnc Lathe Trainer With All Acc	1

MATERIAL TESTING & MEASUREMENT MACHINES LAB

SL.NO.	NAME OF EQUIPMENTS	QUANTITY
1	Pedulum Impact Testing Machine	1
2	Universal Testing Machine	1
3	Brinal Hardness Tester Cap 3000 Kgf	1
4	Torsion Testing Machine	1
5	Polygon Of Forces Apprt.	1
6	Law Of Moment Apprt.Rs 4900	1
7	Law Of Moment Apprt.Rs 9800	1
8	Angle Of Respose Wooden	1
9	Simple Wheel And Axle Wooden	1
10	Winch Crab Single	1
11	Winch Crab Double	1
12	Worm And Worm Wheel Single	1
13	Simple Screw Jack Apprat.	1
14	Gouquss 1520 Pto Engine Disel No A9G1322094	1
15	**UNiversal FORCE TABLE APP**	1

SHEET METAL SHOP

SL.NO.	NAME OF EQUIPMENTS	QUANTITY
1	Divider Wing	4
2	Hollow Punch	4
3	Prick Punch	1
4	Rebate Punch	8
5	Steel Rule 2'	6
6	Straight Snips	4
7	Bent Snips	4
8	Spring Snips	8
9	Steel Square 2'	2
10	Try Square	81
11	Blow Lamp	14
12	Scriber	120
13	S.W.G.	0
14	Solid Punch	4
15	Steel Rule 12"	85
16	Hammer Ballpin 3/4 Kg	0
17	Laddle	12
18	Mallete Round(Wood)	16
19	Melting Pot	4
20	C- Clamp 8"	9
21	Oil Cane	6
22	Scriber	60
23	File Flat Smooth	30
24	Divider 6"	30
25	Try Square	30
26	Cone Mould	1
27	Number Punch	5
28	Spanner D	4
29	Gp Sheets /Coil	171.2
30	G I sheet	210

WELDING SHOP

SL.NO.	NAME OF EQUIPMENTS	QUANTITY
1	Goggless	30
2	Spark Lighter	1
3	Blow Lamp	14
4	S.W.G.	0
5	Electro Holder	2
6	Earth Clamp	6
7	Hand Gloves (Asbestos)	9
8	Hammer Ballpin 3/4 Kg	60
9	Hose Pipe (Blue And Red)	50
10	Handscreen	6
11	Letter Punch 3/32	3
12	Gas Cutter	1
13	Hammer Ballpin 1 Lb	60
14	Welding D.C.Motor	1
15	Welding Tip Nozzle	5
16	Hammer Ballpin 1/2 Kg	60
17	Welding Transformer	1
18	Hand Vice	30
19	Cable Lug	10
20	Cable Connector	10
21	File Bastard	60
22	Electrode	50
23	Black Glass	100
24	Black Gogless	30
25	Caliper (Outside)	60
26	Caliper (Inside)	60
27	Hacksaw Frame	60
28	Letter Punch 1/8	4
29	Welding Machine	2
30	Welding Cable 20 Mtr & Accessories	2
31	Letter Punch	5

MINE ENVIRONMENT & HAZARD LAB

SL.NO.	NAME OF EQUIPMENTS	QUANTITY
1	Velo Xgl 50 Non-Relighting	1
2	Gas Testing Chamber	1
3	Velox Gl 7 Gas Testing Flame Sefety Lamp	1
4	Velox Gl 7 Sefety Lamp Spairs	1
5	Tool Kit For Service Mantanance	1
6	Velox Flame Sefety Lamp (Magnet Unlocker)	1
7	Velox Exp3 Safety Torch	1
8	Velox Gl 7 Gas Testing Flame Sefety Lamp	2
9	Velox Gl 7 Gas Testing Flame Sefety Lamp	1
10	Gasket	100
11	Wick	13
12	Inner Gauge	5
13	Outer Gauge	5
14	Fixed Filament Unit	11
15	Fuel Vessel (Oil Pot0For Gl 50 Lamp	1
16	Battery For Gl 7 Lamp	6
17	Glass Cylinder	1
18	A Complete Gas Cap Indicator Box	1
19	Methane Gas Testing Chamber With All Acc	1
20	Fixed Filament Unit	2
21	Lid With Positive Connector Of Battery Box	2
22	Toximeter	1
23	Multi Gas Detector	1
24	Helment	1
25	Gum Boots	1
26	Hand Gloves	5
27	Ear Muff/Plug	1
28	Fluorescent Jackets (Cottons)	1
29	Nose Mask (Dust Mask)	1
30	Shin Guard /Knee Cap	1
31	First-Aid Box	1
32	Mining Safety Belt	1
33	Goggless	1
34	Sampling Bladder	1
35	Colliery Lamp Room	1
36	Stone Dust Barrier	1
37	Approching Ald Water Logged Working	1
38	Colliery Lamp Room	1
39	Stone Dust Barrier	1
40	Approching Ald Water Logged Working	1
41	Multi Gas Detector	1

MINE MACHINERY LAB

SL.NO.	NAME OF EQUIPMENTS	QUANTITY
1	Model Of Singile Deck Tandem Cage	1
2	Model Of Shaft Sinking	1
3	Model Of Direct Rope Haulage	1
4	Model Of White Metal Cappel	1
5	Cylinderical Drum	1
6	Conical Drum	1
7	Cylindro- Conical Drum	1
8	Bi-Cylindro Conical Drum	1
9	Center Susperded Caliper Brakes	1
10	King Detaching Hook	1
11	Rope Guids	1
12	Stop Block	1
13	Spring Clatch	1
14	Back Stay	1
15	Back Clatch	1
16	Jazz Rail	1
17	Run Way Switch	1
18	Roof & Side Stiching	1
19	Intercoupled Stop-Block & Run Way Switch	1
20	Intercoupled Stop-Block & Run Way Switch& Jazz Rails Combind	1
21	Tub-Retarder	1
22	Tub-Re Railer	1
23	Man Riding Car	1
24	Shaker Conveyor	1
25	Belt Conveyor	1
26	Fore Poling	1
27	Anchored Post Breakes	1
28	Agecroft Divice	1
29	Cylinderical Drum	1
30	Conical Drum	1
31	Cylindro- Conical Drum	1
32	Bi-Cylindro Conical Drum	1
33	Center Susperded Caliper Brakes	1
34	King Detaching Hook	1
35	Rope Guids	1
36	Stop Block	1
37	Spring Clatch	1
38	Back Stay	1
39	Back Clatch	1
40	Jazz Rail	1
41	Run Way Switch	1
42	Roof & Side Stiching	1
43	Intercoupled Stop-Block & Run Way Switch	1
44	Intercoupled Stop-Block & Run Way Switch& Jazz Rails Combind	1
45	Tub-Retarder	1
46	Tub Re-Railer	1
47	Man Riding Car	1

48	Shaker Conveyor	1
49	Belt Conveyor	1
50	Fore Poling	1
51	Anchored Post Breakes	1
52	Cylinderical Drum	1
53	Conical Drum	1
54	Cylindro- Conical Drum	1
55	Bi-Cylindro Conical Drum	1
56	Center Susperded Caliper Brakes	1
57	King Detaching Hook	1
58	Rope Guids	1
59	Stop Block	1
60	Spring Clatch	1
61	Back Stay	1
62	Back Clatch	1
63	Jazz Rail	1
64	Run Way Switch	1
65	Roof & Side Stiching	1
66	Intercoupled Stop-Block & Run Way Switch	1
67	Intercoupled Stop-Block & Run Way Switch& Jazz Rails Combind	1
68	Tub-Retarder	1
69	Tub-Re Railer	1
70	Man Riding Car	1
71	Shaker Conveyor	1
72	Belt Conveyor	1
73	Fore Poling	1
74	Anchored Post Breakes	1
75	Agecroft Divice	1
76	Winding Rope Caple	1
77	Reliance Caple	1
78	White Metal Caple	1
79	Zinc Cone And Tail Strand Type Haulage Roop Caple	1
80	Detaching Hooks	1
81	King Detaching Hooks	1
82	Onnreod Detaching Hooks	1
83	Kep Gear	1
84	Prop Keps	1
85	Collapsing Keps Status	1
86	Tippler	1
87	End-On- Tippler	1
88	Side On Tippler	1
89	Mining Wire Roofs (Displayed)	1
90	Endless Rope Haulage Layout	1
91	Rope Splicing Tools & Tackless	1
92	Rope Splicing	1
93	Gate Belt Conveyor With Loop Take Up Open Caste Mining Machinery (Not Working Model)	1
94	Dumper	1
95	Shovel	1
96	Bulldozer	1

97	Drageline	1
98	Scraper	1
99	Bucket Wheel Ex-Cavator	1
100	Cone Cut (Short Hole)	1
101	Wedge Cut (Short Hole)	1
102	Fan Cut (Short Hole)	1
103	Burn Cut	1
104	Drag Cut (Short Hole)	1
105	Types Of Roof Support By Timber	1
106	Chock Relese Device	1
107	Side And Roof Support In A Road Way	1
108	Sofari Supports	1
109	Roof Bolting	1
110	Back Stay	1
111	Run Way Switch	1
112	Inter Coupled Stop Block And Runaway Switch	1
113	Gate Belt	1
114	Conveyor With Loop Take Up	1
115	Cone Cut	1
116	Wedge Cut	1
117	Fan Cut	1
118	Burn Cut	1
119	Drag Cut	1
120	Types Of Roof Support By Timber	1
121	Chock Relese Device	1
122	Side And Roof Support In A Road Way	1
123	Fore Poling	1
124	Sofari Supports	1
125	Roof & Side Stiching	1
126	Roof Bolting	1
127	Mining Wire Roofs (Displayed)	1
128	Single Deck Cage	1
129	Double Deck Cage	1
130	Reliance Caple	1
131	White Metal Caple	1
132	Rigid Guides	1
133	Rope Guide Shoe	1
134	Prop Keps	1
135	Collapsing Keps Status	1
136	Man Riding Car	1
137	Mine Car	1
138	Shaker Conveyor	1
139	Man And Tail Rope Haulage Layout	1
140	Friction Or Koepe Winding System- Tower Mounted Winder	1
141	Endless Rope Haulage Layout	1
142	Mechanized Open Cast Coil Mine	1
143	Regulator	1
144	Single Rope Friction Or Koepe Pully Tower Mounted	1
145	Single Rope Friction Or Koepe Pully Ground Mounted	1
146	Multi Rope Friction Or Koepe Pully Wheel Mounted	1

147	Multi Rope Friction Or Koepe Pully Ground Mounted	4
148	Ormerod Detaching Hook	1
149	Pit-Top Lay Out With Turntable	1
150	Drop Warwick	1
151	Tipping Tub	1
152	Rope Splicing	1
153	Scraper Chain Conveyor	1

MINE VENTILATION LAB

SL.NO.	NAME OF EQUIPMENTS	QUANTITY
1	Diff. Types Of Stopping	1
2	Axial Flow Fan	1
3	Redial Flow Fan	1
4	Air Crossing	1
5	Ventilation Door With Regulator	1
6	Depillaring Board & Pillar Panel	1
7	Long Wall Reatratoy Face With Caving	1
8	Long Wall Advancing Face With Stowing	1
9	Ventalation Systym In A Board & Pilar	1
10	Ventalation Systym In A Board & Pilar	1
11	Ventalation Systym In A Board & Pilar	1
12	Higrometer Digital	1
13	Whirling Hygrometer	1
14	Mechanical Anemometer	1
15	Velo Meter	1
16	Kata Theromometer	1
17	Development Working In A Bord And Pillar Panel	1
18	Brattic Partition	1
19	Regulator	1
20	Booster Fan In Return Airway	1
21	Booster Fan In Intake Airway	1
22	Development Working In A Bord And Pillar Panel	1
23	Booster Fan In Intake Airway	1

MINING SURVEY LAB

SL.NO.	NAME OF EQUIPMENTS	QUANTITY
1	Meatallic Tape Size 15 Cm	**5**
2	Meatallic Tape Size 30 Cm	**5**
3	Steel Tape 5 Mtr	**5**
4	Steel Tape 15 Mtr	**5**
5	Steel Tape 30 Mtr	**5**
6	Prismastic Compas 4"	1
7	Levelling Staff 4 Mtr	1
8	Wooden Peg	5
9	Total Station Prism	1

GEOLOGY LAB

SL.NO.	NAME OF EQUIPMENTS	QUANTITY
1	Streak Plate	1
2	Rock Speciman With Labels	25
3	Pocket Knife (Multi)	1
4	Mineral Specimen With Labele	30
5	Hardness Box(Moh'S Scale)	1
6	Hand Lens	1
7	Hand Specimen Of Minerals	36
8	Hand Specimen Of Rocks	55
9	Hand Specimen Of Ore	18
10	Moh'S Scale Of Hardness Spl	1
11	Measuring Tape 3 Mtr S.S	1
12	Measuring Tape 15 Mtr S.S	1
13	Measuring Tape 30 Mtr S,S	1
14	Measuring Tape 50 Mtr S.S	1
15	Petrological Microscope	1
16	Trimming Hammer 1000 Gm	1
17	Pocket Magnet	1
18	Geologist Field Note Book	1
19	Munshell Rock Colour Chart	1
20	Geological Map Of India	1
21	Mineral Map Of India	1
22	Tectonic Map Of India & Adj.Country	1
23	3 D Geologcal Model Fiber Glass 100X75 Cm	1
24	3 D Geomorplolical Model 25X35 Cm	2
25	Miniral Hand Specimens	6
26	Rock Speciman Assorted	5
27	Petrological Microscope	1
28	Estwing Rock Hammer	1

- **List of Experimental Setup in each Laboratory / Workshop :**
  The experimental set up in all the Laboratories and Workshops in all the branches are done as per SCTE&VT, Odisha diploma prescribed syllabus.

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- **COMPUTING FACILITIES :**
  - Internet Bandwidth : 300 Mbps
  - Number of configuration of system : 210
  - Total number of system connected by LAN : 280
  - Total number of system connected by WAN : -
  - Major software packages available : Legal System Software – 10
Legal Application Software- 20
  - Special purpose facilities available : -
- Innovation Cell : -
- Social Medical Cell : -
- Compliance of the National Academic Depository (NAD), applicable to PGCM/PGDM Institutions And University Departments : Not Applicable
- **LIST OF FACILITIES AVAILABLE :**
  - Games and Sports Facilities : Volley Ball, Foot Ball, Basket Balls Badminton, Cricket, Javeline Throw, Carom Board.
  - Extra-curricular Activities : Debates, Quiz & Song Competitions, Seminars etc.
  - Soft Skill Development Facilities : The institute has well furnished Communicative English Language Lab. with required software's for soft skill & communication skills development of the students.
- **TEACHING LEARNING PROCESS :**
  - Curricula and syllabus for each of the programmes As approved by the University : Attached
  - Academic Calendar of the University : Attached
  - Academic Time Table with the name of the Faculty Members handling the Course : Attached
  - Teaching Load of each Faculty : 20 classes per week
  - Internal Continuous Evaluation System and Place : Strictly followed the teaching & evaluation scheme & academic calendar of SCTE&VT, Odisha
  - Student's assessment of Faculty, System in the place : Implemented by the Institute.
- **FOR EACH POST GRADUATE COURSES GIVE THE FOLLOWING :** Not Applicable

16. ENROLLMENT & PLACEMENT DETAILS OF STUDENTS IN THE LAST 3 YEARS :

ENROLLMENT DATA (LAST 3 YEARS)

Sl. No.	Session/ Academic Year	A.I.C.T.E. Approved/Sanctioned Annual Intake				
		Civil Engg.	Electrical Engg.	Mechanical Engg.	Mining Engg.	Total Intake
1	2021 – 22	60	120	120	120	420
2	2022 – 23	60	120	120	120	420
3	2023 – 24	60	120	120	120	420

PLACEMENT DATA (LAST 3 YEARS)

Year	Branch	Number of Company Visited	Number of Eligible Students	Total Placement	Lowest Package	Highest Package
2021	Civil Engg.	01	48	11	2 Lakh	2 Lakh
2022	Civil Engg.	01	10	03	2 Lakh	2 Lakh
2023	Civil Engg.	01	61	06	1.8 Lakh	2 Lakh
2021	Elect. Engg.	01	61	17	2 Lakh	2 Lakh
2022	Elect. Engg.	01	12	02	2 Lakh	2 Lakh
2023	Elect. Engg.	4	116	22	1.8 Lakh	2 Lakh
2021	Mech. Engg.	01	72	21	2 Lakh	2 Lakh
2022	Mech. Engg.	01	18	04	2 Lakh	2 Lakh
2023	Mech. Engg.	4	122	24	1.8 Lakh	2 Lakh
2021	Mining Engg.	01	65	10	2 Lakh	2 Lakh
2022	Mining Engg.	01	22	04	2 Lakh	2 Lakh
2023	Mining Engg.	05	127	21	1.8 Lakh	2 Lakh

17. LIST OF RESEARCH PROJECTS/CONSULTANCY WORKS :

- Number of Projects carried out, funding agency Grant received : -
- Publications (if any) out of research in last three Years out of masters projects : -
- Industry Linkages : For Training & Industrial visit purpose.
- MOus with Industries (minimum 3) : For Training & Industrial visit purpose.

18. LoA AND SUBSEQUENT EoA TILL THE CURRENT ACADEMIC YEAR : Attached.

19. ACCOUNTED AUDITED STATEMENT FOR THE LAST THREE YEARS : Attached.

20. BEST PRACTICES ADOPTED, IF ANY : -

[redacted]

STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA

TEACHING AND EVALUATION SCHEME FOR 1ST SEMESTER (Common to All ENGINEERING Programme) (W.e.f 2024-25)

Sl. No	Code No.	Course Title	Hours per week		Total contact hrs/ week	Credits	Evaluation Scheme			
			L	P			Internal Assessment/ Sessional	End Sem Exams	Exams (Hours)	Total
1	TH 1(a) TH 1(b)	Communication Skills in English Or Introduction to IT Systems	3	-	3	3	30	70	3	100
2	TH 2	Applied Physics-I	4	-	4	4	30	70	3	100
3	TH 3	Mathematics-I	4	-	4	4	30	70	3	100
4	TH 4(a) TH 4(b)	Fundamentals of Electrical & Electronics Engineering Or Engineering Mechanics	4	-	4	4	30	70	3	100
5	TH 5(a) TH 5(b)	Environmental Science OR Applied Chemistry	4	-	4	4	30	70	3	100
		TOTAL	**19**	**-**	**19**	**19**	**150**	**350**	**---**	**500**
6	PR 1(a) PR 1(b)	Communication Skills in English Lab OR Introduction to IT Systems Lab	-	4	4	2	25	—	—	25
7	PR 2	Applied Physics-I Lab	-	2	2	1	25	25	3	50
8	PR 3(a) PR 3(b)	Engineering Graphics OR Engineering Workshop Practice	-	4	4	2	25	75	4	100
9	PR 4(a) PR 4(b)	Fundamentals of Electrical & Electronics Engineering Lab Or Engineering Mechanics Lab	-	2	2	1	25	---	----	25
10	PR 5 (a) PR 5 (b)	Sports and Yoga OR Applied Chemistry Lab	-	2	2	1	25	25	3	50
			-	14	14	7	125	125		
		TOTAL	**19**	**14**	**33**	**26**	**275**	**475**	**—**	**750**

Abbreviations: L-Lecturer, P-Practical. Each class is of 1 Hour duration

Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50% and in Aggregate is 40%

There shall be Induction Program before beginning of 1st Semester and Internships at the end of 2nd Semester Classes as per AICTE norm. The best of 2 IA conducted in a subject out of 20 marks to be considered. Assignment/ quiz etc. of 10 marks to be treated as part of IA. Besides this ,Monthly Test to be conducted for each subject. Sessional Marks shall be total of the performance of individual different jobs/ experiments in a subject throughout the semester. Club/Innovation/ Idea Tinkering Activities etc. shall be encouraged to be performed by students beyond the above stipulated hours.

STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA

TEACHING AND EVALUATION SCHEME FOR 2nd SEMESTER (Common to All ENGINEERING Programme) (W.e.f 2024-25)

Sl. No	Code No.	Course Title	Hours per week		Total contact hrs/ week	Credits	Evaluation Scheme			
			L	P			Internal Assessment/ Sessional	End Sem Exams	Exams (Hours)	Total
1	TH 1(a) TH 1(b)	Communication Skills in English Or Introduction to IT Systems	3	-	3	3	30	70	3	100
2	TH 2	Applied Physics-II	4	-	4	4	30	70	3	100
3	TH 3	Mathematics-II	4	-	4	4	30	70	3	100
4	TH 4(a) TH 4(b)	Fundamentals of Electrical & Electronics Engineering Or Engineering Mechanics	4	-	4	4	30	70	3	100
5	TH 5 (a) TH 5(b)	Environmental Science OR Applied Chemistry	4	-	4	4	30	70	3	100
		TOTAL	**19**	**-**	**19**	**19**	**150**	**350**	**---**	**500**
6	PR 1(a) PR 1(b)	Communication Skills in English Lab OR Introduction to IT Systems Lab	-	4	4	2	25	—	—	25
7	PR 2	Applied Physics-II Lab	-	2	2	1	25	25	3	50
8	PR 3(a) PR 3(b)	Engineering Graphics OR Engineering Workshop Practice	-	4	4	2	25	75	4	100
9	PR 4(a) PR 4(b)	Fundamentals of Electrical & Electronics Engineering Lab Or Engineering Mechanics Lab	-	2	2	1	25	---	----	25
10	PR 5 (a) PR 5 (b)	Sports and Yoga OR Applied Chemistry Lab	-	2	2	1	25	25	3	50
			-	14	14	7	125	125		
		TOTAL	**19**	**14**	**33**	**26**	**275**	**475**	**—**	**750**

Abbreviations: L-Lecturer, P-Practical. Each class is of 1 Hour duration

Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50% and in Aggregate is 40%

There shall be Induction Program before beginning of 1st Semester and Internships at the end of 2nd Semester Classes as per AICTE norm. The best of 2 IA conducted in a subject out of 20 marks to be considered. Assignment/ quiz etc. of 10 marks to be treated as part of IA. Besides this ,Monthly Test to be conducted for each subject. Sessional Marks shall be total of the performance of individual different jobs/ experiments in a subject throughout the semester. Club/Innovation/ Idea Tinkering Activities etc. shall be encouraged to be performed by students beyond the above stipulated hours.

Communication Skills in English Course Code- TH 1(a) (Common to 1st & 2nd sem)

Period per week:	03	IA:	30 Marks
Total Period:	45	End Sem Exam:	70 Marks
Timing of End Exam:	3 Hours	No. Of Credit:	3

Course outcomes:

At the end of this course, the students will be able to:

- Understand the meaning, process of communication, types of communication and barrier in communication and manner to communicate effectively.

- Comprehend soft skill and hard skill and to apply it in day to day life.

- Comprehend the seen passages and develop basic speaking and writing skills including proper usage of language and vocabulary so that they can become highly confident and skilled speakers and writers.

- Write personnel & business letter and drafting of notice and minutes of a meeting.

- Enhancement of vocabulary and apply English grammar rules correctly while framing a sentence, answer and writing letter, application etc and enhancement of vocabulary

Course Content

Unit-1 Communication: Theory and Practice

- Basics of communication: Introduction, meaning and definition, process of communication etc.
- Types of communication: formal and informal, verbal, non-verbal and written Barriers to effective communication.
- **7** Cs for effective communication (considerate, concrete, concise, clear, complete, correct, courteous).
- Art of Effective communication,
    - Choosing words
    - Voice
    - Modulation
    - Clarity
    - Time
    - Simplification of words
- Technical Communication.

Unit-2 Soft Skills for Professional Excellence

- Introduction: Soft Skills and Hard Skills.
- Importance of soft skills.
- Life skills: Self-awareness and Self-analysis, adaptability, resilience, emotional intelligence and empathy etc.
- Applying soft skills across cultures.
- Case Studies.

Unit-3: Reading Comprehension

Comprehension, vocabulary enhancement and grammar exercises based on reading of the following texts:

Section-1

Malgudi Days: R.K. Narayan
The Room on Roof: Ruskin Bond "The Gift of the Magi" by O. Henry
"Uncle Podger Hangs a Picture" Jerome K. Jerome

Section-2

Night of the Scorpion by Nissim Ezekiel, Stopping by Woods on a Snowy Evening by Robert Frost, Where the Mind is Without Fear by Rabindranath Tagore, Ode to Tomatoes by Pablo Neruda,

Unit-4: Professional Writing

The art of précis writing,
Letters: business and personnel,
Drafting e-mail, notices, minutes of a meeting etc.
Filling-up different forms such as banks and on-line forms for placement etc.

Unit-5: Vocabulary and Grammar

Vocabulary of commonly used words
Glossary of administrative terms (English and Hindi) One-word substitution, Idioms and phrases etc.
Parts of speech, active and passive voice, tenses etc., Punctuation

References:

1. J.D.O'Connor. *Better English Pronunciation.* Cambridge: Cambridge University Press, 1980.
2. Lindley Murray. *An English Grammar: Comprehending Principles and Rules.* London: Wilson and Sons, 1908.
3. Kulbhushan Kumar, Effective Communication Skills, Khanna Publishing House, New Delhi (Re- vised Edition 2018)
4. Margaret M. Maison. *Examine your English.* Orient Longman: New Delhi, 1964.
5. M. Ashraf Rizvi. *Effective Technical Communication*. Mc-Graw Hill: Delhi, 2002.
6. John Nielson. *Effective Communication Skills.* Xlibris, 2008.
7. *Oxford Dictionary*
8. *Roget's Thesaurus of English Words and Phrases*
9. *Collin's English Dictionary*

Introduction to IT Systems

Course Code- TH 1(b)

(Common to 1st & 2nd sem)

Period per week:	3	IA:	30 Marks
Total Period:	45	End Sem Exam:	70 Marks
Timing of End Exam:	3 Hours	No. Of Credit:	3

Course outcomes:

At the end of the course, students will be able to:

- ✓ Develop the skill to handle & operate computer and access the internet.
- ✓ Assemble the PC, install & configure OS and other software/Hardware.
- ✓ Design & develop the website using mark up language.
- ✓ Create and work with various office tools.
- ✓ Enhance the skill to protect the system and its information from cyber attacks.

Course Content:

UNIT 1:

Basic Internet skills: Understanding browser, efficient use of search engines, awareness about Digital
India portals (state and national portals) and college portals.

General understanding of various computer hardware components – CPU, Memory, Display, Key- board, Mouse, HDD and other Peripheral Devices.

UNIT 2:

OS Installation (Linux and MS Windows), Unix Shell and Commands, vi editor.

UNIT 3:

HTML4, CSS, making basic personal webpage.

UNIT 4:

Office Tools: OpenOffice Writer, OpenOffice Spreadsheet (Calc), OpenOffice Impress.

UNIT 5: Information security best practices.

Class lectures will only introduce the topic or demonstrate the tool, actual learning will take place in the Lab by practicing regularly.

Suggested Lab Work:

This is a skill course. Topics/concepts taught in the class should be practiced in the Lab same week and practiced regularly during the semester till student becomes confident about it. This course is all about some theory and a lot of practice.

References:

1. Introduction to IT Systems (English) by Prof. Prashant Joshi (Download from https://ekumbh.aicte-india.org/dbook.php)
2. R.S. Salaria, Computer Fundamentals, Khanna Publishing House
3. Ramesh Bangia, PC Software Made Easy – The PC Course Kit, Khanna Publishing House
4. Online Resources, Linux man pages, Wikipedia
5. Mastering Linux Shell Scripting: A practical guide to Linux command-line, Bash scripting, and Shell programming, by Mokhtar Ebrahim, Andrew Mallett

Applied Physics –I Course Code-TH 2 (Common to 1st Sem)

Period per week:	4	IA:	30 Marks
Total Period:	60	End Sem Exam:	70 Marks
Timing of End Exam:	3 Hours	No. Of Credit:	4

Course Outcome:

After completion of the course the students will be able to:

1) Classify different physical quantities and derive their units and dimensions.

2) Differentiate between scalar and vector quantity and use its properties to understand physical laws & different types of motion .

3) Apply the basic concept of force, torque, work, energy, power, friction, Moment of Inertia to solve simple classical Mechanics problems.

4) Apply different laws of elasticity, hydro statics and hydro dynamics to calculate various mechanical properties of solid and fluids.

5) Analyze various modes of heat transfer and behaviour of matter under exposure of heat and select appropriate thermometer to measure various range of temperature in industrial application.

Course Content:

Unit 1: **Physical world, Units and Measurements**

Physical quantities; fundamental and derived, Units and systems of units (FPS, CGS and SI units),

Dimensions and dimensional formulae of physical quantities, Principle of homogeneity of dimensions, Dimensional equations and their applications (conversion from one system of units to other, checking of dimensional equations and derivation of simple equations), Limitations of dimensional analysis.

Measurements: Need, measuring instruments, least count, types of measurement (direct, indirect), Errors in measurements (systematic and random), absolute error, relative error, error propagation, error estimation and significant figures.

Unit 2: Force and Motion

Scalar and Vector quantities – examples, representation of vector, types of vectors. Addition and Subtraction of Vectors, Triangle and Parallelogram law (Statement only), Scalar and Vector Product, Resolution of a Vector and its application to inclined plane and lawn roller.

Force, Momentum, Statement and derivation of conservation of linear momentum, its applications such as recoil of gun, rockets, Impulse and its applications.

Circular motion, definition of angular displacement, angular velocity, angular acceleration, frequency, time period, Relation between linear and angular velocity, linear

acceleration and angular acceleration (related numerical), Centripetal and Centrifugal forces with live examples, Expression and applications such as banking of roads and bending of cyclist.

Unit 3: Work, Power and Energy

Work: Concept and units, examples of zero work, positive work and negative work
Friction: concept, types, laws of limiting friction, coefficient of friction, reducing friction and its engineering applications, Work done in moving an object on horizontal and inclined plane for rough and plane surfaces and related applications.

Energy and its units, kinetic energy, gravitational potential energy with examples and derivations, mechanical energy, conservation of mechanical energy for freely falling bodies, trans- formation of energy (examples).

Power and its units, power and work relationship, calculation of power (numerical problems).

Unit 4: **Rotational Motion**

Translational and rotational motions with examples, Definition of torque and angular momentum and their examples, Conservation of angular momentum (quantitative) and its applications.

Moment of inertia and its physical significance, radius of gyration for rigid body, Theorems of parallel and perpendicular axes (statements only), Moment of inertia of rod, disc, ring and sphere (hollow and solid); (Formulae only).

Unit 5: **Properties of Matter**

Elasticity: definition of stress and strain, moduli of elasticity, Hooke's law, significance of stress-strain curve.

Pressure: definition, units, atmospheric pressure, gauge pressure, absolute pressure, Fortin's Barometer and its applications.

Surface tension: concept, units, cohesive and adhesive forces, angle of contact, Ascent Formula (No derivation), applications of surface tension, effect of temperature and impurity on surface tension.
Viscosity and coefficient of viscosity: Terminal velocity, Stoke's law and effect of temperature
on viscosity, application in hydraulic systems.

Hydrodynamics: Fluid motion, stream line and turbulent flow, Reynold's number Equation of continuity, Bernoulli's Theorem (only formula and numericals) and its applications.

Unit 6: Heat and Thermometry

Concept of heat and temperature, modes of heat transfer (conduction, convection and radiation with examples), specific heats, scales of temperature and their relationship, Types of Thermometer (Mercury thermometer, Bimetallic thermometer, Platinum resistance thermometer, Pyrometer) and their uses.
Expansion of solids, liquids and gases, coefficient of linear, surface and cubical expansions and relation amongst them, Co-efficient of thermal conductivity, engineering applications.

References:

1. Applied Physics-I (English) by Prof. Vinod Kumar Yadav (down load from https://ekumbh.aicte-india.org/dbook.php)
2. 'Text Book of Physics for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi
3. Applied Physics, Vol. I and Vol. II, TTTI Publications, Tata McGraw Hill, Delhi.
4. Concepts in Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi
5. Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, New Delhi
6. Engineering Physics by DK Bhhatacharya & PoonamTandan; Oxford University Press, New Delhi.
7. Comprehensive Practical Physics, Vol, I & II, JN Jaiswal, Laxmi Publications (P) Ltd., New Delhi
8. Practical Physics by C. L. Arora, S. Chand Publication.
9. e-books/e-tools/ learning physics software/websites etc.

Mathematics- I

Course Code- TH 3 (Common to 1st Sem)

Period per week:	4	IA:	30 Marks
Total Period:	60	End Sem Exam:	70 Marks
Timing of End Exam:	3 Hours	No. Of Credit:	4

Course Outcomes:

At end of the course, the students will be able to:

(i) Acquire necessary background in Trigonometry to appreciate the importance of the geometric study as well as for the calculation and the mathematical analysis of engineering problems.

(ii) Find the effects of changing conditions on a system in probability and calculus.

(iii) Apply Complex numbers to physical phenomena.

(iv) Decompose rational function to partial fraction for computing the anti-derivative of a function.

Course Content:

UNIT - I: Trigonometry

Concept of angles, measurement of angles in degrees, grades and radians and their conversions, T-Ratios of Allied angles (without proof), Sum, difference formulae and their applications (without proof). Product formulae (Transformation of product to sum, difference and vice versa). T- Ratios of multiple angles, sub-multiple angles (2A, 3A, A/2). Graphs of sin x, cos x, tan x and e^x .

UNIT-II: Differential Calculus

Definition of function; Concept of limits. Four standard limits   and  .

Differentiation by definition of  , e^x and  . Differentiation of sum, product and quotient of functions. Differentiation of function of a function. Differentiation of trigonometric and inverse trigonometric functions, Logarithmic differentiation, Exponential functions.

UNIT - III: Algebra

Complex Numbers: Definition, real and imaginary parts of a Complex number, polar and Cartesian, representation of a complex number and its conversion from one form to other, conjugate of a com- plex number, modulus and amplitude of a complex number Addition, Subtraction, Multiplication and Division of a complex number. De-movier's theorem, its application.

Partial fractions: Definition of polynomial fraction proper & improper fractions and definition of partial fractions. To resolve proper fraction into partial fraction with denominator containing non-repeated linear factors, repeated linear factors and irreducible non-repeated quadratic factors. To resolve improper fraction into partial fraction.

Permutations and Combinations: Value of ${}^{n}P_{r}$ and ${}^{n}C_{r}$.

Binomial theorem: Binomial theorem (without proof) for positive integral index (expansion and general form); binomial theorem for any index (expansion without proof) first and second binomial approximation with applications to engineering problems

References:

✓ Mathematics-I by Dr. Deepak Singh (Download from https://ekumbh.aicte- india.org/dbook.php)

✓ B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi, 40th Edition, 2007.

✓ G. B. Thomas, R. L. Finney, Calculus and Analytic Geometry, Addison Wesley, 9th Edition, 1995.

✓ Reena Garg, Engineering Mathematics, Khanna Publishing House, New Delhi (Revised Ed. 2018)

✓ V. Sundaram, R. Balasubramanian, K.A. Lakshminarayanan, Engineering Mathematics, 6/e., Vikas Publishing House.

✓ Reena Garg & Chandrika Prasad, Advanced Engineering Mathematics, Khanna Publishing House, New Delhi

Fundamentals of Electrical & Electronics Engineering

Course Code- TH 4(a)

(Common to 1st & 2nd sem)

Period per week:	4	IA:	30 Marks
Total Period:	60	End Sem Exam:	70 Marks
Timing of End Exam:	3 Hours	No. Of Credit:	4

Course Outcome-

At the end of this course, the students will be able to:

- ✓ Identify & analyze different types of electronics components and signals.
- ✓ Analyze basic op-amp circuits and digital circuits.
- ✓ Develop the concept on Electrical and magnetic circuit parameters.
- ✓ Acquire knowledge of Machines & Transformer.
- ✓ Develop knowledge on AC circuit & solve numericals.

Course Content:

UNIT I Overview of Electronic Components & Signals:

Passive Active Components: Resistances, Capacitors, Inductors, Diodes, Transistors, FET, MOS and CMOS and their Applications. (Concept and simple problems of Resistance, Capacitor & Inductor, Definition, classification and Working of diode(PN juction,LED, Zener), transistor, FET, Concept of MOS and CMOS)

Signals: DC/AC, voltage/current, periodic/non-periodic signals, average, rms, peak values, different types of signal waveforms, Ideal/non-ideal voltage/current sources, independent/dependent voltage current sources. (Definitions)

UNIT II Overview of Analog Circuits:

Operational Amplifiers-Ideal Op-Amp, Practical op amp, Open loop and closed loop configurations, Application of Op-Amp as amplifier, adder, differentiator and integrator.

UNIT III Overview of Digital Electronics: Introduction to Boolean Algebra, Electronic Implementation of Boolean Operations, Gates-Functional Block Approach (Simple problems of Number system)
Storage elements-Flip Flops-A Functional block approach, Counters: Ripple, Up/down and decade, Introduction to digital IC Gates (of TTL Type).

Unit IV Electric and Magnetic Circuits:

EMF, Current, Potential Difference, Power and Energy; M.M.F, magnetic force, permeability, hysteresis loop, reluctance, leakage factor and BH curve; Electromagnetic induction, Faraday's laws of electromagnetic induction, Lenz's law; Dynamically induced emf; Statically induced emf; Equations of self and mutual inductance; Analogy between electric and magnetic circuits.

Unit V A.C. Circuits:

Cycle, Frequency, Periodic time, Amplitude, Angular velocity, RMS value, Average value, Form Factor Peak Factor, impedance, phase angle, and power factor; Mathematical and phasor representation of alternating emf and current; Voltage and Current relationship in Star and Delta connections; A.C in resistors, inductors and capacitors; A.C in R-L series, R-C series, R-L-C series and parallel circuits; Power in A. C. Circuits, power triangle.

Unit VI Transformer and Machines: General construction and principle of different type of transformers; Emf equation and transformation ratio of transformers; Auto transformers; Construction and Working principle of motors; Basic equations and characteristic of motors.

References:

1. Fundamentals of Electrical and Electronics Engineering by Prof. Susan S. Mathew (Download from https://ekumbh.aicte-india.org/dbook.php)
2. Ritu Sahdev, Basic Electrical Engineering, Khanna Publishing House
3. Mittle and Mittal, Basic Electrical Engineering, McGraw Education, New Delhi, 2015, ISBN : 978-0-07-0088572-5
4. Saxena, S. B. Lal, Fundamentals of Electrical Engineering, Cambridge University Press, latest edition ISBN : 9781107464353
5. Theraja, B. L., Electrical Technology Vol – I, S. Chand Publications, New Delhi, 2015, ISBN: 9788121924405
6. Theraja, B. L., Electrical Technology Vol – II, S. Chand Publications, New Delhi, 2015, ISBN: 9788121924375
7. Jegathesan, V., Basic Electrical and Electronics Engineering, Wiley India, New Delhi, 2015, ISBN : 97881236529513
8. Sedha, R.S., A text book of Applied Electronics, S.Chand, New Delhi, 2008, ISBN-13: 978-8121927833
9. Malvino, Albert Paul, David, Electronics Principles, McGraw Hill Education, New Delhi,2015, ISBN-13**:** 0070634244-978
10. Mehta, V.K., Mehta, Rohit, Principles of Electronics, S. Chand and Company, New Delhi, 2014, ISBN-13-9788121924504
11. Bell Devid, Fundamental of Electronic Devices and Circuits, Oxford University Press, NewDelhi 2015 ISBN : 9780195425239

Engineering Mechanics

Course Code- TH 4(b)

(Common to 1st & 2nd sem)

Period per week:	4	IA:	30 Marks
Total Period:	60	Term End Exam:	70 Marks
Timing of End Exam:	3 Hours	No. Of Credit:	4

Course outcomes:

After completing this course, student will be able to:

1. Analyze the coplanar force system and find out the resultant force of this system by applying basics of mechanics.
2. Determine unknown forces of different engineering systems by applying laws of equilibrium.
3. Apply the principle of friction in various conditions when the object is in static equilibrium.
4. Find the centroid and centre of gravity of various components in engineering system.
5. Analyze different simple machines to find out different influencing parameters viz. Mechanical Advantage, Velocity Ratio and Efficiency.

Course Contents:

Unit – I Basics of mechanics and force system

Significance and relevance of Mechanics, Applied mechanics, Statics, Dynamics.

Space, time, mass, particle, flexible body and rigid body.

Scalar and vector quantity, Units of measurement (SI units) - Fundamental units and derived units.

Force – unit, representation as a vector and by Bow's notation, characteristics and effects of a force, Principle of transmissibility of force, Force system and its classification.

Resolution of a force - Orthogonal components of a force, moment of a force, Varignon's Theorem.

Composition of forces – Resultant, analytical method for determination of resultant for concurrent, non-concurrent and parallel co-planar force systems – Law of triangle, parallelogram and polygon of forces.

Unit– II Equilibrium

Equilibrium and Equilibrant, Free body and Free body diagram, Analytical and graphical methods of analysing equilibrium

Lami's Theorem – statement and explanation, Application for various engineering problems.

Types of beam, supports (simple, hinged, roller and fixed) and loads acting on beam (vertical and inclined point load, uniformly distributed load, couple),

Beam reaction for cantilever, simply supported beam with or without overhang – subjected to combination of Point load and uniformly distributed load.

Beam reaction graphically for simply supported beam subjected to vertical point loads only.

Unit– III Friction

Friction and its relevance in engineering, types and laws of friction, limiting equilibrium, limiting friction, co-efficient of friction, angle of friction, angle of repose, relation between co-efficient of friction and angle of friction.

Equilibrium of bodies on level surface subjected to force parallel and inclined to plane.

Equilibrium of bodies on inclined plane subjected to force parallel to the plane only.

Unit– IV Centroid and centre of gravity

Centroid of geometrical plane figures (square, rectangle, triangle, circle, semi-circle, quarter circle)

Centroid of composite figures composed of not more than three geometrical figures

Centre of Gravity of simple solids (Cube, cuboid, cone, cylinder, sphere, hemisphere) Centre of Gravity of composite solids composed of not more than two simple solids.

Unit – V Simple lifting machine

Simple lifting machine, load, effort, mechanical advantage, applications and advantages. Velocity
ratio, efficiency of machines, law of machine.

Ideal machine, friction in machine, maximum Mechanical advantage and efficiency, reversible and non-reversible machines, conditions for reversibility

Velocity ratios of Simple axle and wheel, Differential axle and wheel, Worm and worm wheel, Single purchase and double purchase crab winch, Simple screw jack, Weston's differential pulley block, geared pulley block.

Suggested Learning Resources:

1. Engineering Mechanics by Prof. Bhankhar Bharat Gokaldas (Download from https://ekumbh.aicte-india.org/dbook.php)
2. D.S. Bedi, Engineering Mechanics, Khanna Publications, New Delhi (2008)
3. Khurmi, R.S., Applied Mechanics, S. Chand & Co. New Delhi.
4. Bansal R K, A text book of Engineering Mechanics, Laxmi Publications.
5. Ramamrutham, Engineering Mechanics, S. Chand & Co. New Delhi.
6. Dhade, Jamadar & Walawelkar, Fundamental of Applied Mechanics, Pune Vidhyarthi Gruh.
7. Ram, H. D.; Chauhan, A. K., Foundations and Applications of Applied Mechanics, Cam- bridge University Press.
8. Meriam, J. L., Kraige, L.G., Engineering Mechanics- Statics, Vol. I, Wiley Publication, New Delhi.

Environmental Science Course Code-TH 5(a) (Common to 1st & 2nd sem)

Period per week:	4	IA:	30 Marks
Total Period:	60	End Sem Exam:	70 Marks
Timing of End Exam:	3 Hours	No. Of Credit:	4

Course outcomes

At the end of the course student will be able to

1. Understand the ecosystem and terminology and solve various engineering problems applying ecosystem knowledge to produce eco-friendly products.
2. Understand the suitable air, extent of noise pollution, and control measures and acts.
3. Understand the water and soil pollution, and control measures and acts.
4. Understand different renewable energy resources and efficient process of harvesting.
5. Understand solid Waste Management, ISO 14000 & Environmental Management

Course Content:

Unit-1 Ecosystem

Structure of ecosystem, Biotic & Abiotic components Food chain and food web

Aquatic (Lentic and Lotic) and terrestrial ecosystem Carbon, Nitrogen, Sulphur, Phosphorus cycle.

Global warming -Causes, effects, process, Green House Effect, Ozone depletion

Unit– 2 Air and, Noise Pollution

Definition of pollution and pollutant, Natural and man made sources of air pollution (Refrigerants, I.C., Boiler)

Air Pollutants: Types, Particulate Pollutants: Effects and control (Bag filter, Cyclone separator, Electrostatic Precipitator)

Gaseous Pollution Control: Absorber, Catalytic Converter, Effects of air pollution due to Refrigerants, I.C., Boiler

Noise pollution: sources of pollution, measurement of pollution level, Effects of Noise pollution, Noise pollution (Regulation and Control) Rules, 2000

Unit- 3 Water and Soil Pollution

Sources of water pollution, Types of water pollutants, Characteristics of water pollutants Turbidity, pH, total suspended solids, total solids BOD and COD: Definition, calculation

Waste Water Treatment: Primary methods: sedimentation, froth floatation, Secondary methods: Activated sludge treatment, Trickling filter, Bioreactor, Tertiary Method: Membrane separation technology, RO (reverse osmosis).

Causes, Effects and Preventive measures of Soil Pollution: Causes-Excessive use of Fertilizers, Pesticides and Insecticides, Irrigation, E-Waste.

Unit– 4 Renewable sources of Energy

Solar Energy: Basics of Solar energy. Flat plate collector (Liquid & Air). Theory of flat plate col- lector. Importance of coating. Advanced collector. Solar pond. Solar water heater, solar dryer. Solar stills.

Biomass: Overview of biomass as energy source. Thermal characteristics of biomass as fuel. Anaerobic digestion. Biogas production mechanism. Utilization and storage of biogas.

Wind energy: Current status and future prospects of wind energy. Wind energy in India. Environmental benefits and problem of wind energy.

New Energy Sources: Need of new sources. Different types new energy sources. Applications of (Hydrogen energy, Ocean energy resources, Tidal energy conversion.) Concept, origin and power plants of geothermal energy

Unit-5 Solid Waste Management, ISO 14000 & Environmental Management 06 hours

Solid waste generation- Sources and characteristics of : Municipal solid waste, E- waste, bio-medical waste.

Metallic wastes and Non-Metallic wastes (lubricants, plastics, rubber) from industries.

Collection and disposal: MSW (3R, principles, energy recovery, sanitary landfill), Hazardous waste.

Air quality act 2004, air pollution control act 1981 and water pollution and control act1996.

Structure and role of Central and state pollution control board.

Concept of Carbon Credit, Carbon Footprint. Environmental management in fabrication industry. ISO14000: Implementation in industries, Benefits.

References:

(a) Suggested Learning Resources:

Books:

1. Environmental Science (English) by Dr. Subrat Roy (Download from https://ekumbh.aicte-india.org/dbook.php)
2. S.C. Sharma & M.P. Poonia, Environmental Studies,Khanna Publishing House,NewDelhi
3. C.N. R. Rao, Understanding Chemistry, Universities Press (India) Pvt. Ltd., 2011.
4. Arceivala, Soli Asolekar, Shyam, Waste Water Treatment for Pollution Control and Reuse, Mc-Graw Hill Education India Pvt. Ltd., New York, 2007, ISBN:978-07-062099-
5. Nazaroff, William, Cohen, Lisa, Environmental Engineering Science, Willy, New York, 2000, ISBN 10: 0471144940.
6. O.P. Gupta, Elements of Environmental Pollution Control, Khanna Publishing House, New Delhi
7. Rao, C. S., Environmental Pollution Control and Engineering, New Age International Publication, 2007, ISBN: 81-224-1835-X.
8. Rao, M. N.Rao, H.V.N, Air Pollution, Tata Mc-Graw Hill Publication, New delhi, 1988, ISBN: 0-07- 451871-8.
9. Frank Kreith, Jan F Kreider, Principles of Solar Engineering, McGraw-Hill, New York ; 1978, ISBN: 9780070354760.

10. Aldo Vieira, Da Rosa, Fundamentals of renewable energy processes, Academic Press Oxford, UK; 2013. ISBN: 9780123978257.

11. Patvardhan, A.D, Industrial Solid Waste, Teri Press, New Delhi, 2013, ISBN:978-81- 7993-502-6

12. Metcalf & Eddy, Waste Water Engineering, Mc-Graw Hill, New York, 2013, ISBN: 077441206.

13. Keshav Kant, Air Pollution & Control, Khanna Publishing House, New Delhi (Edition 2018)

(b) Open source software and website address:

1) www.eco-prayer.org
2) www.teriin.org
3) www.cpcp.nic.in
4) www.cpcp.gov.in
5) www.indiaenvironmentportal.org.in
6) www.whatis.techtarget.com
7) www.sustainabledevelopment.un.org
8) www.conserve-energy-future.com)

Teachers should use the following strategies to achieve the various outcomes of the course.

- Different methods of teaching and media to be used to attain classroom attention.
- Massive open online courses (MOOCs) may be used to teach various topics/sub topics.
- 15-20% of the topics which are relatively simpler of descriptive in nature should be given to the students for self-learning and assess the development of competency through classroom presentations.
- Micro-projects may be given to group of students for hand-on experiences.
- Encouraging students to visit to sites such as Railway station and research establishment around the institution.

Applied Chemistry Course Code- TH 5(b) (Common to 1st & 2nd sem)

Period per week:	4	IA:	30 Marks
Total Period:	60	End Sem Exam:	70 Marks
Timing of End Exam:	3 Hours	No. Of Credit:	4

Course Outcome:

After completing this course, student will be able to:

1) Solve various engineering problems applying the basic knowledge of atomic, molecular, electronic modifications and Chemical bonding by analyzing the technology based on them.
2) Identify the problems associated with raw water used in drinking & boilers and sewage water and solve the problems by using different water treatment methods.
3) Analyze the properties engineering materials and substitute metals with conducting polymers and also produce cheaper biodegradable polymers to reduce environmental pollution.
4) Use relevant fuel and lubricants for domestic and industrial applications
5) To impart knowledge on the essential aspects of electrochemical cells, emf, applications of emf measurements and understand the Principles of corrosion and corrosion control.

- **Unit 1: Atomic Structure, Chemical Bonding and Solutions**

Rutherford model of atom, Bohr's theory (expression of energy and radius to be omitted), and hydrogen spectrum explanation based on Bohr's model of atom, Heisenberg uncertainty principle, Quantum numbers – orbital concept. Shapes of s,p and d orbitals, Pauli's exclusion principle, Hund's rule of maximum multiplicity Aufbau rule, electronic configuration.

Concept of chemical bonding – cause of chemical bonding, types of bonds: ionic bonding (NaCl example), covalent bond (H_2, F_2, HF hybridization in $BeCl_2$, BF_3, CH_4, NH_3, H_2O), coordination bond in NH_4^+, and anomalous properties of NH_3, H_2O due to hydrogen bonding, and metallic bonding.

Solution – idea of solute, solvent and solution, methods to express the concentration of solution molarity (*M* = mole per liter), ppm, mass percentage, volume percentage and mole frac tion.

- **Unit 2: Water**

Graphical presentation of water distribution on Earth (pie or bar diagram). Classification of soft and hard water based on soap test, salts causing water hardness, unit of hardness and simple numerical on water hardness.

Cause of poor lathering of soap in hard water, problems caused by the use of hard water in boiler (scale and sludge, foaming and priming, corrosion etc), and quantitative measurement of water hardness by ETDA method, total dissolved solids (TDS) alkalinity estimation.

I) Water softening techniques – soda lime process, zeolite process and ion exchange process.

II) Municipal water treatment (in brief only) – sedimentation, coagulation, filtration, sterilization.

Water for human consumption for drinking and cooking purposes from any water sources and enlist Indian standard specification of drinking water (collect data and understand standards).

- **Unit 3: Engineering Materials**

  Natural occurrence of metals – minerals, ores of iron, aluminium and copper, gangue (ma- trix), flux, slag, metallurgy – brief account of general principles of metallurgy.

  Extraction of - iron from haematite ore using blast furnace, aluminium from bauxite along with reactions. Alloys – definition, purposes of alloying, ferrous alloys and non-ferrous with suitable examples, properties and applications.

  General chemical composition, composition based applications (elementary idea only details omitted):

  Port land cement and hardening, Glasses Refractory and Composite materials.

  Polymers – monomer, homo and co polymers, degree of polymerization, simple reactions involved in preparation and their application of thermoplastics and thermosetting plastics (using PVC, PS, PTFE, nylon – 6, nylon-6,6 and Bakelite), rubber and vulcanization of rubber.

- **Unit 4: Chemistry of Fuels and Lubricants**

  Definition of fuel and combustion of fuel, classification of fuels, calorific values (HCV and LCV), calculation of HCV and LCV using Dulong's formula.

  Proximate analysis of coal solid fuel

  petrol and diesel - fuel rating (octane and cetane numbers),

  Chemical composition, calorific values and applications of LPG, CNG, water gas, coal gas, producer gas and biogas.

  Lubrication – function and characteristic properties of good lubricant, classification with examples, lubrication mechanism – hydrodynamic and boundary lubrication, physical proper- ties (viscosity and viscosity index, oiliness, flash and fire point, could and pour point only) and chemical properties (coke number, total acid number saponification value) of lubricants.

- **Unit 5: Electro Chemistry**

  Electronic concept of oxidation, reduction and redox reactions.
  Definition of terms: electrolytes, non-electrolytes with suitable examples, Faradays laws of electrolysis and simple numerical problems.
  Industrial Application of Electrolysis –
    - Electrometallurgy
    - Electroplating
    - Electrolytic refining.

  Application of redox reactions in electrochemical cells –
    - Primary cells – dry cell,
    - Secondary cell - commercially used lead storage battery, fuel

  and Solar cells. Introduction to Corrosion of metals –
    - definition, types of corrosion (chemical and electrochemical), H_2 liberation and O_2 absorption mechanism of electrochemical corrosion, factors affecting rate of corrosion.

  Internal corrosion preventive measures –
    - Purification, alloying and heat treatment and

External corrosion preventive measures: a) metal (anodic, cathodic) coatings, b) organic inhibitors.

Suggested Sessional work:

- **Unit 1: Atomic Structure, Chemical Bonding and Solutions**

  Assignments: Writing electronic configuration of elements up to atomic number 30 (Z= 30). Numerical on molarity, ppm, mass percentage, volume percentage and mole fraction of given solution.

  Seminar: 1. Quantum numbers,

  2. Discuss the metallic properties such as malleability, ductility, hardness, high melting point, conductance of heat and electricity, magnetic properties of metals.

  Projects: Model of molecules $BeCl_2$, BF_3, CH_4, NH_3, H_2O.

- **Unit 2: Water**

  Assignments: Simple problems on hardness calculation.

  Seminar: 1. Quality and quantity requirement of water in house and industry.

  2. Quality of control measures of effluents (BOD & COD).

  Projects: Collect water samples from different water sources and measure of hardness of water.

- **Unit 3: Engineering Materials**

  Assignments: Preparation of table showing different ores of iron, copper and aluminium metals along with their chemical compositions and classify in to oxide sulphide halide ores.

  Seminar: Discuss the chemical reactions taking place in blast furnace in extraction
  of Fe, Cu and Al metals.

  Projects: Make table showing place of availability of different ores in India and show places on India map.

- **Unit 4: Chemistry of Fuels and Lubricants**

  Assignments: Calculation of HCV and LCV of fuel using fuel composition in Dulong's formula.

  Seminar: Chemical structure of fuel components influence on fuel rating.

  Projects: Mapping of energy resources in India. Collection of data of various lubricants available in the market.

- **Unit 5: Electro Chemistry**

  Assignments: Simple problems on Faradays laws of electrolysis.

  Seminar: 1. Corrosion rate and units.
  2. Corrosion preventions.

  Projects: Mapping of area in India prone to corrosion. Collection of data of various electrochemical cells batteries used in equipment and devices and avail- able in market. Visit to sites such as Railway station to watch corrosion area in railways and research establishment in and around the institution.

References/Suggested Learning Resources:

(a) Books :

✓ Applied Chemistry by Dr. Anju Rawlley (Download from https://ekumbh.aicte- india.org/dbook.php)
✓ Text Book of Chemistry for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi, 2017-18.
✓ Agarwal, & Shikha, Engineering Chemistry, Cambridge University Press; New Delhi, 2015.
✓ C.N. R. Rao, Understanding Chemistry, Universities Press (India) Pvt. Ltd., 2011.
✓ Dara, S. S. & Dr.S.S.Umare, Engineering Chemistry, S.Chand. Publication, New Delhi, New Del- hi, 2015.
✓ Jain & Jain, Engineering Chemistry, Dhanpat Rai and Sons; New Delhi, 2015.
✓ Dr. Vairam, S., Engineering Chemistry, Wiley India Pvt.Ltd., New Delhi, 2013.
✓ Dr. G. H. Hugar & Prof A. N. Pathak, Applied Chemistry Laboratory Practices, Vol. I and Vol. II, NITTTR, Chandigarh, Publications, 2013-14.
✓ Agnihotri, Rajesh, Chemistry for Engineers, Wiley India Pvt.Ltd., 2014.

(b) Open source software and website address:

1. www.chemguide.co.uk/atommenu.html (Atomic structure and chemical bonding)
2. www.visionlearning.com (Atomic structure and chemical bonding)
3. www.chem1.com (Atomic structure and chemical bonding)
4. https://www.wastewaterelearning.com/elearning/ (Water Treatment)
5. www.capital-refractories.com (Metals, Alloys, Cement, and Refractory Materials)
6. www.em-ea.org/guide%20books/book-2/2.1%20fuels%20and%20combustion.pdf (Fuel and Combustion)
7. www.chemcollective.org (Metals, Alloys)
8. www.wqa.org(Water Treatment)

Communication Skills in English Lab

Course Code- PR
1(a) (Common to 1st & 2nd sem)

Period per week:	4	Sessional:	25 Marks
Total Period:	60	End Sem Exam:	---
Timing of End Exam:	---	No. Of Credit:	2

COURSE OUTCOME:

After completion of the course the students will be able to:

1. Apply 4s i.e Listening, speaking, reading and writing effectively in day to day life.
2. Use of correct pronunciation, intonation, stress, rhythm, speed and pause while communicating with others .
3. Comprehend the basic etiquette of interview, GD,conversation and presentation
4. Analyze a given topic and way to present it.
5. Build vocabulary and use in every day situation.

Course Content:

Unit 1 Listening Skills

Listening Process and Practice: Introduction to recorded lectures, poems, interviews and speeches, listening tests.

Unit II Introduction to Phonetics

Sounds: consonant, vowel, diphthongs, etc. transcription of words (IPA), weak forms, syllable division, word stress, intonation, voice etc.

Unit III Speaking Skills

Standard and formal speech: Group discussion, oral presentations, public speaking, business presentations etc. Conversation practice and role playing, mock interviews etc.

Unit IV Building vocabulary

Etymological study of words and construction of words, phrasal verbs, foreign phrases, idioms and phrases. Jargon/ Register related to organizational set up, word exercises and word games to enhance self-expression and vocabulary of participants.

Recommended Readings:

1. Daniel Jones. *The Pronunciation of English.* Cambridge: Cambridge University Press, 1956.
2. James Hartman& et al. Ed. *English Pronouncing Dictionary.* Cambridge: Cambridge University Press, 2006.
3. Kulbhushan Kumar, Effective Communication Skills, Khanna Publishing House, New Delhi (Revised Ed. 2018)
4. J.D.O'Connor. *Better English Pronunciation.* Cambridge: Cambridge University Press, 1980.
5. Lindley Murray. *An English Grammar: Comprehending Principles and Rules.* London: Wilson and Sons, 1908.
6. Margaret M. Maison. *Examine your English.* Orient Longman: New Delhi, 1964.
7. J.Sethi & et al. *A Practice Course in English Pronunciation*. New Delhi: Prentice Hall, 2004.

8. Pfeiffer, William Sanborn and T.V.S Padmaja. *Technical Communication: A Practical Approach*. 6th ed. Delhi: Pearson, 2007.

Introduction to IT System Lab

Course Code- PR 1(b)

(Common to 1st & 2nd sem)

Period per week:	4	Sessional:	25 Marks
Total Period:	60	End Sem Exam:	---
Timing of End Exam:	---	No. Of Credit:	2

Course outcomes:

At the end of the course students will be able to:

1) Analyze the components of computer hardware such as ports, interfaces, cables etc. and assemble them.
2) Install & configure Linux/Windows Operating System and explore the security features/tools of OS.
3) Create & work with various Office Tools.
4) Apply the knowledge to access browsers, search engines, Web Pages and understand the features of government sites/portals by accessing the services offered by them.
5) Design & Develop the Web Pages by using mark-up language /scripts.

Course Content:

S.No.	Topics for Practice
1	Browser features, browsing, using various search engines, writing search queries
2	Visit various e-governance/Digital India portals, understand their features, services offered
3	Read Wikipedia pages on computer hardware components, look at those components in lab, identify them, recognize various ports/interfaces and related cables, etc.
4	Install Linux and Windows operating system on identified lab machines, explore various options, do it multiple times.
5	Connect various peripherals (printer, scanner, etc.) to computer, explore various features of peripheral and their device driver software.
6	Practice HTML commands, try them with various values, make your own Webpage
7	Explore features of Open Office tools, create documents using these features, do it multiple times.
8	Explore security features of Operating Systems and Tools, try using them and see what happens.

This is a skill course. More you practice, better it will be.

References:

1) Introduction to IT Systems (English) by Prof. Prashant Joshi (Download from https://ekumbh.aicte-india.org/dbook.php)
2) Online resources, Linux man pages, Wikipedia.
3) R.S. Salaria, Computer Fundamentals, Khanna Publishing House.

4) Ramesh Bangia, PC Software Made Easy – The PC Course Kit, Khanna Publishing House.
5) Mastering Linux Shell Scripting: A practical guide to Linux command-line, Bash scripting, and Shell programming, by Mokhtar Ebrahim, Andrew Mallett.
6) IT Essentials PC Hardware and Software Companion Guide, Davis Anfinson and Ken Quamme, CISC Press, Pearson Education.
7) PC Hardware and A+ Handbook, Kate J. Chase PHI (Microsoft).

Applied Physics-I Lab

Course Code- PR 2 (Common to 1st sem)

Period per week:	2	Sessional:	25 Marks
Total Period:	30	End Sem Exam:	25 Marks
Timing of End Exam:	3 Hours	No. Of Credit:	1

List of Practical's/Activities (To perform minimum 8 practicals).

1. To measure length, radius of a given cylinder, a test tube and a beaker using a Vernier caliper and find volume of each object.
2. To determine diameter of a wire, a solid ball and thickness of cardboard using a screw gauge.
3. To determine radius of curvature of a convex and a concave mirror/surface using a spherometer.
4. To verify triangle and parallelogram law of forces.
5. To find the co-efficient of friction between wood and glass using a horizontal board.
6. To determine force constant of a spring using Hook's Law.
7. To verify law of conservation of mechanical energy (PE to KE).
8. To find the moment of inertia of a flywheel.
9. To find the viscosity of a given liquid (Glycerin) by Stoke's law.
10. To find the coefficient of linear expansion of the material of a rod.
11. To determine atmospheric pressure at a place using Fortin's barometer.
12. To measure room temperature and temperature of a hot bath using mercury thermometer and convert it into different scales.

SUGGESTED STUDENT ACTIVITES & STRATEGIES

Apart from classroom and laboratory learning following are the suggested student related activities which can be undertaken to accelerate the attainment of various outcomes of the course

a. Make survey of different physical products and compare the following points
   - Measurements of dimensions
   - Properties
   - Applications
b. Library survey regarding engineering materials/products used in different industries
c. Seminar on any relevant topic.

Teachers should use the following strategies to achieve the various outcomes of the course.

- Different methods of teaching and media to be used to attain classroom attention.
- Massive open online courses (MOOCs) may be used to teach various topics/sub topics.
- 15-20% of the topics which are relatively simpler of descriptive in nature should be given to the students for self-learning and assess the development of competency through classroom presentations.
- Micro-projects may be given to group of students for hand-on experiences.

References:

1. Applied Physics-I (English) by Prof. Vinod Kumar Yadav (Download from https://ekumbh.aicte-india.org/dbook.php)
2. Text Book of Physics for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi
3. Comprehensive Practical Physics, Vol, I & II, JN Jaiswal, Laxmi Publications (P)Ltd.,
4. Practical Physics by C. L. Arora, S. Chand Publication.
5. e-books/e-tools/ learning physics software/YouTube videos/websites etc.

Engineering Graphics

Course Code- PR 3(a)

(Common to 1st & 2nd sem)

Period per week:	4	Sessional:	25 Marks
Total Period:	60	End Sem Exam	75 Marks
Timing of End Exam:	4 Hours	No. Of Credit	2

Course Outcomes

At the end of this course, the students will be able to:

1) Select and construct appropriate drawing scales, use drawing equipment's, and understand Indian Standards of engineering drawing
2) Draw views of given object and components
3) Sketch orthographic projections into isometric projections and vice versa.
4) Apply computer aided drafting tools to create 2D engineering drawings

Course Content

Unit – I Basic elements of Drawing

Drawing Instruments and supporting materials: method to use them with applications.
Convention of lines and their applications.
Representative Fractions – reduced, enlarged and full size scales;
Engineering Scales such as plain and diagonal scale.

Dimensioning techniques as per SP-46:2003 – types and applications of chain, parallel and coordinate dimensioning.

Geometrical and Tangency constructions. (Redraw the figure)

Unit – II Orthographic projections

Introduction of projections-orthographic, perspective, isometric and oblique: concept and applications. (No question to be asked in examination).

Introduction to orthographic projection, First angle and Third angle method, their symbols.

Conversion of pictorial view into Orthographic Views – object containing plain surfaces, slanting surfaces, slots, ribs, cylindrical surfaces. (use First Angle Projection method only)

Unit – III Isometric Projections

Introduction to isometric projections. Isometric scale and Natural scale.

Isometric view and isometric projection.

Illustrative problems related to objects containing lines, circles and arcs shape

only. Conversion of orthographic views into isometric view/projection.

Unit – IV Free Hand Sketches of engineering elements

Free hand sketches of machine elements: Thread profiles, nuts, bolts, studs, set screws, wash- er, Locking arrangements. (For branches other than mechanical Engineering, the teacher should select branch specific elements for free hand sketching)

Free hand sketches of orthographic view (on squared graph paper) and isometric view (on isometric grid paper)

Unit – V Computer aided drafting interface

Computer Aided Drafting: concept.

Hardware and various CAD software available.

System requirements and Understanding the interface.

Components of AutoCAD software window: Title bar, standard tool bar, menu bar, object properties tool bar, draw tool bar, modify tool bar, cursor cross hair. Command window, status bar, drawing area, UCS icon.

File features: New file, Saving the file, Opening an existing drawing file, Creating templates, Quit.

Setting up new drawing: Units, Limits, Grid, Snap. Undoing and redoing action.

Unit – VI Computer aided drafting

Draw basic entities like Line, Circle, Arc, Polygon, Ellipse, Rectangle, Multiline, PolyLine.

Method of Specifying points: Absolute coordinates, Relative Cartesian and Polar coordinates.

Modify and edit commands like trim, extend, delete, copy, offset, array, block, layers.

Dimensioning: Linear, Horizontal Vertical, Aligned, Rotated, Baseline, Continuous, Diameter, Radius, Angular Dimensions.

Dim scale variable.

Editing dimensions.

Text: Single line Text, Multiline text.

Standard sizes of sheet. Selecting Various plotting parameters such as Paper size, paper units, Drawing orientation, plot scale, plot offset, plot area, print preview.

S. No.	Practical Exercises	Unit No.
1	Draw horizontal, Vertical, 30 degree, 45 degree, 60 and 75 degrees lines, different types of lines, dimensioning styles using Tee and Set squares/ drafter. (do this exercise in sketch book)	I
2	Write alphabets and numerical (Vertical only) (do this exercise in sketch book)	I
3	Draw regular geometric constructions and redraw the given figure (do this exercise in sketch book) Part I	II
4	Draw regular geometric construction and redraw the given figure (do this exercise in sketch book) Part II	II
5	Draw a problem on orthographic projections using first angle method of projection having plain surfaces and slanting. Part I	III
6	Draw another problem on orthographic projections using first angle method of projection having slanting surfaces with slots. Part II	III
7	Draw two problems on orthographic projections using first angle method of projection having cylindrical surfaces, ribs. Part I	III
8	Draw two problems on Isometric view of simple objects having plain and slanting surface by using natural scale. Part I	IV
9	Draw some problems on Isometric projection of simple objects having cylindrical surface by using isometric scale. Part I	IV
10	Draw free hand sketches/ conventional representation of machine elements in sketch book such as thread profiles, nuts, bolts, studs, set screws, washers, Locking arrangements. Part I	V

11	Problem based Learning: Given the orthographic views of at least three objects with few missing lines, the student will try to imagine the corresponding objects, complete the views and draw these views in sketch book. Part I	III, II, V
12	Draw basic 2D entities like: Rectangle, Rhombus, Polygon using AutoCAD (Print out should be a part of progressive assessment). Part I	V
13	Draw basic 2D entities like: Circles, Arcs, circular using AutoCAD (Printout should be a part of progressive assessment). Part II	V
14	Draw basic 2D entities like: Circular and rectangular array using AutoCAD (Printout should be a part of progressive assessment). Part III	V
15	Draw blocks of 2D entities comprises of Rectangle, Rhombus, Polygon, Circles, Arcs, circular and rectangular array, blocks using AutoCAD (Print out should be a part of progressive assessment). Part IV	V
16	Draw basic branch specific components in 2D using AutoCAD (Print out should be a part of term work). Part I	VI
17	Draw complex branch specific components in 2D using AutoCAD (Print should be a part of progressive assessment). Part I	VI

SUGGESTED LEARNING RESOURCES

1. Engineering Graphics (English) by Dr. Sharad K. Pradhan (Download from https://ekumbh.aicte-india.org/dbook.php)
2. Bureau of Indian Standards. *Engineering Drawing Practice for Schools and Colleges IS: Sp-46.* BIS. Government of India, Third Reprint, October 1998; ISBN: 81-7061-091-2.
3. Bhatt, N. D. *Engineering Drawing*. Charotar Publishing House, Anand, Gujrat 2010; ISBN: 978-93- 80358-17-8.
4. Jain & Gautam, Engineering Graphics & Design, Khanna Publishing House, New Delhi (ISBN: 978- 93-86173-478)
5. Jolhe, D. A. *Engineering Drawing*. Tata McGraw Hill Edu. New Delhi, 2010; ISBN: 978-0-07- 064837-1
6. Dhawan, R. K. *Engineering Drawing*. S. Chand and Company, New Delhi; ISBN: 81-219- 1431-0.
7. Shah, P. J. *Engineering Drawing*. S. Chand and Company, New Delhi, 2008, ISBN:81-219- 2964-4.
8. Kulkarni, D. M.; Rastogi, A. P.; Sarkar, A. K. *Engineering Graphics with AutoCAD*. PHI Learning Pri- vate Limited-New Delhi (2010); ISBN: 978-8120337831.
9. Jeyapoovan, T. *Essentials of Engineering Drawing and Graphics using AutoCAD*. Vikas Publishing HousePvt. Ltd, Noida, 2011; ISBN: 978-8125953005.
10. Autodesk. *AutoCAD User Guide*. Autodesk Press, USA, 2015.
11. Sham, Tickoo. *AutoCAD 2016 for Engineers and Designers*. Dreamtech Press; Galgotia Publication, New Delhi, 2015; ISBN 978-9351199113.

Software/Learning Websites

1. https://www.youtube.com/watch?v=TJ4jGyD-WCw
2. https://www.youtube.com/watch?v=dmt6_n7Sgcg
3. https://www.youtube.com/watch?v=_MQScnLXL0M
4. https://www.youtube.com/watch?v=3WXPanCq9LI
5. https://www.youtube.com/watch?v=fvjk7PlxAuo
6. http://www.me.umn.edu/coursesme2011/handouts/engg%20graphics.pdf
7. https://www.machinedesignonline.com

Engineering Workshop Practice

Course Code- PR

3(b) (Common to 1st & 2nd sem)

Period per week:	4	Sessional:	25 Marks
Total Period:	60	End Sem Exam:	75 Marks
Timing of End Exam:	4 Hours	No. Of Credit:	2

Course outcomes

At the end of the course, the student will be able to:

✓ Acquire skills in basic engineering practice to identify, select and use various marking, measuring, and holding, striking and cutting tools & equipment's and machines.

✓ Understand job drawing and complete jobs as per specifications in allotted time.

✓ Inspect the job for the desired dimensions and shape.

✓ Operate, control different machines and equipment's adopting safety practices.

Course Content:

S.No.	Details Of Practical Content
I	**Carpentry:** i) Demonstration of different wood working tools / machines. ii) Demonstration of different wood working processes, like plaining, marking, chiseling, grooving, turning of wood etc. iii) One simple job involving any one joint like mortise and tenon dovetail, bridle, half lap etc.
II	**Fitting:** i) Demonstration of different fitting tools and drilling machines and power tools ii) Demonstration of different operations like chipping, filing, drilling, tapping, sawing, cutting etc. iii) One simple fitting job involving practice of chipping, filing, drilling, tapping, cutting etc
III	**Welding:** i) Demonstration of different welding tools / machines. ii) Demonstration on Arc Welding, Gas Welding, MIG, MAG welding, gas cutting and rebuilding of broken parts with welding. iii) One simple job involving butt and lap joint
IV	**Sheet Metal Working:** i) Demonstration of different sheet metal tools / machines. ii) Demonstration of different sheet metal operations like sheet cutting, bending, edging, end curling, lancing, soldering, brazing, and riveting. iii) One simple job involving sheet metal operations and soldering and riveting.
V	**Electrical House Wiring:** Practice on simple lamp circuits (i) one lamp controlled by one switch by surface conduit wiring, (ii) Lamp circuits- connection of lamp and socket by separate switches, (iii) Connection of Fluorescent lamp/tube light, (iv) simple lamp circuits-in- stall bedroom lighting. And (v) Simple lamp circuits- install stair case wiring.
VI	**Demonstration:** i) Demonstration of measurement of Current, Voltage, Power and Energy. ii) Demonstration of advance power tools, pneumatic tools, electrical wiring tools and accessories. iii) Tools for Cutting and drilling

References:

1. Engineering Workshop Practice (English) by Dr. A. K. Sarathe (Download from https://ekumbh.aicte-india.org/dbook.php)
2. S.K. Hajara Chaudhary, Workshop Technology, Media Promoters and Publishers, New Delhi, 2015
3. B.S. Raghuwanshi, Workshop Technology, Dhanpat Rai and sons, New Delhi 2014
4. K. Venkat Reddy, Workshop Practice Manual, BS Publications, Hyderabad 2014
5. Kents Mechanical Engineering Hand book, John Wiley and Sons, New York

Fundamental of Electrical & Electronics Engineering Lab

Course Code- PR

4(a) (Common to 1st & 2nd sem)

Period per week:	2	Sessional:	25 Marks
Total Period:	30	End Sem Exam:	---
Timing of End Exam:	---	No. Of Credit:	1

Course Outcomes:

After completion of the course the students will be able to:

1. Classify different type of magnetic material by calculating permeability using B-H curve.
2. Calculate voltage , current and power in 1-phase and 3- phase circuit by connecting different load (R, R-L, R-C)
3. Determine the transformation ratio(K) other parameters of single phase transformer.
4. Distinguish various electronic components and measure values using multimeter,
5. Draw the input and output characteristics of transistor and Diodes and identify the region of operation.
6. Design amplifier and Integrator using OP-AMP.

Suggested Practicals/Exercises:

The practical in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency.

Sl. No.	List of the Practical
1.	Determine the permeability of magnetic material by plotting its B-H curve.
2.	Measure voltage, current and power in 1-phase circuit with resistive load.
3.	Measure voltage, current and power in R-L series circuit.
4.	Determine the transformation ratio (K) of 1-phase transformer.
5.	Connect single phase transformer and measure input and output quantities.
6.	Make Star and Delta connection in induction motor starters and measure the line and phase values.
7.	Identify various passive electronic components in the given circuit
8.	Connect resistors in series and parallel combination on bread board and measure its value using digital multimeter.
9.	Connect capacitors in series and parallel combination on bread board and measure its value using multimeter.
10.	Identify various active electronic components in the given circuit.
11.	Use multimeter to measure the value of given resistor.
12.	Use LCR-Q tester to measure the value of given capacitor and inductor.
13.	Determine the value of given resistor using digital multimeter to confirm with colour code.
14.	Test the PN-junction diodes using digital multimeter.
15.	Test the performance of PN-junction diode.
16.	Test the performance of Zener diode.
17.	Test the performance of LED.

18.	Identify three terminals of a transistor using digital multimeter.
19.	Test the performance of NPN transistor.
20.	Determine the current gain of CE transistor configuration.
21.	Test the performance of transistor switch circuit.
22.	Test the performance of transistor amplifier circuit.
23.	Test Op-Amp as amplifier and Integrator

References:

1. Fundamentals of Electrical and Electronics Engineering by Prof. Susan S. Mathew (Download from https://ekumbh.aicte-india.org/dbook.php)
2. Ritu Sahdev, Basic Electrical Engineering, Khanna Publishing House, 2018
3. Mittle and Mittal, Basic Electrical Engineering, McGraw Education, New Delhi, 2015, ISBN : 978-0-07-0088572-5
4. Saxena, S. B. Lal, Fundamentals of Electrical Engineering, Cambridge University Press, latest edition ISBN : 9781107464353
5. Theraja, B. L., Electrical Technology Vol – I, S. Chand publications, New Delhi, 2015, ISBN: 9788121924405
6. Theraja, B. L., Electrical Technology Vol – II, S. Chand publications, New Delhi, 2015, ISBN: 9788121924375
7. Jegathesan, V., Basic Electrical and Electronics Engineering, Wiley India, New Delhi, 2015, ISBN : 97881236529513
8. Sedha, R.S., A text book of Applied Electronics, S.Chand ,New Delhi, 2008, ISBN-13: 978-8121927833
9. Malvino, Albert Paul, David, Electronics Principles, McGraw Hill Eduction, New Delhi,2015, ISBN-13**:** 0070634244-978
10. Mehta, V.K., Mehta, Rohit, Principles of Electronics, S. Chand and Company, New Delhi, 2014, ISBN-13-9788121924504
11. Bell Devid, Fundamental of Electronic Devices and Circuits, Oxford University Press, New Delhi 2015 ISBN : 9780195425239

Suggested Softwares/Learning Websites:

- ✓ en.wikipedia.org/wiki/Transformer
- ✓ www.animations.physics.unsw.edu.au//jw/AC.html
- ✓ www.alpharubicon.com/altenergy/understandingAC.htm
- ✓ www.electronics-tutorials
- ✓ learn.sparkfun.com/tutorials/transistors
- ✓ www.pitt.edu/~qiw4/Academic/ME2082/Transistor%20Basics.pdf
- ✓ www.technologystudent.com/elec1/transis1.htmwww.learningaboutelectronics.com
- ✓ www.electrical4u.com

Engineering Mechanics Lab

Course Code- PR 4(b)

(Common to 1st & 2nd sem)

Period per week:	2	Sessional:	25 Marks
Total Period:	30	End Sem Exam:	---
Timing of End Exam:	---	No. Of Credit:	1

Course outcomes:

After completion of the course the students will be able to:

1. Analyze different simple machines to find out different influencing parameters viz. Mechanical Advantage, Velocity Ratio and Efficiency.
2. Understand the phenomena of friction in different condition and make analysis through experiment to find out coefficient of friction.
3. Determine resultant of various force systems and analyse the equilibrium of a rigid body by Lamis theorem.
4. Analyse and find out the value of support reactions of different types of beam.
5. Determine Centroid of geometrical plane figures.

List of Practical to be performed:

1. To study various equipments related to Engineering Mechanics.
2. To find the M.A., V.R., Efficiency and law of machine for Differential Axle and Wheel.
3. To find the M.A., V.R., Efficiency and law of machine for Simple Screw Jack.
4. Derive Law of machine using Worm and worm wheel.
5. Derive Law of machine using Single purchase crab.
6. Derive Law of machine using double purchase crab.
7. Derive Law of machine using Weston's differential or wormed geared pulley block.
8. Determine resultant of concurrent force system applying Law of Polygon of forces using force table.
9. Determine resultant of concurrent force system graphically.
10. Determine resultant of parallel force system graphically.
11. Verify Lami's theorem.
12. Study forces in various members of Jib crane.
13. Determine support reactions for simply supported beam.
14. Obtain support reactions of beam using graphical method.
15. Determine coefficient of friction for motion on horizontal and inclined plane.
16. Determine centroid of geometrical plane figures.

Suggested Learning Resources:

1. Engineering Mechanics by Prof. Bhankhar Bharat Gokaldas (Download from https://ekumbh.aicte-india.org/dbook.php)
2. Bedi D.S., Engineering Mechanics, Khanna Publishing House
3. Khurmi, R.S., Applied Mechanics, S.Chand & Co. New Delhi.
4. Bansal R K, A text book of Engineering Mechanics, Laxmi Publications.
5. Ramamrutham, Engineering Mechanics, S.,S Chand & Co. New Delhi.
6. Dhade, Jamadar & Walawelkar, Fundamental of Applied Mechanics, Pune Vidhyarthi Gruh.
7. Ram, H. D.; Chauhan, A. K. Foundations and Applications of Applied Mechanics, Cambridge Uni- versity Press.
8. Meriam, J. L., Kraige, L.G. , Engineering Mechanics- Statics, Vol. I, Wiley Publication, New Delhi.

Sports and Yoga Course Code-PR 5(a) (Common to 1st & 2nd sem)

Period per week:	2	Sessional:	25 Marks
Total Period:	30	End Sem Exam:	25 Marks
Timing of End Exam:	3 Hours	No. Of Credit:	1

Course Outcomes:

On successful completion of the course the students will be able to:

(i) Practice Physical activities and Hatha Yoga focusing on yoga for strength, flexibility, and relaxation.

(ii) Learn techniques for increasing concentration and decreasing anxiety which leads to stronger academic performance.

(iii) Learn breathing exercises and healthy fitness activities

(iv) Understand basic skills associated with yoga and physical activities including strength and flexibility, balance and coordination.

(v) Perform yoga movements in various combination and forms.

(vi) Assess current personal fitness levels.

(vii) Identify opportunities for participation in yoga and sports activities.

(viii) Develop understanding of health-related fitness components: cardio respiratory endurance, flexibility and body composition etc.

(ix) Improve personal fitness through participation in sports and yogic activities.

(x) Develop understanding of psychological problems associated with the age and lifestyle.

(xi) Demonstrate an understanding of sound nutritional practices as related to health and physical performance.

(xii) Assess yoga activities in terms of fitness value.

(xiii) Identify and apply injury prevention principles related to yoga and physical fitness activities.

(xiv) Understand and correctly apply bio-mechanical and physiological principles elated to exercise and training.

Course Content:

- **Introduction to Physical Education**
  - Meaning & definition of Physical Education
  - Aims & Objectives of Physical Education
  - Changing trends in Physical Education
- **Olympic Movement**
  - Ancient & Modern Olympics (Summer & Winter)
  - Olympic Symbols, Ideals, Objectives & Values

- Awards and Honours in the field of Sports in India (Dronacharya Award, Arjuna Award,
  Dhayanchand Award, Rajiv Gandhi Khel Ratna Award etc.)

- **Physical Fitness, Wellness & Lifestyle**
  - Meaning & Importance of Physical Fitness & Wellness
  - Components of Physical fitness
  - Components of Health related fitness
  - Components of wellness
  - Preventing Health Threats through Lifestyle Change
  - Concept of Positive Lifestyle
- **Fundamentals of Anatomy & Physiology in Physical Education, Sports and Yoga**
  - Define Anatomy, Physiology & Its Importance
  - Effect of exercise on the functioning of Various Body Systems. (Circulatory System, Respi- ratory System, Neuro-Muscular System etc.)
- **Kinesiology, Biomechanics & Sports**
  - Meaning & Importance of Kinesiology & Biomechanics in Physical Edu. & Sports
  - Newton's Law of Motion & its application in sports.
  - Friction and its effects in Sports.
- **Postures**
  - Meaning and Concept of Postures.
  - Causes of Bad Posture.
  - Advantages & disadvantages of weight training.
  - Concept & advantages of Correct Posture.
  - Common Postural Deformities – Knock Knee; Flat Foot; Round Shoulders; Lordosis, Ky- phosis, Bow Legs and Scoliosis.
  - Corrective Measures for Postural Deformities

- **Yoga**
  - Meaning & Importance of Yoga
  - Elements of Yoga
  - Introduction - Asanas, Pranayama, Meditation & Yogic Kriyas
  - Yoga for concentration & related Asanas (Sukhasana; Tadasana; Padmasana & Sha- shankasana)
  - Relaxation Techniques for improving concentration - Yog-nidra
- **Yoga & Lifestyle**
  - Asanas as preventive measures.

- Hypertension: Tadasana, Vajrasana, Pavan Muktasana, Ardha Chakrasana, Bhujangasana, Sharasana.
- Obesity: Procedure, Benefits & contraindications for Vajrasana, Hastasana, Trikonasana, Ardh Matsyendrasana.
- Back Pain: Tadasana, Ardh Matsyendrasana, Vakrasana, Shalabhasana, Bhujangasana.
- Diabetes: Procedure, Benefits & contraindications for Bhujangasana, Paschimottasana, Pavan Muktasana, Ardh Matsyendrasana.
- Asthema: Procedure, Benefits & contraindications for Sukhasana, Chakrasana, Gomukhasana, Parvatasana, Bhujangasana, Paschimottasana, Matsyasana.

- **Training and Planning in Sports**
  - Meaning of Training
  - Warming up and limbering down
  - Skill, Technique & Style
  - Meaning and Objectives of Planning.
  - Tournament – Knock-Out, League/Round Robin & Combination.
- **Psychology & Sports**
  - Definition & Importance of Psychology in Physical Edu. & Sports
  - Define & Differentiate Between Growth & Development
  - Adolescent Problems & Their Management
  - Emotion: Concept, Type & Controlling of emotions
  - Meaning, Concept & Types of Aggressions in Sports.
  - Psychological benefits of exercise.
  - Anxiety & Fear and its effects on Sports Performance.
  - Motivation, its type & techniques.
  - Understanding Stress & Coping Strategies.

    - **Doping**
      - Meaning and Concept of Doping
      - Prohibited Substances & Methods
      - Side Effects of Prohibited Substances
    - **Sports Medicine**
      - First Aid – Definition, Aims & Objectives.
      - Sports injuries: Classification, Causes & Prevention.
      - Management of Injuries: Soft Tissue Injuries and Bone & Joint Injuries
    - **Sports / Games**

Following sub topics related to any one Game/Sport of choice of student out of: Athletics, Badminton, Basketball, Chess, Cricket, Kabaddi, Lawn Tennis, Swimming, Table Tennis, Volleyball, Yoga etc.

- History of the Game/Sport.
- Latest General Rules of the Game/Sport.
- Specifications of Play Fields and Related Sports Equipment.
- Important Tournaments and Venues.
- Sports Personalities.
- Proper Sports Gear and its Importance.

References:

1. Modern Trends and Physical Education by Prof. Ajmer Singh.
2. Light On Yoga By B.K.S. Iyengar.
3. Health and Physical Education – NCERT (11th and 12th Classes)

Applied Chemistry Lab

Course Code- TH 5(b)

(Common to 1st & 2nd sem)

Period per week:	2	Sessional:	25 Marks
Total Period:	30	End Sem Exam:	25 Marks
Timing of End Exam:	3 Hours	No. Of Credit	1

Course Outcome:

After completion of the course the students will be able to:

1) Explain various methods of volumetric analysis i.e. Redox, Iodometric, complexometric, Neutralization etc. and use of conductivity meter for measurement of conductance of water sample.

2) Apply the use of internal and external indicators and their comparison for redox titrations and mechanisms of iodometric titrations and use of double indicator method in a single titration.

3) Estimate the % values of moisture, volatile matter, ash and carbon of fuel by Proximate analysis and instrument handling.

4) Analyse the properties of lubricants viz. Flash & fire point, viscosity, cloud & pour point and their significance.

LIST OF PRACTICALS:

Perform any 10 (Ten) Laboratory Practicals.

Volumetric and Gravimetric analysis:

1 Preparation of standard solution of oxalic acid or potassium permanganate.

2 To determine strength of given sodium hydroxide solution by titrating against standard oxalic acid solution using phenolphthalein indicator.

3 Standardization of $KMnO_4$ solution using standard oxalic acid and Determine the percentage of iron present in given Hematite ore by $KMnO_4$ solution.

4 Iodometric estimation of copper in the copper pyrite ore.

5 Volumetric estimation of total acid number (TAN) of given oil.

6 Volumetric estimation of

a) Total hardness of given water sample using standard EDTA solution.

b) Alkalinity of given water sample using 0.01M sulphuric acid

7 Proximate analysis of coal

a) Gravimetric estimation moisture in given coal sample

b) Gravimetric estimation ash in given coal sample

Instrumental analysis

8. Determine the conductivity of given water sample.
9. Determination of the Iron content in given cement sample using colorimeter.
10. Determination of calorific value of solid or liquid fuel using bomb calorimeter.
11. Determination of viscosity of lubricating oil using Redwood viscometer.

12. Determination of flash and fire point of lubricating oil using Able's flash point apparatus.
13. To verify the first law of electrolysis of copper sulfate using copper electrode.
14. Construction and measurement of emf of elector chemical cell (Daniel cell).
15. To study the effect of dissimilar metal combination.

Teachers should use the following strategies to achieve the various outcomes of the course.

- Different methods of teaching and media to be used to attain classroom attention.
- Massive open online courses (MOOCs) may be used to teach various topics/sub topics.
- 15-20% of the topics which are relatively simpler of descriptive in nature should be given to the students for self-learning and assess the development of competency through classroom presentations.
- Micro-projects may be given to group of students for hand-on experiences
- Encouraging students to visit to sites such as Railway station and research establishment around the institution.

Reference Books:

✓ Applied Chemistry by Dr. Anju Rawlley (Download from https://ekumbh.aicte- india.org/dbook.php)
✓ Text Book of Chemistry for Class XI & XII (Part-I, Part-II); N.C.E.R.T., Delhi, 2017-18.
✓ Dr. G. H. Hugar and Prof A. N. Pathak, Applied Chemistry Laboratory Practices, Vol. I and Vol. II, NITTTR, Chandigarh, Publications, 2013-14.
✓ Agnihotri, Rajesh, Chemistry for Engineers, Wiley India Pvt.Ltd., 2014.
✓ Jain & Jain, Engineering Chemistry, Dhanpat Rai and Sons; New Delhi, 2015.

Applied Physics-II

Course Code- TH 2

(Common to 2nd Sem)

Period per week:	4	IA:	30 Marks
Total Period:	60	End Sem Exam:	70 Marks
Timing of End Exam:	3 Hours	No. Of Credit:	4

Course Outcome:

After completion of course the student will be able to:

1) Explain various parameters of longitudinal & transverse wave motion, derive expression for various parameters of SHM and explain methods of control of sound wave for acoustics of building and uses of ultrasonic wave in various medical and Engineering application.
2) Explain basic optical laws , various optical phenomena and uses of optical instruments.
3) Apply the fundamental electrostatic laws to calculate electric field intensity, electric potential & potential difference of straight charged conductor.
4) Classify magnetic materials (Dia, Para, Ferro) & calculate magnetic field intensity, Magnetic force produced by current carrying conductor.
5) Distinguish solid materials based on conductivity & Energy band gap and explain various engineering and medical application of LASERs, Fiber optics and Nano Technology.

Course Content

UNIT - 1: Wave motion and its applications

Wave motion, transverse and longitudinal waves with examples, definitions of wave velocity, frequency and wave length and their relationship, Sound and light waves and their properties, wave equation ($y = r \sin t$) amplitude, phase, phase difference, principle of superposition of waves and beat formation.

Simple Harmonic Motion (SHM): definition, expression for displacement, velocity, acceleration, time period, frequency etc. Simple harmonic progressive wave and energy transfer, study of vibration of cantilever and determination of its time period, Free, forced and resonant vibrations with examples.

Acoustics of buildings – reverberation, reverberation time, echo, noise, coefficient of absorption of sound, methods to control reverberation time and their applications, Ultrasonic waves – Introduction and properties, engineering and medical applications of ultrasonic.

UNIT - 2: Optics

Basic optical laws; reflection and refraction, refractive index, Images and image formation by mirrors, lens and thin lenses, lens formula, power of lens, magnification and defects. Total internal reflection, Critical angle and conditions for total internal reflection, applications of total internal reflection in optical fiber.

Optical Instruments; simple and compound microscope, astronomical telescope in normal adjustment, magnifying power, resolving power, uses of microscope and telescope, optical projection systems.

UNIT - 3: Electrostatics

Coulombs law, unit of charge, Electric field, Electric lines of force and their properties, Electric flux, Electric potential and potential difference, Gauss law: Application of Gauss law to find electric field intensity of straight charged conductor, plane charged sheet and charged sphere.

Capacitor and its working, Types of capacitors, Capacitance and its units. Capacitance of a parallel plate capacitor, Series and parallel combination of capacitors (related numerical), dielectric and its effect on capacitance, dielectric break down.

UNIT - 4: Current Electricity

Electric Current and its units, Direct and alternating current, Resistance and its units, Specific resistance, Conductance, Specific conductance, Series and parallel combination of resistances. Factors affecting resistance of a wire, carbon resistances and colour coding.

Ohm's law and its verification, Kirchhoff's laws, Wheatstone bridge and its applications (slide wire bridge only), Concept of terminal potential difference and Electromotive force (EMF)

Heating effect of current, Electric power, Electric energy and its units (related numerical problems), Advantages of Electric Energy over other forms of energy.

UNIT - 5: Electromagnetism

Types of magnetic materials; dia, para and ferromagnetic with their properties, Magnetic field and its units, magnetic intensity, magnetic lines of force, magnetic flux and units, magnetization.

Concept of electromagnetic induction, Faraday's Laws, Lorentz force (force on moving charge in magnetic field). Force on current carrying conductor, force on rectangular coil placed in magnetic field.

Moving coil galvanometer; principle, construction and working, Conversion of a galvanometer into ammeter and voltmeter.

UNIT - 6: Semiconductor Physics

Energy bands in solids, Types of materials (insulator, semi-conductor, conductor), intrinsic and extrinsic semiconductors, p-n junction, junction diode and V-I characteristics, types of junction diodes. Diode as rectifier – half wave and full wave rectifier (centre taped).

Transistor; description and three terminals, Types- pnp and npn, some electronic applications (list only).

Photocells, Solar cells; working principle and engineering applications.

UNIT - 7: Modern Physics

Lasers: Energy levels, ionization and excitation potentials; spontaneous and stimulated emission; population inversion, pumping methods, optical feedback, Types of lasers; Ruby, He- Ne and semiconductor, laser characteristics, engineering and medical applications of lasers.

Fiber Optics: Introduction to optical fibers, light propagation, acceptance angle and numerical aperture, fiber types, applications in; telecommunication, medical and sensors.

Nanoscience and Nanotechnology: Introduction, nanoparticles and nanomaterials, properties at nanoscale, nanotechnology, nanotechnology based devices and applications.

References:

1. Applied Physics-I by Prof. Vinod Kumar Yadav (Download from https://ekumbh.aicte-india.org/dbook.php)
2. Text Book of Physics for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi
3. Applied Physics, Vol. I and Vol. II, TTTI Publications, Tata McGraw Hill, Delhi
4. Concepts in Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi
5. Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, New Delhi.
6. Modern approach to Applied Physics-I and II, AS Vasudeva, Modern Publishers.
7. A Textbook of Optics, N Subramanyam, Brij Lal, MN Avahanulu, S Chand and Company Ltd.
8. Introduction to Fiber Optics, Ajoy Ghatak and K Thyagarajan, Cambridge University Press India Pvt. Ltd, New Delhi.
9. Nanoscience and Nanotechnology, KK Choudhary, Narosa Publishing House, Pvt. Ltd. New Delhi.
10. Nanotechnology: Importance and Applications, M.H. Fulekar, IK International Publishing House Pvt. Ltd, New Delhi.
11. e-books/e-tools/ learning physics software/websites etc.

Mathematics- II

Course Code- TH 3 (Common to 2nd sem)

Period per week:	4	IA:	30 Marks
Total Period:	60	End Sem Exam:	70 Marks
Timing of End Exam:	3 Hours	No. Of Credit:	4

Course Outcomes:

At the end of the course, the students will be able to:

(i) Apply the concept of Determinants and Matrices on 3rd order system of equations to find the unknown parameters and simple programming using MATLAB.

(ii) Apply Integral calculus to obtain area and volume of solid.

(iii) Connect algebra and geometry through graphs of lines and curves.

(iv) Differentiate between a resultant and a concurrent force through vector algebra.

(v) To model simple physical problems in the form of a differential equation, analyze and interpret its solutions.

Course Content:

UNIT - I: Determinants and Matrices

Elementary properties of determinants up to 3rd order, consistency of equations, Crammer's rule. Algebra of matrices, Inverse of a matrix, matrix inverse method to solve a system of linear equations in 3 variables.

UNIT - II: Integral Calculus

Integration as inverse operation of differentiation. Simple integration by substitution, by parts and by partial fractions (for linear factors only). Use of formulas  ,  and  for solving problems Where m and n are positive integers.
Applications of integration for i. Simple problem on evaluation of area bounded by a curve and axes. ii. Calculation of Volume of a solid formed by revolution of an area about axes. (Simple problems).

UNIT - III: Co-Ordinate Geometry

Equation of straight line in various standard forms (without proof), inter section of two straight lines, angle between two lines. Parallel and perpendicular lines, perpendicular distance formula.

General equation of a circle and its characteristics. To find the equation of a circle, given:

ii. Centre and radius,

iii. Three points lying on it and

iv. Coordinates of end points of a diameter;

Definition of conics (Parabola, Ellipse, Hyperbola) their standard equations without proof. Problems on conics when their foci, directories or vertices are given.

UNIT - IV: Vector Algebra

Definition notation and rectangular resolution of a vector. Addition and subtraction of vectors. Scalar
and vector products of 2 vectors. Simple problems related to work, moment and angular velocity.

UNIT-V: Differential Equations

Solution of first order and first degree differential equation by variable separation method (simple
problems). MATLAB – Simple Introduction.

References:

- ✓ Mathematics-II by Dr. Garima Singh (Download from https://ekumbh.aicte- india.org/dbook.php)
- ✓ B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi, 40th Edition, 2007.
- ✓ G. B. Thomas, R. L. Finney, Calculus and Analytic Geometry, Addison Wesley, 9th Edition, 1995.
- ✓ S.S. Sabharwal, Sunita Jain, Eagle Parkashan, Applied Mathematics, Vol. I & II, Jalandhar.
- ✓ Comprehensive Mathematics, Vol. I & II by Laxmi Publications, Delhi.
- ✓ Reena Garg & Chandrika Prasad, Advanced Engineering Mathematics, Khanna Publishing House, New Delhi

Applied Physics-II Lab

Course Code-PR 2

(Common to 2nd sem)

Period per week:	2	Sessional:	25 Marks
Total Period:	30	End Sem Exam:	25 Marks
Timing of End Exam:	3 Hours	No. Of Credit:	1

Course Outcome:

List of Practicals/Activities: (To perform minimum 10 Practicals)

1. To determine and verify the time period of a cantilever.
2. To determine velocity of ultrasonic in different liquids using ultrasonic interferometer.
3. To verify laws of reflection from a plane mirror/ interface.
4. To verify laws of refraction (Snell's law) using a glass slab.
5. To determine focal length and magnifying power of a convex lens.
6. To verify Ohm's law by plotting graph between current and potential difference.
7. To verify laws of resistances in series and parallel combination.
8. To find the frequency of AC main using electrical vibrator.
9. To verify Kirchhoff's law using electric circuits.
10. To study the dependence of capacitance of a parallel plate capacitor on various factors and determines permittivity of air at a place.
11. To find resistance of a galvanometer by half deflection method.
12. To convert a galvanometer into an ammeter.
13. To convert a galvanometer into a voltmeter.
14. To draw V-I characteristics of a semiconductor diode (Ge, Si) and determine its knee volt- age.
15. To verify inverse square law of radiations using a photo-electric cell.
16. To measure wavelength of a He-Ne/diode laser using a diffraction grating.
17. To measure numerical aperture (NA) of an optical fiber.
18. Study of an optical projection system (OHP/LCD) - project report.

Suggested Student Activities & Strategies

Apart from classroom and laboratory learning following are the suggested student related activities which can be undertaken to accelerate the attainment of various outcomes of the course.

a. Make survey of different physical products and compare the following points
   - Measurements of dimensions
   - Properties
   - Applications

b. Library survey regarding engineering materials/products used in different industries

c. Seminar on any relevant topic.

Teachers should use the following strategies to achieve the various outcomes of the course.

- Different methods of teaching and media to be used to attain classroom attention.
- Massive open online courses (MOOCs) may be used to teach various topics/sub topics.

- 15-20% of the topics which are relatively simpler or descriptive in nature should be given to the students for self-learning and assess the development of competency through classroom presentations/projects.
- Micro-projects on relevant may be given to group of students for hand-on experiences.

Recommended Books:

1. Applied Physics-I by Prof. Vinod Kumar Yadav (Download from https://ekumbh.aicte- india.org/dbook.php)
1. Text Book of Physics for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi
2. Comprehensive Practical Physics, Vol, I & II, JN Jaiswal, Laxmi Publications (P) Ltd., New Delhi
3. Practical Physics by C. L. Arora, S. Chand & Company Ltd.
4. e-books/e-tools/ learning physics software/you Tube videos/ websites etc.

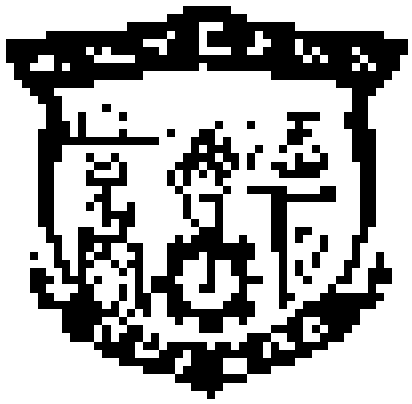
STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA									
TEACHING AND EVALUATION SCHEME FOR 3rd Semester Civil Engineering (wef 2019-20)									
Subject Number	Subject Code	Subject	Periods/week			Evaluation Scheme			
			L	T	P	Internal Assessment/ Sessional	End Sem Exams	Exams (Hours)	Total
		Theory							
Th.1		Structural Mechanics	5		-	20	80	3	100
Th.2		Geotechnical Engineering	4		-	20	80	3	100
Th.3		Building materials & Construction Technology	5		-	20	80	3	100
Th.4		Estimation &Cost Evaluation- I	4			20	80	3	100
Th.5		Environmental studies	4			20	80	3	100
		Total	22			100	400	-	500
		Practical							
Pr.1		Civil Engg. Lab-I	-	-	6	50	100		
Pr.2		Civil Engg. Drawing-I	-	-	5	25	50		
Pr.3		Estimation Practice-I (Computer-Aided)	-	-	3	25			
		Student Centered Activities(SCA)		-	3	-	-	-	-
		Total	-	-	*17*	*100*	*150*	-	*250*
		Grand Total	**22**	**-**	**17**	**200**	**550**	**-**	**750**
Abbreviations: L-Lecturer, T-Tutorial, P-Practical. Each class is of minimum 55 minutes duration									
Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50% and in Aggregate is 40%									
SCA shall comprise of Extension Lectures/ Personality Development/ Environmental issues /Quiz /Hobbies/ Field visits/ Cultural activities/Library studies/Classes on MOOCS/SWAYAM etc., Seminar and SCA shall be conducted in a section.									
There shall be 1 Internal Assessment done for each of the Theory Subject. Sessional Marks shall be total of the performance of individual different jobs/ experiments in a subject throughout the semester									

CURRICULLUM OF 3RD SEMESTER

For

DIPLOMA IN CIVIL ENGINEERING

(Effective From 2019-20 Session)



STATE COUNCIL FOR TECHNICAL EDUCATION & VOCATIONAL TRAINING, ODISHA, BHUBANESWAR

Th1. STRUCTURAL MECHANICS

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	3rd
Total Period:	75	Examination	3 hrs
Theory periods:	5P/week	Internal Assessment:	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONALE

The course aims to prepare the students to comprehend the design principles associated with the structural members. The students will develop competency in calculating necessary dimensions and material properties so that the members can withstand the loading conditions.

B. COURSE OBJCTIVES

On completion of the course, students will be able to -

1. Comprehend, define, compute and interpret major mechanical properties demonstrated by solid materials.
2. Analyze solid states under uniaxial loading and plane stress conditions.
3. Draw shear force and bending moment diagrams of simple statically determinate and statically indeterminate structural members subject to transverse loading.
4. Obtain slope and deflection profiles of statically determinate simple structural members.
5. Comprehend buckling as a failure mode in column and determine crippling loads for columns using Euler's theory.
6. Compute forces in members of a truss

C. TOPIC WISE DISTRIBUTION

Chapter	Name of topics	Periods
1	Review of Basic Concepts	04
2	Simple and Complex Stress, Strain	15
3	Stresses in Beams	10
4	Columns and Struts	04
5	Shear Force and Bending Moment	12
6	Slope and Deflection	10
7	Indeterminate Beams	10
8	Trusses and Frames	10

D. Course Contents:

1 Review Of Basic Concepts

1.1 Basic Principle of Mechanics: Force, Moment, support conditions, Conditions of equilibrium, C.G & MI, Free body diagram

1.2 Review of CG and MI of different sections

2 Simple And Complex Stress, Strain

2.1 Simple Stresses and Strains

Introduction to stresses and strains: Mechanical properties of materials — Rigidity, Elasticity, Plasticity, Compressibility, Hardness, Toughness, Stiffness, Brittleness, Ductility, Malleability, Creep, Fatigue, Tenacity, Durability, Types of stresses -Tensile, Compressive and Shear stresses, Types of strains - Tensile, Compressive and Shear strains, Complimentary shear stress - Diagonal tensile / compressive Stresses due to shear, Elongation and Contraction, Longitudinal and Lateral strains, Poisson's Ratio, Volumetric strain, computation of stress, strain, Poisson's ratio, change in dimensions and volume etc, Hooke's law - Elastic Constants, Derivation of relationship between the elastic constants.

2.2 Application of simple stress and strain in engineering field:

Behaviour of ductile and brittle materials under direct loads, Stress Strain curve of a ductile material, Limit of proportionality, Elastic limit, Yield stress, Ultimate stress, Breaking stress, Percentage elongation, Percentage reduction in area, Significance of percentage elongation and reduction in area of cross section, Deformation of prismatic bars due to uniaxial load, Deformation of prismatic bars due to its self weight.

2.3 Complex stress and strain

Principal stresses and strains: Occurrence of normal and tangential stresses, Concept of Principal stress and Principal Planes, major and minor principal stresses and their orientations, Mohr's Circle and its application to solve problems of complex stresses

3 Stresses In Beams and Shafts

3.1 Stresses in beams due to bending: Bending stress in beams — Theory of simple bending — Assumptions — Moment of resistance — Equation for Flexure– Flexural stress distribution – Curvature of beam – Position of N.A. and Centroidal Axis – Flexural rigidity – Significance of Section modulus

3.2 Shear stresses in beams: Shear stress distribution in beams of rectangular, circular and standard sections symmetrical about vertical axis.

3.3 Stresses in shafts due to torsion: Concept of torsion, basic assumptions of pure torsion, torsion of solid and hollow circular sections, polar moment of inertia, torsional shearing stresses, angle of twist, torsional rigidity, equation of torsion

3.4 Combined bending and direct stresses: Combination of stresses, Combined direct and bending stresses, Maximum and Minimum stresses in Sections, Conditions for no tension, Limit of eccentricity, Middle third/fourth rule, Core or Kern for square, rectangular and circular sections, chimneys, dams and retaining walls

4 Columns and Struts

4.1 Columns and Struts, Definition, Short and Long columns, End conditions, Equivalent length / Effective length, Slenderness ratio, Axially loaded short and long column, Euler's theory of long columns, Critical load for Columns with different end conditions

5 Shear Force and Bending Moment

5.1 Types of loads and beams:

Types of Loads: Concentrated (or) Point load, Uniformly Distributed load (UDL), Types of Supports: Simple support, Roller support, Hinged support, Fixed support, Types of Reactions: Vertical reaction, Horizontal reaction, Moment reaction, Types of Beams based on support conditions: Calculation of support reactions using equations of static equilibrium.

5.2 Shear force and bending moment in beams:

Shear Force and Bending Moment: Signs Convention for S.F. and B.M, S.F and B.M of general cases of determinate beams with concentrated loads and udl only, S.F and B.M diagrams for Cantilevers, Simply supported beams and Over hanging beams, Position of maximum BM, Point of contra flexure, Relation between intensity of load, S.F and B.M.

6 Slope and Deflection

6.1 Introduction: Shape and nature of elastic curve (deflection curve); Relationship between slope, deflection and curvature (No derivation), Importance of slope and deflection.

6.2 Slope and deflection of cantilever and simply supported beams under concentrated and uniformly distributed load (by Double Integration method, Macaulay's method).

7 Indeterminate Beams

7.1 Indeterminacy in beams, Principle of consistent deformation/compatibility, Analysis of propped cantilever, fixed and two span continuous beams by principle of superposition, SF and BM diagrams (point load and udl covering full span)

8 Trusses

8.1 Introduction: Types of trusses, statically determinate and indeterminate trusses, degree of indeterminacy, stable and unstable trusses, advantages of trusses.

8.2 Analysis of trusses: Analytical method (Method of joints, method of Section)

E. Course Coverage Upto Internal Assessment: Chapters 1,2,3,4

F. Recommended Books

Sl. No	Name of Authors	Titles of Book	Name of Publisher
1	R.Subramanian	Strength of Materials	Oxford Publication
2	S.Rammrutham,	Theory of structure	Dhanpat Rai Publications
3	V.N.Vazirani&M.M. Rathwani	Analysis of Structures-Vol.I&II	Khanna Publication

Th2. GEOTECHNICAL ENGINEERING

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	3rd
Total Period:	60	Examination	3 hrs
Theory periods:	4P/week	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

A. **Rationale**

The course aims to prepare the students to comprehend the design principles associated with the civil foundations and other geotechnical structures. The students will develop competency in estimating and predicting soil strength and slope based on properties and design requirements.

B. Course Objectives

On completion of the course, students will be able to -

1. comprehend the scope of soil mechanics and define the associated terminology and inter-relation among various soil properties.
2. classify and indentify soil types under different standards
3. comprehend significance of permeability and seepage and compute those.
4. describe requirement and methodology of compaction and consolidation.
5. realize the methods towards shear strength estimation and obtain strength envelop for different types of soils.
6. define terms of foundation engineering and estimate bearing capacity.

C. Topic Wise Distribution

Chapter	Name of topics	Hours
1	Introduction	02
2	Preliminary Definitions and Relationship.	06
3	Index Properties of soil	04
4	Classification of Soil	06
5	Permeability and Seepage	07
6	Compaction and Consolidation.	08
7	Shear Strength.	06
8	Earth Pressure on Retaining Structures.	07

9	Foundation Engineering.	14

D. **Course Contents**:

1 Introduction

1.1 Soil and Soil Engineering

1.2 Scope of Soil Mechanics

1.3 Origin and formation of soil

2 Preliminary Definitions and Relationship

2.1 Soil as a three Phase system.

2.2 Water Content, Density, Specific gravity, Voids ratio, Porosity, Percentage of air voids, air content, degree of saturation, density Index, Bulk/Saturated/dry/submerged density, Interrelationship of various soil parameters

3 Index Properties of Soil

3.1 Water Content

3.2 Specific Gravity

3.3 Particle size distribution: Sieve analysis, wet mechanical analysis, particle size distribution curve and its uses

3.4 Consistency of Soils, Atterberg's Limits, Plasticity Index, Consistency Index, Liquidity Index

4 Classification of Soil

4.1 General

4.2 I.S. Classification, Plasticity chart

5 Permeability and Seepage

5.1 Concept of Permeability, Darcy's Law, Co-efficient of Permeability,

5.2 Factors affecting Permeability.

5.3 Constant head permeability and falling head permeability Test.

5.4 Seepage pressure, effective stress, phenomenon of quick sand

6 Compaction and Consolidation

6.1 Compaction: Compaction, Light and heavy compaction Test, Optimum Moisture

Content of Soil, Maximum dry density, Zero air void line, Factors affecting Compaction, Field compaction methods and their suitability

6.2 Consolidation: Consolidation, distinction between compaction and consolidation.

Terzaghi's model analogy of compression/ springs showing the process of consolidation – field implications

7 Shear Strength

7.1 Concept of shear strength, Mohr- Coulomb failure theory, Cohesion, Angle of internal friction, strength envelope for different type of soil, Measurement of shear strength;- Direct shear test, triaxial shear test, unconfined compression test and vane-shear test

8 Earth Pressure on Retaining Structures

8.1 Active earth pressure, Passive earth pressure, Earth pressure at rest.

8.2 Use of Rankine's formula for the following cases (cohesion-less soil only)

(i) Backfill with no surcharge, (ii) backfill with uniform surcharge

9 Foundation Engineering

9.1 Functions of foundations, shallow and deep foundation, different type of shallow and deep foundations with sketches. Types of failure (General shear, Local shear & punching shear)

9.2 Bearing capacity of soil, bearing capacity of soils using Terzaghi's formulae & IS Code formulae for strip, Circular and square footings, Effect water table on bearing capacity of soil

9.3 Plate load test and standard penetration test

E. COURSE COVERAGE UPTO INTERNAL EXAMINATION

Chapters 1, 2, 3, 4, 5, 6

F. RECOMMENDED BOOKS

Learning Resources			
Text Books			
Sl. No	**Name of Authors**	**Titles of Book**	**Name of Publisher**
1	Dr. B.C.Punmia	Soil Mechanics & Foundation Engineering	Laxmi publications (P) LTD
2	Dr. K.R.Arora	Soil Mechanics& Foundation Engineering	Standard Publishers Distributors Ltd.
3	Dr. V.N.S. Murthy	Soil Mechanics& Foundation Engineering,Vol-I	UBS Publishers Distributors Ltd.

Th3.BUILDING MATERIALS AND CONSTRUCTIONS TECHNOLOGY

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	3rd
Total Period:	75	Examination	3 hrs
Theory periods:	5P/week	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONALE

The course has two parts namely the materials and construction task. The first part offers insight to the common materials used in construction. This enables students to understand the application and processing requirement in the common construction materials. The second part of the course offers idea on construction activities based on components of a building. Another objective of the course is to develop concept of eco-friendly construction practices.

B. COURSE OBJCTIVES

On completion of the course, students will be able to –

1. Realize the role of rock, bricks, cement, concrete, timber and steel in construction and comprehend the classification and processing tasks involved.
2. Understand the composition and mechanism of the protective paints and prescribe as necessary.
3. Classify buildings on occupancy and comprehend different components and their requirement in a building.
4. Understand the glossary of terms involved in foundation, masonry, wood works and other activities involved in building construction.
5. Grasp the construction details involved in a building.
6. Realize the significance of protecting environment and adopt necessary practices towards green construction.

C. TOPIC WISE DISTRIBUTION

D.

Chapter	Name of topics	Hours
PART A: BUILDING MATERIALS		
1	Stone	05
2	Bricks	06
3	Cement, Mortar and Concrete	07

4	Other Construction Materials	07
5	Surface Protective Materials:	05
PART B: CONSTRUCTIONS TECHNOLOGY		
1	Introduction	02
2	Foundations	04
3	Walls & Masonry Works	06
4	Doors, Windows and Lintels:	04
5	Floors, Roofs and Stairs	05
7	Protective, Decorative Finishes and Termite Proofing	05
8	Green Buildings, Energy Management and Energy Audit of Buildings & Project:	04

E. COURSE CONTENTS:

PART :A (BUILDING MATERIALS)

1 Stone

1.1 Classification of rock, uses of stone, natural bed of stone,
1.2 Qualities of good building stone,
1.3 Dressing of stone
1.4 Characteristics of different types of stone and their uses

2 Bricks

2.1 Brick earth – its composition
2.2 Brick making — Preparation of brick earth, Moulding, Drying, Burning in kilns (continuous Process)
2.3 Classification of bricks, size of traditional and modular bricks, qualities of good building bricks

3 Cement, Mortar and Concrete

3.1 Cement: Types of cements, Properties of cements, Manufacturing of cement
3.2 Importance and application of blended cement with fly ash and blast furnace slag.
3.3 Mortar: Definition and types of mortar
3.4 Sources and classification of sand, Bulking of sand
3.5 Use of gravel, morrum and fly ash as different building material
3.6 Concrete: Definition and composition- Water cement ratio- Workability, mechanical properties and grading of aggregates, mixing, placing, compacting and curing of concrete.

4 Other Construction Materials

4.1 Timber: Classification and Structure of timber.

4.2 Seasoning of timber – Importance.

4.3 Characteristics of good timber.

4.3 Clay products and refractory materials – Definition and Classification.

4.4 Properties and uses of refractory materials- tiles, terracotta, porcelain glazing.

4.5 Iron and Steel: Uses of cast iron, wrought iron, mild steel and tor steel

5 Surface Protective Materials

5.1 Composition of Paints, enamels, varnishes.

5.2 Types and uses of surface protective materials like Paints, Enamels, Varnishes, Distempers, Emulsion, French polish and Wax Polish.

PART: B (CONSTRUCTIONS TECHNOLOGY)

1 Introduction

1.1 Buildings and classification of buildings based on occupancy

1.2 Different components of a building.

1.3 Site investigation – objectives, site reconnaissance and explorations.

2 Foundations

2.1 Concept of foundation and its purpose

2.2 Types of foundations – shallow and deep

2.3 Shallow foundation-constructional details of : Spread foundations for walls, thumb rules for depth and width of foundation and thickness of concrete block

2.4 Deep foundations: Pile foundations-their suitability, classification of piles based on materials, function and method of installation.

3 Walls & Masonry Works :

3.1 Purpose of walls

3.2 Classification of walls – load bearing, non-load bearing walls, retaining walls.

3.3 Classification of walls as per materials of construction: brick, stone, reinforced brick, reinforced concrete, precast, hollow and solid concrete block and composite masonry walls (Concept Only).

3.4 Partition Walls : Suitability and uses of brick and wooden partition walls

3.5 Brick masonry : Definition of different terms

3.6 Bond — meaning and necessity: English bond for 1and 1-1/2 Brick thick walls. T, X and right angled corner junctions. Thickness for 1and 1-1/2 brick square pillars in English bond

3.7 Stone Masonry :

3.8 Glossary of terms –String course, corbel, cornice, block-in-course, grouting, mouldings, templates, throating, through stones, parapet, coping, pilaster and buttress

4 Doors, Windows And Lintels

4.1 Glossary of terms used in doors and windows

4.2 Doors – different types of doors

4.3 Windows – different types of windows

4.4 Purpose of use of arches and lintels

5 Floors, Roofs and Stairs

5.1 Floors: Glossary of terms ,Types of floor finishes — cast-in-situ, concrete flooring(monolithic, bonded), terrazzo tile flooring, cast in situ Terrazzo flooring, timber flooring (Concept only)

5.2 Roofs: Glossary of terms, Types of roofs, concept and function of flat, pitched, hipped and Sloped roofs

5.3 Stairs: Glossary of terms; Stair case, winder, landing, stringer, newel, baluster, rise, tread, width of stair case, hand rail, nosing, head room, mumty room.

5.4 Various types of stair case — straight flight, dog legged, open well, quarter turn, half turn (newel and geometrical stairs), bifurcated stair, spiral stair, cantilever stair, tread riser stair.

6 Protective, Decorative Finishes, Damp and Termite Proofing

6.1 Plastering – purpose – Types of plastering, Types of plaster finishes – Grit finish, rough cast, smooth cast, sand faced, pebble dash, acoustic plastering and plain plaster etc.

6.2 Proportion of mortars used for different plasters, preparation of mortars, techniques

of plastering and curing

6.3 Pointing – purpose –Types of pointing

6.4 Painting – objectives – method of painting new and old wall surfaces, wood surface and metal surfaces – powder coating and spray painting on metal surfaces.

6.5 White washing – Colour washing – Distempering – internal and external walls.

6.6 Damp and Termite proofing – Materials and Methods.

7 Green Buildings, Energy Management and Energy Audit Of Buildings & Project

8.1 Concept of green building

8.2 Introduction to Energy Management and Energy Audit of Buildings.

8.3 Aims of energy management of buildings.

8.4 Types of energy audit, Response energy audit questionnaire

8.5 Energy surveying and audit report.

F. Course Coverage up to Internal Assessment: All of Part A and Chapters 1, 2 of Part B

G. RECOMMENDED BOOKS

Sl. No	Name of Authors	Titles of Book	Name of Publisher
1	N. Subramanian	Building materials & Construction	Oxford Publication
2	Rangwala	Engineering Materials	Charorar Publishing House
3	Rangwala	Building Construction	Charorar Publishing House
4	Sarkar & Saraswati	Construction Technology	Oxford Publication

Th4. ESTIMATION & COST EVALUATION – I

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	4th
Total Period:	60	Examination	3 hrs
Theory periods:	4P/week	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONALE

The course enables the students to be ready to act as estimator and prepare necessary plans before construction satisfying the requirements imposed by different regulatory bodies. Further, the course helps them realize the organizational hierarchy and professional roles.

B. COURSE OBJCTIVES

On completion of the course, students will be able to –

1. Understand the significance of accurate estimation practices.
2. Evaluate and generate component wise estimates for a building
3. Develop a proper cost estimate for single storeyed building.
4. Analyse and offer reason behind the costs involved in different components
5. Prepare abstract of cost estimates in line with prescription by state regulating bodies.
6. Realize the levels existing in organization and comprehend the roles and responsibilities at different levels.

C. TOPIC WISE DISTRIBUTION

Chapter	Name of topics	Hours
1	Introduction :	02
2	Quantity Estimate of Building	30
3	Analysis of Rates and Valuation.	22
4	Administrative Set-Up of Engineering Organisations	04

D. COURSE CONTENTS:

1 Introduction

1.1 Types of estimates – Plinth area, floor area / carpet area

1.2 Units and modes of measurements as per IS 1200

1.3 Accuracy of measurement for different item of work

2 Quantity Estimate of Building

2.1 Short wall long wall method and centre line method, deductions in masonry, plastering, white washing, painting etc., multiplying factor (paint coefficients) for painting of doors and windows (paneled/glazed), grills etc.

2.2 Detailed estimate of single storied flat roof building with shallow foundation and RCC roof slab with leak proof treatment over it including staircase and mumty room.

3 Analysis of Rates and Valuation

3.1 Analysis of rates for cement concrete, brick masonry in Cement Mortar, laterite stone masonry in Cement Mortar, cement plaster, white washing, Artificial Stone flooring, Tile flooring, concrete flooring, R.C.C. with centering and shuttering, reinforcing steel, Painting of doors and windows etc. as per OPWD.

3.2 Calculation of lead, lift, conveyance charges, royalty of materials, etc. as per Orissa P.W.D. system (Concept of C.P.W.D./Railways provisions)

3.3 Abstract of cost of estimate.

3.4 Valuation- Value and cost, scrap value, salvage value, assessed value, sinking fund, depreciation and obsolesce, methods of valuation.

4 Administrative Set-Up of Engineering Organisations:

4.1 Administrative set-up and hierarchy of Engineering department in State Govt./Central Govt./PSUs/Private Sectors etc. Duties and responsibilities of Engineers at different positions /levels.

E. Course Coverage up to Internal Assessment: Chapters 1, 2

F. Recommended Books

Sl. No	Name of Authors	Titles of Book	Name of Publisher
1	M.Chakraborty.	Estimating, Costing, specification &Valuation in Civil Engineering	Published by author
3	B.N.Dutta	Estimating &Costing	UBSPD
4	A. Panigrahi	Accounts & contracts	Vikas Publication
5	Govt. of Odisha	Latest Orissa PWD Schedule of Rates & Analysis of rates	Govt. of Odisha

B: The use of schedule and analysis of rates of Govt. of Odisha is allowed in the end examination.

Th5. ENVIRONMENTAL STUDIES
(Common to All Branches)

Name of the Course: Diploma in Civil Enginering			
Course code:		Semester	3rd
Total Period:	60	Examination :	3 hrs
Theory periods:	4P / week	Internal Assessment:	20
Maximum marks:	100	End Semester Examination	80

A. Rationale:

Due to various aspects of human developments including the demand of different kinds of technological innovations, most people have been forgetting that, the Environment in which they are living is to be maintained under various living standards for the preservation of better health. The degradation of environment due to industrial growth is very much alarming due to environmental pollution beyond permissible limits in respect of air, water industrial waste, noise etc. Therefore, the subject of Environmental Studies to be learnt by every student in order to take care of the environmental aspect in each and every activity in the best possible manner.

B. OBJECTIVES:

After completion of study of environmental studies, the student will be able to:

1. Gather adequate knowledge of different pollutants, their sources and shall be aware of solid waste management systems and hazardous waste and their effects.
2. Develop awareness towards preservation of environment.

C. TOPIC WISE DISTRIBUTION OF PERIODS

SL.NO.	TOPIC	PERIODS
1	The Multidisciplinary nature of environmental studies	04
2	Natural Resources	10
3	Systems	08
4	Biodiversity and it's Conservation	08
5	Environmental Pollution.	12
6	Social issues and the Environment	10
7	Human population and the environment	08
	TOTAL	60

Unit 1: The Multidisciplinary nature of environmental studies

Definition, scope and importance, Need for public awareness.

Unit 2: Natural Resources

Renewable and non renewable resources:

a) Natural resources and associated problems.

- Forest resources: Use and over-exploitation, deforestation, case studies, Timber extraction mining, dams and their effects on forests and tribalpeople.
- Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dam's benefits and problems.
- Mineral Resources: Use and exploitation, environmental effects of extracting and using mineralresources.
- Food Resources: World food problems, changes caused by agriculture and over grazing, effects of modern agriculture, fertilizers- pesticides problems, water logging, salinity, .
- Energy Resources: Growing energy need, renewable and non-renewable energy sources, use of alternate energy sources, case studies.
- Land Resources: Land as a resource, land degradation, man induces landslides, soil erosion, anddesertification.

b) Role of individual in conservation of natural resources.
c) Equitable use of resources for sustainable life styles.

Unit 3: Systems

- Concept of an eco system.
- Structure and function of an eco system.
- Producers, consumers, decomposers.
- Energy flow in the eco systems.
- Ecological succession.
- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following eco system:
- Forest ecosystem:
- Aquatic eco systems (ponds, streams, lakes, rivers, oceans, estuaries).

Unit 4: Biodiversity and it's Conservation

- Introduction-Definition: genetics, species and ecosystem diversity.
- Biogeographically classification of India.
- Value of biodiversity: consumptive use, productive use, social ethical, aesthetic and optinvalues.
- Biodiversity at global, national and local level.
- Threats to biodiversity: Habitats loss, poaching of wild life, man wildlife conflicts.

Unit 5: Environmental Pollution.

Definition Causes, effects and control measures of:

a) Air pollution.
b) Water pollution.
c) Soil pollution
d) Marine pollution
e) Noise pollution.
f) Thermal pollution
g) Nuclear hazards.

Solid waste Management: Causes, effects and control measures of urban and industrial wastes.

Role of an individual in prevention of pollution.

Disaster management: Floods, earth quake, cyclone and landslides.

Unit 6: Social issues and the Environment

- Form unsustainable to sustainable development.
- Urban problems related to energy.
- Water conservation, rain water harvesting, water shed management.
- Resettlement and rehabilitation of people; its problems and concern.
- Environmental ethics: issue and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies.
- Air (prevention and control of pollution) Act.
- Water (prevention and control of pollution) Act.
- Public awareness.

Unit 7: Human population and the environment

- Population growth and variation among nations.
- Population explosion- family welfare program.
- Environment and humanhealth.
- Human rights.
- Value education
- Role of information technology in environment and human health.

Syllabus coverage upto I.A

Units 1, 2, 3

Learning Resources:			
Sl.No	**Title of the Book**	**Name of Authors**	**Name of Publisher**
1.	Textbook of Environmental studies	Erach Bharucha	#UGC
2.	Fundamental concepts in Environmental Studies	D.D. Mishra	S.Chand&Co-Ltd
3.	Text book of Environmental Studies	K.Raghavan Nambiar	SCITECH Publication Pvt. Ltd
4.	Environmental Engineering	V.M.Domkundwar	Dhanpat Rai & Co

Pr1. CIVIL ENGINEERING LABORATORY-I

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	3rd
Total Period:	90	Examination	3 hrs
Lab. periods:	6P/week	Term Work	50
Maximum marks:	150	End Semester Examination:	100

A. RATIONALE

The course exposes the students to different test facilities and their usage methods to determine characteristics of Civil Engineering materials.

B. COURSE OBJCTIVES

C. On completion of the course, students will be able to –

1. Use Universal testing machine to determine the stress-strain relation in steel.
2. Carry out tests to determine cement characteristics and strength.
3. Investigate properties of aggregates
4. Conduct tests to determine concrete workability and compressive strength
5. To perform non-destructive tests on concrete
6. To conduct strength tests on different types of bricks

D. TOPIC WISE DISTRIBUTION

Chapter	Name of topics	Hours
1	MATERIAL TESTING LABORATORY	60
2	CONCRETE LABORATORY	30

E. COURSE CONTENTS

I. Material Testing Laboratory:

1. Test on Steel

Determination of Young's Modulus of steel in a tensile testing machine.

2. Tests on Cement, Sands, Bricks, Blocks & Aggregates

2.1 Determination of fineness of Cement by sieving.

2.2 Determination of normal Consistency, initial and final setting time of Cement

2.3 Determination of soundness of Cement by Le-Chatelier apparatus.

2.4 Determination of Compressive Strength of cement.

2.5 Determination of Compressive Strength of Burnt clay, Fly Ash Bricks and Blocks.

2.6 Grading of Fine & Coarse aggregate by sieving for concrete .

2.7 Determination of Specific Gravity and Bulking of sand.

2.8 Determination of Specific Gravity and Bulk density of coarse aggregate.

2.9 Grading of Road Aggregates.

2.10 Determination of Flakiness, Elongation of Road aggregates.

2.11 Determination of Crushing Value Test of aggregates.

2.12 Los-Angeles Abrasion Test of aggregate.

2.13 Impact test of aggregate.

2.14 Determination of soundness test of road aggregates.

II. Concrete Laboratory

3.1 Determination of Compressive Strength of concrete cubes.

3.2 Determination of Workability of concrete by:

a) Slump Cone method,
b) Compaction Factor method.

3.3 Non Destructive tests on Concrete:

a) Demonstration on Rebound hammer
b) Ultrasonic Pulse Velocity measuring Instrument.

F. RECOMMENDED BOOKS

Learning Resources			
Text Books			
Sl. No	**Name of Authors**	**Titles of Book**	**Name of Publisher**
1	M. L. Gambhir	Concrete Manual-A Laboratory Manual For Quality of Concrete	Dhanpat Rai & Co. Pvt. Ltd.
2	Dr. M.Chakraborty	Cement,Aggregate and concrete Laboratory Manual	
3	S.K.Khanna & C.E.G.Justo	Highway material testing Laboratory manual	Nem Chand & Bros,Roorkee,India
4	Ajay K. Duggal & Vijay P Puri	Laboratory manual in Highway Engg.	New Age Int.Publishers
5	Dr.M.R.Samal	Civil Engineering Laboratory Practice-I	Kalyani Publishers

Pr2. CIVIL ENGINEERING DRAWING-I

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	3rd
Total Period:	75	Examination	2 hrs
Theory periods:	5P/week	Term Work	25
Maximum marks:	75	End Semester Examination:	50

A. RATIONALE

The course aims to prepare the students to use modern engineering tools to prepare building drawings.

B. COURSE OBJCTIVES

After completion of the course, students will be able to
CO1- Use AutoCAD modules to prepare engineering drawings
CO2- Comprehend various drawing commands available in CAD software CO3- Prepare plan, elevation and section views of flat roof buildings
CO4- Prepare plan, elevation and section views of inclined roof buildings CO5- Generate drawings of building citing material differences
CO6- Generate building plans following prescribed regulations in established codes.

C. TOPIC WISE DISTRIBUTION

Chapter	Name of topics	Hours
1	AutoCAD software	25
2	Plan, elevation and sectional elevation of flat roof building from line diagram and given specifications using AutoCAD software	25
3	Plan, elevation and section of inclined roof building with a/c sheet/gci/tiles on wooden structure using AutoCAD software	10
4	Building planning	15

D. COURSE CONTENTS

1. AutoCAD SOFTWARE.

- **1.1** Recap of the Draw, Format, Edit, Dimension, Modify commands
- **1.2** Draw 2D drawings of the following Building Components - Doors, Windows, Cross section through wall, Spread footing, Column footing, Stairs case, R.C.C. T-beam and slab
- **1.3** Develop Isometric drawings of simple objects
- **1.4** Develop 3D drawings of simple objects.

2 PLAN, ELEVATION AND SECTIONAL ELEVATION OF FLAT ROOF BUILDING FROM LINE DIAGRAM AND GIVEN SPECIFICATIONS with use of AutoCAD software.

- **2.1** Plan at window sill level of a single storeyed R.C. roof slab building with elevation and sectional views form given line diagram and specification.
- **2.2** Detail drawing of Double storeyed pucca building with R.C.C. stair case from line diagram and given specification.

2.3 Preparation of approval drawing of a residential building as per the norms of local approving authority with site plan, index plan etc.

3 PLAN, ELEVATION AND SECTION OF INCLINED ROOF BUILDING WITH AC SHEET/GCI/TILES ON WOODEN STRUCTURE with use of AutoCAD Commands

Detail drawing of inclined roof building from given line diagram and specification. (gabbled / hipped)

4. **BUILDING PLANNING**

4.1 Planning of buildings for specific cost based on approximate plinth area rate.

4.2 Orientation of buildings, location of openings and living areas.

4.3 Line plan of School, hostel, market complex and dispensary building.

E. RECOMMENDED BOOKS

Learning Resources			
Text Books			
Sl. No	**Name of Authors**	**Titles of Book**	**Name of Publisher**
1	M.Chakrobarty	Civil Engg. Drawing	M.Chakrobarty
2	B.P.Verma	Civil Engineering drawing &House Planning	Khanna Publishers
3	Govt Of India	IS12556, 10713&I.S-696	BIS Publication
4	V.Thanikachalama & K.V Natarajan	Civil Engineering drawing Manual	S Chand & Co Pvt Ltd
5	G.V.Krishnan & Thomas A. Stellman	Harnessing AutoCAD	Delmar Cengage Learning
	George Omura	Mastering AutoCAD	Sybex
	William G. Wyatt	AutoCAD (Architecture) –latest edition	Delmar Cengage Learning

Pr3. ESTIMATING PRACTICE

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	4th
Total Period:	45	Examination	
Lab. periods:	3 P/week	Term Work	25
Maximum marks:	25	End Semester Examination:	00

A. RATIONALE

The course will enable the students to develop detailed estimate and prepare bill of materials essential for buildings in accordance with prescribed codes.

B. COURSE OBJCTIVES

After completion of the course, students will be able to

CO1- Prepare estimates fir 2 room single storey building

CO2- Prepare estimate for 2 storeyed buildings

CO3- Comprehend the schedule and analysis of rates offered by State Works

Department CO4- Use MX Excel to prepare analysis of rates

CO5- Evaluate dry material list and cost associated using MS Excel

CO6- Prepare abstract of costs and bill of materials for single storey and double storey buildings

C. TOPIC WISE DISTRIBUTION

Chapter	Name of topics	Hours
1	Estimate for plinth area	21
2	Analysis of rates	09
3	Dry material calculation	09
4	Cost estimate and bill of quantities	06

D. COURSE CONTENTS

1.0 Preparation of plinth area estimate & detailed estimate for the following ;

- 1.1 Single storeyed two roomed building with specification as per Orissa P.W.D. schedule of rates and analysis of rates
- 1.2 A two storeyed pucca Building with specification as per Orissa P.W.D. schedule of rates and analysis of rates

2.0 Analysis of rates in detail for the above items of works basing on Orissa Govt. analysis of rate with help of **MS Excel software.**

3.0 Calculation of dry materials for different items of building basing on Orissa Govt. analysis of rate with help of **MS Excel software**

4.0 Preparation of abstract of cost and bill of quantities of the estimates as per item no. 1.0 above with help of **MS Excel software**

E. RECOMMENDED BOOKS

Learning Resources			
Text Books			
Sl. No	**Name of Authors**	**Titles of Book**	**Name of Publisher**
1	M.Chakrobarty	Estimating,Costing,specification &Valuation in Civil Engineering	Chakrobarty
2	B.N.Dutta	Estimating &Costing in Civil Engg.	UBS Publishers' Distributors Pvt. Ltd
3	G.S.Birdie	Text Book of Estimating &Costing	Dhanpat Rai Publishing Company Pvt. Ltd
4	Govt. of Odisha	Latest Orissa PWD Schedule of Rates & Analysis of rates	Govt. of Odisha

STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA

TEACHING AND EVALUATION SCHEME FOR 4th Semester (Civil Engineering)(wef 2019-20)

Subject Number	Subject Code	Subject	Periods/week			Evaluation Scheme			
			L	T	P	Internal Assessment/ Sessional	End Sem Exams	Exams (Hours)	Total
		Theory							
Th.1		Structural Design - I	5		-	20	80	3	100
Th.2		Hydraulic and Irrigation Engineering	5		-	20	80	3	100
Th.3		Land Surveying – I	5		-	20	80	3	100
Th.4		Highway Engineering	5			20	80	3	100
		Total	*20*			*80*	*320*	-	*400*
		Practical							
Pr.1		Land Survey Practice-I	-	-	7	50	100	3	150
Pr.2		Civil Engg. Drawing-II	-	-	6	50	100	3	150
Pr.3		Technical Seminar			3	50			50
		Student Centered Activities(SCA)		-	3				
		Total	-	-	*19*	*150*	*200*	-	*350*
		Grand Total	**20**	**-**	**19**	**230**	**520**	**-**	**750**

Abbreviations: L-Lecturer, T-Tutorial, P-Practical . Each class is of minimum 55 minutes duration

Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50% and in Aggregate is 40%

SCA shall comprise of Extension Lectures/ Personality Development/ Environmental issues /Quiz /Hobbies/ Field visits/ cultural activities/Library studies/Classes on MOOCS/SWAYAM etc. ,Seminar and SCA shall be conducted in a section.

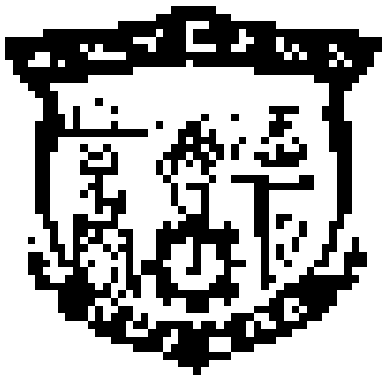
There shall be 1 Internal Assessment done for each of the Theory Subject. Sessional Marks shall be total of the performance of individual different jobs/ experiments in a subject throughout the semester

CURRICULLUM OF 4TH SEMESTER

For

DIPLOMA IN CIVIL ENGINEERING

(Effective FROM 2019-20 Session)



STATE COUNCIL FOR TECHNICAL EDUCATION & VOCATIONAL TRAINING, ODISHA, BHUBANESWAR

Th1. STRUCTURAL DESIGN – I

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	4th
Total Period:	75	Examination	3 hrs
Theory periods:	5P/week	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

(*Use of only IS 456 code is allowed in the written examination*)

A. RATIONALE

The course will enable the students to undertake activities relating to the Design of simple Civil structural elements in view of load conditions and regulations imposed by standard or codes.

B. COURSE OBJECTIVES

On completion of the subject a student will be able to –

1. Comprehend design philosophies and compare those
2. Refer the design codes
3. Design simple R.C. structural elements
4. Draw structural details for construction
5. Analyze and design structural elements such as beams, columns, staircase etc
6. Design formwork and scaffolding.

C. TOPIC WISE DISTRIBUTION OF PERIODS

Chapter	Name of topics	Periods
1	Working stress method (WSM)	05
2	Philosophy of Limit state method (LSM)	03
3	Analysis and design of singly and double reinforced sections (LSM)	15
4	Shear, Bond and Development Length (LSM)	04
6	Analysis and Design of T-Beam (LSM)	15
7	Analysis and Design of Slab and Stair case (LSM)	15
8	Design of Axially loaded columns and Footings (LSM)	18

D. COURSE CONTENTS:

(The codal provision for I.S.456 – 2000 along with other codes are to be followed**)**

1 Working stress method (WSM)

1.1 Objectives of design and detailing. State the different methods of design of concrete structures.

1.2 Introduction to reinforced concrete, R.C. sections their behavior, grades of concrete and steel. Permissible stresses, assumption in W.S.M.

1.3 Flexural design and analysis of single reinforced sections from first principles.

1.4 Concept of under reinforced, over reinforced and balanced sections.

1.5 Advantages and disadvantages of WSM, reasons for its obsolescence.

2 Philosophy Of Limit State Method (LSM)

2.1 Definition, Advantages of LSM over WSM, IS code suggestions regarding design philosophy.

2.2 Types of limit states, partial safety factors for materials strength, characteristic strength, characteristic load, design load, loading on structure as per I.S. 875

2.3 Study of I.S specification regarding spacing of reinforcement in slab, cover to reinforcement in slab, beam column & footing, minimum reinforcement in slab, beam & column, lapping, anchorage, effective span for beam & slab.

3 Analysis and Design of Single and Double Reinforced Sections (LSM)

3.1 Limit state of collapse (flexure), Assumptions, Stress-Strain relationship for concrete and steel, neutral axis, stress block diagram and strain diagram for singly reinforced section.

3.2 Concept of under- reinforced, over-reinforced and limiting section, neutral axis co-efficient, limiting value of moment of resistance and limiting percentage of steel required for limiting singly R.C. section.

3.3 Analysis and design: determination of design constants, moment of resistance and area of steel for rectangular sections

3.4 Necessity of doubly reinforced section, design of doubly reinforced rectangular section

4 Shear, Bond and Development Length (LSM)

4.1 Nominal shear stress in R.C. section, design shear strength of concrete, maximum shear stress, design of shear reinforcement, minimum shear reinforcement, forms of shear reinforcement.

4.2 Bond and types of bond, bond stress, check for bond stress, development length in tension and compression, anchorage value for hooks 900 bend and 450 bend standards lapping of bars, check for development length.

4.3 Numerical problems on deciding whether shear reinforcement is required or not, check for adequacy of the section in shear. Design of shear reinforcement; Minimum shear reinforcement in beams (Explain through examples only).

5 Analysis and Design of T-Beam (LSM)

5.1 General features, advantages, effective width of flange as per IS: 456-2000 code provisions.

5.2 Analysis of singly reinforced T-Beam, strain diagram & stress diagram, depth of neutral axis, moment of resistance of T-beam section with neutral axis lying within the flange.

5.3 Simple numerical problems on deciding effective flange width. (Problems only on finding moment of resistance of T-beam section when N.A. lies within or up to the bottom of flange shall be asked in written examination)..

6 Analysis and Design of Slab and Stair case (LSM)

6.1 Design of simply supported one-way slabs for flexure check for deflection control and shear.

6.2 Design of one-way cantilever slabs and cantilevers chajjas for flexure check for deflection control and check for development length and shear.

6.3 Design of two-way simply supported slabs for flexure with corner free to lift.

6.4 Design of dog-legged staircase

6.5 Detailing of reinforcement in stairs spanning longitudinally.

7 Design of Axially loaded columns and Footings (LSM)

7.1 Assumptions in limit state of collapse- compression.

7.2 Definition and classification of columns, effective length of column. Specification for minimum reinforcement; cover, maximum reinforcement, number of bars in rectangular, square and circular sections, diameter and spacing of lateral ties.

7.3 Analysis and design of axially loaded short square, rectangular and circular columns (with lateral ties only).

7.4 Types of footing, Design of isolated square column footing of uniform thickness for flexure and shear.

E. Syllabus Coverage up to Internal Assessment: Chapters 1, 2, 3, 4

F. RECOMMENDED BOOKS

Sl. No	Name of Authors	Titles of Book	Name of Publisher
1	N.Subramanian	Design of Reinforced Concrete Structures	Oxford Pbln
2	N.C.Sinha,S.K.Roy	Fundamentals of Reinforced Concrete	S.Chand
3	H.J Saha.	Reinforced Concrete	Charotar Publishing house
4	Pillai & Menon.	Reinforced Concrete Structures	Tata McGraw Hill Education Private Limited
5	A.K. Jain.	Limit State Method (RCC Design)	Nem Chand & Bros
6	IS:456-2000		BIS Publication
7	SP-16		BIS Publication

Th2. HYDRAULICS & IRRIGATION ENGINEERING

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	4th
Total Period:	75	Examination	3 hrs
Theory periods:	5P/week	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONALE

The course will be imparted in two parts. Primarily it aims to explain students the need of irrigation and components of the irrigation system which is covered in the second part of the course. The course aims to explain students the intricacies of irrigation engineering with reference to basic sciences relating to fluid mechanics and hydraulic machines. The essential components of fluid mechanics and hydraulic machines will be addressed in the first part of the course.

B. COURSE OBJECTIVES

On completion of the course students will be able to -

1. Define common fluid properties and interpret results from pressure measuring instruments.
2. Realize the science behind fluid flow and compute fluid flow characteristics through notches, weirs, channels and pipes.
3. Realize the working principle of hydraulic pumps and evaluate their performance in general cases.
4. Comprehend the need of irrigation
5. Determine cause and effect of water logging
6. Comprehend the purpose of irrigation system components and elaborate on these

C. TOPIC WISE DISTRIBUTION OF PERIODS

Chapter	Name Of Topics	Periods
PART: A (Hydraulics And Machines)		
1	Hydrostatics	12
2	Kinematics Of Fluid Flow	18
3	Pumps	05
Part: B (Irrigation Engineering)		
1	Hydrology	04
2	Water Requirement Of Crops	04
3	Flow Irrigation	07
4	Water Logging And Drainage :	02
5	Diversion Head Works And Regulatory Structures	08
6	Cross Drainage Works :	07
7	Dams	08

D. COURSE CONTENTS:

PART: A (Hydraulics)

1 HYDROSTATICS:

1.1 **Properties of fluid:** density, specific gravity, surface tension, capillarity, viscosity and their uses

1.2 **Pressure and its measurements:** intensity of pressure, atmospheric pressure, gauge pressure, absolute pressure and vacuum pressure; relationship between atmospheric pressure, absolute pressure and gauge pressure; pressure head; pressure gauges.

1.3 Pressure exerted on an immersed surface: Total pressure, resultant pressure, expression for total pressure exerted on horizontal & vertical surface.

2 KINEMATICS OF FLUID FLOW:

2.1 Basic equation of fluid flow and their application: Rate of discharge, equation of continuity of liquid flow, total energy of a liquid in motion- potential, kinetic & pressure, Bernoulli's theorem and its limitations. Practical applications of Bernoulli's equation.

2.2 Flow over Notches and Weirs: Notches, Weirs, types of notches and weirs, Discharge through different types of notches and weirs-their application (No Derivation)

2.3 Types of flow through the pipes: uniform and non uniform; laminar and turbulent; steady and unsteady; Reynold's number and its application

2.4 Losses of head of a liquid flowing through pipes: Different types of major and minor losses. Simple numerical problems on losses due to friction using Darcy's equation, Total energy lines & hydraulic gradient lines (Concept Only).

2.5 Flow through the Open Channels: Types of channel sections-rectangular, trapezoidal and circular, discharge formulae- Chezy's and Manning's equation, Best economical section.

3 PUMPS:

3.1 Type of pumps

3.2 Centrifugal pump: basic principles, operation, discharge, horse power & efficiency.

3.3 Reciprocating pumps: types, operation, discharge, horse power & efficiency

PART: B (Irrigation Engineering)

1 Hydrology

1.1 Hydrology Cycle

1.2 Rainfall: types, intensity, hyetograph

1.3 Estimation of rainfall, rain gauges, Its types(concept only),

1.4 Concept of catchment area, types, run-off, estimation of flood discharge by Dicken's and Ryve's formulae

2 Water Requirement of Crops

2.1 Definition of irrigation, necessity, benefits of irrigation, types of irrigation

2.2 Crop season

2.3 Duty, Delta and base period their relationship, overlap allowance, kharif and rabi crops

2.4 Gross command area, culturable command area, Intensity of Irrigation, irrigable area, time factor, crop ratio

3 FLOW IRRIGATION

3.1 Canal irrigation, types of canals, loss of water in canals
3.2 Perennial irrigation
3.3 Different components of irrigation canals and their functions
3.4 Sketches of different canal cross-sections
3.5 Classification of canals according to their alignment, Various types of canal lining — Advantages and disadvantages

4 WATER LOGGING AND DRAINAGE :

4.1 Causes and effects of water logging, detection, prevention and remedies

5 DIVERSION HEAD WORKS AND REGULATORY STRUCTURES

5.1 Necessity and objectives of diversion head works, weirs and barrages
5.2 General layout, functions of different parts of barrage
5.3 Silting and scouring
5.4 Functions of regulatory structures

6 CROSS DRAINAGE WORKS :

6.1 Functions and necessity of Cross drainage works - aqueduct, siphon, super- passage, level crossing
6.2 Concept of each with help of neat sketch

7 DAMS

7.1 Necessity of storage reservoirs, types of dams
7.2 Earthen dams: types, description, causes of failure and protection measures.
7.3 Gravity dam- types, description, Causes of failure and protection measures.
7.4 Spillways- Types (With Sketch) and necessity.

E. Syllabus Coverage up to Internal Assessment: Part A: Chapters 1, 2 & Part B: 1, 2

F. RECOMMENDED BOOKS

Sl. No	Name of Authors	Titles of Book	Name of Publisher
1	Modi & Seth	Fluid Mechanics & Hydraulic machines	Standard Book House
2	D.R. Biswal	Hydraulics & Fluid Mechanics	Kalyani Pbln
3	R.K.Rajput	A Text Book of Fluid Mechanics & Hydraulic machines	S.Chand

Sl. No	Name of Authors	Titles of Book	Name of Publisher
1	S.K.Garg	Irrigation Engineering & Hydraulics Structures	Khanna Publishers
2	N. N. Basak	Irrigation Engineering	TMH Publishing
3	S.K. Sharma	Irrigation Engineering & Hydraulic structures.	S. Chand Pbln

Th3. LAND SURVEY – I

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	4th
Total Period:	75	Examination	3 hrs
Theory periods:	5P/week	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONALE

Survey is an essential prerequisite for all types of civil construction activities. This course aims to provide knowledge in area of plane survey and the survey instruments. Besides, the course aims to provide students in map reading and area computations from survey data.

B. COURSE OBJECTIVES

On completion of the course students will be able to

1. Define various survey terminology and carryout necessary corrections for errors
2. Comprehend the principle, purpose, equipment and error corrections in chain and compass surveying
3. Comprehend the principle, purpose, equipment and error corrections in plane table and theodolite surveying
4. Comprehend the map nomenclature and apply skills in map interpretation
5. Gather skill towards leveling and contouring with knowledge of purpose and different methods thereof
6. Compute area and volume using different numerical algebraic methods

C. Topic Wise Distribution of Periods

Chapter	Name of topics	Periods
1	Introduction To Surveying, Linear Measurements	07
2	Chaining and Chain Surveying	07
3	Angular Measurement and Compas Surveying	12
4	Map Reading Cadastral Maps & Nomenclature	07
5	Plane Table Surveying	07
6	Theodolite Surveying and Traversing:	15
7	Levelling and Contouring	15
8	Computation of Area & Volume	05

D. Course Contents

1 INTRODUCTION TO SURVEYING, LINEAR MEASUREMENTS:

1.1 Surveying: Definition, Aims and objectives

1.2 Principles of survey-Plane surveying- Geodetic Surveying- Instrumental surveying.

1.3 Precision and accuracy of measurements, instruments used for measurement of distance, Types of tapes and chains.

1.4 Errors and mistakes in linear measurement – classification, Sources of errors and remedies.

1.5 Corrections to measured lengths due to-incorrect length, temperature variation, pull, sag, numerical problem applying corrections.

2 CHAINING AND CHAIN SURVEYING :

2.1 Equipment and accessories for chaining
2.2 Ranging – Purpose, signaling, direct and indirect ranging, Line ranger – features and use, error due to incorrect ranging.
2.3 Methods of chaining –Chaining on flat ground, Chaining on sloping ground – stepping method, Clinometer-features and use, slope correction.
2.4 Setting perpendicular with chain & tape, Chaining across different types of obstacles –Numerical problems on chaining across obstacles.
2.5 Purpose of chain surveying, Its Principles, concept of field book.
Selection of survey stations, base line, tie lines, Check lines.
2.7 Offsets – Necessity, Perpendicular and Oblique offsets, Instruments for setting offset – Cross Staff, Optical Square.
2.8 Errors in chain surveying – compensating and accumulative errors causes & remedies, Precautions to be taken during chain surveying.

3 ANGULAR MEASUREMENT AND COMPAS SURVEYING :

3.1 Measurement of angles with chain, tape & compass
3.2 Compass – Types, features, parts, merits & demerits, testing & adjustment of compass
3.3 Designation of angles- concept of meridians — Magnetic, True, arbitrary; Concept of bearings – Whole circle bearing, Quadrantal bearing, Reduced bearing, suitability of application, numerical problems on conversion of bearings
3.4 Use of compasses — setting in field-centering, leveling, taking readings, concepts of Fore bearing, Back Bearing, Numerical problems on computation of interior & exterior angles from bearings.
3.5 Effects of earth's magnetism — dip of needle, magnetic declination, variation in declination, numerical problems on application of correction for declination.
3.6 Errors in angle measurement with compass – sources & remedies.
3.7 Principles of traversing – open & closed traverse, Methods of traversing.
3.8 Local attraction – causes, detection, errors, corrections, Numerical problems of application of correction due to local attraction.
3.9 Errors in compass surveying – sources & remedies.
Plotting of traverse – check of closing error in closed & open traverse, Bowditch's correction, Gales table

4 MAP READING CADASTRAL MAPS & NOMENCLATURE:

4.1 Study of direction, Scale, Grid Reference and Grid Square
Study of Signs and Symbols
4.2 Cadastral Map Preparation Methodology
4.3 Unique identification number of parcel
4.4 Positions of existing Control Points and its types
4.5 Adjacent Boundaries and Features, Topology Creation and verification.

5 PLANE TABLE SURVEYING :

5.1 Objectives, principles and use of plane table surveying.
5.2 Instruments & accessories used in plane table surveying.
5.3 Methods of plane table surveying – (1) Radiation, (2) Intersection, (3) Traversing, (4) Resection.
5.4 Statements of TWO POINT and THREE POINT PROBLEM.
Errors in plane table surveying and their corrections, precautions in plane table surveying.

6 THEODOLITE SURVEYING AND TRAVERSING:

6.1 Purpose and definition of theodolite surveying

6.2 Transit theodolite- Description of features, component parts, Fundamental axes of a theodolite, concept of vernier, reading a vernier, Temporary adjustment of theodolite

6.3 Concept of transiting –Measurement of horizontal and vertical angles.

6.4 Measurement of magnetic bearings, deflection angle, direct angle, setting out angles, prolonging a straight line with theodolite, Errors in Theodolite observations.

6.5 Methods of theodolite traversing with – inclined angle method, deflection angle method, bearing method, Plotting the traverse by coordinate method, Checks for open and closed traverse.

6.6 Traverse computation — consecutive coordinates, latitude and departure, Gale's traverse table, Numerical problems on omitted measurement of lengths & bearings

6.7 Closing error – adjustment of angular errors, adjustment of bearings, numerical problems

6.8 Balancing of traverse – Bowditch's method, transit method, graphical method, axis method, calculation of area of closed traverse.

7 LEVELLING AND CONTOURING :

7.1 Definition and Purpose and types of leveling– concepts of level surface, Horizontal surface, vertical surface, datum, R. L., B.M.

7.2 Instruments used for leveling, concepts of line of collimation, axis of bubble tube, axis of telescope, Vertical axis.

7.3 Levelling staff – Temporary adjustments of level, taking reading with level, concept of bench mark, BS, IS, FS, CP, HI.

7.4 Field data entry — level Book — height of collimation method and Rise & Fall method, comparison, Numerical problems on reduction of levels applying both methods, Arithmetic checks.

7.5 Effects of curvature and refraction, numerical problems on application of correction.

7.6 Reciprocal leveling – principles, methods, numerical problems, precise leveling.

7.7 Errors in leveling and precautions, Permanent and temporary adjustments of different types of levels.

7.8 Definitions, concepts and characteristics of contours.

7.9 Methods of contouring, plotting contour maps, Interpretation of contour maps, toposheets.

7.10 Use of contour maps on civil engineering projects — drawing cross-sections from contour maps, locating proposal routes of roads / railway / canal on a contour map, computation of volume of earthwork from contour map for simple structure.

7.11 Map Interpretation: Interpret Human and Economic Activities (i.e.: Settlement, Communication, Land use etc.), Interpret Physical landform (i.e.: Relief, Drainage Pattern etc.), Problem Solving and Decision Making

8 COMPUTATION OF AREA & VOLUME:

8.1 Determination of areas, computation of areas from plans.

8.2 Calculation of area by using ordinate rule, trapezoidal rule, Simpson's rule.

8.3 Calculation of volumes by prismoidal formula and trapezoidal formula, Prismoidal corrections, curvature correction for volumes.

E. SYLLABUS COVERAGE UPTO INTERNAL ASSESSMENT

Chapters 1, 2, 3, 4, 5

G. RECOMMENDED BOOKS

Sl. No	Name of Authors	Titles of Book	Name of Publisher
1	R.Subramanian	Surveying and Levelling	Oxford
2	Dr.B.C.Punmia.	Surveying,Vol.-I&II	Laxmi Publication
3	R. Agor	A text Book of Surveying & Levelling	Khanna Publishers
4	N.N Basak.	Surveying & Levelling	TMH Publishing

Th4. HIGHWAY ENGINEERING

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	4th
Total Period:	75	Examination	3 hrs
Theory periods:	5P/week	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONALE

One of the major tasks carried out by civil engineering professionals is highway construction. Knowledge is essential on necessary geometric, materials, equipment essential for highway construction. The course aims to impart knowledge in this segment.

B. COURSE OBJECTIVES

On completion of the course students will be able to -

1. Realize significance of the highway transportation and professional bodies associated with this,
2. Acquaint themselves with road geometric terms and understand the purpose of providing necessary features including angles and curvature during road construction.
3. Select proper road construction materials based on required properties and test data.
4. Comprehend the pavements and their types and know the step wise construction processes.
5. Acquire knowledge on common construction equipment
6. Realize essence of drainage and maintenance on the highways and prescribe related practices.

C. TOPIC WISE DISTRIBUTION

Chapter	Name of topics	Periods
1	Introduction	05
2	Road Geometrics	20
3	Road Materials	09
4	Road Pavements	13
5	Hill Roads	07
6	Road Drainage	07
7	Road Maintenance :	07
8	Construction equipments:	07

D. COURSE CONTENTS:

1 Introduction

1.1 Importance of Highway transportation: importance organizations like Indian roads congress, Ministry of Surface Transport, Central Road Research Institute.
1.2 Functions of Indian Roads Congress
1.3 IRC classification of roads
1.4 Organisation of state highway department

2 Road Geometrics

2.1 Glossary of terms used in geometric and their importance, right of way, formation width, road margin, road shoulder, carriage way, side slopes, kerbs, formation level, camber and gradient

2.2 Design and average running speed, stopping and passing sight distance

2.3 Necessity of curves, horizontal and vertical curves including transition curves and super elevation, Methods o f providing super — elevation

3 Road Materials

3.1 Difference types of road materials in use: soil, aggregates, and binders

3.2 Function of soil as highway Subgrade

3.3 California Bearing Ratio: methods of finding CBR valued in the laboratory and at site and their significance

3.4 Testing aggregates: Abrasion test, impact test, crushing strength test, water absorption test & soundness test

4 **Road Pavements**

4.1 Road Pavement: Flexible and rigid pavement, their merits and demerits, typical cross-sections, functions of various components

Flexible pavements:

4.2 Sub-grade preparation:

Setting out alignment of road, setting out bench marks, control pegs for embankment and cutting, borrow pits, making profile of embankment, construction of embankment, compaction, stabilization, preparation of subgrade, methods of checking camber, gradient and alignment as per recommendations of IRC, equipment used for subgrade preparation

4.3 Sub base Course:

Necessity of sub base, stabilized sub base, purpose of stabilization (no designs)

Types of stabilization

- Mechanical stabilization
- Lime stabilization
- Cement stabilization
- Fly ash stabilization

4.4 Base Course:

Preparation of base course, Brick soling, stone soling and metalling, Water Bound Macadam and wet-mix Macadam, Bituminous constructions: Different types

4.5 Surfacing:

- Surface dressing
  (i) Premix carpet and (ii) Semi dense carpet
- Bituminous concrete
- Grouting

4.6 Rigid Pavements:

Concept of concrete roads as per IRC specifications

5 Hill Roads:

5.1 Introduction: Typical cross-sections showing all details of a typical hill road in cut, partly in cutting and partly in filling

5.2 Breast Walls, Retaining walls, different types of bends

6 Road Drainage:

6.1 Necessity of road drainage work, cross drainage works

6.2 Surface and sub-surface drains and storm water drains. Location, spacing and typical details of side drains, side ditches for surface drainage, intercepting drains, pipe drains in hill roads, details of drains in cutting embankment, typical cross sections.

7 Road Maintenance :

7.1 Common types of road failures – their causes and remedies
7.2 Maintenance of bituminous road such as patch work and resurfacing
7.3 Maintenance of concrete roads – filling cracks, repairing joints, maintenance of shoulders (berm), maintenance of traffic control devices
7.4 Basic concept of traffic study, Traffic safety and traffic control signal

8 Construction equipments:

Preliminary ideas of the following plant and equipment:
8.1 Hot mixing plant
8.2 Tipper, tractors (wheel and crawler) scraper, bulldozer, dumpers, shovels, graders, roller dragline
8.3 Asphalt mixer and tar boilers
8.4 Road pavers
8.5 Modern construction equipments for roads.

E. SYLLABUS COVERAGE UPTO INTERNAL ASSESSMENT: Chapters 1, 2, 3, 4

F. RECOMMENDED BOOKS

Sl. No	Name of Authors	Titles of Book	Name of Publisher
1	S.K.Khanna & C.E.G. Justo	Highway Engineering	Nem Chand & Bros
2	S.P.Chandola	A Text Book Of Transportation Engineering	S. Chand
3	S.P.Bindra	A course on Highway engineering	Dhanpat Rai Publications
4	S.K. Sharma	Principles, practices & design of Highway Enginnering.	S. Chand

Pr1. LAND SURVEY PRACTICE-I

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	4th
Total Period:	105	Examination	3hrs
Lab. periods:	7P/week	Term Work/Sessional	50
Maximum marks:	150	End Semester Examination:	100

A. RATIONALE

The course prepares the students in use of survey instruments to conduct survey, present and interpret the generated data. This course, further, aims to enable students in map reading and computation of area from survey generated data. In addition, It introduces modern practice of survey that is photogrammetry which is applied in topographic mapping and site planning activities, along with the foundation for GIS information generation.

B. COURSE OBJECTIVES

On completion of the course students will be able to

1. Undertake linear measurement activities using chains in absence or presence of obstacles
2. Conduct compass surveying and record data in necessary format
3. Read, interpret and verify a map
4. Setup plane table and conduct survey using different methods
5. Use of theodolite and plot the traverse and contour maps
6. Realize significance of photogrammetry as pictorial, accurate and permanent record and understand the basics of aerial photography
7. Acquire image through aerial and satellite platform and scanning thereof along with stereoscopic measurement
8. Generate DTM/DEM and ortho-image

C. TOPIC WISE DISTRIBUTION OF PERIODS

Chapter	Name of topics	Hours
1	Linear Mesurements, Chaining and Chain Surveying	05
2	Angular Measurement and Compass Surveying	12
3	Map Reading Cadastral Maps & Nomenclature	08
4	Plane Table Surveying	13
5	Theodolite Traversing	10
6	Levelling and Contouring	12
7	Basics of Aerial Photography	09
8	Basics of Photogrammetry, DEM and Ortho Image Generation	36

D. **COURSE CONTENTS:**

1.0 Linear Measurements, Chaining and Chain Surveying:

1.1 Testing and adjusting of a metric chain.
1.2 Measurement of distance between two points (more than 2 chain lengths apart) with chain including direct ranging.
1.3 Setting out different types of triangles, given the lengths of sides with chain and tape.
1.4 Measurement of distance between two points by chaining across a sloped ground using stepping method and a clinometer.
1.5 Measurement of distance by chaining across a obstacles on the chain line i) a pond ii)a building iii) a stream/ river (in the event of non-availability of stream / river, a pond or lake may be taken, considering that chaining around the same is not possible.
1.6 Setting perpendicular offsets to various objects (at least 3) from a chain line using-(1) tape, (2) cross-staff, (3) optical square and comparing the accuracy of the 3 methods
1.7 Setting oblique offsets to objects (at least 3) from a chain using tape

2.0 Angular Measurement and Compass Surveying:

2.1 Testing and adjustment of Prismatic compass and Surveyor's compass.
2.2 Measurement of bearings of lines (at least 3 lines) and determination of included angles using Prismatic compass and Surveyor's compass.
2.3 Setting out triangles (at least 2) with compass, given the length and bearing of one side and included angles.
2.4 Setting out a closed traverse of 5 sides, using prismatic compass, given bearing of one line and included angles and lengths of sides.
2.5 Conducting chain and compass traverse surveying in a given plot of area (2plots) and recording data in the field book. (5 to 6 students/groups)

3.0 Map Reading Cadastral Maps & Nomenclature:

3.1 Study of direction, Scale, Grid Reference and Grid Square
3.2 Study of Signs and Symbols
3.3 Cadastral Map Preparation Methodology
3.4 Unique identification number of parcel
3.5 Positions of existing Control Points and its types
3.6 Adjacent Boundaries and Features, Topology Creation and verification.

4.0 Plane Table Surveying:

4.1 Setting up of Plane Table and Plotting five points by radiation method and five inaccessible points by intersection method.
4.2 Conducting Plane Table surveying in a given plot of area by traversing (Atleast a 5-sided traverse and locating the objects)
4.3 Plane table surveying by Resection method (two point &three point problem method)

5.0 Theodolite Traversing:

5.1 Measurement of horizontal angles (3nos.) by repetition and reiteration method and compare two methods
5.2 Prolonging a given straight line with the help of a theodolite
5.3 Determination of magnetic bearing of 3 given straight lines

Setting out a closed traverse with 6 sides and entering the field data
5.4 Plotting the traverse from exercise 4.1 and checking the error of closure
5.5 Setting out an open traverse with 5 sides and entering the field data
5.6 Plotting the traverse from exercise 4.3 and checking the error of closure

6.0 Leveling and Contouring:

6.1 Making temporary adjustments of Levels
6.2 Determining Reduced Levels of five given points taking staff readings with Levels.
6.3 Determining the difference of levels between two points (3 pairs of points / group) by taking staff readings form single set up of level, recording the readings in level book and application of Arithmetic check. (At least 3 change points must be covered)
6.4 Conduct Fly Leveling (Compound) between two distant points with respect to R.L. of a given B.M. and reduction of levels by both height of collimation and rise & fall method and applying Arithmetic check. (At least 3 change points must be covered)
6.5 Conduct profile leveling along the given alignment for a road / canal for 150m length, taking L. S. at every 15m and C. S. at 1m & 3m apart on both sides at every 30m interval and recording the data in level book and applying arithmetical check.
6.6 Locating contour points in the given area by direct method / indirect method
6.7 Conducting block level survey in the given area
6.8 Plotting and drawing contour map of a given area by radial method
6.9 Map Interpretation: Interpret Human and Economic Activities (i.e.: Settlement, Communication, Land use etc.), Interpret Physical landform (i.e.: Relief, Drainage Pattern etc.), Problem Solving and Decision Making

7.0 Basics of Aerial Photography:

7.1 Film
7.2. Focal Length
7.3. Scale
7.4. Types of Aerial Photographs (Oblique, Straight)

8.0 Basics of Photogrammetry, DEM and Ortho Image generation:

Photogrammetry:

8.1 Classification of Photogrammetry
8.2 Aerial Photogrammetry
8.3 Terrestrial Photogrammetry

Photogrammetry Process:
8.4 Acquisition of Imagery using aerial and satellite platform
8.5 Control Survey
8.6 Geometric Distortion in Imagery
8.7 Application of Imagery and its support data
8.8 Orientation and Triangulation
8.9 Stereoscopic Measurement: X-parallax and Y-parallax
8.10 DTM/DEM Generation
8.11 Ortho Image Generation

E. RECOMMENDED BOOKS:

- Surveying and Leveling - R.Subramanian
- Surveying, Vol.-I&II -Dr.B.C.Punmia
- A text Book of Surveying & Leveling -R.Agor.
- Surveying Part-III - Dr.B.C.Punmia
- Advanced Surveying - D. Gaikwad, S. Chand

Pr2. CIVIL ENGINEERING DRAWING – II

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	4th
Total Period:	90	Examination	3 hrs
Lab. periods:	6 P/week	Term Work/Sessional	50
Maximum marks:	150	End Semester Examination:	100

A. RATIONALE

The course aims to prepare the students to use modern engineering tools to prepare drawings of essential structures that include culverts, irrigation structures, sanitation components.

B. COURSE OBJECTIVES

After completion of the course, students will be able to use AutoCAD or CAD softwares to

- Prepare RCC slab culvert drawings
- Prepare Hume pipe culvert drawings
- Prepare detailed drawings including plan, elevation and section views of irrigation structures
- Prepare detailed drawings of drainage siphons
- Generate drawings of plumbing and sanitary connections in two room buildings
- Generate detailed drawing of septic tanks

C. TOPIC WISE DISTRIBUTION OF PERIODS

Chapter	Name of topics	Hours
1	Detailed drawing of culvert	25
2	Irrigation Structures	35
3	Plumbing and Sanitary connections	10
4	septic tank up to 50 users with soak pit	20

D. COURSE CONTENT:

(ALL THE DRAWINGS TO BE DONE USING AUTO CAD SOFTWARE ONLY)

1.0 Detailed drawing of culvert

Half foundation plan and half top plan, cross sectional elevation and longitudinal section of

i) RCC Slab culvert with right angled wing wall
ii) Hume pipe culvert with splayed wing wall

2.0 Irrigation Structures

2.1 Detail drawing of a vertical drop type fall (Sarada Type) from given specifications
2.2 Drawing of a Drainage siphon from given specifications

3 Plumbing and Sanitary connections and fittings of a two roomed building

4 Detailed drawing of septic tank up to 50 users with soak pit and necessary connection from the water closet.

E. RECOMMENDED BOOKS:

1. Civil Engg. Drawing -M.Chakrobarty.
2. Civil Engineering Drawing & House Planning -B.P.Verma.
3. A Course in Civil Engg Drawing -VB Sikka
3. Engineering graphics and design - K. Kumar, A.K. Ray & C. Ranjan- Vikas Pbln.
4. Auto Cad -Omura
5. AutoCAD (Architecture) 2011 -William G. Wyatt

Pr.3 -TECHNICAL SEMINAR

Total Periods	03	Maximum Marks	50 Marks
Lab. Periods:	03 Periods /week	Term Work/Sessional	50Marks
Examination	3hours	End Semester Examination	--

Each student has to select a recent topic of latest technology in the area of Civil Engineering and present a seminar in front of all students of the class. He/She has to prepare a PowerPoint presentation of the selected topic and the total presentation will be approximately 10 minutes duration .There will be interactive session between the presenter and rest of the students including the faculty members of the dept at the end of presentation .A student has to present at least 2 nos.of seminar during a semester and to submit the report for evaluation.

CIVIL ENGG. CAD LABORATORY

(Can be used for Engg. Drawing/Civil Engg. Drawing-I & II /Estimation & Cost Evaluation Practice – I & II)

Gr. Size -30students

Sl. No.	Item with Specification-	QNTY in No.
1	STAAD-Pro -V8i(Latest Educational Version – 15 user) software	1
2	AutoCAD-2016 or lates Educational version for minimum15 users	1
3	Desk Top Computer with following latest version configuration : Processor: Intel Core i7 or higher version, CPU@2.3GHz or higher, Ram: 4GB or higher,MS Windows 64 bit operating system with 64 based processor etc.	30
4	Laptop Computer with following latest version configuration : Processor: Intel Core i7 or higher version, CPU@2.3GHz or higher, Ram: 4GB or higher,MS Windows 64 bit operating system with 64 based processor etc.	1
5	Online UPS: 5KVA	5
6	Laser Printer- Resolution in dpi: Mono 600x600, Paper size:A4, Print speed in ppm(A4 size):14, port:1 or higher configuration	1
7	Document Scanner A4/Legal size, Resolution: 600x600, Flat Bed size:A4	1
8	Plotter(44”) with accessories in complete set	1
9	LCD projector 4000 ansi lumen with screen	1

SURVEY PRACTICE I (For Gr,. Size-30 students)

Sl No.	Name of Equipments	Quantity required
1	Metallic Tape(15m,30m) in leather/fiber case and winding device as per BIS1492:1970	10
2	Steel Tape(3m,5m,15m & 30m) made of steel ribbon in leather/fiber case and winding device as per BIS1492:1970	02
3	Invar Tape(15m,30m) made of invar steel in leather/ fiber case and winding device as per BIS1492:1970	01
4	Cross Staff(Open type metallic)100X100X150 mm iron leg painted at bottom,1.5m length	10
5	Arrows(MS)	30
6	Ranging Rods(Iron) 2 & 3m length made of conduits of 30mm dia painted with white and black/red with iron shoes as per BIS2283:1983	30
7	Hammer	10
8	Prismatic Compass(150mm dia.) made of brass or gun metal Circles: Aluminum graduated every 30 minutes, Reading Agate stone bearing with help of prism glasses & reflecting mirror packed in fiber case with sighting vane and rigid stand and ball socket arrangement	06
9	Plane Table Surveying Plane Table consisting of Drawing Board 75cmX60cmX2cm made of seasoned pine wood/fire wood and braced with teak wood battens fitted with brass screws and washers in slots complete with metallic disc of 160 mm dia at base and confirming to BIS2539:1963;accessories comprising of magnetic trough compass confirming to BIS1764:1961,spirit level 15 cm long, plumb bob , 28cm long brass Ufork, alidade 45 cm long made of brass, one sided beveled edged wooden stand with metallic head and shoes.	10 sets
10	Telescopic Alidade size 175mm Internal focusing vertical circle graduated to read 30min with vernier, extendable base plate to 375mm and half degree divided giving angle of elevation and depression spirit level mounted on top telescope, telescope fitted with stadia diaphragm, vertical circle, to be supplied in teak wood box fully protected from dust	06
11	Automatic Level (as per BIS:4590) Telescope: Apperature of objective 45mm Field view1020' Magnification 32X Stadia Ratio 1:100 Addition Constant 0(zero) Minimum Focusing Distance1.5mm Range250meters Circular level with sensitivity per 2mm run10' mounted on sides of the telescope Accessories: Maintenance tools Leveling : Speedy Leveling by ball and socket arrangement. Tilting screw for final leveling Teak wood box, Tripod stand made of seasoned timber rigid with metal shoes	06
12	Leveling Staff: Aluminium-4 meter long in telescopic accurately painted in red and black on white background as per BIS 1779 and push type automatic locking system in canvas cover. Least Count- 0.005m /.001m	06

STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA

TEACHING AND EVALUATION SCHEME FOR 5th Semester (Civil Engineering)(wef 2020-21)

Subject Number	Subject Code	Subject	Periods/week			Evaluation Scheme			
			L	T	P	Internal Assessment/ Sessional	End Sem Exams	Exams (Hours)	Total
		Theory							
Th.1		Entrepreneurship and Management & Smart Technology	4		-	20	80	3	100
Th.2		Structural Design-II	4		-	20	80	3	100
Th.3		Railway & Bridge Engineering	4		-	20	80	3	100
Th.4		Water Supply & Waste Water Engineering	5			20	80	3	100
Th.5		Estimating & Cost Evaluation- II	4			20	80	3	100
		Total	21			100	400	-	500
		Practical							
Pr.1		Civil Engineering. Lab-II	-	-	6	50	100	3	150
Pr.2		Estimating Practice-II (Computer-Aided)	-	-	3	25	50	3	75
Pr.3		Project Phase-I	-	-	6	25	-	-	25
		Student Centred Activities(SCA)			3				
				-		-	-	-	-
		Total	-	-	*18*	*100*	*150*	-	*250*
		Grand Total	**21**	**-**	**18**	**200**	**550**	**-**	**750**

Abbreviations: L-Lecturer, T-Tutorial, P-Practical . Each class is of minimum 55 minutes duration

Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50% and in Aggregate is 40%

SCA shall comprise of Extension Lectures/ Personality Development/ Environmental issues /Quiz /Hobbies/ Field visits/ cultural activities/Library studies/Classes on MOOCS/SWAYAM etc. ,Seminar and SCA shall be conducted in a section.

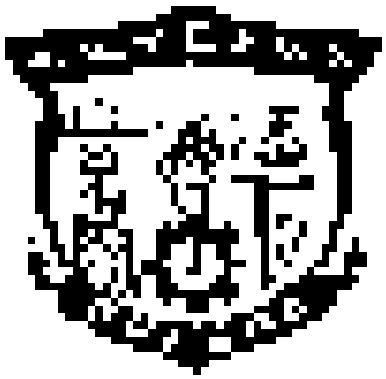
There shall be 1 Internal Assessment done for each of the Theory Subject. Sessional Marks shall be total of the performance of individual different jobs/ experiments in a subject throughout the semester

CURRICULLUM OF 5TH SEMESTER

For

DIPLOMA IN CIVIL ENGINEERING

(Effective FROM 2020-21 Sessions)



STATE COUNCIL FOR TECHNICAL EDUCATION & VOCATIONAL TRAINING, ODISHA, BHUBANESWAR

Th1. ENTREPRENEURSHIP and MANAGEMENT & SMART TECHNOLOGY

(Common to All Branches)

Theory	**4 Periods per week**	**Internal Assessment**	**20 Marks**
Total Periods	**60 Periods**	**End Sem Exam**	**80 Marks**
Examination	**3hours**	**Total Marks**	**100Marks**

Topic Wise Distribution of Periods

Sl No.	Topic	Periods
1	Entrepreneurship	10
2	Market Survey and Opportunity Identification(Business Planning)	8
3	Project report Preparation	4
4	Management Principles	5
5	Functional Areas of Management	10
6	Leadership and Motivation	6
7	Work Culture, TQM & Safety	5
8	Legislation	6
9	Smart Technology	6
	TOTAL	60

RATIONALE

In the present day scenario, it has become imperative to impart entrepreneurship and management concepts to students, so that a significant percentage of them can be directed towards setting up and managing their own small enterprises. It may be further added that an entrepreneurial mind set with managerial skill helps the student in the job market. The students can also be introduced with Startup and Smart Technology concept, which shall radically change the working environment in the coming days in the face of Industry 4.0

In this subject, the Students shall be introduced/ exposed to different concepts and Terminologies in brief only, so that he/she can have broad idea about different concepts/items taught in this subject. Solving numerical problem on any topic/item is beyond the scope of this subject.

OBJECTIVES

After undergoing this course, the students will be able to :

- Know about Entrepreneurship, Types of Industries and Startups
- Know about various schemes of assistance by entrepreneurial support agencies
- Conduct market survey
- Prepare project report
- know the management Principles and functional areas of management
- Inculcate leadership qualities to motivate self and others.
- Maintain and be a part of healthy work culture in an organisation.
- Use modern concepts like TQM
- Know the General Safety Rules
- Know about IOT and its Application in SMART Environment.

DETAILED CONTENTS

1. **Entrepreneurship**
   - Concept /Meaning of Entrepreneurship
   - Need of Entrepreneurship
   - Characteristics, Qualities and Types of entrepreneur, Functions
   - Barriers in entrepreneurship
   - Entrepreneurs vrs. Manager

- Forms of Business Ownership: Sole proprietorship, partnership forms and others
- Types of Industries, Concept of Start-ups
- Entrepreneurial support agencies at National, State, District Level(Sources): DIC, NSIC,OSIC, SIDBI, NABARD, Commercial Banks, KVIC etc.
- Technology Business Incubators (TBI) and Science and Technology Entrepreneur Parks

2. **Market Survey and Opportunity Identification (Business Planning)**

- Business Planning
- SSI, Ancillary Units, Tiny Units, Service sector Units
- Time schedule Plan, Agencies to be contacted for Project Implementation
- Assessment of Demand and supply and Potential areas of Growth
- Identifying Business Opportunity
- Final Product selection

3. **Project report Preparation**

- Preliminary project report
- Detailed project report, Techno economic Feasibility
- Project Viability

4. **Management Principles**
- Definitions of management
- Principles of management
- Functions of management (planning, organising, staffing, directing and controlling etc.)
- Level of Management in an Organisation

5. **Functional Areas of Management**

a) Production management
- Functions, Activities
- Productivity
- Quality control
- Production Planning and control

b) Inventory Management
- Need for Inventory management
- Models/Techniques of Inventory management

c) Financial Management
- Functions of Financial management
- Management of Working capital
- Costing (only concept)
- Break even Analysis
- Brief idea about Accounting Terminologies: Book Keeping, Journal entry, Petty Cash book, P&L Accounts, Balance Sheets(only Concepts)

d) Marketing Management
- Concept of Marketing and Marketing Management
- Marketing Techniques (only concepts)
- Concept of 4P s (Price, Place, Product, Promotion)

e) Human Resource Management
- Functions of Personnel Management
- Manpower Planning, Recruitment, Sources of manpower, Selection process, Method of Testing, Methods of Training & Development, Payment of Wages

6. **Leadership and Motivation**

a) Leadership
- Definition and Need/Importance
- Qualities and functions of a leader
- Manager Vs Leader
- Style of Leadership (Autocratic, Democratic, Participative)

b) Motivation
- Definition and characteristics
- Importance of motivation
- Factors affecting motivation
- Theories of motivation (Maslow)
- Methods of Improving Motivation
- Importance of Communication in Business
- Types and Barriers of Communication

7. **Work Culture, TQM & Safety**
- Human relationship and Performance in Organization
- Relations with Peers, Superiors and Subordinates
- TQM concepts: Quality Policy, Quality Management, Quality system
- Accidents and Safety, Cause, preventive measures, General Safety Rules , Personal Protection Equipment(PPE)

8. **Legislation**

a) Intellectual Property Rights(IPR), Patents, Trademarks, Copyrights
b) Features of Factories Act 1948 with Amendment (only salient points)
c) Features of Payment of Wages Act 1936 (only salient points)

9. **Smart Technology**
- Concept of IOT, How IOT works
- Components of IOT, Characteristics of IOT, Categories of IOT
- Applications of IOT- Smart Cities, Smart Transportation, Smart Home, Smart Healthcare, Smart Industry, Smart Agriculture, Smart Energy Management etc.

Syllabus to be covered before IA: Chapter 1,2,3,4

RECOMMENDED BOOKS

1. Entrepreneurship Development and Management by R.K Singhal, Katson Books., New Delhi
2. Entrepreneurship Development and Management by U Saroj and V Mahendiratta, Abhishek Publications, Chandigarh
3. Entrepreneurship Development and Management by Vasant Desai, Himalaya Pub.House
4. Industrial Engineering and Management by O.P Khanna ,Dhanpat Rai and Sons
5. Industrial Engineering and Management by Banga and Sharma, Khanna Publications
6. Internet of Things by Jeeva Jose, Khanna Publications, New Delhi
7. Online Resource on Startups and other concepts
8. https://www.fundable.com/learn/resources/guides/startup

Th2. STRUCTURAL DESIGN– II

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	5th
Total Period:	60	Examination	3 hrs
Theory periods:	4P / week	Internal Assessment :	20
Maximum marks:	100	End Semester examination:	80

A. RATIONALE

The course aims at imparting skills to design structural members. This will enable the students to recognize the load conditions and possible failure locations so that student will be able to compute necessary dimensions to prevent failure.

B. COURSE OBJECTIVES

On completion of the course, a student will be able to-

1. Design simple steel structure such as tension members, compression members and simple beams.
2. Design timber structural elements
3. Design staircase, footings by limit method of design.
4. Draw the details of a steel roof truss.
5. Draw the reinforcement details of underground RCC water tank and RCC footings.
6. Use standards and design codes.

C. TOPIC WISE DISTRIBUTION OF PERIODS

Chapter	Name of topics	Hours
1	Introduction:	5
2	Structural Steel Fasteners and Connections.	10
3	Design of Steel tension Members	10
4	Design of Steel Compression members.	10
5	Design of Steel beams:	10
6	Design of Tubular Steel Structures	6
7	Design of Masonry Structures	9

D. COURSE CONTENT IN TERMS OF SPECIFIC OBJECTIVES

1 Introduction:

1.1 Common steel structures, Advantages & disadvantages of steel structures.
1.2 Types of steel, properties of structural steel.
1.3 Rolled steel sections, special considerations in steel design.
1.4 Loads and load combinations.
1.5 Structural analysis and design philosophy.
1.6 Brief review of Principles of Limit State design.

2 Structural Steel Fasteners and Connections.

2.1 Bolted Connections
2.1.1 Classification of bolts, advantages and disadvantages of bolted connections.

2.1.2 Different terminology, spacing and edge distance of bolt holes.
2.1.3 Types of bolted connections.
2.1.4 Types of action of fasteners, assumptions and principles of design.
2.1.5 Strength of plates in a joint, strength of bearing type bolts (shear capacity& bearing capacity), reduction factors, and shear capacity of HSFG bolts.
2.1.6 Analysis & design of Joints using bearing type and HSFG bolts (except eccentric load and prying forces)
2.1.7 Efficiency of a joint.
2.2 Welded Connections:
2.2.1 Advantages and Disadvantages of welded connection
2.2.2 Types of welded joints and specifications for welding
2.2.3 Design stresses in welds.
2.2.4 Strength of welded joints.

3 Design of Steel tension Members

3.1 Common shapes of tension members.
3.2 Maximum values of effective slenderness ratio.
3.4 Analysis and Design of tension members.(Considering strength only and concept of block shear failure.)

4 Design of Steel Compression members.

4.1 Common shapes of compression members.
4.2 Buckling class of cross sections, slenderness ratio
4.3 Design compressive stress and strength of compression members.
4.4 Analysis and Design of compression members (axial load only).

5 Design of Steel beams:

5.1 Common cross sections and their classification.
5.2 Deflection limits, web buckling and web crippling.
5.3 Design of laterally supported beams against bending and shear.

6 Design of Tubular Steel Structures:

6.1 Round Tubular Sections, Permissible Stresses
6.2 Tubular Compression & Tension Members
6.3 Joints in Tubular trusses

7 Design of Masonry Structures:

7.1 Design considerations for Masonry walls & Columns, Load Bearing & Non-Load Bearing walls, Permissible stresses, Slenderness Ratio, Effective Length, Height & Thickness.

E. **SYLLABUS COVERGE UPTO INTERNAL ASSESSMENT** Chapters 1,2,3,4

F. BOOKS RECOMMENDED

Sl. No	Name of Authors	Titles of Book	Name of Publisher
1	B.N.Duggal	Design of Steel Structures	McGraw Hill Education
2	Samal & Panigrahi	Elements of Steel ,Timber & Masonry Design	Kalyani Pbln
3	Samal & Panigrahi	Steel Tables	Kalyani Pbln
4	BIS.	1) I.S 800-Code of practice for General construction in steel	BIS

		2) SP-20 Hand book on masonry design and construction- BIS Publication. 3) IS 806: 1968 Code of practice for use of steel tubes in general building construction. 4) IS 1161: 1998 Steel Tubes for Structural Purposes — Specification	

Th3. RAILWAY & BRIDGE ENGINEERING

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	5th
Total Period:	60	Examination	3 hrs
Theory periods:	4P/week	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONALE

The course will expose the students to the requirements posed by railways and bridges and how these requirements are different from roads. The course shall acquaint the students with common engineering terminology and prepares them to pursue higher courses in the aspect.

B. COURSE OBJECTIVES

On completion of the course, students will be able to

1. Explain railway terminology
2. Comprehend the track components and relate to the material or geometric aspects that can be used for these
3. Describe methods of laying and maintaining the track
4. State the requirements for an ideal bridge and describe types of foundation and substructures
5. Classify the bridges and identify the components
6. Select the bridge sites in context of hydrologic requirements

C. TOPIC WISE DISTRIBUTION OF PERIODS

Chapter	Name of topics	Hours
1	Introduction	2
2	Permanent way	5
3	Track materials	10
4	Geometric for broad gauge	10
5	Points and crossings	4
6	Laying & maintenance of track	4
Section – B: BRIDGES		
1	Introduction to bridges	2
2	Bridge site investigation, hydrology & planning	5
3	Bridge foundation	8
4	Bridge substructure and approaches	5
5	Culvert & Cause Ways	5

D. COURSE CONTENTS:

Section – A: RAILWAYS

1 Introduction

1.1 Railway terminology
1.2 Advantages of railways
1.3 Classification of Indian Railways

2 Permanent way

2.1 Definition and components of a permanent way
2.2 Concept of gauge, different gauges prevalent in India, suitability of these gauges

under different conditions

3 Track materials

3.1 Rails
3.1.1 Functions and requirement of rails
3.1.2 Types of rail sections, length of rails
3.1.3 Rail joints – types, requirement of an ideal joint
3.1.4 Purpose of welding of rails & its advantages
3.1.5 Creep- definition, cause & prevention
3.2 Sleepers
3.2.1 Definition, function & requirements of sleepers
3.2.2 Classification of sleepers
3.2.3 Advantages & disadvantages of different types of sleepers
3.3 Ballast
3.3.1 Functions & requirements of ballast
3.3.2 Materials for ballast
3.4 Fixtures for Broad gauge
3.4.1 Connection of rails to rail-fishplate, fish bolts
3.4.2 Connection of rails to sleepers

4 Geometric for broad gauge

4.1 Typical cross – sections of single & double broad gauge railway track in cutting and embankment
4.2 Permanent & temporary land width
4.3 Gradients for drainage
4.4 Super elevation – necessity & limiting valued

5 Points and crossings

5.1 Definition, necessity of Points and crossings
5.2 Types of points & crossings with tie diagrams

6 Laying & maintenance of track

6.1 Methods of Laying & maintenance of track
6.2 Duties of a permanent way inspector

Section – B: BRIDGES

1 Introduction to bridges

1.1 Definitions
1.2 Components of a bridge
1.3 Classification of bridges
1.4 Requirements of an ideal bridge

2 Bridge site investigation, hydrology & planning

2.1 Selection of bridge site, Alignment,
2.2 Determination of Flood Discharge
2.3 Waterway & economic span
2.4 Afflux, clearance & free board

3 Bridge foundation

3.1 Scour depth minimum depth of foundation
3.2 Types of bridge foundations – spread foundation, pile foundation- well foundation – sinking of wells, caission foundation

3.3 Coffer dams

4 **Bridge substructure and approaches**
4.1 Types of piers
4.2 Types of abutments
4.3 Types of wing walls
4.4 Approaches

5 **Culvert & Cause ways**
5.1 Types of culvers – brief description
5.2 Types of causeways – brief description

E. SYLLABUS COVERGE UPTO INTERNAL ASSESSMENT
Chapters 1,2,3,4 of Section A & Chapters 1,2 of Section B

F. Recommended Books

Sl. No	Name of Authors	Titles of Book	Name of Publisher
1	Chandra & Agrawal	Railway Engineering	Oxford Publication
3	S.C.Sexena & S.P.Arora	A Text book of Railway Engineering	Dhanpat Rai Publications
4	S. C. Rangwala	Railway Engineering	Charotar Publication
5	S.P. Bindra	Bridge Engineering	Dhanpat Rai Publications

Th4. WATER SUPPLY AND WASTE WATER ENGINEERING

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	5th
Total Period:	75	Examination	3 hrs
Theory periods:	5P/week	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONALE

The course aims to expose the students to the current state of water supply and sewage disposal system. Through the course the principles, purposes and the methods are covered at different stages of the activity, thus laying foundation in students to think of meeting futuristic challenges.

B. COURSE OBECTIVES

On completion of the course, students will be able to

1. Compute water demand in terms of quantity and quality
2. Describe the water sources, conveyance and distribution system
3. Realize the necessity of treatment and comprehend the principle and purpose of different water treatment processes
4. Comprehend the terminology relating to sanitary engineering and compute quantity & quality of sewage
5. Describe the sewerage system and its components stating the purposes thereof
6. Comprehend the necessity and method of sewage treatment and disposal

C. TOPIC WISE DISTRIBUTION OF PERIODS

Chapter	Name of topics	Hours
	SECTION A:WATER SUPPLY	
1	Introduction to Water Supply, Quantity and Quality of water	10
2	Sources and Conveyance of water	8
3	Treatment of water	12
4	Distribution system and Appurtenance in distribution system	8
5	W/s plumbing in building	2
	SECTION B:WASTE WATER ENGINEERING	
6	Introduction	5
7	Quantity and Quality of sewage	7
8	Sewerage system	5
9	Sewer appurtenances and Sewage Disposal	7
10	Sewage treatment	8
11	Sanitary plumbing for building	3

D. COURSE CONTENTS:

SECTION A: WATER SUPPLY

1 Introduction to Water Supply, Quantity and Quality of water

1.1 Necessity of treated water supply
1.2 Per capita demand, variation in demand and factors affecting demand

1.3 Methods of forecasting population, Numerical problems using different methods
1.4 Impurities in water – organic and inorganic, Harmful effects of impurities
1.5 Analysis of water –physical, chemical and bacteriological
1.6 Water quality standards for different uses

2 Sources and Conveyance of water

2.1 Surface sources – Lake, stream, river and impounded reservoir
2.2 Underground sources – aquifer type & occurrence – Infiltration gallery, infiltration well, springs, well
2.3 Yield from well- method s of determination, Numerical problems using yield formulae (deduction excluded)
2.4 Intakes – types, description of river intake, reservoir intake, canal intake
2.5 Pumps for conveyance & distribution – types, selection, installation.
2.6 Pipe materials – necessity, suitability, merits & demerits of each type
2.7 Pipe joints – necessity, types of joints, suitability, methods of jointing Laying of pipes — method

3 Treatment of water

Note:
1. Design of treatment units excluded.
2. Students may be asked to prepare detailed sketches of units, preferably from working drawing, as home assignment
3. Field visit to treatment plant, under practical should be arranged after covering this unit.

3.1 Flow diagram of conventional water treatment system
3.2 Treatment process / units :
3.2.1 Aeration ; Necessity
3.2.2 Plain Sedimentation : Necessity, working principles, Sedimentation tanks — types, essential features, operation & maintenance
3.2.3 Sedimentation with coagulation: Necessity, principles of coagulation, types of coagulants, Flash Mixer, Flocculator, Clarifier (Definition and concept only)
3.2.4 Filtration : Necessity, principles, types of filters
Slow Sand Filter, Rapid Sand Filter and Pressure Filter – essential features
3.2.5 Disinfection : Necessity, methods of disinfection
Chlorination – free and combined chlorine demand, available chlorine, residual chlorine, pre-chlorination, break point chlorination, super-chlorination
3.2.6 Softening of water – Necessity, Methods of softening – Lime soda process and Ion exchange method (Concept Only)

4 Distribution system And Appurtenance in distribution system:

4.1 General requirements, types of distribution system-gravity, direct and combined
4.2 Methods of supply – intermittent and continuous
4.3 Distribution system layout – types, comparison, suitability
4.4 Valves-types, features, uses, purpose-sluice valves, check valves, air valves, scour valves, Fire hydrants, Water meters

5 W/s plumbing in building :

5.1 Method of connection from water mains to building supply
5.2 General layout of plumbing arrangement for water supply in single storied and multi-storied building as per I.S. code.

SECTION B: WASTE WATER ENGINEERING

6 Introduction

6.1 Aims and objectives of sanitary engineering

6.2 Definition of terms related to sanitary engineering

6.3 Systems of collection of wastes– Conservancy and Water Carriage System – features, comparison, suitability

7 Quantity and Quality of sewage

7.1 Quantity of sanitary sewage – domestic & industrial sewage, variation in sewage flow, numerical problem on computation quantity of sanitary sewage.

7.2 Computation of size of sewer, application of Chazy's formula, Limiting velocities of flow : self-cleaning and scouring

7.3 General importance, strength of sewage, Characteristics of sewage-physical, chemical & biological

7.4 Concept of sewage-sampling, tests for – solids, pH, dissolved oxygen, BOD, COD

8 Sewerage system

8.1 Types of system-separate, combined, partially separate , features, comparison between the types, suitability

8.2 Shapes of sewer – rectangular, circular, avoid-features, suitability

8.3 Laying of sewer-setting out sewer alignment

9 Sewer appurtenances and Sewage Disposal:

9.1 Manholes and Lamp holes – types, features, location, function

9.2 Inlets, Grease & oil trap – features, location, function

9.3 Storm regulator, inverted siphon – features, location, function

9.4 Disposal on land – sewage farming, sewage application and dosing, sewage sickness-causes and remedies

9.5 Disposal by dilution – standards for disposal in different types of water bodies, self purification of stream

10 Sewage treatment :

(Note: 1.Design of treatment units excluded.

2.Students may be asked to prepare detailed sketches of units, preferably from working drawing, as home assignment.

3.Field visit to treatment plant, under practical should be arranged after covering this unit.)

10.1 Principles of treatment, flow diagram of conventional treatment

10.2 Primary treatment – necessity, principles, essential features, functions

10.3 Secondary treatment – necessity, principles, essential features, functions

11 Sanitary plumbing for building :

11.1 Requirements of building drainage, layout of lavatory blocks in residential buildings, layout of building drainage

11.2 Plumbing arrangement of single storied & multi storied building as per I.S. code practice

11.3 Sanitary fixtures — features, function, and maintenance and fixing of the fixtures – water closets, flushing cisterns, urinals, inspection chambers, traps, anti- syphonage pipe

E. SYLLABUS COVERGE UPTO INTERNAL ASSESSMENT

Chapters 1, 2, 3, 4 from Section A & Chapters 6,7,8 from Section B

F. RECOMMENDED BOOKS

Sl. No	Name of Authors	Titles of Book	Name of Publisher
1	G.S.Birdie	Text book on water supply and sanitary engineering	Dhanpat Rai Publications
2	S.K.Garg	Water Supply Engineering	Khanna Publishers
3	S.K.Garg	Waste Water Disposal Engg.	Khanna Publishers
4	By Ministry of Urban Development,Govt. of India.	CPHEEO manual Water supply	
5	By Ministry of Urban Development,Govt. of India.	CPHEC Mannual- Sewage & Sewage Treatment - by Ministry of Urban Development,Govt.of India.	

Th5. ESTIMATION & COST EVALUATION – II

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	5th
Total Period:	60	Examination	3 hrs
Theory periods:	4P/week	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONALE

The course exposes the students to the techniques and best practices to prepare detailed estimates of roads, bridges, culverts, irrigation structures and PWD works.

B. COURSE OBJECTIVES

On completion of the course, students will be able to

1. Create detailed estimate of culverts and bridges
2. Prepare estimates of irrigation structures
3. Prepare estimates of a macadam road and a national highway in cutting and filling
4. Prepare detailed estimates for septic tank and soak pits
5. Prepare detailed estimates of miscellaneous works
6. Comprehend the management practices in Public Works Department
7. Interpret the building bylaws furnished by regulatory bodies

C. **TOPIC WISE DISTRIBUTION OF PERIODS**

Chapter	Name of topics	Hours
1.	Detailed estimate of culverts and bridges	12
2.	Estimate of irrigation structures	14
3.	Detailed estimate of roads	12
4.	Detailed estimates of miscellaneous works	12
5.	PWD accounts works	10

D. COURSE CONTENTS:

1. Detailed estimate of culverts and bridges

1.1 Detailed estimate of a RCC slab culvert with right angled wing walls with bar bending schedule.

1.2 RCC Hume pipe culvert with splayed angled wing wall

2. Estimate of irrigation structures

2.1 Detailed estimate of simple type of vertical fall to given specification

2.2 Detailed estimate of drainage siphon to given specification.

3. Detailed estimate of roads

3.1 Detail estimate of a water bound macadam road

3.2 Detailed estimate of a flexible pavement in cutting / filling

3.2 Detailed estimate of septic tank and soak pit for 50 users

4. Miscellaneous estimates

4.1 Tube well, Piles and Pile cap, Isolated and combined footings.

5. PWD Accounts works

5.1 Works

5.1.1 Classification of work-original, major, petty, repair work, annual repair, special repair, quadrantal repair.

5.1.2 Concept of Method of execution of works through the contractors and department, contract and agreement, work order, types of contract, piece work agreement.

5.2 Accounts of works –

5.2.1 Explanation of various terms

Administrative approval, technical sanction, tender, preparation of notice inviting tender, quotations, earnest money, E-tendering, security deposit, advance payment, intermediate payment, final payment, running bill, final bill, regular and temporary establishment, cash, major & subhead of account, temporary advance (imprest money),supervision charges, suspense account, debit, credit, book transfer, voucher and related accounts .

5.2.2 Measurement book use & maintenance, procedure of marking entries of measurement of work and supply of materials, labour employed, standard measurement books and common irregularity

5.2.3 Muster roll : Its preparation & use for making payment of pay & wages

5.2.4 Acquittance Roll : Its preparation & use for making payment of pay & wages

5.2.5 Labour & labour report, method of labour payment, use of forms and necessity of Submission

5.2.6 Classification of stores, receipt / issue statement on standard form, method of preparation of stock account, preparation and submission of returns, verification of stocks, shortage and excess

5.3 Building BYLAWS and REGULATORY Bodies, Development authorities, types and their levels, RERA etc.

E. SYLLABUS COVERGE UPTO INTERNAL ASSESSMENT

Chapters 1, 2, 3

F. RECOMMENDED BOOKS

Sl. No	Name of Authors	Titles of Book	Name of Publisher
1	M.Chakraborty.	Estimating,Costing,specification &Valuation in Civil Engineering	Published by author
2	B.N.Dutta.	Estimating &Costing	UBSPD
3	Birdi &Ahuja.	Estimating &Costing	Dhanpat Rai Publication
4	Latest Orissa PWD Schedule of Rates & Analysis of rates		Govt. of Odisha

Pr1. CIVIL ENGINEERING LABORATORY-II

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	5th
Total Period:	90	Examination	3 hrs
Practical periods:	6P/week	Sessional Marks:	50
Maximum marks:	150	Practical Examination:	100

A. RATIONALE

The course aims to develop competence in conduct of experiments in line with prescribed standards and interpret the results. The objective is to enable the students gathering professional skills in working at research and testing laboratories. In the course students are required to conduct at least fifteen experiments selecting minimum three from each of the section furnished in course contents.

B. COURSE OBJECTIVES

On completion of the course students will be able to

1. Prepare setups and specimens for experiments
2. Interpret the specimen specifications prescribed in standard test manuals and codes
3. Acquaint themselves with modern test equipment
4. Record the results in prescribed formats
5. Plot graphs and interpret the results
6. Analyze the results and predict possible trends

C. TOPIC WISE DISTRIBUTION OF PERIODS

Chapter	Name of topics	Hours
1.	TESTS ON SOIL	36
2.	HYRAULICS LABORATORY	18
3.	TRANSPORTATION LABORATORY	18
4.	PUBLIC HEALTH ENGINEERING LABORATORY	18

D. COURSE CONTENTS

1.0 TESTS ON SOIL :

1.1 Determination of Specific gravity of Soil by Pycnometer /Density bottle.

1.2 Determination of Field Density of Soil by Core Cutter Method.

1.3 Determination of Particle Size gradation of sand/Gravel by sieve analysis.

1.4 Wet mechanical analysis using pipette method for clay and silt.

1.5 (a)Determination of Liquid Limit by soil by Casagrande"s apparatus.
(b)Determination of Plastic limit of soil.

1.6 Determination of Shrinkage limit of soil.

1.7 Determination of MDD & OMC of soil by using modified Proctor Test.

1.8 Determination of CBR value using Laboratory CBR Testing device.

1.9 Determination of c and φ of soil by triaxial testing device.

1.10 Determination of coefficient of permeability of soil by constant head method.

2.0 HYRAULICS LABORATORY:

2.1 Verification of Bernoulli's Theorem

2.3 Determination of coefficient of Discharge of a rectangular notch fitted in open Channel.

2.3 Determination of coefficient of Discharge of a Venturimeter, Orificemeter fitted in a pipe

2.4 Determination of head Loss due to friction and coefficient of friction for flow through pipe.

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3.0 TRANSPORTATION LABORATORY:

3.1 Penetration Test of Bitumen.

3.2 Ductility Test of Bitumen.

3.3 Viscosity Test of Bitumen.

3.4 Bitumen content by centrifuge extractor.

4.0 PUBLIC HEALTH ENGINEERING LABORATORY:

4.1 Determination of Turbidity of water Sample using Turbidimeter/Nephlometer/Jackson's Candle Turbidimeter.

4.2 Determination of pH of Water sample using (a) pH – meter (b) colour Comparator.

4.3 Determination of Chloride content of a Water sample using method of titration.

4.4 Determination of Coagulant (Alum) dose requirement for a turbid water sample by Jar Test.

4.5 Determination of dissolved oxygen in a water sample.

4.6 Determination of bacteriological quality of water sample by Coliform test.

E. Recommended Books

1. Soil Testing -A. P. Mittal

2. Civil Engineering laboratory Practice-II - Dr. M.R. Samal, Kalyani Pbln

3. Highway material testing Laboratory manual -S.K.Khanna &C.E.G.Justo.

4. Laboratory manual in Highway material testing -Ajay K. Duggal,Vijaya p.

5. Laboratory work in Hydraulic Engineering -G.L.Asawa.

6. Experimental Hydraulics -S.N. Ghosh & S.C Talapatra.

7. Laboratory manual in Environmental Engineering -Prof.P.D.Kulkarni.

8. Experimental Hydraulics - S.N. Ghosh &S.C Talapatra,

9. Hydraulics Laboratory Manual - S.K.Likhi.

10. Priciples, Practice and design of Highway Engg. - S.K.Sharma — S.Chand

Pr2. ESTIMATING PRACTICE – II
(Computer -Aided)

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	5th
Total Period:	45	Examination	3 hrs
Practical periods:	3P/week	Sessional Examination:	25
Maximum marks:	75	Practical Examination	50

Detailed estimate from working drawings / standard drawings as mentioned at Sl. No. 1, 2 , 3 & 4 of theory — 4 Estimation & Cost Evaluation — II)are to be taken in the practical classes using excel sheets.(Computer aided).

Learning Resources			
Text Books			
Sl. No	**Name of Authors**	**Titles of Book**	**Name of Publisher**
1	M.Chakraborty.	Estimating,Costing,specification &Valuation in Civil Engineering	Published by author
2	B.N.Dutta.	Estimating &Costing	UBSPD
3	Birdi &Ahuja.	Estimating &Costing	Dhanpat Rai Publications
4	Latest Orissa PWD Schedule of Rates & Analysis of rates		Govt. of Odisha

Pr 3. PROJECT WORK (Phase-I)

Name of the Course: Diploma in Civil			
Course code:		Semester	5th
Total Period:	60	Examination :	-
Theory periods:	4P / week	Sessional Marks	25
		TOTAL Marks	25

RATIONALE

Students' Project Work aims at developing innovative skills in the students whereby they apply the knowledge and skills gained through the course covered in many subjects and Labs, by undertaking a project. The prime emphasis of the project work is to understand and apply the basic knowledge of the principles of civil engineering practices in real life situations, so as to participate and manage a large civil engineering projects in future.

Entire Project shall spread over 5th and 6th Semester. Part of the Project covered in 5th Semester shall be named as *Project Phase-I* and balance portion to be covered in 6th Semester shall be named as *Project Phase-II*.

OBJECTIVES

After undergoing the Project Work, the student will be able to:

- Implement the theoretical and practical knowledge and skills gained through various subjects/courses into an application suitable for a real practical working environment, preferably in an industrial environment.
- Develop civil engineering knowledge and applications in implementing these for the actual needs of the community/industry.
- Explain the working of industrial environment and its work ethics.
- Explain what entrepreneurship is and how to become an entrepreneur.
- Identify and contrast gap between the technological knowledge acquired through curriculum and the actual industrial need and to compensate it by acquiring additional knowledge as required.
- Carry out cooperative learning through synchronous guided discussions within the class in key areas, asynchronous document sharing and discussions, as well as prepare collaborative edition of the final project report.
- Field computing and to achieve real life experience in civil engineering planning, designing and execution.
- To develop the skill of writing Project Report

General Guidelines

The individual students have different aptitudes and strengths. Project work, therefore, should match the strengths of students. For this purpose, students should be asked to identify the type of project work, they would like to execute. The activity of problem identification should begin well in advance (right from beginning of 5th semester). Students should be allotted a problem of interest to him/her as a project work. It is also

essential that the faculty of the respective department may have a brainstorming session to identify suitable project assignments for their students. The project assignment can be individual assignment or a group assignment. There should not be more than 5 students if the project work is given to a group. The project work identified in collaboration with industry should be preferred.

Following are the broad suggestive areas of project work

- ✓ Qualitative analysis of any one or more of the civil engineering materials by addition or alteration of one or more constituents to assess their suitability as construction materials.
- ✓ Characterization of one or more locally available/recently developed civil engineering materials
- ✓ Experimental investigation of behavior of structural elements.
- ✓ Preparation of innovative structural models by use of materials having close resemblance to real life structures.
- ✓ Qualitative and/or Quantitative analysis of Physio-chemical characteristics of water form one or more sources of water.
- ✓ Analysis, design and/or estimation of civil engineering structures. Use of software for execution of projects may be encouraged.
- ✓ Planning, testing and execution of construction project.
- ✓ Soil properties enhancement using different available materials.
- ✓ Development of Waste disposal system including e-waste.
- ✓ Application of different surveying techniques for solving real world problem.
- ✓ Traffic volume studies and congestion solution.
- ✓ Any other related area found worth.

A suggestive criterion for assessing student performance by the external (preferably person from industry) and internal (teacher) examiner is given in table below:

Sl. No.	**Performance Criteria**
1.	Selection of project assignment
2.	Planning and execution of considerations
3.	Quality of performance
4.	Providing solution of the problems or production of final product
5.	Sense of responsibility
6.	Self expression/ communication/ Presentation skills
7.	Interpersonal skills/human relations
8.	Report writing skills
9	Viva voce

The teachers are free to evolve other criteria of assessment, depending upon the type of project work.
It is proposed that the institute may organize an annual exhibition of the project work done by the students and invite leading Industrial organisations to such an exhibition.

Project Phase-I and Phase-II

The Project work duration shall cover 2 semesters(5^{th} and 6^{th} sem). The Grouping of students, selection of Project, assignment of Project Guide to the Group shall be done in the beginning of 5^{th} sem under Project Phase-I. The students may be allowed to study literature, any existing system and then define the Problem/objective of the Project. Preliminary work upto Design of the system have to be complete in Phase-I. Execution of work may begin in Phase-I depending on the Project. Project Milestones are to be set so that progress can be tracked . In Phase-II Execution of work and Documentation have to be complete. Project Report have to be prepared and complete in Phase-II. All Project reports should be organized uniformly in proper order, irrespective of group. Teacher Guides can make suitable alteration in the components of Task and schedule.

At the end of Project Phase-I in 5^{th} semester there shall be one presentation by each group to mark to progress and also to judge whether the Project is moving in right direction as per the objective of the Project.

CIVIL ENGINEERING LABORATORY – II (FOR A GROUP OF 30 STUDENTS)

Sl. No.	Name of the experiment	Name of apparatus required with detailed specification	Quantity required in No.
Soil Testing Equipments			
1	Determination of Water content of Soil by Oven drying method.	Metal Container or moisture can with lid(air tight non corrodible)suitable for 15 to 20g soil	5NOS
		Digital Weighing balance (0.01gm sensitivity) nearly 500gm capacity	2NOS
		Oven- Thermostatically controlled with interior of non–corroding material to maintain temperature at 110o ± 5°C.	1NO
		Descicators	1NO
		Tongs(One Pair)	5PAIRS
2	Determination of Specific gravity of Soil by Pycnometer/Density bottle.	Pycnometer	5NOS
		Density bottle	5NOS
		Vaccum descicators.	1NO
		Digital Weighing balance	2NOS
		Thermometer	1NO
		Glass rod	5NOS
		Sample divider of the multiple slot type (riffle box)	1 NO
3	Determination of Field Density of Soil by Core Cutter Method.	Cylindrical core cutter	4NOS
		Steel Rammer (with	4NOS
		Steel dolly	4NOS
		Digital Balance	2NOS
		Steel Rule.	4NOS
		Straight edge	4NOS
		Palette Knife	4NOS
4	Determination of Particle Size gradation of sand/Gravel by sieve analysis	(a) I.S.Sieves (GI, 450 mm dia.)-100mm,75mm,40mm,25mm,19mm,12.5mm,10mm,6.5 mm, 4.75mm)	2 SETS
		(b) I.S.Sieves (Brass, 200mm dia)2.00mm,850µ,600µ, 425 µ,300 µ,150 µ,75 µ with lid and pan.	2 SETS
		Digital Weighing balance	2NOS
		Rubber pestle and motar	
		Mechanical Sieve Shaker	2 SETS
		Mechanical Sieve Shaker	2 SETS
5	Wet mechanical analysis using pippette method for clay and silt.	Pippete	4 NOS
		Cylinder/jars	5 NOS
		Mechanical stirrer	6 NOS
		Glass weighing bottles	7 NOS
		Digital Balance-	NIL
		Thermometer	1
		Water bath -	2NOS
6	Determination of	Casagrande's liquid limit device with grooving tools	5NOS

	Liquid Limit by soil by Casagrande"s apparatus	Moisture can with lid	5NOS
		Porcelain evaporating dish	5NOS
		Spatula –flexible ,with the blade	5NOS
7	Determination of Plastic limit of soil.	Ground glass plate	4NOS
		3 mm dia glass rod	4NOS
		425 µ I.S. sieve	1NO
8	Determination of Shrinkage limit of soil.	Steel shrinkage dish –	8NOS
		Glass cup	4NOS
		Prong plate	4NOS
		Plain plate	4NOS
		Spatula	4NOS
		Straight edge	4NOS
		Mercurry	2 KG
		Porcelain evaporating dishes	4NOS
9	Determination of Coefficient of permeability of course grained soils under constant head method.	Permeameter mould of non-corrodible material	One set consist of all the above items
		Accassories of permeameter mould detachable collor ,porous stones (2 No.), dummy base plate etc.	
		Compaction rammer	
		Whatman Filter paper	
		Beaker	
		Drying crucible.	
		GI tray	
		Stop watch.	
		Glass Measuring cylinder	
		Reservoir/Over head tank	
10	Determination of MDD & OMC of soil by using modified Proctor Test	(a) Compaction moulds – cylindrical mould of capacity 1000 cc, internal diameter 100 mm ,effective height 127.3mm	One set consist of all the above items
		(b) Cylindrical mould of - 2250cc, internal diameter 150 mm, effective height 127.3mm	
		Metal rammers — (a) for light compaction (face diameter 50mm mass of 2.6 kg ,free drop of 310 mm) (b) for heavy compaction (mass =4.89kg ,free fall 450 mm)	
		Mould accessories – (detachable base plate , removable collar)	
		I.S. Sieves- size 19 mm & 4.75 mm, Brass	
		GI tray - 02 No.	
		Drying crucibles-06 Nos.	
		Graduated jars (Glass)	
		Straight edge	
		Spatula	
11	Determination of C and Φ of Soil sample by Triaxial Test device.	Tri-axial test cell	
		Lateral pressure assembly for applying and maintaining desired pressure on the fluid within the cell	
		Loading frame	
		Proving ring of	

		Split mould of diameter and length to suit the specimen	One set consist of all the above items
		Trimming knife	
		Scale & vernier calliperse.	
		Dial gauge	
		Piano wire saw	
		Metal straight edge	
		Volume change burette 25 cc.	
		Air compressor	
		Metal scale	
		Non-corrodible metal or plastic end caps of the same diameter as the specimen ; the upper cap having a central spherical seating to receive the loading ram	
		Seam less rubber membrane	
		Membrane stretcher	
		Rubber rings	
12	Determination of CBR value using Laboratory CBR Testing device	C.B.R mould	One set consist of all the above items
		Steel cutting edge (collar) which a can fit flush with the mould.	
		Spacer disc	
		Surcharge weight	
		Dial gauge	
		Penetration plunger	
		Loading machine	
		Metal rammer	
		Expansion measuring apparatus – perforated plate with adjustable stem, metal tripod etc.	
13	Universal Testing Machine	Digital Universal Testing Machine 40 Tone Capacity	One set
Hydraulics Laboratory			
1	Verification of Bernoulli's Theorem	F1-10 hydraulics bench	One set consist of all the above items
		F1-15 Bernoulli's apparatus test equipment	
		A stopwatch for timing the flow measurement.	
2	Determination of coefficient of Discharge of a rectangular notch fitted in open Channel	Rectangular notch, Collecting tank, Constant head tank, Stop watch	One set consist of all the above items
3	Determination of coefficient of Discharge of a Venturimeter, Orificemeter fitted in a pipe	Venturimeter fitted in a horizontal pipe line with means of varying flow rate, U tube differential manometer.	Each One set consist of all the above items
		Orificemeter fitted in a horizontal pipeline with means of varying flow rate, U tube differential manometer.	

4	Determination of head Loss due to friction and coefficient of friction for flow through pipe	F1-10 hydraulics bench F1-18 pipe friction apparatus Stopwatch for timing the flow measurement Measuring cylinder for measuring very low flow rates Spirit level Thermometer	One set consist of all the above items
Transportation Laboratory			
1	Penetration Test of Bitumen	**Penetrometer** consisting of a needle assembly with a total weight of 100 gram and device for releasing and locking needle in any position.	One set consist of all the above items
2	Ductility Test of Bitumen	**Briquette mould:** It is made of brass. Circular holes are provided at ends called clips to grip the fixed and movable ends of the testing machine. **Water bath:** A bath maintained within 27.0° ±0.1 °C of the specified test temperature containing not less than 10 litres of water. **Testing machine**: For pulling the briquette of bituminous material apart, any apparatus may be used which is so constructed that the specimen will be continuously submerged in water while the two clips are being pulled apart horizontally at a uniform speed of 50 ± 2.5 mm per minute. **Thermometer**: Range 0-44°C and readable up to 0.2°C	One set consist of all the above items
3	Viscosity Test of Bitumen	Tar viscometer, cup, valve, receiver, thermometer	One set consist of all the above items
4	Bitumen content by centrifuge extractor	Centrifuge apparatus used for binder content test of bituminous mix	One set consist of all the above items
Public Health Engineering Laboratory			
1	Determination of Turbidity of water Sample using Turbidimeter/Nephlometer/Jackson's Candle Turbidimeter	W.H.O Nephelometric turbidity meter and test tubes	One set consist of all the above items

2	Determination of pH of Water sample using (a) pH — meter (b) colour Comparator	pH meter with electrode, Color comparator with discs	One set consist of all the above items
		Thermometer that can read 77±18oC to the nearest value of 0.1 degree Celsius	
		Glass stirring rod	
		Minimum capacity scale to read up to 1.1 lb	
3	Determination of Cloride content of a Water sample using method of titration	Burette Pipettes Flask Measuring Cylinder	One set consist of all the above items
4	Determination of Coagulant (Alum) dose requirement for a turbid water sample by Jar Test.	Jar test apparatus Glass beaker Pipette pH meter Nephelometer	One set consist of all the above items
5	Determination of dissolved oxygen in a water sample	300 ml capacity bottle with stopper Burette Pipette	One set consist of all the above items
6	Detremination of B.O.D of waste water sample by Coliform test	B.O.D. bottle 300ml capacity B.O.D. incubator Air compressor Measuring cylinder Burette pipette	One set consist of all the above items

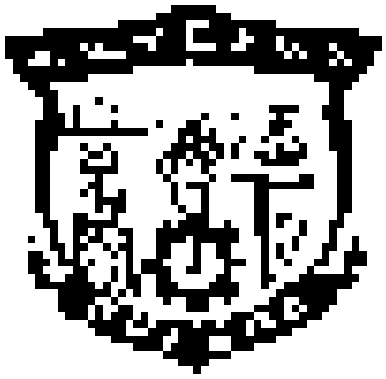
STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA									
TEACHING AND EVALUATION SCHEME FOR 6th Semester (Civil Engineering)(wef 2020-21)									
Subject Number	Subject Code	Subject	Periods/week			Evaluation Scheme			
			L	T	P	Internal Assessment/ Sessional	End Sem Exams	Exams (Hours)	Total
		Theory							
Th.1		Land Survey-II	5		-	20	80	3	100
Th.2		Construction Management	4		-	20	80	3	100
Th.3		Advanced Construction Techniques & Equipment	4		-	20	80	3	100
Th.4		Electives: a. Concrete Technology, b. Disaster Management c. Architectural Practices & Interior Design	4			20	80	3	100
		Total	*17*			*80*	*320*	-	*400*
		Practical							
Pr.1		Construction Workshop Practice & MS Project	-	-	5	25	25		50
Pr.2		Land Survey Practice -II	-	-	5	25	50		75
Pr.3		CADD Lab and Design & Detailing Practice	-	-	3	25	25		50
Pr.4		Project Phase-II			5	50	100		150
Pr.5		Life Skill			2	25	-		25
		Student Centred Activities(SCA)		-	2	-	-	-	-
		Total	-	-	*22*	*150*	*200*	-	*350*
		Grand Total	**17**		**22**	**230**	**520**	**-**	**750**
Abbreviations: L-Lecturer, T-Tutorial, P-Practical . Each class is of minimum 55 minutes duration									
Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50% and in Aggregate is 40%									
SCA shall comprise of Extension Lectures/ Personality Development/ Environmental issues /Quiz /Hobbies/ Field visits/ cultural activities/Library studies/Classes on MOOCS/SWAYAM/ Idea Tinkering and Innovation Lab Practice etc. ,Seminar and SCA shall be conducted in a section.									
There shall be 1 Internal Assessment done for each of the Theory Subject. Sessional Marks shall be total of the performance of individual different jobs/ experiments in a subject throughout the semester									

CURRICULLUM OF 6TH SEMESTER

For

DIPLOMA IN CIVIL ENGINEERING

(Effective FROM 2020-21Sessions)



STATE COUNCIL FOR TECHNICAL EDUCATION & VOCATIONAL TRAINING, ODISHA, BHUBANESWAR

Th 1. LAND SURVEY– II

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	6th
Total Period:	75	Examination	3 hrs
Theory periods:	5P/week	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONALE

Modern survey techniques are heavily dependent on advanced instruments and image based data. The course enables students to acquaint themselves with necessary information and processing procedures.

B. COURSE OBJECTIVES

On completion of the subject a student will be able to –

1. Solve numerical problems in the segment off tacheometry
2. Comprehend concepts of curve ranging and solve simple numerical
3. Study and interpret maps
4. Acquaint themselves with modern surveying methods including use of digital theodolite and total station
5. Comprehend basics of GPS setup, data processing and export
6. Comprehend basics of GIS and prepare map using GIS data

C. TOPIC WISE DISTRIBUTION

Chapter	Name of topics	Hours
1	TACHEOMETRY: (Only concepts; applications without derivation)	09
2	CURVES	08
3	BASICS ON SCALE AND BASICS OF MAP:	08
4	SURVEY OF INDIA MAP SERIES:	10
5	BASICS OF AERIAL PHOTOGRAPHY, PHOTOGRAMMETRY, DEM AND ORTHO IMAGE GENERATION:	10
6	MODERN SURVEYING METHODS :	10
7	BASICS ON GPS & DGPS AND ETS:	10
8	BASICS OF GIS AND MAP PREPARATION USING GIS	10

D. COURSE CONTENTS:

1 TACHEOMETRY:
(Only concepts; applications without derivation)

1.1 Principles, stadia constants determination

1.2 Stadia tacheometry with staff held vertical and with line of collimation horizontal or inclined, numerical problems

1.3 Elevations and distances of staff stations – numerical problems

2 CURVES :

2.1 compound, reverse and transition curve, Purpose & use of different types of curves in field

2.2 Elements of circular curves, numerical problems
2.3 Preparation of curve table for setting out
2.4 Setting out of circular curve by chain and tape and by instrument angular methods (i) offsets from long chord, (ii) successive bisection of arc, (iii) offsets from tangents, (iv) offsets from chord produced, (v) Rankine's method of tangent angles (No derivation)
2.5 Obstacles in curve ranging – point of intersection inaccessible

3 BASICS ON SCALE AND BASICS OF MAP:

3.1 Fractional or Ratio Scale, Linear Scale, Graphical Scale
3.2 What is Map, Map Scale and Map Projections
3.3 How Maps Convey Location and Extent
3.4 How Maps Convey characteristics of features
3.5 How Maps Convey Spatial Relationship
3.5.1 Classification of Maps
- 3.5.1 Physical Map
- 3.5.2 Topographic Map
- 3.5.3 Road Map
- 3.5.4 Political Map
- 3.5.5 Economic & Resources Map
- 3.5.6 Thematic Map
- 3.5.7 Climate Map

4 SURVEY OF INDIA MAP SERIES:

- 4.1 Open Series map
- 4.2 Defense Series Map
- 4.3 Map Nomenclature
  - 4.3.1 Quadrangle Name
  - 4.3.2 Latitude, Longitude, UTM's
  - 4.3.4 Contour Lines
  - 4.3.5 Magnetic Declination
  - 4.3.6 Public Land Survey System
  - 4.3.7 Field Notes

5 BASICS OF AERIAL PHOTOGRAPHY, PHOTOGRAMMETRY, DEM AND ORTHO IMAGE GENERATION:

5.1 Aerial Photography:
- 5.1.1 Film, Focal Length, Scale
- 5.1.2 Types of Aerial Photographs (Oblique, Straight)

5.2 Photogrammetry:
- 5.2.1 Classification of Photogrammetry
- 5.2.2 Aerial Photogrammetry
- 5.2.3 Terrestrial Photogrammetry

5.3 Photogrammetry Process:
- 5.3.1 Acquisition of Imagery using aerial and satellite platform
- 5.3.2 Control Survey
- 5.3.3 Geometric Distortion in Imagery

Application of Imagery and its support data
Orientation and Triangulation
Stereoscopic Measurement
19.9.1 X-parallax
19.2.2 Y-parallax

5.4 DTM/DEM Generation
5.5 Ortho Image Generation

6 MODERN SURVEYING METHODS :

6.1 Principles, features and use of (i) Micro-optic theodolite, digital theodolite
6.2 Working principles of a Total Station (Set up and use of total station to measure angles, distances of points under survey from total station and the co-ordinates (X,Y & Z or northing, easting, and elevation) of surveyed points relative to Total Station position using trigonometry and triangulation.

7 BASICS ON GPS & DGPS AND ETS:

7.1 GPS: - Global Positioning
- 7.1.1 Working Principle of GPS,GPS Signals,
- 7.1.2 Errors of GPS,Positioning Methods

7.2 DGPS: - Differential Global Positioning System
- 7.2.1 Base Station Setup
- 7.2.2 Rover GPS Set up
- 7.2.3 Download, Post-Process and Export GPS data
- 7.2.4 Sequence to download GPS data from flashcards
- 7.2.5 Sequence to Post-Process GPS data
- 7.2.6 Sequence to export post process GPS data
- 7.2.7 Sequence to export GPS Time tags to file

7.3 ETS: - Electronic Total Station
- 7.3.1 Distance Measurement
- 7.3.2 Angle Measurement
- 7.3.3 Leveling
- 7.3.4 Determining position
- 7.3.5 Reference networks
- 7.3.6 Errors and Accuracy

8 BASICS OF GIS AND MAP PREPARATION USING GIS

8.1 Components of GIS, Integration of Spatial and Attribute Information
8.2 Three Views of Information System
- 8.2.1 Database or Table View, Map View and Model View

8.3 Spatial Data Model
8.4 Attribute Data Management and Metadata Concept
8.5 Prepare data and adding to Arc Map.
8.6 Organizing data as layers.
8.7 Editing the layers.
8.8 Switching to Layout View.
8.9 Change page orientation.
8.10 Removing Borders.
8.11 Adding and editing map information.
8.12 Finalize the map

E. COURSE COVERAGE UPTO INTERNAL ASSESSMENT

Chapters 1, 2, 3, 4, 5

F. RECOMMENDED BOOKS

Sl. No	Name of Authors	Titles of Book	Name of Publisher
1	D. Gaikwad	Advanced Surveying	S.Chand
2	B. C. Punmia	Surveying Vol. I, II, III	Laxmi Publication, Delhi — 06
3	R. Agor	A text book of surveying and leveling	Khanna Publishers, Delhi-6
4	N. N. Basak	Surveying and Levelling	Tata Mcgraw Hill

REFERENCE Materials

1. https://theconstructor.org/surveying/surveying-principles-methods-civil-engineering/13048/
2. https://www.novatel.com/an-introduction-to-gnss/chapter-2-basic-gnss-concepts/
3. http://gps.alaska.edu/jeff/Spatial_Reference/Freymueller_DOT_GPS.pdf
4. https://drive.google.com/file/d/0B7srsl9Fr4QdUzAzSlRwZnNRZ3M/view_:-
5. Surveying and Levelling by N.N. Basak, 2nd Edition
6. **https://2018.foss4g-na.org/sites/default/files/slides/survey_resurvey_cadastral_layer_Odisha.pdf**
7. **http://www.lawsofindia.org/pdf/orissa/2012/2012OR5.pdf**
8. **http://revenueodisha.gov.in/sites/default/files/document/DILRMP/SOP_MRR_2016.pdf**
9. **http://revenueodisha.gov.in/sites/default/files/document/Govt_Land/22958_4_8_14.pdf**
10. **https://www.google.co.in/search?q=map+reading+and+interpretation+ppt&oq=Map+reading+and+&aqs=chrome.3.69i57j0l5.9755j0j7&sourceid=chrome&ie=UTF-8**
11. **Map Use: Reading, Analysis and Interpretation by Juliana O. Muehrcke and Philip Muehrcke**
12. **http://indiageospatialforum.org/2012/proceedings/ppt/P%20K%20parida.pdf**
13. **http://www.indiana.edu/~paleoind/Resources/Guide%20to%20Topographic%20Maps.pdf**
14. **http://www.dst.gov.in/sites/default/files/nationalmappolicy.pdf**
15. **Remote sensing and GIS / BasudebBhatta, 2nd edition, New Delhi, India, Oxford University Press, - Oxford higher education.**
16. **http://www.gisresources.com/basic-of-photogrammetry_2/**
17. **http://giswin.geo.tsukuba.ac.jp/sis/tutorial/Fundamentals_of_GIS_Estoque.pdf**
18. **Learning Material Approved by R&DM Deptt., Govt. of Odisha**

Th 2. CONSTRUCTION MANAGEMENT

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	6th
Total Period:	60	Examination	3 hrs
Theory periods:	4P/week	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONALE

The course aims to prepare students to be an effective team member in a construction organization setup. This necessitates managerial skills in managing materials, time and human resources. Also, the course helps the students to build concepts of disasters and explore about manmade disasters at national as well as international level with quality measuring indices and vulnerability atlas of India.. The course has been designed to cater to these needs.

B. COURSE OBJECTIVES

On completion of the course students will be able to-

1. Develop schedules for construction project
2. Realize significance of organizational behavior towards successful functioning
3. Explain the important terminology related to materials management, site management, equipment management and labor management
4. Understand construction quality indicators and their measurement
5. Apply methods to measure and monitor progress of work
6. Realize significance of safety requirement and regulations at workplace
7. Understand the importance and usage of the Vulnerability Atlas of India in construction Projects.

C. TOPIC WISE DISTRIBUTION

Chapter	Name of topics	Hours
1	Introduction To Construction Management	04
2	Constructional Planning	07
3	Materials and Stores Management	04
4	Construction Site Management	05
5	Construction Organisation:	06
6	Construction Labour and Labour Management:	06
7	Equipment Management	06
8	Quality Control	05
9	Monitoring Progress	06
10	Safety Management In Construction	05
11	Role of Vulnerability Atlas of India in construction projects	06

D. COURSE CONTENTS:

1 Introduction To Construction Management

1.1 Aims and objectives of construction management.

1.2 Functions of construction management.

1.3 The construction team components- owner,engineer,architect,contractor-their functions and interrelationship and jurisdiction.

1.4 Resources for construction management-men,machines,materials,money

2 Constructional Planning

2.1 Importance of Construction Planning

2.2 Developing work breakdown structure for construction work

2.3 Construction Planning stages-Pre-tender stage, Post-tender stage.

2.4 Construction scheduling by Bar charts-preparation of Bar Charts for simple construction works.

2.5 Preparation of schedules for labour materials,machinery, finance for small works

2.6 Limitation of Bar charts

2.7 Construction scheduling by network techniques-defination of terms ,PERT and CPM techniques, advantages and disadvantages of two techniques, network analysis, estimation of time and critical path, application of PERT and CPM techniques in sample construction works.

3 Materials and Stores Management

3.1 Classification of Stores-storage of stock.

3.2 Issue of materials-indent , invoice, bin card

4 Construction Site Management

4.1 Job Lay out-Objectives, Review plans, specifications, Lay out of equipments.

4.2 Location of equipment, organizing labour at site.

4.3 Job lay out for different construction sites.

4.4 Principle of storing material at site.

5 Construction Organization:

5.1 Introduction – Characteristics, Structure, importance.

5.2 Organization types-line and staff, functions and their characteristics

5.3 Principles of organization- meaning and significance of terms- control, authority, responsibility, job & task.

5.4 Leadership-necessity, styles of leadership, role of leader

5.5 Human relations-relations with subordinates, peers, Supervisors, characteristics of group behavior, mob psychology, handling of grievances, absenteeism, labour welfare.

5.6 Conflicts in organization-genesis of conflicts, types-intrapersonal, interpersonal, intergroup, resolving conflicts.

6 Construction Labour and Labour Management:

6.1 Preparing Labour schedule

6.2 Essential steps for optimum labour output

6.3 Labour characteristics

6.4 Wages & their payment

6.5 Labour incentives

6.6 Motivation- Classification of motives, different approaches to motivation.

7 Equipment Management

7.1 Preparing the equipment schedule

7.2 Identification of different alternative equipment

7.3 Importance of Owning & operating costs in making decisions for hiring & purchase of equipment

7.4 Inspection and testing of equipment

7.5 Equipment maintenance

8 Quality Control

8.1 Concept of quality in construction

8.2 Quality Standards- during construction, after construction, destructive & non destructive methods.

9 Monitoring Progress

9.1 Programme and progress of work
9.2 Work study
9.3 Analysis and control of physical and financial progress corrective measures.

10 Safety Management In Construction

10.1 Importance of safety
10.2 causes and effects of accidents in construction works
10.3 Safety measures in worksites for excavation, scaffolding, formwork, fabrication and erection, demolition.
10.4 Development of safety consciousness
10.5 Safety legislation- Workman's compensation act, contract labour act.

11 Role of Vulnerability Atlas of India in construction projects

11.1 Introduction to Vulnerability Atlas of India, Concepts of natural hazards and disasters and vulnerability profile of India. Definition of disaster related terms.
11.2 Earthquake hazard and vulnerability, Magnitude and intensity scales of earthquake, seismic zones, earthquake hazard maps, types of structures and damage classification, effects in housing and resistant measures.
11.3 Wind / Cyclone hazard and vulnerability, wind speed and pressures, wind hazard and cyclone occurrence maps, storm surveys and cyclone resistant measures.
11.4 Flood hazard and vulnerability, Flood hazard and Flood prone areas of the country, General protection of habitants and flood resistant construction.
11.5 Landslides, Tsunamis and Thunderstorm hazards and vulnerability, Landslide & Thunderstorm incidence maps, Measures against Tsunami hazards.
11.6 Housing vulnerability risk tables and usage of vulnerability atlas of India, Inclusion of vulnerability atlas in Tender documents.

E. COURSE COVERAGE UPTO INTERNAL ASSESSMENT

Chapters 1, 2, 3, 4, 5

F. RECOMMENDED BOOKS

Sl. No	Name of Authors	Titles of Book	Name of Publisher
1	M. R. Samal & R.L. Sahoo	Construction Management	Kalyani Publication
2	PS Gahlot & B M Dhir	Construction planning and management	New age international Publishers
3	Robert L Peurifoy & Willium B Ledbetter	Construction Planning equipment and methods	TMH Education
4	Dr. U K Shrivastava	Construction planning and management	Galgotia Publications
5	SC Sharma	Construction equipment and its management	Khanna Publishers
6	B Sengupta & H Guha	Construction management and planning	TMH Education
7	Vulnerability Atlas of India:- Published By BMTPC of India		

Th 3. ADVANCED CONSTRUCTION TECHNIQUES & EQUIPMENT

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	6th
Total Period:	60	Examination	3 hrs
Theory periods:	4P/week	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONALE

Current age construction industry is adopting state of art materials and technologies to improve aesthetics, strength, earthquake resistance, services relating to civil construction. The course will help the student to develop a general awareness on these advancements.

B. COURSE OBJECTIVES

On completion of the course students will be able to-

1. Select proper material during construction in domain of advanced materials including fibers, artificial timbers etc.
2. Select appropriate prefabrications in pursuance of standard codes
3. Adopt structural requirements and possible retrofits to improve earthquake resistance
4. Comprehend requirement of various services need to be operational
5. Understand the role of different construction earth moving equipments and select during planning
6. Comprehend necessity of soil reinforcing and prescribe appropriate strategy

C. TOPIC WISE DISTRIBUTION

Chapter	Name of topics	Hours
1	Advanced construction materials	10
2	Prefabrication	08
3	Earthquake Resistant Construction	08
4	Retrofitting of Structures	08
5	Building Services	08
6	Construction and earth moving equipments	10
7	Soil reinforcing techniques	08

D. COURSE CONTENT

1 Advanced construction materials

1.1 Fibers and Plastics-

Types of fibers- Steel, Carbon, glass fibers, Use of fibers as construction material, properties of Fibers.

Types of plastics- PVC, RPVC, HDPE, FRP, GRP etc. Colored plastic sheets. Use of plastic as construction material.

1.2 Artificial Timbers — Properties and uses of artificial timber. Types of artificial timber available in market, strength of artificial timber.

1.3 Miscellaneous materials — Properties and uses of acoustics materials, wall claddings, plaster boards, micro-silica, artificial sand, bonding agents, adhesives etc.

2 Prefabrication

2.1 Introduction, necessity and scope of prefabrication of buildings, history of prefabrication, current uses of prefabrication , types of prefabricated systems, classification of prefabrication, advantages and disadvantages of prefabrication,

2.2 The theory and process of prefabrication, design principle of prefabricated systems, types of prefabricated elements, modular coordination

2.3 Indian standard recommendation for modular planning.

3 Earthquake Resistant Construction

3.1 Building Configuration

3.2 Lateral Load resisting structures

3.3 Building characteristics

3.4 Effect of structural irregularities-vertical irregularities, plan configuration problems.

3.5 Safety consideration during additional construction and alteration of existing Buildings.

3.6 Additional strengthening measures in masonry building-corner reinforcement, lintel band, sill band, plinth band, roof band, gable band etc.

4 Retrofitting of Structures

4.1 Seismic retrofitting of reinforced concrete buildings :

4.2 -Sources of weakness in RC frame building

4.3 -Classification of retrofitting techniques and their uses

5 Building Services

5.1 Cold Water Distribution in high rise building, lay out of installation

5.2 Hot water supply – General principles for central plants-layout

5.3 Sanitation –soil and waste water installation in high rise buildings

5.4 Electrical services — i) requirements in high rise buildings ii) Layout of wiring - types of wiring iii) Fuses and their types iv)Earthing and their uses

5.5 Lighting – Requirement of lighting, Measurement of light intensity

5.6 Ventilation - Methods of ventilation (Natural and artificial Systems of ventilation) problems on ventilation

5.7 Mechanical Services- Lifts, Escalator, Elevators – types and uses.

6 Construction and earth moving equipments –

6.1 Planning and selection of construction equipments

6.2 Study on earth moving equipments like drag line, tractor, bulldozer, Power shovel

6.3 Study and uses of compacting equipments like tamping rollers, Smooth wheel rollers, Pneumatic tired rollers and vibrating compactors

6.4 Owning and operating cost – problems

7 Soil reinforcing techniques

7.1 Necessity of soil reinforcing.

7.2 Use wire mesh and geo-synthetics.

7.3 Strengthening of embankments, Slope stabilization in cutting and embankments by soil reinforcing techniques.

E. Syllabus Coverage up to Internal Assessment: Chapters 1, 2, 3, 4

F. RECOMMENDED BOOKS

Sl. No	Name of Authors	Titles of Book	Name of Publisher
1	Agrawal & Shrikhande	Earthquake Resistant Design of Structures	Prentice-Hall of India Pvt. Ltd.
2	Swami Saran	Reinforced Soil and its Engineering applications	I.K.International Pvt. Ltd.
3	National building code of India_ BIS		
4	Fred & Greeno	Building Services Hand book	Routledge Publisher
5	B.L. Gupta & Amit Gupta	Construction Management & Machinery Limit	Standard Publishers
6	S.K. Duggal,	Earthquake resistant design of structures	Oxford
7	M.R. Samal	Advance Construction and Equipment	Platinum Publisher,Kolkata
8	Hand book on repair & rehabilitation of RCC buildings- CPWD		

Th 4(a). CONCRETE TECHNOLOGY (ELECTIVE)

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	6th
Total Period:	60	Examination	3 hrs
Theory periods:	4P/week	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONALE

Concrete is said to be the second most consumed material and in construction plays a vital role. The knowledge in constituents, strength development process and deterioration mechanism helps the learner in designing and producing good quality concrete.

B. COURSE OBJECTIVES

On completion of the course, the students will be able to

1. Describe functions and characteristics of the concrete constituents
2. Prescribe test requirements and methods for fresh and hardened concrete
3. Design concrete mix
4. Comprehend concrete production and inspection techniques
5. Acquaint themselves with special concrete preparation and application
6. Know the concrete deteriorating agencies and methods towards durability improvement and repair

C. TOPIC WISE DISTRIBUTION

Chapter	Name of topics	Hours
1	Concrete as a construction material	02
2	Cement	04
3	Aggregate, Water and Admixtures:	06
4	Properties of fresh concrete	06
5	Properties of hardened concrete	07
6	Concrete mix Design	05
7	Production of concrete	06
10	Inspection and Quality Control of Concrete	06
11	Special Concrete	06
12	Deterioration of concrete and its prevention:	06
13	Repair technology for concrete structures:	06

D. COURSE CONTENTS:

1 Concrete as a construction material:

1.1 Grades of concrete.
1.2 Advantages and disadvantages of concrete.

2 Cement:

2.1 Composition, hydration of cement, water cement ratio and compressive strength, fineness of cement, setting time, soundness, types of cement.

3 Aggregate, Water and Admixtures:

3.1 Classification and characteristics of aggregate, fineness modulus, grading of aggregate,I.S.383
3.2 Quality of water for mixing and curing.
3.3 Important functions, classification of admixtures, I.S 9103, accelerating admixtures, retarding admixtures, water reducing admixtures, air containing admixtures

4 Properties of fresh concrete:

4.1 Concept of fresh concrete, workability, slump test, compacting factor test, V-bee consistency test and flow test, requirement of workability,I.S.1199.

5 Properties of hardened concrete:

5.1 Cube and cylinder compressive strengths, flexural strength of concrete, stress-strain and elasticity, phenomena of creep and shrinkage, permeability, durability of concrete, sulphate, chloride and acid attack on concrete, efflorescence.

6 Concrete mix Design

6.1 a) Introduction

b) Data or input required for mix design.

6.2 Nominal mix concrete &design mix concrete.

6.3 Basic consideration for concrete mix design, Methods of proportioning concrete mix – I.S Code method of mix design(I.S.10262)

7 Production of concrete:

7.1 Batching of materials, mixing of concrete materials, transportation, placing of concrete, compaction of concrete (vibrators), Curing of concrete, Formwork-requirements and types ,stripping of forms. (Concepts only)

10 Inspection and Quality Control of Concrete

10.1 Quality control of Concrete as per I.S.456, Factors causing the variations in the quality of concrete

10.2 Mixing, Transporting, Placing &curing requirements of Concrete as per I.S.456.

10.3 Inspection and Testing as per Clause 17 of IS:456.

10.4 Durability requirements of Concrete as per I.S:456.

11 Special Concrete

11.1 Introduction to ready mix concrete, high performance concrete, silica fume concrete, shot-crete concrete or gunitting (Concepts only).

12 Deterioration of concrete and its prevention:

12.1 Types of deterioration, prevention of concrete deterioration, corrosion of reinforcement, effects and prevention

13 Repair technology for concrete structures:

13.1 Symptom, cause and prevention and remedy of defects during construction, cracking of concrete due to different reasons. Repair of cracks for different purposes, selection of techniques, polymer based repairs, common types of repairs.

E. COURSE COVERAGE UPTO INTERNAL ASSESSMENT

Chapters 1,2,3,4,5,6

F. RECOMMENDED BOOKS

Sl. No	Name of Authors	Titles of Book	Name of Publisher
1	M.S Shetty & A.K.Jain	Concrete technology	S.Chand
2	M.L.Gambhir	Concrete technology	Tata McGraw Hill.
3	A R Santhakumar.	Concrete technology	Oxford Publication
CODE			
4	BIS Codes:- I.S 383,10262,9103		

Th 4(b). DISASTER MANAGEMENT (ELECTIVE)

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	6th
Total Period:	60	Examination	3 hrs
Theory periods:	4P/week	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONALE

The course helps students to build concepts of disasters and explore into the strategies and existing policies to mitigate challenges imposed by the natural and manmade disasters at national as well as international level.

B. COURSE OBJECTIVES

On completion of the course students will be able to

1. Comprehend the risk and social vulnerability in wake of disasters
2. Define the disasters and comprehend the scales of measuring the intensities associated
3. State the causes and basic science behind the disasters
4. Prescribe mitigating strategies
5. Prepare for possible effects in industry and society
6. Follow appropriate plans and policies formulated by government institutions and policy planning body
7. Develop awareness about application of remote sensing in Disaster Risk Management (DRM)

C. TOPIC WISE DISTRIBUTION

Chapter	Name of topics	Hours
1	Introduction	04
2	Earthquakes	06
3	Tsunami	05
4	Landslides.	05
5	Cyclones	06
6	Floods	06
7	Droughts	05
8	Forest Fire	05
9	Other type of Hazards and disasters	05
10	Policy, Planning and Institutions for disaster mitigation	05
11	Geospatial Application for Disaster Risk Management at Global and Local level	08

D. COURSE CONTENTS

1 Introduction

1.1 Definition of hazards, disasters. Explain the difference between hazard and disaster.

1.2 Concept of risk and vulnerability. Risk reduction: preparedness and mitigation.

1.3 Disaster management cycle.

1.4 Personal and community awareness.

1.5 Types of disasters, earthquake, Tsunami, Landslide, cyclone ,flood,drought,forest fire, Chemical and industrial accidents.

2 Earthquakes.

2.1 Definition and concept ,intensity, Richter's scale.

2.2 Element of risk.

2.3 Hazard Zones in India.

2.4 Typical effects.

2.5 Main mitigation strategies, safe Engineering practice, Indian Standard code and enforcement Bye-Laws.

3 Tsunami.

3.1 Definition and concept.

3.2 Onset, Type and Cases.

3.3 Warming.

3.4 Elements at risk.

3.5 Typical effects, Physical damage, Environmental Damage, Casualties and Public health.

3.6 Specific Preparedness: Hazard Mapping, Early warning systems, Community preparedness.

3.7 Main mitigation strategies: Site planning and land management, Engineering structures. Flood management.

4 Landslides.

4.1 Definition, concept.

4.2 Onset time and warning.

4.3 Causes.

4.4 Elements at risk.

4.5 Hazard zones and Indian landslides.

4.6 Typical effects: Physical damage, casualties.

4.7 Main mitigation strategies: Hazard mapping, Landslide practice, retaining walls, Surface drainage control works, Engineering structures.

4.8 Community based mitigation.

5 Cyclones.

5.1 Definition, concept.

5.2 Onset type, Warning.

5.3 Elements at risk.

5.4 Typical effects.

5.5 Indian Hazard Zones.

5.6 Main mitigation strategies: Hazard mapping, Land use control, Engineering Structures, Flood management, improving vegetation cover.

5.7 Community based mitigation.

6 Floods.

6.1 Definition, concept, Onset type.
6.2 Warning.
6.3 Elements at risk.
6.4 Hazard zones and Indian floods.
6.5 Typical effects: Physical damage, Casualties and Public health, Crops and flood.
6.6 Main mitigation strategies: Mapping of the flood prone areas, land use control, Flood control and management.
6.7 Community based mitigation.

7 Droughts.

7.1 Definition, concept.
7.2 Onset type and warning.
7.3 Elements at risk.
7.4 Typical effects.
7.5 Main mitigation strategies: drought monitoring, water supply augmentation and conservation.
7.6 Drought Planning.

8 Forest Fire.

8.1 Definition and concept.
8.2 Forest fire damages in India.
8.3 Operational fire management systems and organizations.
8.4 Community involvement.
8.5 Public policies concerning fire.
8.6 The needs of fire management.

9 Other type of Hazards and disasters.

9.1 Chemical and Industrial disasters: brief description, effects, Preparedness.
9.2 Epidemic: Onset type, warning,causes and effects, risk reduction measures.
9.3 Heat waves: definition, dangers and effects, Forecasts and warning, awareness.

10 Policy, Planning and Institutions for disaster mitigation.

10.1 Role of policy makers in disaster risk reduction, course for specific action.
10.2 Institutional arrangement in India: Central level, State Level, District and Block level.
10.3 Major institutions in National and State level.

11 Geospatial Application for Disaster Risk Management at Global and Local level

11.1 Overview of Disaster Risk Management (DRM) and relevance of geospatial technologies in DRM

11.2 Earth observation technologies and their application in disaster management.

11.3 Remote sensing and geospatial intelligence for disaster management.

11.4 Application of remote sensing in hydro metrological, geological and environmental disaster.

11.5 International systems for disaster risk management:- UN-SPIDER, International Charter for Space and Major Disasters, Copernicus Emergency Management Service & Sentinel Missions.

E. COURSE COVERAGE UPTO INTERNAL ASSESSMENT

Chapters 1, 2, 3, 4, 5

F. RECOMMENDED BOOKS

Sl. No	Name of Authors	Titles of Book	Name of Publisher
1	R. Subramanian	Disaster Management	Vikas Publication
2	Donald and David Hyndman	Natural hazards and Disasters	Books/Cole CENGAGE learning
3	D.K.Sinha	Towards Basics of Natural Disaster	Researchco Book Cenre
4	S.B.Reed	Introduction to Hazards	Disaster Management Training Programme, 1997
5	Nigel Blundell	A Century of Man -Made Disaster	Pen & Sword Books Limited
6	**Website of "United Nation office for Outerspace Affairs" & "charter space & measure disasters"** www.unoosa.org www.disasterscharter.org www.un-spider.org		

Th 4(c). ARCHITECTURAL PRACTICES AND INTERIOR DESIGN (Elective)

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	6th
Total Period:	60	Examination	3 hrs
Theory periods:	4P/week	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONALE

The course helps students comprehend the important roles architects play in providing aesthetics and utility simultaneously. The course further exposes students to undertake designing activities considering anthropomorphic requirement and engineering challenges.

B. COURSE OBJECTIVES

On completion of the course students will be able to-

1. Comprehend the role of architects in taking care of utility and aesthetics
2. Analyze case study relating to residential and commercial buildings
3. Understand and apply procedure of landscaping
4. Comprehend ergonomic requirement and adopt in the building and its components
5. Comprehend the characteristics of interior materials and prescribe accordingly
6. Formulate plans for residential and small commercial buildings in compliance of requirements

C. TOPIC WISE DISTRIBUTION

Chapter	Name of topics	Hours
1	Architectural design	06
2	Building Aesthetics	06
3	Design of Projects	07
4	Landscaping	07
5	Elements & principle of Interior Design	07
6	Anthropometrics Data	06
7	Interior materials	07
8	Interior of Residential Building	07
9	Interior of small commercial building	07

D. COURSE CONTENTS:

1 Architectural design.

1.1 Review of Architecture
1.2 Site selection, climatic conditions, sun control, orientation of building & site
1.3 Building bye laws and its applications.

2 Building Aesthetics

2.1 Feeling for aesthetics and utility, composition, utility, mass composition, order, expression,

2.2 Proportion, scale, accentuation, order, expression, proportion, scale, accentuation & rhythm, contrast, balance, pattern.

2.3 Character of building.

3 Design of Projects

3.1 A case study of residential building.

3.2 A case study of public / commercial building.

3.3 Aspect of working Drawing – Plan, Elevation and Section.

4 Landscaping

4.1 Soft and hard landscaping

4.2 Basic principles of landscaping.

4.3 Assessment of land.

4.4 Design procedure.

4.5 A case study of landscaping for public / commercial building campus.

4.6 Main mitigation strategies: Hazard mapping, Landslide practice, retaining walls, Surface drainage control works, Engineering structures.

4.7 Community based mitigation.

5 Elements & principle of Interior Design

5.1 Elements such as form, texture, light, colour, effect of light on colour and texture, organization of space in design, space pattern.

5.2 Importance of colour as art element, Various colour scheme.

6 Anthropometrics Data

6.1 Relation of human measurement to furniture and movement to circulation patterns.

7 Interior materials

7.1 Different interior materials, paneling, partitions, finishing materials, furniture.

7.2 False ceiling, Flooring, Paints.

8 Interior of Residential Building

8.1 Use of space, circulation, standard size of furniture.

8.2 Plans and elevation of interior with furniture for living space, dining space, kitchen, bed room, guest room etc.

9 Interior of small commercial building.

9.1 Planning of interior of small commercial units such as offices, consulting chambers, shops etc.

9.2 Furniture details such as executive table, architectures table etc. used in commercial units.

E. COURSE COVERAGE UPTO INTERNAL ASSESSMENT

Chapters 1, 2, 3, 4, 5

F. RECOMMENDED BOOKS:

Sl. No	Name of Authors	Titles of Book	Name of Publisher
1	David Van Dommalan	Designing and decorating interiors	Jhon Wiley Sons
2	National building code of India		B.I.S
3	P. Stharamamn	Interior Design and Decoration	CBS Publishers & Distributors
5	Julius panero	Human dimension &interior space	Whitney Library of Design
6	Frank D.K Ching	Interior design illustrated	Jhon Wiley Sons

Pr 1. CONSTRUCTION WORKS PRACTICE & MS PROJECT

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	6th
Total Period:	75	Examination	3 hrs
Lab. periods:	5P/week	Term Work	25
Maximum marks:	50	End Semester Examination:	25

A. RATIONALE

Construction works involve construction, fabrication, testing and proper management. The practical course aims at exposing students at all these tasks. The course aims at imbibing the skills and attitude required at construction industries.

Microsoft Project is professional software that can help project managers. Team members will have better usability and control over hours of work. The applications help in developing plans, assigning resources to tasks, tracking budget management, workload analysis and reporting.

B. COURSE OBJECTIVES

On completion of the course students will be able to-

1. Know the construction tools and select as per requirement.
2. Construct brick walls and comprehend the challenges associated
3. Fabricate formworks and reinforcements
4. Evaluate compressive strength of concrete by conducting non-destructive tests
5. Know different plumbing tools and fixtures
6. Use MS Project to plan, schedule and report a project

C. TOPIC WISE DISTRIBUTION

Chapter	Name of topics	Hours
	PART I: Construction work Practices	
1	Tools for construction of masonry	06
2	Construction of brick walls	06
3	Formwork fabrication	08
4	Fabrication of reinforcements	10
5	Non-destructive tests for concrete	05
6	Pipe joints and Plumbing fixtures	05
	PART II: MS Project	
1	Introduction to Microsoft Project	04
2	Creating a project plan	05
3	Basics of Microsoft Project	06
4	Tracking the project progress	06
5	Project Reporting	07
6	Custom views and field	07

D. COURSE CONTENTS

PART I: Construction work Practices

1 Study of tools required for construction of masonry.

2 Lay out Plan of a building.

3 Construction of 1 &1 ½ Brick thick walls in English Bond in Mud

mortar including a corner.

4 Construction of 1 &1 ½ Brick thick Pillar in Mud mortar.
5 Bar bending and fabrication of reinforcements for a beam.
6 Bar bending and fabrication of reinforcements for a slab.
7 Bar bending and fabrication of reinforcements for a lintel with chajja.
8 Bar bending and fabrication of reinforcements for a column.
9 Conducting a Non destructive compressive strength test on concrete beam using rebound Hammer as per I.S:1311(Part-2)-1992.
10 Study of pipe joints and plumbing fixtures.
11 **Field visits:**
Visit to a construction site of a building where the following works are in progress.
Excavation of foundation, b) Masonry works, c) Plumbing works d) Painting (interior/ exterior), e) Wood works, f) Fabrication & concreting works, g)Flooring

PART II: MS Project

1 **Introduction to Microsoft Project**

1.1 Project Management-Definition & concept
1.2 Features of Microsoft project
1.3 MS project scheduling for engineering

2 **Creating a project plan**

2.1 Basic information for a new project
2.2 Creating project from a blank
2.3 Creating project from existing

3 **Basics of Microsoft Project**

3.1 Estimating a project
3.2 Project Task
3.3 Project Resources

4 **Tracking the project progress**

5 **Project Reporting**

6 **Custom views and field**

E. RECOMMENDED BOOKS

Sl. No	Name of Authors	Titles of Book	Name of Publisher
1	S.C.Rangawala.	Building Construction	Charotar Publishing

			House Pvt. Limited
2	S.S. Bhavikatti,	Building Construction	Vikas Publication
4	BIS Publication	Hand Book on Reinforcement Detailing (SP-34)	

Pr 2. LAND SURVEY PRACTICE – II

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	6th
Total Period:	75	Examination	3 hrs
Lab. periods:	5P/week	Term Work	25
Maximum marks:	75	End Semester Examination:	50

A. RATIONALE

Current age Civil Engineering professionals are required to be conversant with traditional as well as modern equipments and techniques for creating accurate maps. The course trains the students in skill sets required to use traditional high-end equipments and modern tools.

B. COURSE OBJECTIVES

On completion of the course students will be able to-

1. Conduct trigonometric leveling work in the field with the help of plane table surveying or geodetic surveying.
2. Prepare contoured maps or plans requiring both the horizontal as well as vertical control
3. Set out circular curve in the field.
4. Prepare survey map by conducting traverse survey with theodolite.
5. Lay out the construction plan of different types of structures at the site.
6. Study and use of modern electronic surveying instruments for its different applications.

C. TOPIC WISE DISTRIBUTION

Chapter	Name of topics	Hours
1	Trigonometrical surveying & Tacheometry	10
2	Setting out curves and site surveying	10
3	Study of map and map series	10
4	GPS & DGPS and ETS	25
5	GIS and map preparation using GIS	20

D. COURSE CONTENTS

1.0 TRIGONOMETRICAL SURVEYING & TACHEOMETRY:

1.1 Determination of height of 3 objects whose bases are accessible

1.2 Determination of stadia constants

1.3 Determination of horizontal distance an elevation with Staff vertical , by stadia method

2.0 SETTING OUT CURVES AND SITE SURVEYING:

2.1 Setting out a simple circular curve by offsets from long chord

2.2 Setting out a simple circular curve by offsets from the tangent

2.3 Setting out a simple circular curve by offsets from chords produces

2.4 Setting out a simple circular curve by Rankine's method of tangent angle (Deflection angles)
Setting out a site the center line and foundation width of a building from the given plan

2.5 Setting out the foundation line for a culvert

2.6 Dividing an area into plots of given size

3. STUDY OF MAP AND MAP SERIES:

3.1 Physical Map
3.2 Topographic Map
3.3 Road Map
3.4 Political Map
3.5 Economic & Resources Map
3.6 Thematic Map
3.7 Climate Map
3.8 Open Series map and Defense Series Map

4. STUDY ON GPS & DGPS AND ETS:

4.1 GPS: - Global Positioning, GPS Signals, Errors of GPS,Positioning Methods
4.2 DGPS: - Differential Global Positioning System
- 4.2.1 Base Station Setup
- 4.2.2 Rover GPS Set up
- 4.2.3 Download, Post-Process and Export GPS data
- 4.2.4 Sequence to download GPS data from flashcards
- 4.2.5 Sequence to Post-Process GPS data
- 4.2.6 Sequence to export post process GPS data
- 4.2.7 Sequence to export GPS Time tags to file

4.3 ETS: - Electronic Total Station
- 4.3.1 Distance Measurement
- 4.3.2 Angle Measurement
- 4.3.3 Leveling
- 4.3.4 Determining position
- 4.3.5 Reference networks
- 4.3.6 Errors and Accuracy

5. STUDY OF GIS AND MAP PREPARATION USING GIS

5.1 Components of GIS, Integration of Spatial and Attribute Information
5.2 Three Views of Information System
- 5.2.1 Database or Table View, Map View and Model View

5.3 Spatial Data Model
5.4 Attribute Data Management and Metadata Concept
5.5 Prepare data and adding to Arc Map.
5.6 Organizing data as layers.
5.7 Editing the layers.
5.8 Switching to Layout View.
5.9 Change page orientation.
5.10 Removing Borders.
5.11 Adding and editing map information.
5.12 Finalize the map

E. RECOMMENDED BOOKS:

Sl. No	Name of Authors	Titles of Book	Name of Publisher
1	R. Agor	A text book of surveying and leveling	Khanna Publishers,
2	B. C. Punmia	Surveying Vol. I, II, III	Laxmi Publication
3	D. Gaikwad, S. Chand & Co.	Advanced Surveying	
4	Bhatta	Remote sensing & GIS	Oxford Publication

REFERENCE Materials

1. https://theconstructor.org/surveying/surveying-principles-methods-civil-engineering/13048/
2. https://www.novatel.com/an-introduction-to-gnss/chapter-2-basic-gnss-concepts/
3. http://gps.alaska.edu/jeff/Spatial_Reference/Freymueller_DOT_GPS.pdf
4. https://drive.google.com/file/d/0B7srsI9Fr4QdUzAzSlRwZnNRZ3M/view_:-
5. Surveying and Levelling by N.N. Basak, 2nd Edition
6. **https://2018.foss4g-na.org/sites/default/files/slides/survey_resurvey_cadastral_layer_Odisha.pdf**
7. **http://www.lawsofindia.org/pdf/orissa/2012/2012OR5.pdf**
8. **http://revenueodisha.gov.in/sites/default/files/document/DILRMP/SOP_MRR_2016.pdf**
9. **http://revenueodisha.gov.in/sites/default/files/document/Govt_Land/22958_4_8_14.pdf**
10. **https://www.google.co.in/search?q=map+reading+and+interpretation+ppt&oq=Map+reading+and+&aqs=chrome.3.69i57j0l5.9755j0j7&sourceid=chrome&ie=UTF-8**
11. **Map Use: Reading, Analysis and Interpretation by Juliana O. Muehrcke and Philip Muehrcke**
12. **http://indiageospatialforum.org/2012/proceedings/ppt/P%20K%20parida.pdf**
13. **http://www.indiana.edu/~paleoind/Resources/Guide%20to%20Topographic%20Maps.pdf**
14. **http://www.dst.gov.in/sites/default/files/nationalmappolicy.pdf**
15. **Remote sensing and GIS / BasudebBhatta, 2nd edition, New Delhi, India, Oxford University Press, - Oxford higher education.**
16. **http://www.gisresources.com/basic-of-photogrammetry_2/**
17. **http://giswin.geo.tsukuba.ac.jp/sis/tutorial/Fundamentals_of_GIS_Estoque.pdf**
18. **Learning Material Approved by R&DM Deptt., Govt. of Odisha**

Pr 3. CADD Lab and Design & Detailing Practice

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	6th
Total Period:	45	Examination	3 hrs
Practical periods:	3P/week	Sessional Examination:	25
Maximum marks:	50	Practical Examination:	25

A. RATIONALE

The course intends to imbibe necessary skills in using software towards design and drafting.

B. COURSE OBJECTIVES

On completion of the course students will be able to

1. Draw necessary detailing and schedule of bars for the various structural members
2. Draw important components of buildings using AutoCAD
3. Draw connectors using AutoCAD
4. Use STADD Pro in modeling structural members
5. Analyze the stress and deformation pattern in structural members
6. Design of buildings using STADD Pro software
7. Prepare building drawings suiting to approval needs prescribed by regulatory bodies

C. TOPIC WISE DISTRIBUTION

Chapter	Name of topics	Hours
1	Structural Detailing Practice	20
2	Use of STADD Pro Software	15
3	Revit Architecture Software	10

D. COURSE CONTENTS

1.0 Structural Detailing Practice:

Draw the following with necessary details and schedule of bars from supplied sketches or given references such as SP 34

1.1 Slab, beam and lintel with chajja as in a simple building (Help from Sections 8 & 9 of SP 34 may be taken) (Plate I)

1.2 Columns, column-beam connections with & without splicing, isolated footing, staircase (Help from sections 6, 7, 10 of SP 34 may be taken)(Plate 2)

1.3 Different types of bolt connections, welded connections. (Plat3)

1.4 Details of Pile and Pile cap

2.0 Use of STADD Pro Software:

2.1 2-D Modelling of structures, Use of Structure wizard, Geometry, Property, Support, Loads and combinations, Analysis

2.2 Analysis of a Continuous beam with more than two span subjected to udl and point load

2.3 3-D modeling of building structures ,dead load, live load, earthquake and wind load analysis, design of a 3 storeyed building and preparation of reinforcement drawing and detailing

2.4 Introduction to STADD foundation.

3.0 Revit Architecture Software:

3.1 Basics- Modify, Wall, Door, Window, Component Room, Roof, Floor, Grid, Lines, Dimension, Section, Level, Text, View
3.2 Modelling- Ramp, Railing, Stair
3.3 Site- Topo surface- Parking Component, Site Component
3.4 Align, Split, Trim, offset, Match type, Line work, Paint, Scale, Unit
3.5 3D View
3.6 Preparation of approval drawing of a double storied residential building from given specifications with its 3D view using above commands

SOFTWARES REQUIRED:

1) STADD-Pro/V8i (latest Version) - Bentley
2) AutoCAD (Architecture) 2010 (Book) -William G. Wyatt

Pr4. PROJECT Phase - II

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	6th
Total Period:	75	Examination	3 hrs
Lab. periods:	5 P / week	Sessional	50
Maximum marks:	150	End Sem Examination	100

RATIONALE

Students' Project Work aims at developing innovative skills in the students whereby they apply the knowledge and skills gained through the course covered in many subjects and Labs, by undertaking a project. The prime emphasis of the project work is to understand and apply the basic knowledge of the principles of Civil engineering and practices in real life situations, so as to participate and manage a large Civil engineering projects, in future. Entire Project spreads over 5th and 6th Semester. Part of the Project covered in 5th Semester was named as *Project Phase-I* and balance portion to be covered in 6th Semester shall be named as *Project Phase-II*.

OBJECTIVES

After undergoing the Project Work, the student will be able to:

- Implement the theoretical and practical knowledge and skills gained through various subjects/courses into an application suitable for a real practical working environment, preferably in an industrial environment.
- Develop software packages or applications and implement these for the actual needs of the community/industry.
- Identify and contrast gap between the technological knowledge acquired through curriculum and the actual industrial need and to compensate it by acquiring additional knowledge as required.
- Carry out cooperative learning through synchronous guided discussions within the class in key areas, asynchronous document sharing and discussions, as well as prepare collaborative edition of the final project report.
- To achieve real life experience in Project design.
- To develop the skill of writing Project Report

Project Phase-I and Phase-II

The Project work duration covers 2 semesters(5th and 6th sem). The Grouping of students, selection of Project, assignment of Project Guide to the Group was done in the beginning of 5th semester under Project Phase-I. The students were allowed to study literature, any existing system and then define the Problem/objective of the Project. Preliminary work and Design of the system also have to be complete in Phase-I. Development may also begin in this phase. Project Milestones are to be set so that progress can be tracked .

In Phase-II Development, Testing, Documentation and Implementation have to be complete. Project Report have to be prepared and complete in Phase-II. All Project reports should be organized uniformly in proper order, irrespective of group. Teacher Guides can make suitable alteration in the components of Task and schedule.

At the end of Project Phase-II in 6th semester there shall be one presentation by each group on whole Project work undertaken by them.

A suggestive criterion for assessing student performance by the external (preferably person from industry) and internal (teacher) examiner is given in table below:

Sl. No.	Performance Criteria
1.	Selection of project assignment
2.	Planning and execution of considerations
3.	Quality of performance
4.	Providing solution of the problems or production of final product
5.	Sense of responsibility
6.	Self expression/ communication/ Presentation skills
7.	Interpersonal skills/human relations
8.	Report writing skills
9	Viva voce

The teachers are free to evolve other criteria of assessment, depending upon the type of project work.
It is proposed that the institute may organize an annual exhibition of the project work done by the students and invite leading Industrial organisations to such an exhibition.

The Project Report need to be prepared as per standard format and following is the indicative format. The Teacher Guide may make minor alteration keeping the sense in tact.

Organization of Project Report

1. Cover page:
   It should contain the following (in order)
   (i) Title of the Project
   (ii) —Submitted in partial fulfillment of the requirements for the Diploma in <Branch Name>‖
   (iii) By Name of the Student(s)
   (iv) Logo of the Institution
   (v) Branch Name/Depart Name and Institution Name with Address
   (vi) Academic Year
2. 1st Inner page
   Certificate:
   It should contain he following
   —This is to certify that the work in this Project Report entitled <Project Title> by <Name of student(s)> has been carried out under my supervision in partial fulfillment of the requirements for the Diploma in <Branch Name>‖ during session <session > in <Branch /Department Name> of <Institute name> and this work is the original work of the above student(s).

   Seal and signature of the Supervisor/Guide with date
3. 2nd Inner Page
   Acknowledgement by the Student(s)
4. Contents.
5. Chapter wise arrangement of Reports
6. Last Chapter: Conclusion

It should contain

(i) Conclusion

(ii) Limitations

(iii) Scope for further Improvement

7. References

Pr-5 LIFE SKILL

(Common to All Branches)

Practical	**2 Periods per week**	**Sessional**	**25 Marks**
Total Periods	**30 Periods**	**Total Marks**	**25 Marks**

Objective: After completion of this course the student will be able to**:**

- Develop team spirit i.e. concept of working in team
- Apply problem solving skills for a given situation
- Use effective presentation techniques
- Apply task management techniques for given projects
- Enhance leadership traits
- Resolve conflict by appropriate method
- Survive self in today's competitive world
- Face interview without fear

DETAIL CONTENTS:

1. SOCIAL SKILL

Society, Social Structure, Develop Sympathy and Empathy
Swot Analysis — Concept, How to make use of SWOT
Inter personal Relation**:** Sources of conflict, Resolution of conflict ,
Ways to enhance interpersonal relation

2. PROBLEM SOLVING

Steps of Problem solving**:**

- Identify and clarify the problem,
- Information gathering related to problem,
- Evaluate the evidence,
- Consider alternative solutions and their implications,
- Choose and implement the best alternative,
- Review
- Problem solving techniques:

1) Trial and error, 2) Brain storming, 3) Lateral (Out of Box) thinking

3. PRESENTATION SKILL

Body language , Dress like the audience
Posture, Gestures, Eye contact and facial expression. STAGE FRIGHT,
Voice and language — Volume, Pitch, Inflection, Speed, Pause
Pronunciation, Articulation, Language, Practice of speech.
Use of AV aids such as Laptop with LCD projector, white board etc.

4. GROUP DISCUSSION AND INTERVIEW TECHNIQUES

Group Discussion:
Introduction to group discussion, Ways to carry out group discussion,
Parameters— Contact, body language, analytical and logical thinking,
decision making
Interview Technique :
Dress, Posture, Gestures, facial expression, Approach
Tips for handling common questions.

5. WORKING IN TEAM

Understand and work within the dynamics of a groups.
Tips to work effectively in teams,
Establish good rapport, interest with others and work effectively with them
to meet common objectives,
Tips to provide and accept feedback in a constructive and considerate way ,
Leadership in teams, Handling frustrations in group.

6. TASK MANAGEMENT

Introduction, Task identification, Task planning ,
organizing and execution, Closing the task

PRACTICAL

List of Assignment: *(Any Five to be performed including Mock Interview)*

a. SWOT analysis:-

Analyse yourself with respect to your strength and weaknesses, opportunities and threats. Following points will be useful for doing SWOT.

a) Your past experiences,
b) Achievements,
c) Failures,
d) Feedback from others etc.

b. Solve the True life problem assigned by the Teacher.

3. Working in a Team

Form a group of 5-10 students and do a work for social cause e.g. tree plantation, blood donation, environment protection, camps on awareness like importance of cleanliness in slum area, social activities like giving cloths to poor etc.(One activity per group where Team work shall be exhibited)

4. Mock Interview

5. Discuss a topic in a group and prepare minutes of discussion.

6. Deliver a seminar for 5 minutes using presentation aids on the topic given by your teacher.

7. Task Management

Decide any task to be completed in a stipulated time with the help of teacher. Write a report considering various steps in task management (with Break up into sub tasks and their interdependencies and Time)

Note: -1. Please note that these are the suggested assignments on given contents/topic. These assignments are the guide lines to the subject teachers. However the subject teachers are free to design any assignment relevant to the topic.

Note: -2. The following Topics may be considered for Seminar/GD in addition to other Topics at the discretion of the Teacher.

(Comparison with developed countries, Occupational Safety, Health Hazard, Accident & Safety, First-Aid, Traffic Rules, Global Warming, Pollution, Environment, Labour Welfare Legislation, Labour Welfare Acts, Child Labour Issues, Gender Sensitisation ,Harassment of Women at Workplace)

METHODOLOGY:

The Teacher is to explain the concepts prescribed in the contents of the syllabus and then assign different Exercises under Practical to the students to perform.

Books Recommended:-

Sl.No	Name of Authors	Title of the Book	Name of the Publisher
01	E.H. Mc Grath , S.J	Basic Managerial Skills for All	PHI
02	Lowe and Phil	Creativity and problem solving	Kogan Page (I) P Ltd
03	Adair, J	Decision making & Problem Solving	Orient Longman
04	Bishop , Sue	Develop Your Assertiveness	Kogan Page India
05	Allen Pease	Body Language	Sudha Publications Pvt. Ltd.

Equipment List

LAND SURVEY PRACTICE II (For Group Size-30 Students)

Sl No.	Name of Equipments	Quantity Required in Nos.
1	Substence bar	06
2	Photogrametry equipments and 3-D maps	06
3	Theodolite Traversing -Transit Vernier Theodolite-Telescope:Length 210mm, Magnification 30X, Resolving Power 1.3mm, Minimum focusing distance 1.5m, Stadia Multiplying Constant-100, Additive Constant-0(zero),Image-Erect, Accuracy-5mm/Km, Sensitivity of vertical circle-200seconds/2mm, Horizontal circle-100 to115mm, Graduation-20minutes, Vernier-20sec, Vertical Circle -100 to 115mm, Graduation-20 minutes, Vernier -20sec, /00With optical plummet, with telescope level and plate level supplied with all standard accessories as per BIS 2988-1965 including Tripod stand & Box	06
4	Digital Theodolite & EDM	06
5	Total Station (Auto Tracking & Auto Pointing) with all accessories: 1. Data transfer cable, 2. Aluminium Stand, 3. Both side display, 4. Detachable tribarch having following features, Focusing Mode, a)Auto focus mode, b) Power focus mode, c) Manual focus mode, d) Red dot appearing on the object where distance has to be measured, Graph of entire survey displayed on screen of total station. On board preloaded graphical software including are, perimeter, volume (cut/fill), 7500 points on board memory range, prism, single prism3000m (under normal condition) Three prism400m can measure distance without reflections up to 80m , Angle accuracy:5‖ (Seconds), Temperature, pressure sensor in built, Large LCD display screen 8 lines,20 characters,Battery12 hours continuous, angleony (angle + distance 6hrs.minimum) Charger with graphic display & discharge function.	06
6	DGPS (Dual frequency)	05
7	Electronic Total station	05
8	AutoCAD software	15 user
9	GIS software	Multiuser
10	Image processing software	multiuser

CONSTRUCTION WORKS PRACTICE LABORATORY & MS PROJECT (For Group Size-30 Students)

Sl No.	Name of Equipments	Quantity Required in Nos.
1	Masonry tools: Steel wire brush, Mason's Trowel, Pointing Trowel, Hacking hammer, Trig square (300 x 600mm), Blaster Chisel, Hammer (2 lbs), Cold steel chisel, straight edge (1800 mm), straight edge (1200mm), plumb bob (250g) with thread, steel measuring tape (3m), mortar pan (350 dia), GI bucket (15 Ltr), spade, wheel barrow, sprit level (300mm), wooden float (1200mm), wooden float (600mm), steel towel, Gauge Box (1.25 ft), Sand screen, Water storage tank (500 ltr.) Plastic mug, PVC tube (5mm dia), 20m, Nylon thread bundle (100 ft), Cotton Thread bundle (100 ft)	5 each

2	Claw hammer (216), Ball pin hammer (2 lb), Hand saw (18''), Tenon saw (12''), Wooden making gauge, wooden mortise gauge, spirit level (12'' long), Tri square (5'') Drill machine with bits from 3mm to 25 mm, fammer chisel (1 ½ ''), Mortise chisel (½ ''), cutting plier (8''), Screw driver set, making knife / scribe, Hacksaw frame with blade (12''), spanner set, wire rail (1 ½ ''-1 Kg), Wire nail (2 ½ ''-1 kg), wire nail (3'' — 1 kg), portable cutter with blade	5 each
3	Measuring steel tape (15m & 30m), binding hook, bending lenr (8mm, 10mm, 12mm, 16mm, 20mm, 25mm), rail piece (450-600mm long), cold chisel flat nose, Hammer (10lb), trysquare (300 x 600mm) Hacksaw frame, standard wire gauge, cutting blades for hacksaw, bar bending machine (36mm dia), Bar shearing machine (36mm dia), Hand shearing machine (upto 12mm dia), bending tables with support and sleeper, Bar Cutting Machine	5 each
4	Water supply plumbing fitting - (1'' dia) GI & PVC – bend, draw, short piece, ripple, socket, plug, reducer socket, union tee, RS tee, Reducer socket etc	5 each
5	Sanitary plumbing fittings–(4‖ dia) GI & PVC- Bend, Door Bend, T-Juction, Y-Juction, Short piece- P,S,Q trap, vent pipe, cowl.	5 each
6	Fixtures — Wash basin, sink, Indian pan, European pan (Commode), Anglo Indian Pan, Videt, Showers(Overhead, Health, Hand), Bib-cocks with hot & cold water Mixture, Connection pipe, waste, Waste Pipe, Bibcock, Pillar cock, Angle cock, Stop cock, Valves – oneway (Reflux), full way	5 each
7	MS Project software	Multi user

CIVIL ENGG. CAD LABORATORY (FOR A GROUP OF 30 STUDENTS)
(Can be used for Engg. Drawing/Civil Engg. Drawing-I & II /Estimation & Cost Evaluation Practice – I & II)
Gr. Size -30students

Sl. No.	Item with Specification-	QNTY in Nos.
1	STAAD-Pro -V8i(Latest Educational Version) software	30 users
2	AutoCAD-2016 or lates Educational version	15 users
3	Desk Top Computer with following latest version configuration :	30
4	Laptop Computer with following latest version configuration :	1
5	Online UPS: 15KVA	
6	Laser Printer- Paper size:A4	1
7	Document Scanner A4/Legal size, Resolution: 600x600, Flat Bed size:A4	1
8	Plotter(44‖) with accessories in complete set	1
9	LCD projector 4000 ansi lumen with screen	1

STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA									
TEACHING AND EVALUATION SCHEME FOR 3rd Semester Electrical Engg.(wef 2019-20)									
Subject Number	Subject Code	Subject	Periods/week			Evaluation Scheme			
			L	T	P	Internal Assessment/ Sessional:	End Sem Exams	Exams (Hours)	Total
		Theory							
Th.1		Engineering Mathematics-III	4		-	20	80	3	100
Th.2		Circuit and Network Theory	4	1	-	20	80	3	100
Th.3		Element of Mechanical Engineering	4		-	20	80	3	100
Th.4		Electrical Engineering Material	4			20	80	3	100
Th.5		Environmental studies	4			20	80	3	100
		Total	20	01		100	400	-	500
		Practical							
Pr.1		Mechanical Engineering Lab	-	-	3	25	50	3	75
Pr.2		Circuit and Simulation Lab	-	-	6	50	50	3	100
Pr.3		Mechanical Workshop	-	-	6	25	50	3	75
		Student Centred Activities(SCA)		-	3	-	-	-	-
		Total	-	-	*18*	*100*	*150*	-	*250*
		Grand Total	**20**	**01**	**18**	**200**	**550**	**-**	**750**
Abbreviations: L-Lecturer, T-Tutorial, P-Practical . Each class is of minimum 55 minutes duration									
Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50% and in Aggregate is 40%									
SCA shall comprise of Extension Lectures/ Personality Development/ Environmental issues /Quiz /Hobbies/ Field visits/ cultural activities/Library studies/Classes on MOOCS/SWAYAM etc., Seminar and SCA shall be conducted in a section.									
There shall be 1 Internal Assessment done for each of the Theory Subject. Sessional: Marks shall be total of the performance of individual different jobs/ experiments in a subject throughout the semester									

CURRICULLUM OF 3RD SEMESTER

For

DIPLOMA IN ENGINEERING

(Effective FROM 2019-20 Sessions)

STATE COUNCIL FOR TECHNICAL EDUCATION & VOCATIONAL TRAINING, ODISHA, BHUBANESWAR

Th1. ENGINEERING MATHEMATICS – III

(COMMON TO ELECT,ETC, AE & I and other Allied branches of Electrical and ETC)

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	3rd
Total Period:	60	Examination :	3 hrs
Theory periods:	4P / week	Internal Assessment:	20
Maximum marks:	100	End Semester Examination ::	80

A. RATIONALE:

The subject engineering mathematics-III is a common paper for engineering branches. This subject includes complex numbers, Matrices, Laplace Transforms, Fourier series, Differential equations and Numerical Methods etc for solution of engineering problems.

B. OBJECTIVE:

On completion of study of Engineering Mathematics-III, the students will be able to:

1. Apply complex number concept in electricity , Quadratic equation , Imaginary numbers in signal processing, Radar & even biology (Brain Waves)
2. Apply Matrices in Engineering fields such as Electrical Circuits and Linear programming.
3. Transform Engineering problems to mathematical models with the help of differential equations and familiarize with the methods of solving by Analytical methods, Transform method and operator method and Numerical methods.
4. Solve algebraic equations by iterative Methods easily programmable in computers.
5. Analysis data and develop interpolating polynomials through method of differences

C. Topic wise distribution of periods:

Sl. No.	Topics	Period
1	Complex Numbers	06
2	Matrices	04
3	Differential Equations	10
4	Laplace transforms	12
5	Fourier Series	12
6	Numerical Methods	04
7	Finite difference & interpolation	12
	Total:	**60**

D. COURSE CONTENTS

1. Complex Numbers

1.1 Real and Imaginary numbers.
1.2 Complex numbers, conjugate complex numbers, Modulus and Amplitude of a complex number.
1.3 Geometrical Representation of Complex Numbers.
1.4 Properties of Complex Numbers.
1.5 Determination of three cube roots of unity and their properties.

1.6 De Moivre's theorem
1.7 Solve problems on 1·1 - 1·6

2. Matrices

2.1. Define rank of a matrix.
2.2. Perform elementary row transformations to determine the rank of a matrix.
2.3. State Rouche's theorem for consistency of a system of linear equations in unknowns.
2.4. Solve equations in three unknowns testing consistency.
2.5. Solve problems on 2.1 – 2.4

3. Linear Differential Equations

3.1. Define Homogeneous and Non – Homogeneous Linear Differential Equations with constant coefficients with examples.
3.2. Find general solution of linear Differential Equations in terms of C.F. and P.I.
3.3. Derive rules for finding C.F. And P.I. in terms of operator D, excluding .
3.4. Define partial differential equation (P.D.E) .
3.5. Form partial differential equations by eliminating arbitrary constants and arbitrary functions.
3.6. Solve partial differential equations of the form Pp + Qq = R
3.7. Solve problems on 3.1- 3.6

4. Laplace Transforms

4.1. Define Gamma function and and find .
4.2. Define Laplace Transform of a function and Inverse Laplace Transform .
4.3. Derive L.T. of standard functions and explain existence conditions of L.T.
4.4. Explain linear, shifting property of L.T.
4.5. Formulate L.T. of derivatives, integrals, multiplication by and division by .
4.6. Derive formulae of inverse L.T. and explain method of partial fractions .
4.7. solve problem on 4.1- 4.6

5. Fourier Series

5.1. Define periodic functions.
5.2. State Dirichlet's condition for the Fourier expansion of a function and it's convergence
5.3. Express periodic function satisfying Dirichlet's conditions as a Fourier series.
5.4. State Euler's formulae.
5.5. Define Even and Odd functions and find Fourier Series in ( ).
5.6. Obtain F.S of continuous functions and functions having points of discontinuity in ( )
5.7. Solve problems on 5.1 – 5.6

6. Numerical Methods

6.1. Appraise limitation of analytical methods of solution of Algebraic Equations.
6.2. Derive Iterative formula for finding the solutions of Algebraic Equations by :

6.2.1. Bisection method
6.2.2. Newton- Raphson method
6.3. solve problems on 6.2

7. Finite difference and interpolation

7.1. Explain finite difference and form table of forward and backward difference.
7.2. Define shift Operator and establish relation between & difference operator .
7.3. Derive Newton's forward and backward interpolation formula for equal intervals.
7.4. State Lagrange's interpretation formula for unequal intervals.
7.5. Explain numerical integration and state:
7.5.1. Newton's Cote's formula.
7.5.2. Trapezoidal rule.
7.5.3. Simpson's 1/3rd rule
7.6. Solve problems on 7.1- 7.5

Syllabus to be covered up to I.A.
Chapter: 1,2,3 and 4

Learning Resources:

Sl.No	Title of the Book	Name of Authors	Name of Publisher
1.	Higher engineering mathematics	Dr B.S. Grewal	khanna publishers
2.	Elements of mathematics Vol-1	Odisha state bureau of text book preparation and production	
3.	Text Book of Engineering Mathematics-I	C.R Mallick	Kalayani publication
4.	Text Book of engineering mathematics-III	C.R Mallick	Kalayani publication

Th2. Circuit and Network Theory

(Common to Electrical /EEE/E&M/EIC)

Name of the Course: Diploma in Electrical Engineering			
Course code:			
Total Period:	75(60L+15T)	Semester	3rd
Theory periods:	4P/week	Examination :	3 hrs
Tutorial:	1P/week	Internal Assessment:	20
Maximum marks:	100	End Semester Examination ::	80

A. Rationale:

Study of Magnetic and Electric Circuits are essential in study of Electrical Engineering. Study of Circuits, Network and Filters constitutes the basic and fundamental aspect of deriving insight into the functioning and analysis of Electrical network, instruments and machineries.

B. Objectives:

After completion of this subject the student will be able to:

1. To develop the concept on Electrical circuit parameters
2. To develop problem solving ability on magnetic Circuit.
3. To develop knowledge on network analysis
4. Use of theorems in problem solving.
5. To develop knowledge on R-L, R-C and R-L-C circuit analysis in A.C
6. To understand the behavior of circuit in transient condition.
7. To develop knowledge of filters and their circuit characteristics

C. TOPIC WISE DISTRIBUTION OF PERIODS

Sl.No.	Name of the Topic	Period
1	Magnetic Circuits	07
2	Coupled Circuits	05
3	Circuit Elements And Analysis	06
4	Network Theorems	08
5	Ac Circuit And Resonance	08
6	Poly-phase Circuit	06
7	Transients	06
8	Two-Port Network	08
9	Filters	06
	TOTAL	**60**

D. COURSE CONTENT:

1. MAGNETIC CIRCUITS

- 1.1 Introduction
- 1.2 Magnetizing force, Intensity, MMF, flux and their relations
- 1.3 Permeability, reluctance and permeance
- 1.4 Analogy between electric and Magnetic Circuits
- 1.5 B-H Curve
- 1.6 Series & parallel magnetic circuit.
- 1.7 Hysteresis loop

2. COUPLED CIRCUITS:

- 2 . 1 Self Inductance and Mutual Inductance
- 2 . 2 Conductively coupled circuit and mutual impedance
- 2 . 3 Dot convention
- 2 . 4 Coefficient of coupling
- 2 . 5 Series and parallel connection of coupled inductors.
- 2 . 6 Solve numerical problems

3. CIRCUIT ELEMENTS AND ANALYSIS:

- 3 . 1 Active, Passive, Unilateral & bilateral, Linear & Non linear elements
- 3 . 2 Mesh Analysis, Mesh Equations by inspection
- 3 . 3 Super mesh Analysis
- 3 . 4 Nodal Analysis, Nodal Equations by inspection
- 3 . 5 Super node Analysis.
- 3 . 6 Source Transformation Technique
- 3 . 7 Solve numerical problems (With Independent Sources Only)

4. NETWORK THEOREMS:

- 4.1 Star to delta and delta to star transformation
- 4.2 Super position Theorem
- 4.3 Thevenin's Theorem
- 4.4 Norton's Theorem
- 4.5 Maximum power Transfer Theorem.
- 4.6 Solve numerical problems (With Independent Sources Only)

5. AC CIRCUIT AND RESONANCE:

- 5.1 A.C. through R-L, R-C & R-L-C Circuit
- 5.2 Solution of problems of A.C. through R-L, R-C & R-L-C series Circuit by complex algebra method.
- 5.3 Solution of problems of A.C. through R-L, R-C & R-L-C parallel & Composite Circuits

5.4 Power factor & power triangle.
5.5 Deduce expression for active, reactive, apparent power.
5.6 Derive the resonant frequency of series resonance and parallel resonance circuit
5.7 Define Bandwidth, Selectivity & Q-factor in series circuit.
5.8 Solve numerical problems

6. **POLYPHASE CIRCUIT**
6.1 Concept of poly-phase system and phase sequence
6.2 Relation between phase and line quantities in star & delta connection
6.3 Power equation in 3-phase balanced circuit.
6.4 Solve numerical problems
6.5 Measurement of 3-phase power by two wattmeter method.
6.6 Solve numerical problems.

7. **TRANSIENTS:**
7.1 Steady state & transient state response.
7.2 Response to R-L, R-C & RLC circuit under DC condition.
7.3 Solve numerical problems

8. **TWO-PORT NETWORK:**
8.1 Open circuit impedance (z) parameters
8.2 Short circuit admittance (y) parameters
8.3 Transmission (ABCD) parameters
8.4 Hybrid (h) parameters.
8.5 Inter relationships of different parameters.
8.6 T and π representation.
8.7 Solve numerical problems

9. **FILTERS:**
9.1 Define filter
9.2 Classification of pass Band, stop Band and cut-off frequency.
9.3 Classification of filters.
9.4 Constant – K low pass filter.
9.5 Constant – K high pass filter.
9.6 Constant – K Band pass filter.
9.7 Constant – K Band elimination filter.
9.8 Solve Numerical problems

Syllabus coverage up to Internal assessment

Chapters: 1, 2, 3, 4 and 5.

Learning Resources:			
Sl.No	**Title of the Book**	**Name of Authors**	**Name of the publisher**
1	Electrical Technology Volume – I [for module: 2 only]	B. L. Thereja	S. Chand
2	Introduction to CIRCUIT ANDNETWORK	Gargi Basu	Platinum

3	Network Analysis and Synthesis	B.R.Gupta	S.CHAND
4	Circuit and Networks	Sakhija & Nagsarkar	OXFORD
5	CIRCUIT & NETWORKS for modules:- 1,3,4,5,6,7,8,9	A. Sudhakar & Shyam Mohan S Palli	Tata McGraw Hill
6	Introduction to Circuit and Network	Gargi Basu	Platinum Publishers

Th3. Elements of Mechanical Engineering

(Common to Electrical and EEE)

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	3rd
Total Period:	60	Examination :	3 hrs
Theory periods:	4P/week	Internal Assessment:	20
Maximum marks:	100	End Semester Examination ::	80

A. Rationale:

This subject has been introduced with a view to provide adequate understanding of properties of steam, thermodynamic laws, Boilers, Turbines, Condensers to the students of electrical engineering since these form the basic and fundamental aspect for drive mechanisms used in generation of electricity

B. Objectives:

On completion of the course content the students will be able to:

1. Explain the principle of working of Boilers, Turbines and condensers.
2. State the different types of boilers and Turbines and their uses.
3. Explain the properties of steam.
4. State and explain thermodynamic laws.

C. TOPIC WISE DISTRIBUTION OF PERIODS

Sl No.	Topic	Periods
1.	THERMODYNAICS	06
2.	PROPERTIES OF STEAM	05
3.	BOILERS	10
4.	STEAM ENGINES	10
5.	STEAM TURBINES	06
6.	CONDENSER	04
7.	I.C. ENGINE	04
8.	HYDROSTATICS	05
9.	HYDROKINETICS	05
10.	HYDRAULIC DEVICES AND PNEUMATICS	05
	TOTAL	**60**

D. **Course Content :**

1. THERMODYNAICS:
   - 1.1 State Unit of Heat and work, 1st law of thermodynamics.
   - 1.2 State Laws of perfect gases
   - 1.3 Determine relationship of specific heat of gases at constant volume and constant pressure.
2. PROPERTIES OF STEAM:
   - 2.1 Use steam table for solution of simple problem
   - 2.2 Explain total heat of wet, dry and super heated steam
3. BOILERS:
   - 3 . 1 State types of Boilers

3 . 2 Describe Cochran, Babcock Wilcox boiler
3 . 3 Describe Mountings and accessories

4. STEAM ENGINES:
   4.1 Explain the principle of Simple steam engine
   4.2 Draw Indicator diagram
   4.3 Calculate Mean effective pressure, IHP and BHP and mechanical efficiency.
   4.4 Solve Simple problem.
5. STEAM TURBINES:
   5.1 State Types
   5.2 Differentiate between impulse and reaction Turbine
6. CONDENSER:
   6.1 Explain the function of condenser
   6.2 State their types
7. I.C. ENGINE:
   7.1 Explain working of two stroke and 4 stroke petrol and Diesel engines.
   7.2 Differentiate between them
8. HYDROSTATICS:
   8.1 Describe properties of fluid
   8.2 Determine pressure at a point, pressure measuring Instruments
9. HYDROKINETICS:
   9.1 Deduce equation of continuity of flow
   9.2 Explain energy of flowing liquid
   9.3 State and explain Bernoulli's theorem
10. HYDRAULIC DEVICES AND PNEUMATICS:
   10.1 Intensifier
   10.2 Hydraulic lift
   10.3 Accumulator
   10.4 Hydraulic ram

Syllabus coverage up to Internal assessment

Chapters: 1, 2, 3, and 4.

Learning Resources:			
Sl.No	**Title of the Book**	**Name of Authors**	**Name of the publisher**
1	Thermal Engineering	R. S. Khurmi	S Chand
2	Hydraulics & Hydraulic M/Cs	A. R. Basu	Dhanpat Rai & Co.
3	Thermal Engineering	A. S. Sarad	Satyaprakashan
4	Hydraulics & Hydraulic M/Cs	R. K. Bansal	Laxmi Publishers

Th4. ELECTRICAL ENGINEERING MATERIAL

(Common to Electrical /E&M)

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	3rd
Total Period:	60	Examination :	3 hrs
Theory periods:	4P/week	Internal Assessment:	20
Maximum marks:	100	End Semester Examination ::	80

A. Rationale:

Electrical Engg. Materials hold prime importance for Electrical Engineers in design, installation & maintenance of electrical equipments. With the advent of latest metallurgical processes the materials used in the design processes brings safer and hazard free electrical installations. Hence basic knowledge on electrical Engineering materials is essential.

B. Objectives:

1. To clarify the students on insulating, conducting & magnetic materials.
2. To impart knowledge on the Physical, Electrical & Mechanical properties
3. To impart knowledge on practical uses of various materials in different areas.

C.TOPIC WISE DISTRIBUTION OF PERIODS

Sl No.	Topic	Periods
1.	Conducting materials	16
2.	Semiconducting materials	10
3.	Insulating materials	09
4.	Dielectric materials	08
5.	Magnetic materials	08
6.	Material for special purposes	09
	Total:	**60**

D. COURSE CONTENT:

1. **Conducting Materials:**
   - 1.1 Introduction
   - 1.2 Resistivity, factors affecting resistivity
   - 1.3 Classification of conducting materials into low-resistivity and high resistivity materials
   - 1.4 Low Resistivity Materials and their Applications. (Copper, Silver, Gold, Aluminum, Steel)

1.5 Stranded conductors
1.6 Bundled conductors
1.7 Low resistivity copper alloys
1.8 High Resistivity Materials and their Applications(Tungsten, Carbon, Platinum, Mercury)
1.9 Superconductivity
1. 10 Superconducting materials
1. 11 Application of superconductor materials

2. **Semiconducting Materials:**

2 . 1 Introduction
2 . 2 Semiconductors
2 . 3 Electron Energy and Energy Band Theory
2 . 4 Excitation of Atoms
2 . 5 Insulators, Semiconductors and Conductors
2 . 6 Semiconductor Materials
2 . 7 Covalent Bonds
2 . 8 Intrinsic Semiconductors
2 . 9 Extrinsic Semiconductors
2 . 10 N-Type Materials
2 . 11 P-Type Materials
2 . 12 Minority and Majority Carriers
2 . 13 Semi-Conductor Materials
2 . 14 Applications of Semiconductor materials
2.14.1 Rectifiers
2.14.2 Temperature-sensitive resisters or thermistors
2.14.3 Photoconductive cells
2.14.4 Photovoltaic cells
2.14.5 Varisters
2.14.6 Transistors
2.14.7 Hall effect generators
2.14.8 Solar power

3. **Insulating Materials:**

3 . 1 Introduction
3 . 2 General properties of Insulating Materials
3.2.1 Electrical properties
3.2.2 Visual properties
3.2.3 Mechanical properties
3.2.4 Thermal properties
3.2.5 Chemical properties
3.2.6 Ageing
3.3 Insulating Materials – Classification, properties, applications
3.3.1 Introduction
3.3.2 Classification of insulating materials on the basis physical and

chemical structure

3.4 Insulating Gases

3.4.1 Introduction.

3.4.2 Commonly used insulating gases

4. **Dielectric Materials:**

4.1 Introduction

4.2 Dielectric Constant of Permittivity

4.3 Polarization

4.4 Dielectric Loss

4.5 Electric Conductivity of Dielectrics and their Break Down

4.6 Properties of Dielectrics.

4.7 Applications of Dielectrics.

5. **Magnetic Materials:**

5.1 Introduction

5.2 Classification

5.2.1 Diamagnetism

5.2.2 Para magnetism

5.2.3 Ferromagnetism

5.3 Magnetization Curve

5.4 Hysteresis

5.5 Eddy Currents

5.6 Curie Point

5.7 Magneto-striction

5.8 Soft and Hard magnetic Materials

5.8.1 Soft magnetic materials

5.8.2 Hard magnetic materials

6. **Materials for Special Purposes**

6.1 Introduction

6.2 Structural Materials

6.3 Protective Materials

6.3.1 Lead

6.3.2 Steel tapes, wires and strips

6.4 Other Materials

6.4.1 Thermocouple materials

6.4.2 Bimetals

6.4.3 Soldering Materials

6.4.4 Fuse and Fuse materials.

6.4.5 Dehydrating material.

Syllabus coverage up to Internal assessment

Chapters: 1, 2 and 3.

Learning Resources:			
Sl.No	Title of the Book	Name of Authors	Name of Publisher
1	Electrical Engineering Material & Electronic components	K.B.Raina, S.K. Bhattacharya, T. Joneja	S. K. Kataria & Sons
2	An Introduction to Electrical Engineering Materials	C.S.Indulkar, S.Thiruvengadam	S. Chand
3	Electrical Engineering Materials	R.K.Shukla, Archana Singh	Mc Graw Hill

Th5. ENVIRONMENTAL STUDIES

(Common to all Branches)

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	3rd
Total Period:	60	Examination :	3 hrs
Theory periods:	4P / week	Internal Assessment:	20
Maximum marks:	100	End Semester Examination ::	80

A. RATIONALE:

Due to various aspects of human developments including the demand of different kinds of technological innovations, most people have been forgetting that, the Environment in which they are living is to be maintained under various living standards for the preservation of better health. The degradation of environment due to industrial growth is very much alarming due to environmental pollution beyond permissible limits in respect of air, water industrial waste, noise etc. Therefore, the subject of Environmental Studies to be learnt by every student in order to take care of the environmental aspect in each and every activity in the best possible manner.

B. OBJECTIVE:

After completion of study of environmental studies, the student will be able to:

1. Gather adequate knowledge of different pollutants, their sources and shall be aware of solid waste management systems and hazardous waste and their effects.
2. Develop awareness towards preservation of environment.

C. Topic wise distribution of periods:

Sl. No.	Topics	Period
1	The Multidisciplinary nature of environmental studies	04
2	Natural Resources	10
3	Systems	08
4	Biodiversity and it's Conservation	08
5	Environmental Pollution	12
6	Social issues and the Environment	10
7	Human population and the environment	08
	Total:	**60**

D. COURSE CONTENTS

1. The Multidisciplinary nature of environmental studies:

1.1 Definition, scope and importance.

1.2 Need for public awareness.

2. Natural Resources:

Renewable and non renewable resources:

2.1 Natural resources and associated problems.

2.1.1. Forest resources: Use and over-exploitation, deforestation, case studies, Timber extraction mining, dams and their effects on forests and tribal people.

2.1.2. Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dam's benefits and problems.

2.1.3. Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources.

2.1.4. Food Resources: World food problems, changes caused by agriculture and over grazing, effects of modern agriculture, fertilizers- pesticides problems, water logging, salinity, .

2.1.5. Energy Resources: Growing energy need, renewable and non-renewable energy sources, use of alternate energy sources, case studies.

2.1.6. Land Resources: Land as a resource, land degradation, man induces landslides, soil erosion, and desertification.

2.2 Role of individual in conservation of natural resources.

2.3 Equitable use of resources for sustainable life styles.

3. **Systems:**

3.1. Concept of an eco system.

3.2. Structure and function of an eco system.

3.3. Producers, consumers, decomposers.

3.4. Energy flow in the eco systems.

3.5. Ecological succession.

3.6. Food chains, food webs and ecological pyramids.

3.7. Introduction, types, characteristic features, structure and function of the following eco system:

3.8. Forest ecosystem:

3.9. Aquatic eco systems (ponds, streams, lakes, rivers, oceans,

estuaries).

4. **Biodiversity and it's Conservation:**

4.1. Introduction-Definition: genetics, species and ecosystem diversity.
4.2. Biogeographically classification of India.
4.3. Value of biodiversity: consumptive use, productive use, social ethical, aesthetic and optin values.
4.4. Biodiversity at global, national and local level.
4.5. Threats to biodiversity: Habitats loss, poaching of wild life, man wildlife conflicts.

5. **Environmental Pollution:**

5.1. Definition Causes, effects and control measures of:

5.1.1 Air pollution.
5.1.2 Water pollution.
5.1.3 Soil pollution
5.1.4 Marine pollution
5.1.5 Noise pollution.
5.1.6 Thermal pollution
5.1.7 Nuclear hazards.

5.2. Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
5.3. Role of an individual in prevention of pollution.
5.4. Disaster management: Floods, earth quake, cyclone and landslides.

6. **Social issues and the Environment:**

6.1. Form unsustainable to sustainable development.
6.2. Urban problems related to energy.
6.3. Water conservation, rain water harvesting, water shed management.
6.4. Resettlement and rehabilitation of people; its problems and concern.
6.5. Environmental ethics: issue and possible solutions.
6.6. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies.
6.7. Air (prevention and control of pollution) Act.
6.8. Water (prevention and control of pollution) Act.
6.9. Public awareness.

7. **Human population and the environment:**

7.1. Population growth and variation among nations.
7.2. Population explosion- family welfare program.
7.3. Environment and humanhealth.
7.4. Human rights.
7.5. Value education

7.6. Role of information technology in environment and human health.

Syllabus coverage up to Internal assessment

Chapters: 1, 2 and 3.

Learning Resources:			
Sl.No	**Title of the Book**	**Name of Authors**	**Name of Publisher**
1.	Textbook of Environmental studies	Erach Bharucha	#UGC
2.	Fundamental concepts in Environmental Studies	D.D. Mishra	S.Chand & Co-Ltd
3.	Text book of Environmental Studies	K.Raghavan Nambiar	SCITECH Publication Pvt. Ltd.
4.	Environmental Engineering	V.M.Domkundwar	Dhanpat Rai & Co

Pr1. MECHANICAL ENGINEERING LABORATORY

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	3rd
Total Period:	45	Examination :	3 hrs
Lab. periods:	3 P / week	Sessional:	25
Maximum marks:	75	End Semester Examination ::	50

1. APPLIED MECHANICS & MATERIAL TESTING

1.1 Determination of M.A.,V.R. and efficiency of Screw Jack

1.2 Determination of friction co-efficient of bearing

1.3 Determination of Young's modulus by Searle's Apparatus

1.4 Determination of M.A.,V.R. and efficiency of wheel train

1.5 Determination of Bending stress in beam using strain gauge

1.6 Study of Universal Testing Machine and determination of tensile stress and Young's module of M.S specification.

2. HYDRAULICS & HYDRAULIC MACHINE LAB

2.1 Study of pressure measuring devices such as (a) Piezo-meter (b) Simple manometer

2.2 Study of venturi-meter

2.3 Verification of Bernouli's Theorem

2.4 Model study of Centrifugal pumps, Francis, Turbine, Kaplan turbine and Pelton wheel.

3. HEAT ENGINE LAB

3.1 Study of Cochran Boiler

3.2 Study and demonstration of Stream Engine

3.3 Study and demonstration of Diesel Engine

3.4 Study and demonstration of Petrol Engine

Pr2. CIRCUIT AND SIMULATION LAB

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	3rd
Total Period:	90	Examination :	3hrs
Lab. periods:	6 P / week	Sessional:	50
Maximum marks:	100	End Semester Examination ::	50

A. Rationale:

The response of Electrical Circuit can be verified practically by applying different theorems and fundamental techniques. The students will become sure that the theoretical tricks which they have learned from books are true. The students will become competent in the field of circuit analysis

B. Objective:

On completion of the lab course the student will be able to:

1. Verify the theorems using different components.
2. Know the various types of filters.
3. Simulate different circuits using P-Spice/MATLAB software.

C. Course content in terms of specific objectives:

1. Measurement of equivalent resistance in series and parallel circuit
2. Measurement of power and power factor using series R-L-C Load.
3. Verification of KCL and KVL.
4. Verification of Super position theorem
5. Verification of Thevenin's Theorem
6. Verification of Norton's Theorem
7. Verification of Maximum power transfer Theorem
8. Determine resonant frequency of series R-L-C circuit.
9. Study of Low pass filter & determination of cut-off frequency
10. Study of High pass filter & determination of cut-off frequency
11. Analyze the charging and discharging of an R-C & R-L circuit with oscilloscope and Compute the time constant from the tabulated data and determine the rise time graphically.
12. Construct the following circuits using P-Spice/MATLAB software and compare the measurements and waveforms.
    i. Superposition theorem
    ii. Series Resonant Circuit
    iii. Transient Response in R-L-C series circuit

Note: P-Spice/MATLAB software might be loaded in 10 systems.

Pr3. MECHANICAL WORKSHOP PRACTICE

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	3rd
Total Period:	90	Examination:	3 hrs
Lab. periods:	6 P / week	Sessional:	25
Maximum marks:	75	End Semester Examination ::	50

1. Carpentry:

1.1 Name of carpentry tools and uses

1.2 Different operations

a. Sawing
b. Planning
c. Chiseling

1.3 Measuring & Marking

1.4 Different types of timbers used by carpenters, substitutions of timbers.

1.5 Jobs :

a. Slot. Notch
b. Mortise and tenon joint
c. Single dovetail joint

2. Turning

Study of S. C. Lathes and their accessories, practice in lathe work involving various operations such as plane turning, step turning, tapper turning, knuckling and external V. Threading. (One job only.)

List of Equipments for a batch size thirty (Electrical Laboratory)

Sl. No.	Equipment	Quantity
1	DC SHUNT MOTOR coupled with a DC SHUNT GENERATOR (MG SET)	
2	DC SERIES MOTOR	
3	DC SHUNT MOTOR	
4	DC COMPOUND MOTOR	
5	1- PHASE TRANSFORMER	
6	MULTIMETER	
7	MEGGER	
8	VOLTMETER [MI type 0-30, 0-300, 0-150-300-600 V], [MC type 0-50, 0-100, 0-150, 0-300, 0-600, 0-75-150 V]	
9	AMMETER [MI type 0-100mA, 0-2.5, 0-5, 0-5-10A] [MC type 0-100ma, 0-500 ma,0-1, 0-2.5, 0-3, 0-5A]	
10	WATTMETER [LPF-150W, 300W, 600W], [UPF 700W, 1400W]	
11	TACHOMETER [ANALOG & DIGITAL 0-10,000 rpm]	
12	P.F METER [5A,250V,0.5P.F]	
13	VARIABLE RESISTANCE (50Ω,5Amp)	
14	VARIABLE RESISTANCE (100Ω,5Amp)	
15	VARIABLE RESISTANCE (150Ω,5Amp)	
17	VARIABLE RESISTANCE (600Ω,1.2 Amp)	
18	VARIABLE RESISTANCE (20Ω,5Amp)	
19	RESISTIVE LOAD BOX (1.2KW)	
20	LAMP LOAD BOX (1.2 KW)	
21	STARTER (3 point)	
22	STARTER (4 point)	
23	BALL PIN HAMMER	
24	MALLET HAMMER	
25	COMBINATION PLIER	
26	NOSE PLIER	
27	WIRE GAUGE	
28	WIRE STRIPPER	
29	NEON TESTER(240V)	
30	MEASURINGTAPE(30M)	
31	SCREW DRIVER(10 INCH)	
32	SCREW DRIVER(5 INCH)	
33	ELECTRICIAN KNIFE	
34	WIRE CUTTER	
35	PVC TAPE	
36	Fuse(240v,5 amp)	
37	Fuse(240v,15 amp)	
38	One way switch(240v,5Amp)	
39	One way switch(240v,15Amp)	
40	Combination plier	
41	Nose plier	

42	Wire gauge	
43	Wire stripper	
44	Incandsecent lamp(180w,230v)	
45	Flourescent tube(40w,230v)	
46	Choke(230v)	
47	Starter	
48	Tubelight stand	
49	Lamp holder	
50	Sodium vapour lamp set	
51	Mercury vapour lamp	
52	Icdp switch(230v,5 amp)	
53	Ictp switch(400v,15 amp)	
54	Pcv board(2×2)	
55	Pcv board(2×4)	
56	Pcv board(4×6)	
57	Pcv board(6×6)	
58	Pcv board(4×10)	
59	Pcv board(6×8)	
60	Junction box	
61	PVC CONDUIT PIPE(20m)	
62	BATTENT(1.5 inch,10 m)	
63	CASING CAPPING(20m)	
64	5Pin Socket(230v,5Amp)	
65	5Pin Socket(230v,15Amp)	
66	Extention Chord(30m)	
67	FAN REGULATOR	
68	BEARING PULLER	
69	CAPACITOR(2.5μf,230V)	
70	CAPACITOR(3μf,230V)	
71	CEILING FAN	
72	PEDESTAL FAN	
73	BATTERY CHARGER [0-12-24 V]	
74	BANDPASS FILTER	
75	LOW PASS FILTER	
76	HIGH PASS FILTER	
77	BAND ELIMINATION FILTER	
78	CONSTANT K TYPE BANDPASS FILTER	
79	CRO	
80	FUNCTION GENERATOR	
81	NETWORK THEOREM KIT	
82	PARALLEL RESONANCE TRAINER KIT	
83	RC CIRCUIT AND TIME CONSTANT KIT	
84	SERIES RESONANCE TRAINER KIT	

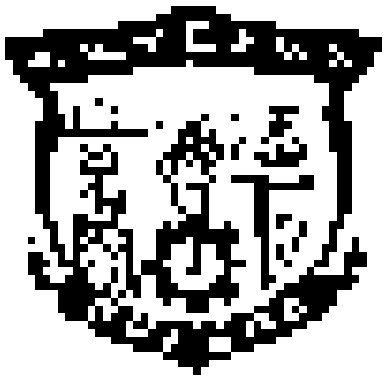
STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA									
TEACHING AND EVALUATION SCHEME FOR 4th Semester (Electrical)(wef 2019-20)									
Subject Number	Subject Code	Subject	Periods/week			Evaluation Scheme			
			L	T	P	Internal Assessment/ Sessional	End Sem Exams	Exams (Hours)	Total
		Theory							
Th.1		Energy Conversion-I	4	1	-	20	80	3	100
Th.2		Analog Electronics & OP-Amp	4		-	20	80	3	100
Th.3		Electrical Measurement & Instrumentation	4	1	-	20	80	3	100
Th.4		Generation, Transmission and Distribution	4			20	80	3	100
		Total	*16*	*02*		*80*	*320*	-	*400*
		Practical							
Pr.1		Electrical Machine Lab-I	-	-	6	25	50	3	75
Pr.2		Analog Electronics Lab	-	-	3	25	50	3	75
Pr.3		Simulation Practice on MATLAB	-	-	3	25	50	3	75
Pr.4		Electrical Drawing			6	25	100	3	125
		Student Centered Activities(SCA)		-	3				
		Total	-	-	*21*	*100*	*250*	-	*350*
		Grand Total	**16**	**02**	**21**	**180**	**520**	**-**	**750**
Abbreviations: L-Lecturer, T-Tutorial, P-Practical . Each class is of minimum 55 minutes duration									
Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50% and in Aggregate is 40%									
SCA shall comprise of Extension Lectures/ Personality Development/ Environmental issues /Quiz /Hobbies/ Field visits/ cultural activities/Library studies/Classes on MOOCS/SWAYAM etc. ,Seminar and SCA shall be conducted in a section.									
There shall be 1 Internal Assessment done for each of the Theory Subject. Sessional Marks shall be total of the performance of individual different jobs/ experiments in a subject throughout the semester									

CURRICULLUM OF 4TH SEMESTER

For

DIPLOMA IN ENGINEERING

(Effective FROM 2019-20 Sessions)



STATE COUNCIL FOR TECHNICAL EDUCATION & VOCATIONAL TRAINING,

ODISHA, BHUBANESWAR

Th1. ENERGY CONVERSION – I

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	4th
Total Period:	75 (60L + 15T)	Examination	3 hrs
Theory periods:	4P / week	Internal Assessment :	20
Tutorial:	1 P / week		
Maximum marks:	100	End Semester examination:	80

A. RATIONALE

Energy Conversion-I deals with DC machines and transformers. The application of DC generators and motors in modern industries are still in practice. The electrical technicians have to look after the installation, operation, maintenance and control of such machine. So the knowledge of these machines is felt essential. Transformers of various voltage ratios and KVA ratings are in wide use in industries as well as in distribution and transmission.

B. OBJECTIVES

After completion of this subject the student will be able to:

1. To acquire knowledge of construction, characteristic and control of the DC machines.
2. To acquire knowledge on performance of DC machines and transformers.
3. To acquire knowledge of testing and maintenance of transformers and DC machines.

C. TOPIC WISE DISTRIBUTION OF PERIODS		
Sl. No.	**Topic**	**Periods**
1.	DC GENERATORS	17
2.	DC MOTORS	15
3.	SINGLE PHASE TRANSFORMER	20
4.	AUTO TRANSFORMER	03
5.	INSTRUMENT TRANSFORMERS	05
TOTAL		60

D. COURSE CONTENT IN TERMS OF SPECIFIC OBJECTIVES

1. D.C GENERATOR

1.1. Operating principle of generator
1.2. Constructional features of DC machine.
  1.2.1. Yoke, Pole & field winding, Armature, Commutator.
  1.2.2. Armature winding, back pitch, Front pitch, Resultant pitch and commutator- pitch.
  1.2.3. Simple Lap and wave winding, Dummy coils.
1.3. Different types of D.C. machines (Shunt, Series and Compound)
1.4. Derivation of EMF equation of DC generators. (Solve problems)
1.5. Losses and efficiency of DC generator. Condition for maximum efficiency and numerical problems.

1.6. Armature reaction in D.C. machine
1.7. Commutation and methods of improving commutation.
1.7.1. Role of inter poles and compensating winding in commutation.
1.8. Characteristics of D.C. Generators
1.9. Application of different types of D.C. Generators.
1.10. Concept of critical resistance and critical speed of DC shunt generator
1.11. Conditions of Build-up of emf of DC generator.
1.12. Parallel operation of D.C. Generators.
1.13. Uses of D.C generators.

2. D. C. MOTORS

2.1. Basic working principle of DC motor
2.2. Significance of back emf in D.C. Motor.
2.3. Voltage equation of D.C. Motor and condition for maximum power output(simple problems)
2.4. Derive torque equation (solve problems)
2.5. Characteristics of shunt, series and compound motors and their application.
2.6. Starting method of shunt, series and compound motors.
2.7. Speed control of D.C shunt motors by Flux control method. Armature voltage Control method. Solve problems
2.8. Speed control of D.C. series motors by Field Flux control method, Tapped field method and series-parallel method
2.9. Determination of efficiency of D.C. Machine by Brake test method(solve numerical problems)
2.10. Determination of efficiency of D.C. Machine by Swinburne's Test method(solve numerical problems)
2.11. Losses, efficiency and power stages of D.C. motor(solve numerical problems)
2.12. Uses of D.C. motors

3. SINGLE PHASE TRANSFORMER

3.1 Working principle of transformer.
3.2 Constructional feature of Transformer.
3.2.1 Arrangement of core & winding in different types of transformer.
3.2.2 Brief ideas about transformer accessories such as conservator, tank, breather, and explosion vent etc.
3.2.3 Explain types of cooling methods
3.3 State the procedures for Care and maintenance.
3.4 EMF equation of transformer.
3.5 Ideal transformer voltage transformation ratio
3.6 Operation of Transformer at no load, on load with phasor diagrams.
3.7 Equivalent Resistance, Leakage Reactance and Impedance of transformer.
3.8 To draw phasor diagram of transformer on load, with winding Resistance and Magnetic leakage with using upf, leading pf and lagging pf load.
3.9 To explain Equivalent circuit and solve numerical problems.
3.10 Approximate & exact voltage drop calculation of a Transformer.
3.11 Regulation of transformer.
3.12 Different types of losses in a Transformer. Explain Open circuit and Short Circuit test.(Solve numerical problems)
3.13 Explain Efficiency, efficiency at different loads and power factors, condition for maximum efficiency (solve problems)
3.14 Explain All Day Efficiency (solve problems)
3.15 Determination of load corresponding to Maximum efficiency.
3.16 Parallel operation of single phase transformer.

4. AUTO TRANSFORMER

4.1. Constructional features of Auto transformer.
4.2. Working principle of single phase Auto Transformer.
4.3. Comparison of Auto transformer with an two winding transformer (saving of Copper).
4.4. Uses of Auto transformer.
4.5. Explain Tap changer with transformer (on load and off load condition)

5. INSTRUMENT TRANSFORMERS

1.1 Explain Current Transformer and Potential Transformer

1.2 Define Ratio error, Phase angle error, Burden.

1.3 Uses of C.T. and P.T.

Syllabus coverage up to Internal assessment

Chapters: 1 and 2.

Learning Resources:			
Sl.No	***Title of the Book***	***Name of Author***	***Publisher***
1	*Electrical Technology – II*	*B. L. Thareja and A. K. Thareja*	*S.Chand*
2	*A Textbook of Electrical Machines*	*K R Siddhapura, D B Raval*	*Vikas*
3.	*Electrical Technology*	*J. B. Gupta*	*S.K.Kataria and Sons*
4.	*Electric Machine*	*Ashfaq Husain*	*Dhanpat Rai and Sons*
5.	*Electrical Machine*	*S. K. Bhattarcharya*	*TMH*
6.	*Electrical Machines*	*D P Kothari, I J Nagrath*	*Mc Graw Hill*
7	*Electrical Machines*	*Prithwiraj purakait and Indrayudh Bandyopadhyay*	*OXFORD*

Th2. Analog Electronics and OP-AMP

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	4th
Total Period:	60	Examination	3 hrs
Theory periods:	4P/week	Internal Assessment :	20
Maximum marks:	100	End Semester Examination:	80

A. Rationale:

Electrical Engineers use electronic devices and circuits in various fields. The modern electrical plants need help of solid state electronic circuits for control, starting etc. So it was felt to provide a subject having electronic devices and circuits for the electrical students. Study of practical circuits and components have been dealt here with in the theoretical approach.

B. Objectives:

1. To develop knowledge on the characteristics of different types of diodes, transistors, UJT, FET and to draw a comparison in their characteristics and application.
2. To develop knowledge of their application.
3. To develop knowledge of different oscillator circuits and to identify the difference between them and their frequency relation.
4. To develop knowledge of operational amplifiers and their application in the field.

C. TOPIC WISE DISTRIBUTION OF PERIODS

Sl No.	Name of the Topic	Periods
1	P-N JUNCTION DIODE	6
2	SPECIAL SEMICONDUCTOR DEVICES	5
3	RECTIFIER CIRCUITS & FILTERS	7
4	TRANSISTORS	7
5	TRANSISTOR CIRCUITS	7
6	TRANSISTOR AMPLIFIERS & OSCILLATORS	13
7	FIELD EFFECT TRANSISTOR	6
8	OPERATIONAL AMPLIFIERS	9
	Total	**60**

D. Course Content:

1. P-N JUNCTION DIODE:
   - 1.1 P-N Junction Diode
   - 1.2 Working of Diode
   - 1.3 V-I characteristic of PN junction Diode.
   - 1.4 DC load line
   - 1.5 Important terms such as Ideal Diode, Knee voltage
   - 1.6 Junctions break down.
     - 1.6.1 Zener breakdown
     - 1.6.2 Avalanche breakdown
   - 1.7 P-N Diode clipping Circuit.
   - 1.8 P-N Diode clamping Circuit

2. **SPECIAL SEMICONDUCTOR DEVICES:**

2 . 1 Thermistors, Sensors & barretters
2 . 2 Zener Diode
2 . 3 Tunnel Diode
2 . 4 PIN Diode

3. **RECTIFIER CIRCUITS & FILTERS:**

3.1 Classification of rectifiers
3.2 Analysis of half wave, full wave centre tapped and Bridge rectifiers and calculate:
- 3.2.1 DC output current and voltage
- 3.2.2 RMS output current and voltage
- 3.2.3 Rectifier efficiency
- 3.2.4 Ripple factor
- 3.2.5 Regulation
- 3.2.6 Transformer utilization factor
- 3.2.7 Peak inverse voltage

3.3 Filters:
- 3.3.1 Shunt capacitor filter
- 3.3.2 Choke input filter
- 3.3.3 π filter

4. **TRANSISTORS:**

4.1 Principle of Bipolar junction transistor
4.2 Different modes of operation of transistor
4.3 Current components in a transistor
4.4 Transistor as an amplifier
4.5 Transistor circuit configuration & its characteristics
- 4.5.1 CB Configuration
- 4.5.2 CE Configuration
- 4.5.3 CC Configuration

5. **TRANSISTOR CIRCUITS:**

5.1 Transistor biasing
5.2 Stabilization
5.3 Stability factor
5.4 Different method of Transistors Biasing
- 5.4.1 Base resistor method
- 5.4.2 Collector to base bias
- 5.4.3 Self bias or voltage divider method

6. **TRANSISTOR AMPLIFIERS & OSCILLATORS:**

6.1 Practical circuit of transistor amplifier
6.2 DC load line and DC equivalent circuit
6.3 AC load line and AC equivalent circuit
6.4 Calculation of gain
6.5 Phase reversal
6.6 H-parameters of transistors

6.7 Simplified H-parameters of transistors

6.8 Generalised approximate model
6.9 Analysis of CB, CE, CC amplifier using generalised approximate model
6.10 Multi stage transistor amplifier
6.10.1 R.C. coupled amplifier
6.10.2 Transformer coupled amplifier
6.11 Feed back in amplifier
6.11.1 General theory of feed back
6.11.2 Negative feedback circuit
6.11.3 Advantage of negative feed back
6.12 Power amplifier and its classification
6.12.1 Difference between voltage amplifier and power amplifier
6.12.2 Transformer coupled class A power amplifier
6.12.3 Class A push – pull amplifier
6.12.4 Class B push – pull amplifier
6.13 Oscillators
6.13.1 Types of oscillators
6.13.2 Essentials of transistor oscillator
6.13.3 Principle of operation of tuned collector, Hartley, colpitt, phase shift, wein-bridge oscillator (no mathematical derivations)

7. **FIELD EFFECT TRANSISTOR:**

7.1 Classification of FET
7.2 Advantages of FET over BJT
7.3 Principle of operation of BJT
7.4 FET parameters (no mathematical derivation)
7.4.1 DC drain resistance
7.4.2 AC drain resistance
7.4.3 Trans-conductance
7.5 Biasing of FET

8. **OPERATIONAL AMPLIFIERS:**

8.1 General circuit simple of OP-AMP and IC – CA – 741 OP AMP
8.2 Operational amplifier stages
8.3 Equivalent circuit of operational amplifier
8.4 Open loop OP-AMP configuration
8.5 OPAMP with fed back
8.6 Inverting OP-AMP
8.7 Non inverting OP-AMP
8.8 Voltage follower & buffer
8.9 Differential amplifier
8.9.1 Adder or summing amplifier
8.9.2 Sub tractor
8.9.3 Integrator
8.9.4 Differentiator

8.9.5 Comparator

Syllabus coverage up to Internal assessment

Chapters: 1, 2, 3, 4 and 5.

Learning Resources:			
Sl.No	**Name of Authors**	**Title of the Book**	**Name of the publisher**
1	Sanjeev Gupta	Electronic Devices and Circuits	Dhanpat Rai Publications
2	R.S SEDHA	Electronics circuit	S.CHAND

Th3. ELECTRICAL MEASUREMENT & INSTRUMENTATION

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	4th
Total Period:	75 (60L + 15T)	Examination	3 hrs
Theory periods:	4P / week	Internal Assessment :	20
Tutorial:	1 P / week		
Maximum marks:	100	End Semester Examination:	80

A. RATIONALE :

The subjects deal with the methods of measuring voltage, current, power, energy, frequency, power factor & line parameters, and principle of operation of the instruments used for such measurements. Also it provides the methods to extend the range of low range instruments to measure higher values. A power measurement includes measurement of DC power, AC single phase power and AC three phase power. Also accuracy, precision, resolution and errors and their correction are very important and have been fully discussed. Since the whole system is a combination of analog and digital system in Industry, the topics of both the system have been studied along with the topics of sensors, their characteristics and their interfacing with analog and digital system under this subject.

B. OBJECTIVES :

1. To acquire the knowledge of selecting various types of instruments for similar purpose like measurement of voltage, current, power factor, frequency etc.
2. To learn the connection of different types of electrical measuring instruments.
3. To learn the adjustment of different instruments.
4. To understand the working principle and construction of the electrical instruments.
5. To solve different numerical problems associated with the instruments based on their design Formula.
6. To acquire knowledge of the construction, characteristics and methods of usage of sensors and transducers.

C. **TOPIC WISE DISTRIBUTION OF PERIODS**

Sl. No.	Topic	Periods
1.	Measuring instruments	05
2.	Analog ammeters and voltmeters	10
3.	Wattmeter and measurement of power	08
4.	Energy meters and measurement of energy	08
5.	Measurement of speed, frequency and power factor	07
6.	Measurement of Resistance, Inductance& Capacitance	08
7.	Sensors And Transducer	09
8.	Oscilloscope	05
	TOTAL	**60**

D. COURSE CONTENT IN TERMS OF SPECIFIC OBJECTIVES

1. MEASURING INSTRUMENTS

1.1 Define Accuracy, precision, Errors, Resolutions Sensitivity and tolerance.

1.2 Classification of measuring instruments.

1.3 Explain Deflecting, controlling and damping arrangements in indicating type of

instruments.

1.4 Calibration of instruments.

2. ANALOG AMMETERS AND VOLTMETERS

2.1. Describe Construction, principle of operation, errors, ranges merits and demerits of:

2.1.1 Moving iron type instruments.

2.1.2 Permanent Magnet Moving coil type instruments.

2.1.3 Dynamometer type instruments

2.1.4 Rectifier type instruments

2.1.5 Induction type instruments

2.2 Extend the range of instruments by use of shunts and Multipliers.

2.3 Solve Numerical

3. WATTMETERS AND MEASUREMENT OF POWER

3.1 Describe Construction, principle of working of Dynamometer type wattmeter. (LPF and UPF type)

3.2 The Errors in Dynamometer type wattmeter and methods of their correction.

3.3 Discuss Induction type watt meters.

4. ENERGYMETERS AND MEASUREMENT OF ENERGY

4.1 Introduction

4.2 Single Phase Induction type Energy meters — construction, working principle and their compensation & adjustments.

4.3 Testing of Energy Meters.

5. MEASUREMENT OF SPEED, FREQUENCY AND POWER FACTOR

5.1 Tachometers, types and working principles

5.2 Principle of operation and construction of Mechanical and Electrical resonance Type frequency meters.

5.3 Principle of operation and working of Dynamometer type single phase and three phase power factor meters.

6. MEASUREMENT OF RESISTANCE, INDUCTANCE& CAPACITANCE

6.1 Classification of resistance

6.1..1. Measurement of low resistance by potentiometer method. .

6.1..2. Measurement of medium resistance by wheat Stone bridge method.

6.1..3. Measurement of high resistance by loss of charge method.

6.2 Construction, principle of operations of Megger & Earth tester for insulation resistance and earth resistance measurement respectively.

6.3 Construction and principles of Multimeter. (Analog and Digital)

6.4 Measurement of inductance by Maxewell's Bridge method.

6.5 Measurement of capacitance by Schering Bridge method

7. SENSORS AND TRANSDUCER

7.1. Define Transducer, sensing element or detector element and transduction elements.

7.2. Classify transducer. Give examples of various class of transducer.

7.3. Resistive transducer

7.3.1 Linear and angular motion potentiometer.

7.3.2 Thermistor and Resistance thermometers.

7.3.3 Wire Resistance Strain Gauges

7.4. Inductive Transducer

7.4.1 Principle of linear variable differential Transformer (LVDT)

7.4.2 Uses of LVDT.

7.5. Capacitive Transducer.

7.5.1 General principle of capacitive transducer.

7.5.2 Variable area capacitive transducer.

7.5.3 Change in distance between plate capacitive transducer.

7.6. Piezo electric Transducer and Hall Effect Transducer with their applications.

8. OSCILLOSCOPE

8.1. Principle of operation of Cathode Ray Tube.

8.2. Principle of operation of Oscilloscope (with help of block diagram).

8.3. Measurement of DC Voltage & current.

8.4. Measurement of AC Voltage, current, phase & frequency.

Syllabus coverage up to Internal assessment

Chapters: 1, 2, 3 and 4.

Learning Resources:			
Sl.No	**Title of the Book**	**Name of Author**	**Publisher**
1.	Electrical & Electronic Measurements and Instrumentation	R.K.Rajput	S.Chand
2.	Electric Measurement and Measuring instruments	A.K. Sawhney	Dhanpat Rai & Co
3.	Electrical and Electronics Measuring instruments and Measurement	J. B. Gupta	S K Kataria & Sons
4.	Electrical Measurement and Measuring instruments	E.W. Golding & H Widdis	Wheeler Publishing
5.	Industrial Instrumentation and Control	S K Singh	TMH Ltd.
6.	Electrical and Electronic Measurement and Instrumentation.	S K Bhattacharya	Vikas

Th4. GENERATION TRANSMISSION & DISTRIBUTION

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	4th
Total Period:	60	Examination	3 hrs
Theory periods:	4P / week	Internal Assessment :	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONALE :

Power system comprises generation, transmission and distribution. In this subject generation, transmission and distribution, types of generation schemes, transmission with transmission loss and efficiencies, different type of sub-stations, different type of distribution schemes, EHV AC and HV DC overhead transmission, underground cable transmission and economic aspects involved are dealt with. Further, types of tariff are briefly included to give brief and overall idea to the students.

B. OBJECTIVES :

After completion of this subject the student will be able to:

1. Different schemes of power generation with their block diagram.
2. Mechanical and electrical design of transmission lines and numerical problems.
3. Types of cables and their methods of laying and testing.
4. Different schemes of distribution with problem solving
5. Different types of sub-stations.
6. Economic aspects of power supply system with problem and type of tariff of electricity.

C. TOPIC WISE DISTRIBUTION OF PERIODS

Sl. No.	Topics	Periods
1.	Generation of electricity	07
2.	Transmission of electric power	05
3.	Over head line	07
4.	Performance of short & medium lines	07
5.	EHV transmission	07
6.	Distribution System	07
7.	Underground cable	06
8.	Economic Aspects	06
9.	Types of tariff	03
10.	Substation	05
	TOTAL	**60**

D. COURSE CONTENTS IN TERMS OF SPECIFIC OBJECTIVES.

1. GENERATION OF ELECTRICITY

1.1 Elementary idea on generation of electricity from Thermal, Hydel, Nuclear, Power station.

1.2 Introduction to Solar Power Plant (Photovoltaic cells).

1.3 Layout diagram of generating stations.

2. TRANSMISSION OF ELECTRIC POWER

2.1 Layout of transmission and distribution scheme.
2.2 Voltage Regulation & efficiency of transmission.
2.3 State and explain Kelvin's law for economical size of conductor.
2.4 Corona and corona loss on transmission lines.

3. OVER HEAD LINES

3.1 Types of supports, size and spacing of conductor.
3.2 Types of conductor materials.
3.3 State types of insulator and cross arms.
3.4 Sag in overhead line with support at same level and different level. (approximate formula effect of wind, ice and temperature on sag)
3.5 Simple problem on sag.

4. PERFORMANCE OF SHORT & MEDIUM LINES

4.1. Calculation of regulation and efficiency.

5. EHV TRANSMISSION

5.1 EHV AC transmission.
5.1. .1. Reasons for adoption of EHV AC transmission.
5.1. .2. Problems involved in EHV transmission.
5.2 HV DC transmission.
5.2. .1. Advantages and Limitations of HVDC transmission system.

6. DISTRIBUTION SYSTEMS

6.1 Introduction to Distribution System.
6.2 Connection Schemes of Distribution System: (Radial, Ring Main and Inter connected system)
6.3 DC distributions.
6.3.1 Distributor fed at one End.
6.3.2 Distributor fed at both the ends.
6.3.3 Ring distributors.
6.4 AC distribution system.
6.4.1. Method of solving AC distribution problem.
6.4.2. Three phase four wire star connected system arrangement.

7. UNDERGROUND CABLES

7.1 Cable insulation and classification of cables.
7.2 Types of L. T. & H.T. cables with constructional features.
7.3 Methods of cable lying.
7.4 Localization of cable faults: Murray and Varley loop test for short circuit fault / Earth fault.

8. ECONOMIC ASPECTS

8.1 Causes of low power factor and methods of improvement of power factor in

power system.

8.2 Factors affecting the economics of generation: (Define and explain)

8.2.1 Load curves.
8.2.2 Demand factor.
8.2.3 Maximum demand.
8.2.4 Load factor.
8.2.5 Diversity factor.
8.2.6 Plant capacity factor.

8.3 Peak load and Base load on power station.

9. TYPES OF TARIFF

9.1. Desirable characteristic of a tariff.

9.2. Explain flat rate, block rate, two part and maximum demand tariff. (Solve Problems)

10. SUBSTATION

10.1 Layout of LT, HT and EHT substation.
10.2 Earthing of Substation, transmission and distribution lines.

Syllabus coverage up to Internal assessment

Chapters: 1, 2, 3, 4 and 5.

Learning Resources:			
Sl.No	**Title of the Book**	**Name of Author**	**Publisher**
1.	Principles of Power System	V. K. Mehta	S Chand
2	A text book of Power System Engineering	A Chakrabarti, M L Soni, P V Gupta, U S Bhatnagar	Dhanpat Rai & Co
3.	A course of electrical power system	S. L. Uppal	Khanna publisher
4.	Power System Engineering	D. P. Kothari, IJ Nagrath	TMH

Pr1. ELECTRICAL MACHINE LAB-I

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	4th
Total Period:	90	Examination	3 hrs
Lab. periods:	6 P / week	Sessional	25
Maximum marks:	75	End Semester Examination:	50

A. RATIONALE: The sole objective of the subject is to be familiar with machines and different parts. To perform practice of the experiments and become fit to meet the challenges in practical implementation.
In the beginning the faculties have to illustrate all the tools and instruments required/ used in conducting the experiments.

B. OBJECTIVES:

After completion of this Laboratory the student will be able to:

1. To be familiar with constructional features, terminal testing, insulation testing of DC machines, and Transformers.
2. Know methods of Starting and Speed control of DC machines.
3. To determine efficiency, regulations of different machines.
4. To draw and study performance characteristics.
5. Load sharing of transformers.

C. LIST OF EXPERIMENTS:

1. Identification of different terminals of a DC machine by test lamp method and multi-meter method & to measure insulation resistance by megger.
2. Dimensional and material study of various parts of a DC machine.
3. Plot OCC of a DC shunt generator at constant speed and determine critical resistance from the graph.
4. Plot External Characteristics of a DC shunt generator at constant speed.
5. Study of Three point starter, connect and run a DC shunt motor & measure the no load current.
6. Study of Four point starter, connect and run a DC compound motor & measure no load current.
7. Control the speed of a DC shunt motor by field flux control method & armature voltage control method.
8. Determine the armature current vs. speed characteristic of a DC motor
9. Determine the efficiency of a DC machine by brake test method.
10. Identification of terminals, determination of voltage transformation ratio of a single phase transformer.
11. Perform OC Test and SC test of a single phase transformer.
12. Determine the voltage regulation of a single phase transformer at different loads.

13. Polarity test of single phase transformer and parallel operation of two single phase transformers.

Learning Resources:

Sl. No.	Title of the Book	Name of Author	Publisher
1.	Laboratory courses in Electrical Engineering	S G Tarnekar; P K Kharbanda; S D Naik et.al	S.Chand

Pr2. ANALOG ELECTRONICS LAB

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	4th
Total Period:	45	Examination	3 hrs
Lab. periods:	3 P / week	Sessional	25
Maximum marks:	75	End Semester Examination:	50

A. RATIONALE

In this practical work the students get knowledge about the Analog Systems components.They will become capable of developing and implementing Analog Circuit.

B. OBJECTIVE

On completion of the Lab. Course the student will be able to

1. Identify the active components
2. Understand the behavior character of basic semiconductor devices
3. Understand the concept of oscillator. Amplifier, Rectifier etc.

C. COURSE CONTENT IN TERMS OF SPECIFIC OBJECTIVES

1. Determine the input and output Characteristics of CE & CB transistor configuration
2. Determine Drain & Transfer Characteristics of JFET
3. Construct Bridge Rectifier using different filter circuit and to determine Ripple factor & analyze wave form with filter & without filter.
4. Construct Bridge Rectifier using different filter and to determine Ripple factor.
5. Construct & test the regulator using Zener diode
6. Construct different types of biasing circuit and analyze the wave form

   (i) Fixed bias (ii) Emitter bias (iii) Voltage divider bias
7. Study the single stage CE amplifier & find Gain
8. Study multi stage R-C coupled amplifier & to determine frequency- response & gain.
9. Construct & Find the gain

   (I) Class A. Amplifier (ii) Class B. Amplifier (iii) Class C Tuned Amplifier
10. Construct & test push pull amplifier & observer the wave form
11. Construct & calculate the frequency of

(i) Hartly Oscillator (ii) Collpit's Oscillator (iii) Wein Bridge Oscillator (iv) R-C phase shift oscillator and draw wave form & calculate the frequency

12. Construct & Test Differentiator and Integrator using R-C Circuit

13. Study Multivibrator (Astable, Bistable, Monstable) Circuit & Draw its Wave forms

- **Mini Project:** To collect data like base configuration. Operational Characteristics, applications and critical factor etc. On all semiconductor devices studied in theory and compile a Project report throughout and submit at the end of the semester. To assemble and test simple circuit using above components with test Points.(e.g. Series Regulator / Oscillators etc)

Learning Resources:

Sl. No.	Title of the Book	Name of Author	Publisher
1.	Basic electronic Lab. Manual :	Paul B. Zbar	S.Chand

Pr3. SIMULATION PRACTICE ON MATLAB

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	4th
Total Period:	45	Examination	3 hrs
Lab. periods:	3 P / week	Sessional	25
Maximum marks:	75	End Semester Examination:	50

A. RATIONALE:

Computer simulation is necessary for any hardware, before its fabrication. MATLAB software provides a unique platform for computer simulation. Practice on MATLAB has been opted for final semester students to be familiar with programming and simulation practice with SIMULINK to make them comfortable for designing various hardware projects and verify different experiments in absence of proto type experimental equipments.

B. OBJECTIVE:

1. To learn programming in MATLAB to perform mathematical manipulation.
2. To prepare virtual experiment setup for different electrical and power electronics experiments under MATLAB Simulink.

C. Topic wise distribution of periods:		
Sl. No.	**Topics**	**No of Periods**
1.	Introduction to MATLAB programming	20
2.	Introduction to SIMULINK	25
	Total	**45**

D. COURSE CONTENT (in terms of specific objective)

1. **Introduction to MATLAB programming:**

1.1. Functions and operation using variables and arrays.
  1.1.1. To learn algebraic, trigonometric and exponential manipulation.
  1.1.2. To learn Arithmetic, Relational and Logic operator.
1.2. Matrix formation and its manipulation.
1.3. Vector manipulation:
  1.3.1. Use of linspace to create vectors.
  1.3.2. To create, add and multiply vectors.
  1.3.3. Use of sin and sqrt functions with vector arguments.

1.4. Plotting:

1.4.1. Two dimensional Plots and sub plots

1.4.2. Label the plot and printing.

1.5. Write and execute a file to plot a circle, impulse, step, ramp, sine and cosine functions. .

2. **Introduction to SIMULINK:**

2.1. Use of Commonly used blocks, Math operation block and Display block from SIMULINK library.

2.2. Use of logical and relational operator block.

2.3. Use of Sim-Power system block to use Electrical sources, elements and Power electronics devices.

2.4. SIMULATION:

2.4.1. Verification of Network theorems.

2.4.2. Simulation of a half wave uncontrolled rectifier.

2.4.3. Simulation of 1-phase full bridge controlled rectifier.

2.4.4. Simulation of step-down chopper.

Learning Resources:			
Sl.No	**Title of the Book**	**Name of Authors**	**Name of Publisher**
1.	MATLAB and Simuilink for Engineers	Agam Kumar Tyagi	Oxford
2.	Getting started with MATLAB	Rudra Pratap	Oxford
3.	MATLAB Demystified	K K Sarma	Vikas

Pr4. ELECTRICAL DRAWING

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester:	4th
Total Period:	90	Examination:	3 hrs
Theory periods:	6 P/week	Term work:	25
Maximum marks:	125	End Semester Examination:	100

A. Rationale:

A technical person takes help of an engineering drawing to understand the constructional features of machines and accessories. Electrical drawing is introduced for the final year students to be familiar with Circuit diagrams of AC motors starters, Development of stator windings with conventional symbols.

Sketching as to BIS and REC specification and symbol of electrical earthing installations, SP and DP structures and substations of 132/33 kV and 33/11 kV type. This will enable them to follow engineering drawing in the working environment.

B. Objectives:

1. To draw wiring circuit diagram for different AC and DC motor starters.
2. To follow BIS and REC standard to draw earthing installation and SP and DP Structures and stay sets for line supports.
3. To use various symbols to draw the single line diagram of 33/11kV substations.

C. TOPIC WISE DISTRIBUTION OF PERIODS

Sl. No.	Topics	Periods
1.	Wiring Diagram of Starters	18
2.	Development of DC armature winding	18
3.	1 φ and 3 φ transformer	12
4.	Sketches of Earthing and LT and HT line	18
5.	Single line diagram sub station	09
6.	Auto CAD practice	15
	Total	**90**

D. COURSE CONTENT:

1. **WIRING DIAGRAM AND CONTROL CIRCUIT**
   - 1.1 3 point D. C. motor starter.
   - 1.2 4 point D.C. motor starter.
   - 1.3 DOL starter
   - 1.4 Star delta starter.
   - 1.5 Auto Transformer Starter.
   - 1.6 Rotor resistance starter.

2. **DRAW D.C. M/C PARTS** (Dimensional Drawing)
   - 2.1. Pole with pole shoes.
   - 2.2. Commutator
   - 2.3. Armature
   - 2.4. DC. armature winding
     - (a) Simple lap winding
     - (b) Simple wave winding.

3. **DRAW 1-PHASE & 3-PHASE TRANSFORMER** (Assembly Drawing)
   - 3.1 Stepped core type.
   - 3.2 Plane shell type.

5. **DRAW SKETCHES OF THE FOLLOWING AS PER B.I.S AND REC SPECIFICATIONS**
   - 5.1 Earthing installation.
   - 5.2 Double pole structure for LT and HT distribution lines.

6. **DRAW SINGLE LINE DIAGRAM OF SUBSTATION**
   - 6.1 Single line diagram of 33/11kV distribution substation.
   - 6.2 Single line diagram of a 11/0.4 kV distribution substation.

8. **COMPUTER AIDED ELECTRICAL DRAWING USING SOFT WARE**
   - 8.1 Draw Electrical symbols (take Print out)
   - 8.2 Draw D.C. m/c parts (take print out)
   - 8.3 Draw A. C. m/c parts (take print out)
   - 8.4 Draw electrical layout of diagram of Electrical Installation of a building.

Learning Resources:

Sl.No	***Title of the Book***	***Name of Authors***	***Name of the publisher***
1	*Electrical Design and Drawing*	*Surjit Singh*	*Dhanpat Rai & Sons*
2	*Electrical Engineering Drawing*	*C.R. Dargan*	*Asian Publication*

Equipment List

ANALOG ELECTRONICS LAB

Sl. No.	Equipment
1	Breadboard
2	Regulated Power Supply
3	Digital Multimeter
4	JFET Characteristics Trainer kit
5	Rectifier Trainer with Filter
6	Voltage Regulator Trainer Kit using Zener Diode
7	BJT Biasing Trainer (fixed Bias, Emitter Bias, Voltage Divider Bias, Collector Feedback Bias)
8	CE amplifier Trainer
9	RC couple Amplifier Trainer
10	CRO with Probes
11	Step Down Transformer
12	Zener Diode
13	Function Generator
14	Class A,Class B,Class C Tuned Amplifier Trainer
15	Oscillator Trainer kit(Heartly osicalltor,collpits oscillator. Wein Bridge Oscillator, RC Phase Shift Oscillator)
16	Transistor Configuration Trainer Kit
17	Push Pull Amplifier Trainer
18	OPamp Trainer Kit for Differentiation and Integration
19	Multivibrator Trainer Kit(Astable,Bistable,Monostable)

ELECTRICAL MACHINE LAB-I

Sl. No.	Equipment
1	DC SHUNT MOTOR coupled with a DC SHUNT GENERATOR (MG SET)
2	DC SERIES MOTOR
3	DC SHUNT MOTOR
4	DC COMPOUND MOTOR
5	1- PHASE TRANSFORMER
6	MULTIMETER
7	MEGGER
8	VOLTMETER
9	AMMETER
10	WATTMETER
11	TACHOMETER
12	P.F METER
13	VARIABLE RESISTANCE
14	RESISTIVE LOAD BOX
15	LAMP LOAD BOX
16	3 POINT STARTER
17	4 POINT STARTER
18	1PH VARIAC
19	SPRING WEIGHT
20	STAR DELTA STARTER
21	3PHASE INDUCTION MOTOR -SHUNT GENERATOR SET
22	DRUM CONTROL
23	INDUCTIVE LOAD(VARIABLE)
24	CAPACITIVE LOAD
25	2 POINT STARTER
26	OHM METRE

MATLAB S/W- Multiuser

STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA

TEACHING AND EVALUATION SCHEME FOR 5th Semester (Electrical)(wef 2020-21)

Subject Number	Subject Code	Subject	Periods/week			Evaluation Scheme			
			L	T	P	Internal Assessment/ Sessional	End Sem Exams	Exams (Hours)	Total
		Theory							
Th.1		Entrepreneurship and Management & Smart Technology	4		-	20	80	3	100
Th.2		Energy Conversion-II	4		-	20	80	3	100
Th.3		Digital Electronics & Microprocessor	5		-	20	80	3	100
Th.4		Utilization of Electrical Energy & Traction	4			20	80	3	100
Th.5		Power Electronics & PLC*	4			20	80	3	100
		Total	21			100	400	-	500
		Practical							
Pr.1		Electrical Machine Lab-II	-	-	6	25	50	3	75
Pr.2		Power Electronics & PLC Lab	-	-	3	25	50	3	75
Pr.3		Digital Electronics & Microprocessor Lab	-	-	3	25	50	3	75
Pr.4		Project Phase– I			3	25	-	-	25
		Student Centered Activities(SCA)		-	3	-	-	-	-
		Total	-	-	*18*	*100*	*150*	-	*250*
		Grand Total	**21**	**-**	**18**	**200**	**550**	**-**	**750**

Abbreviations: L-Lecturer, T-Tutorial, P-Practical. Each class is of minimum 55 minutes duration

Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50% and in Aggregate is 40%

SCA shall comprise of Extension Lectures/ Personality Development/ Environmental issues /Quiz /Hobbies/ Field visits/ cultural activities/Library studies/Classes on MOOCS/SWAYAM etc. Seminar and SCA shall be conducted in a section.

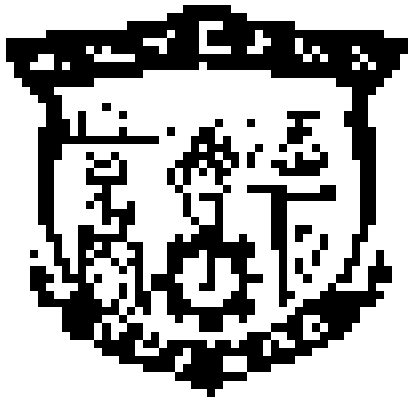
There shall be 1 Internal Assessment done for each of the Theory Subject. Sessional Marks shall be total of the performance of individual different jobs/ experiments in a subject throughout the semester

CURRICULLUM OF 5TH SEMESTER

For

DIPLOMA IN ELECTRICAL ENGINEERING

(Effective from 2020-21 Sessions)



STATE COUNCIL FOR TECHNICAL EDUCATION & VOCATIONAL TRAINING, ODISHA, BHUBANESWAR

Th1. ENTREPRENEURSHIP and MANAGEMENT & SMART TECHNOLOGY

(Common to All Branches)

Theory	**4 Periods per week**	**Internal Assessment**	**20 Marks**
Total Periods	**60 Periods**	**End Sem Exam**	**80 Marks**
Examination	**3hours**	**Total Marks**	**100Marks**

Topic Wise Distribution of Periods

Sl No.	Topic	Periods
1	Entrepreneurship	10
2	Market Survey and Opportunity Identification(Business Planning)	8
3	Project report Preparation	4
4	Management Principles	5
5	Functional Areas of Management	10
6	Leadership and Motivation	6
7	Work Culture, TQM & Safety	5
8	Legislation	6
9	Smart Technology	6
	TOTAL	60

RATIONALE

In the present day scenario, it has become imperative to impart entrepreneurship and management concepts to students, so that a significant percentage of them can be directed towards setting up and managing their own small enterprises. It may be further added that an entrepreneurial mind set with managerial skill helps the student in the job market. The students can also be introduced with Startup and Smart Technology concept, which shall radically change the working environment in the coming days in the face of Industry 4.0

In this subject, the Students shall be introduced/ exposed to different concepts and Terminologies in brief only, so that he/she can have broad idea about different concepts/items taught in this subject. Solving numerical problem on any topic/item is beyond the scope of this subject.

OBJECTIVES

After undergoing this course, the students will be able to :

- Know about Entrepreneurship, Types of Industries and Startups
- Know about various schemes of assistance by entrepreneurial support agencies
- Conduct market survey
- Prepare project report
- know the management Principles and functional areas of management
- Inculcate leadership qualities to motivate self and others.
- Maintain and be a part of healthy work culture in an organisation.
- Use modern concepts like TQM
- Know the General Safety Rules
- Know about IOT and its Application in SMART Environment.

DETAILED CONTENTS

1. **Entrepreneurship**
   - Concept /Meaning of Entrepreneurship
   - Need of Entrepreneurship
   - Characteristics, Qualities and Types of entrepreneur, Functions
   - Barriers in entrepreneurship
   - Entrepreneurs vrs. Manager
   - Forms of Business Ownership: Sole proprietorship, partnership forms and others
   - Types of Industries, Concept of Start-ups
   - Entrepreneurial support agencies at National, State, District Level(Sources): DIC, NSIC,OSIC, SIDBI, NABARD, Commercial Banks, KVIC etc.
   - Technology Business Incubators (TBI) and Science and Technology Entrepreneur Parks

2. **Market Survey and Opportunity Identification (Business Planning)**

   - Business Planning
   - SSI, Ancillary Units, Tiny Units, Service sector Units
   - Time schedule Plan, Agencies to be contacted for Project Implementation
   - Assessment of Demand and supply and Potential areas of Growth
   - Identifying Business Opportunity
   - Final Product selection

3. **Project report Preparation**

   - Preliminary project report
   - Detailed project report, Techno economic Feasibility
   - Project Viability

4. **Management Principles**
   - Definitions of management
   - Principles of management
   - Functions of management (planning, organising, staffing, directing and controlling etc.)
   - Level of Management in an Organisation

5. **Functional Areas of Management**
   a) Production management
      - Functions, Activities
      - Productivity
      - Quality control
      - Production Planning and control

   b) Inventory Management
      - Need for Inventory management
      - Models/Techniques of Inventory management

   c) Financial Management
      - Functions of Financial management
      - Management of Working capital
      - Costing (only concept)
      - Break even Analysis

- Brief idea about Accounting Terminologies: Book Keeping, Journal entry, Petty Cash book, P&L Accounts, Balance Sheets(only Concepts)

d) Marketing Management
- Concept of Marketing and Marketing Management
- Marketing Techniques (only concepts)
- Concept of 4P s (Price, Place, Product, Promotion)

e) Human Resource Management
- Functions of Personnel Management
- Manpower Planning, Recruitment, Sources of manpower, Selection process, Method of Testing, Methods of Training & Development, Payment of Wages

6. **Leadership and Motivation**

a) Leadership
- Definition and Need/Importance
- Qualities and functions of a leader
- Manager Vs Leader
- Style of Leadership (Autocratic, Democratic, Participative)

b) Motivation
- Definition and characteristics
- Importance of motivation
- Factors affecting motivation
- Theories of motivation (Maslow)
- Methods of Improving Motivation
- Importance of Communication in Business
- Types and Barriers of Communication

7. **Work Culture, TQM & Safety**

- Human relationship and Performance in Organization
- Relations with Peers, Superiors and Subordinates
- TQM concepts: Quality Policy, Quality Management, Quality system
- Accidents and Safety, Cause, preventive measures, General Safety Rules , Personal Protection Equipment(PPE)

8. **Legislation**

a) Intellectual Property Rights(IPR), Patents, Trademarks, Copyrights
b) Features of Factories Act 1948 with Amendment (only salient points)
c) Features of Payment of Wages Act 1936 (only salient points)

9. **Smart Technology**
- Concept of IOT, How IOT works
- Components of IOT, Characteristics of IOT, Categories of IOT
- Applications of IOT- Smart Cities, Smart Transportation, Smart Home, Smart Healthcare, Smart Industry, Smart Agriculture, Smart Energy Management etc.

Syllabus to be covered before IA: Chapter 1,2,3,4

RECOMMENDED BOOKS

1. Entrepreneurship Development and Management by R.K Singhal, Katson Books., New Delhi
2. Entrepreneurship Development and Management by U Saroj and V Mahendiratta, Abhishek Publications, Chandigarh
3. Entrepreneurship Development and Management by Vasant Desai, Himalaya Pub.House
4. Industrial Engineering and Management by O.P Khanna ,Dhanpat Rai and Sons
5. Industrial Engineering and Management by Banga and Sharma, Khanna Publications
6. Internet of Things by Jeeva Jose, Khanna Publications, New Delhi
7. Online Resource on Startups and other concepts
8. https://www.fundable.com/learn/resources/guides/startup

TH.2 ENERGY CONVERSION – II

Name of the Course: Diploma in Electrical Engineering			
Course code:	Th.2	Semester:	5th
Total Period:	60 Periods	Examination:	3 Hrs.
Theory periods:	4 P / Week	Internal Assessment:	20
Tutorial:	---	End Semester Examination:	80
Maximum marks:	100		

A. Rationale:

Modern industries are mostly equipped with AC machines. So the students are given a scope to gain the concepts of electrical machines like synchronous machines, 3-phase & 1- phase induction motors and fractional horse power motors and other special machines. The students are required to be familiar with constructional features, working principles, starting and speed control methods and performance characteristics with applications of the machines. Numerical solving makes the student to understand the feature more clearly.

B. Objectives:

After completion of this subject the student will be able:

1. To describe various parts, their material specification with suitable reasoning and working principle of synchronous machines, 3-phase & 1- phase AC motors and fractional horse power and other special machines.
2. To describe their operating principle and working characteristics, torque equation of three phase motors.
3. To describe the losses and efficiency of all machines.
4. To be familiar with starting and speed control of AC motors.
5. To develop problem solving ability on synchronous machines and 3-phase induction motor for better understanding about the concept of machines.
6. To be familiar with different testing methods carried out on such three phase machines.

C. TOPIC WISE DISTRIBUTION OF PERIODS

Sl. No.	Topics	Periods
1.	Alternator (Synchronous Generator)	14
2.	Synchronous Motor	08
3.	Induction motor	14
4.	Single Phase induction motor	08
5.	Commutator motors	06
6.	Special Electric Machine	05
7.	Three phase transformers	05
	Total	**60**

D. COURSE CONTENT:

1. ALTERNATOR:

1.1. Types of alternator and their constructional features.
1.2. Basic working principle of alternator and the relation between speed and frequency.
1.3. Terminology in armature winding and expressions for winding factors (Pitch factor, Distribution factor).
1.4. Explain harmonics, its causes and impact on winding factor.
1.5. E.M.F equation of alternator. (Solve numerical problems).
1.6. Explain Armature reaction and its effect on emf at different power factor of load.
1.7. The vector diagram of loaded alternator. (Solve numerical problems)
1.8. Testing of alternator (Solve numerical problems)
  1.8.1. Open circuit test.
  1.8.2. Short circuit test.
1.9. Determination of voltage regulation of Alternator by direct loading and synchronous impedance method. (Solve numerical problems)
1.10. Parallel operation of alternator using synchro-scope and dark & bright lamp method.
1.11. Explain distribution of load by parallel connected alternators.

2. SYNCHRONOUS MOTOR:

2.1. Constructional feature of Synchronous Motor.
2.2. Principles of operation, concept of load angle
2.3. Derive torque, power developed.
2.4. Effect of varying load with constant excitation.
2.5. Effect of varying excitation with constant load.
2.6. Power angle characteristics of cylindrical rotor motor.
2.7. Explain effect of excitation on Armature current and power factor.
2.8. Hunting in Synchronous Motor.
2.9. Function of Damper Bars in synchronous motor and generator.
2.10. Describe method of starting of Synchronous motor.
2.11. State application of synchronous motor.

3. THREE PHASE INDUCTION MOTOR:

3.1. Production of rotating magnetic field.
3.2. Constructional feature of Squirrel cage and Slip ring induction motors.
3.3. Working principles of operation of 3-phase Induction motor.
3.4. Define slip speed, slip and establish the relation of slip with rotor quantities.
3.5. Derive expression for torque during starting and running conditions and derive conditions for maximum torque. (solve numerical problems)

3.6. Torque-slip characteristics.
3.7. Derive relation between full load torque and starting torque etc. (solve numerical problems)
3.8. Establish the relations between Rotor Copper loss, Rotor output and Gross Torque and relationship of slip with rotor copper loss. (solve numerical problems)
3.9. Methods of starting and different types of starters used for three phase Induction motor.
3.10. Explain speed control by Voltage Control, Rotor resistance control, Pole changing, frequency control methods.
3.11. Plugging as applicable to three phase induction motor.
3.12. Describe different types of motor enclosures.
3.13. Explain principle of Induction Generator and state its applications.

4. SINGLE PHASE INDUCTION MOTOR:

4.1. Explain Ferrari's principle.
4.2. Explain double revolving field theory and Cross-field theory to analyze starting torque of 1-phase induction motor.
4.3. Explain Working principle, Torque speed characteristics, performance characteristics and application of following single phase motors.
    4.3.1. Split phase motor.
    4.3.2. Capacitor Start motor.
    4.3.3. Capacitor start, capacitor run motor.
    4.3.4. Permanent capacitor type motor.
    4.3.5. Shaded pole motor.
4.4. Explain the method to change the direction of rotation of above motors.

5. COMMUTATOR MOTORS:

5.1. Construction, working principle, running characteristic and application of single phase series motor.
5.2. Construction, working principle and application of Universal motors.
5.3. Working principle of Repulsion start Motor, Repulsion start Induction run motor, Repulsion Induction motor.

6. SPECIAL ELECTRICAL MACHINE:

6.1. Principle of Stepper motor.
6.2. Classification of Stepper motor.
6.3. Principle of variable reluctant stepper motor.
6.4. Principle of Permanent magnet stepper motor.
6.5. Principle of hybrid stepper motor.
6.6. Applications of Stepper motor.

7. THREE PHASE TRANSFORMERS:

7.1. Explain Grouping of winding, Advantages.
7.2. Explain parallel operation of the three phase transformers.
7.3. Explain tap changer (On/Off load tap changing)
7.4. Maintenance Schedule of Power Transformers.

Syllabus coverage up to Internal assessment

Chapters: 1, 2 and 3.

Learning Resources:			
Sl.No	**Title of the Book**	**Name of Author**	**Publisher**
1	Electrical Technology – II	B. L. Theraja and A. K. Theraja	S.Chand
2	A Textbook of Electrical Machines	K R Siddhapura, D B Raval	Vikas
3.	Electrical Technology	J. B. Gupta	S.K.Kataria and Sons
4.	Electric Machine	Ashfaq Husain	Dhanpat Rai and Sons
5.	Electrical Machine	S. K. Bhattarcharya	TMH
6.	Electrical Machines	D P Kothari, I J Nagrath	Mc Graw Hill

TH.3 DIGITAL ELECTRONICS & MICROPROCESSOR

Name of the Course: Diploma in Electrical Engineering			
Course code:	Th.3	Semester	5th
Total Period:	75	Examination	3 Hrs.
Theory periods:	5P / week	Internal Assessment:	20
Tutorial:	---	End Semester Examination:	80
Maximum marks:	100		

A. RATIONALE

The tremendous power and usefulness of digital electronics can be seen from the wide variety of industrial and consumer products, such as automated industrial machinery, computers, microprocessors, pocket calculators, digital watches and clocks, TV games, etc., Which are based on the principles of digital electronics? The years of applications of digital electronics have been increasing every day. In fact, digital systems have invaded all walks of life. This subject will very much helpful for student to understand clearly about the developmental concept of digital devices.

B. OBJECTIVES

On comprehend of the subject, the student will able to

1. Comprehend the systems and codes.
2. Familiar with logic gates.
3. Realize logic expressions using gates.
4. Construct and verify the operation of arithmetic & logic circuits
5. Understand and appreciate the relevance of combinational circuits.
6. Know various logic families & flops.
7. Architecture & different instructions of 8085 microprocessor.
8. Assembly language programs and write programs & functions of the interfacing chips like 8255, 8259, 8259 etc.

C. TOPIC WISE DISTRIBUTION OF PERIODS

Sl. No.	Topics	Periods
1	Basics Of Digital Electronics	15
2	Combinational Logic Circuits	15
3	Sequential Logic Circuits	15
4	8085 Microprocessor	20
5	Interfacing And Support Chips	10
	Total	**75**

D : **COURSE CONTENT IN TERMS OF SPECIFIC OBJECTIVES**

1. BASICS OF DIGITAL ELECTRONICS

1.1 Binary, Octal, Hexadecimal number systems and compare with Decimal system.

1.2 Binary addition, subtraction, Multiplication and Division.
1.3 1‘s complement and 2‘s complement numbers for a binary number
1.4 Subtraction of binary numbers in 2‘s complement method.
1.5 Use of weighted and Un-weighted codes & write Binary equivalent number for a number in 8421, Excess-3 and Gray Code and vice-versa.
1.6 Importance of parity Bit.
1.7 Logic Gates: AND, OR, NOT, NAND, NOR and EX-OR gates with truth table.
1.8 Realize AND, OR, NOT operations using NAND, NOR gates.
1.9 Different postulates and De-Morgan‘s theorems in Boolean algebra.
1.10 Use Of Boolean Algebra For Simplification Of Logic Expression
1.11 Karnaugh Map For 2,3,4 Variable, Simplification Of SOP And POS Logic Expression Using K-Map.

2. COMBINATIONAL LOGIC CIRCUITS

2.1 Give the concept of combinational logic circuits.
2.2 Half adder circuit and verify its functionality using truth table.
2.3 Realize a Half-adder using NAND gates only and NOR gates only.
2.4 Full adder circuit and explain its operation with truth table.
2.5 Realize full-adder using two Half-adders and an OR – gate and write truth table
2.6 Full subtractor circuit and explain its operation with truth table.
2.7 Operation of 4 X 1 Multiplexers and 1 X 4 demultiplexer
2.8 Working of Binary-Decimal Encoder & 3 X 8 Decoder.
2.9 Working of Two bit magnitude comparator.

3. SEQUENTIAL LOGIC CIRCUITS

3.1 Give the idea of Sequential logic circuits.
3.2 State the necessity of clock and give the concept of level clocking and edge triggering,
3.3 Clocked SR flip flop with preset and clear inputs.
3.5 Construct level clocked JK flip flop using S-R flip-flop and explain with truth table
3.6 Concept of race around condition and study of master slave JK flip flop.
3.7 Give the truth tables of edge triggered D and T flip flops and draw their symbols.
3.8 Applications of flip flops.
3.9 Define modulus of a counter
3.10 4-bit asynchronous counter and its timing diagram.
3.11 Asynchronous decade counter.
3.12 4-bit synchronous counter.
3.13 Distinguish between synchronous and asynchronous counters.
3.14 State the need for a Register and list the four types of registers.
3.15 Working of SISO, SIPO, PISO, PIPO Register with truth table using flip flop.

4. 8085 MICROPROCESSOR

4.1 Introduction to Microprocessors, Microcomputers
4.2 Architecture of Intel 8085A Microprocessor and description of each block.
4.3 Pin diagram and description.
4.4 Stack, Stack pointer & stack top
4.5 Interrupts
4.6 Opcode & Operand,
4.7 Differentiate between one byte, two byte & three byte instruction with example.
4.8 Instruction set of 8085 example
4.9 Addressing mode
4 .10 Fetch Cycle, Machine Cycle, Instruction Cycle, T-State
4.11 Timing Diagram for memory read, memory write, I/O read, I/O write
4.12 Timing Diagram for 8085 instruction
4.13 Counter and time delay.
4. 14 Simple assembly language programming of 8085.

5. INTERFACING AND SUPPORT CHIPS

5.1 Basic Interfacing Concepts, Memory mapping & I/O mapping
5.2 Functional block diagram and description of each block of Programmable peripheral interface Intel 8255 ,
5.3 Application using 8255: Seven segment LED display, Square wave generator, Traffic light Controller

Syllabus coverage up to Internal assessment

Chapters: 1,2 and 3

Learning Resources:			
Sl. No.	**Title of the Book**	**Name of Authors**	**Name of Publisher**
1	Fundamental of Digital Electronics	Ananda Kumar	PHI
2	Digital Electronics — Principal & Application	S. K. Mondal	TMH
3	Digital Electronics	B. R. Gupta & V. Singhal	S. K. Kateria
4	Digital Electronics	P. Raja	SciTech
5	Microprocessor Architecture programming & Application with 8085	R.S Gaonkar	Peneram
6	Fundamentals of Microprocessor & Micro Computers	B.Ram	Dhanpat rai
7	Microprocessor and Inter facing	Sunetra Choudhury & S. P. Chowdhury	Scitech

TH.4 UTILIZATION OF ELECTRICAL ENERGY & TRACTION

Name of the Course: Diploma in Electrical Engineering			
Course code:	Th.4	Semester:	5th
Total Period:	60 Periods	Examination:	3 Hrs.
Theory periods:	4 P / Week	Internal Assessment:	20
Tutorial:	---	End Semester Examination:	80
Maximum marks:	100		

A. Rationale:

There is great demand for utilization of electrical power in various fields in the form of power for electrolysis, illumination, electrical heating, electrical welding, electrical traction and for electrical drives. Hence these aspects are taken care of, in the subject of utilization of electrical energy and traction to give exposure of the student.

B. Objectives:

The subject will facilitate the student :

1. To acquire knowledge of principle of ionic dissociation and electrolysis and loss involving in the process, usage of this process.
2. To acquire knowledge of types of electrical heating as employed in the electrical oven, induction furnaces and arc furnaces and dielectrically ovens.
3. To acquire knowledge of principle of arc welding and resistant welding,
4. To define various terms used in illumination engineering to design lighting schemes with specific attention to laws of illumination to explain the working and construction and use of fluorescent lamp, SV lamp, H.P. MV, Neon lamps and energy saving lamps.
5. To classify various types of industrial drives and their application.
6. To classify various methods of traction and traction motor with their control and types of braking.

C. TOPIC WISE DISTRIBUTION OF PERIODS

Sl. No.	Topics	Periods
1.	Electrolytic Process	08
2.	Electrical Heating.	08
3.	Principles of Arc Welding.	08
4.	Illumination.	12
5.	Industrial Drives.	10
6.	Electric Traction.	14
	TOTAL	**60**

D. COURSE CONTENTS:

1. ELECTROLYTIC PROCESS:

1.1. Definition and Basic principle of Electro Deposition.
1.2. Important terms regarding electrolysis.
1.3. Faradays Laws of Electrolysis.
1.4. Definitions of current efficiency, Energy efficiency.
1.5. Principle of Electro Deposition.
1.6. Factors affecting the amount of Electro Deposition.
1.7. Factors governing the electro deposition.
1.8. State simple example of extraction of metals.
1.9. Application of Electrolysis.

2. ELECTRICAL HEATING:

2.1. Advantages of electrical heating.
2.2. Mode of heat transfer and Stephen's Law.
2.3. Principle of Resistance heating. (Direct resistance and indirect resistance heating.)
2.4. Discuss working principle of direct arc furnace and indirect arc furnace.
2.5. Principle of Induction heating.
    2.5.1. Working principle of direct core type, vertical core type and indirect core type Induction furnace.
    2.5.2. Principle of coreless induction furnace and skin effect.
2.6. Principle of dielectric heating and its application.
2.7. Principle of Microwave heating and its application.

3. PRINCIPLES OF ARC WELDING:

3.1. Explain principle of arc welding.
3.2. Discuss D. C. & A. C. Arc phenomena.
3.3. D.C. & A. C. arc welding plants of single and multi-operation type.
3.4. Types of arc welding.
3.5. Explain principles of resistance welding.
3.6. Descriptive study of different resistance welding methods.

4. ILLUMINATION:

4.1. Nature of Radiation and its spectrum.
4.2. Terms used in Illuminations. [Lumen, Luminous intensity, Intensity of illumination, MHCP, MSCP, MHSCP, Solid angle, Brightness, Luminous efficiency.]
4.3. Explain the inverse square law and the cosine law.
4.4. Explain polar curves.
4.5. Describe light distribution and control. Explain related definitions like maintenance factor and depreciation factors.
4.6. Design simple lighting schemes and depreciation factor.
4.7. Constructional feature and working of Filament lamps, effect of variation of voltage

on working of filament lamps.
4.8. Explain Discharge lamps.
4.9. State Basic idea about excitation in gas discharge lamps.
4.10. State constructional factures and operation of Fluorescent lamp. (PL and PLL Lamps)
4.11. Sodium vapor lamps.
4.12. High pressure mercury vapor lamps.
4.13. Neon sign lamps.
4.14. High lumen output & low consumption fluorescent lamps.

5. INDUSTRIAL DRIVES:

5.1. State group and individual drive.
5.2. Method of choice of electric drives.
5.3. Explain starting and running characteristics of DC and AC motor.
5.4. State Application of:
  5.4.1. DC motor.
  5.4.2. 3-phase induction motor.
  5.4.3. 3 phase synchronous motors.
  5.4.4. Single phase induction, series motor, universal motor and repulsion motor.

6. ELECTRIC TRACTION:

6.1. Explain system of traction.
6.2. System of Track electrification.
6.3. Running Characteristics of DC and AC traction motor.
6.4. Explain control of motor:
  6.4.1. Tapped field control.
  6.4.2. Rheostatic control.
  6.4.3. Series parallel control.
  6.4.4. Multi-unit control.
  6.4.5. Metadyne control.
6.5. Explain Braking of the following types:
  6.5.1. Regenerative Braking.
  6.5.2. Braking with 1-phase series motor.
  6.5.3. Magnetic Braking.

Syllabus coverage up to Internal assessment

Chapters: 1, 2, 3 and 4.

Learning Resources:			
Sl.No	***Title of the Book***	***Name of Authors***	***Name of the Publisher***
1.	*Utilization of Electrical Energy by Traction*	*G. C. Garg*	*Khanna Publisher*
2.	*Utilization of Electrical Energy*	*E. I. Taylor*	*TMH*
3.	*A Text book on Power system Engineering*	*Soni, Gupta and Bhatnagar*	*Dhanpat Rai & Sons*

TH.5 POWER ELECTRONICS AND PLC

Name of the Course: Diploma in Electrical Engineering			
Course code:	Th.5	Semester:	5th
Total Period:	60 Periods	Examination:	3 Hrs
Theory periods:	4 P / Week	Internal Assessment:	20
Tutorial:	-	End Semester Examination:	80
Maximum marks:	100		

A. Rationale:

The development of high power semiconductor devices has facilitated electronic control techniques for electrical power control in a simple, economic and efficient manner. Thus a new area of power electronics has now emerged which replaced the old and bulky method of power control through the use of small electronic devices. Power electronics application has occupied an indispensible position in industrial applications like heating, welding, uninterrupted power supply, battery charging etc. Industrial drives, lighting control are most efficiently controlled by power electronics devices to achieve optimum performance. The objective of this paper is to familiar students with the principles and operations of Power electronics devices in Industrial applications with drives control.

B. Objectives:

After completion of this subject the student will be able to:

1. Understand construction, working principle & application of various power electronics devices.
2. Know different gate triggering circuits and commutation methods.
3. Understand working principle of phase controlled rectifier.
4. Know the types and working principle of inverter.
5. Understand working principle and voltage control of chopper.
6. Understand frequency variation using Cyclo-converter.
7. Understand control principle of AC & DC industrial drive.
8. Know different application of SCR / Thyristor.
9. Concept in PLC & its Programming

C. TOPIC WISE DISTRIBUTION OF PERIODS

Sl. No.	Topics	Periods
1.	Understand The Construction And Working Of Power Electronic Devices	18
2.	Understand The Working Of Converters, Ac Regulators And Choppers.	12
3.	Understand The Inverters And Cyclo-Converters	08
4.	Understand Applications Of Power Electronic Circuits	10
5.	PLC And Its Applications	12

Total	**60**

D. COURSE CONTENT:

1. UNDERSTAND THE CONSTRUCTION AND WORKING OF POWER ELECTRONIC DEVICES

1.1 Construction, Operation, V-I characteristics & application of power diode, SCR, DIAC,TRIAC, Power MOSFET,GTO &IGBT
1.2 Two transistor analogy of SCR.
1.3 Gate characteristics of SCR.
1.4 Switching characteristic of SCR during turn on and turn off.
1.5 Turn on methods of SCR.
1.6 Turn off methods of SCR (Line commutation and Forced commutation)
  1.6.1 Load Commutation
  1.6.2 Resonant pulse commutation
1.7 Voltage and Current ratings of SCR.
1.8 Protection of SCR
  1.8.1 Over voltage protection
  1.8.2 Over current protection
  1.8.3 Gate protection
1.9 Firing Circuits
  1.9.1 General layout diagram of firing circuit
  1.9.2 R firing circuits
  1.9.3 R-C firing circuit
  1.9.4 UJT pulse trigger circuit
  1.9.5 Synchronous triggering (Ramp Triggering)
1.10 Design of Snubber Circuits

2. UNDERSTAND THE WORKING OF CONVERTERS, AC REGULATORS AND CHOPPERS.

2.1 Controlled rectifiers Techniques(Phase Angle, Extinction Angle control), Single quadrant semi converter, two quadrant full converter and dual Converter
2.2 Working of single-phase half wave controlled converter with Resistive and R-L loads.
2.3 Understand need of freewheeling diode.
2.4 Working of single phase fully controlled converter with resistive and R- L loads.
2.5 Working of three-phase half wave controlled converter with Resistive load
2.6 Working of three phase fully controlled converter with resistive load.
2.7 Working of single phase AC regulator.
2.8 Working principle of step up & step down chopper.
2.9 Control modes of chopper
2.10 Operation of chopper in all four quadrants.

3. UNDERSTAND THE INVERTERS AND CYCLO-CONVERTERS

3.1 Classify inverters.
3.2 Explain the working of series inverter.
3.3 Explain the working of parallel inverter
3.4 Explain the working of single-phase bridge inverter.

3.5 Explain the basic principle of Cyclo-converter.
3.6 Explain the working of single-phase step up & step down Cyclo-converter.
3.7 Applications of Cyclo-converter.

4. UNDERSTAND APPLICATIONS OF POWER ELECTRONIC CIRCUITS

4.1 List applications of power electronic circuits.
4.2 List the factors affecting the speed of DC Motors.
4.3 Speed control for DC Shunt motor using converter.
4.4 Speed control for DC Shunt motor using chopper.
4.5 List the factors affecting speed of the AC Motors.
4.6 Speed control of Induction Motor by using AC voltage regulator.
4.7 Speed control of induction motor by using converters and inverters (V/F control).
4.8 Working of UPS with block diagram.
4.9 Battery charger circuit using SCR with the help of a diagram.
4.10 Basic Switched mode power supply (SMPS) - explain its working & applications

5. PLC AND ITS APPLICATIONS

5.1 Introduction of Programmable Logic Controller(PLC)
5.2 Advantages of PLC
5.3 Different parts of PLC by drawing the Block diagram and purpose of each part of PLC.
5.4 Applications of PLC
5.5 Ladder diagram
5.6 Description of contacts and coils in the following states
i)Normally open ii) Normally closed iii) Energized output iv)latched Output v) branching
5.7 Ladder diagrams for i) AND gate ii) OR gate and iii) NOT gate.
5.8 Ladder diagrams for combination circuits using NAND,NOR, AND, OR and NOT
5.9 Timers-i)T ON ii) T OFF and iii)Retentive timer
5.10 Counters-CTU, CTD
5.11 Ladder diagrams using Timers and counters
5.12 PLC Instruction set
5.13 Ladder diagrams for following
(i) DOL starter and STAR-DELTA starter (ii) Stair case lighting (iii) Traffic light Control (iv) Temperature Controller
5.14 Special control systems- Basics DCS & SCADA systems
5.15 Computer Control–Data Acquisition, Direct Digital Control System (Basics only)

Syllabus coverage up to Internal assessment

Chapters: 1 and 2.

Learning Resources:			
Sl.No	***Title of the Book***	***Name of Authors***	***Name of the Publisher***
1.	*Power Electronics*	*Dr. P. S. Bhimbhra*	*Khanna Publisher*
2.	*Modern Power Electronics*	*B.K.Bose*	*PHI Publisher*

	and AC Drives		
3.	*Power Electronics*	*M. D. Singh and K.B Khanchandani*	*TMH*
4.	*Power Electronics*	*M H Rashid*	PHI Publisher
5.	*Power Electronics*	*P C Sen*	*TMH*
6.	*Power Electronics*	*N Mohan*	*Willey (India)*
7.	*Programmable logic Controllers*	*Frank D. Petruzela*	TMH
8.	*Programme logic controller*	*Dr.M.Mitra&Dr.S.Sengupta*	*Penram*

Pr.1 ELECTRICAL MACHINE LAB-II

Name of the Course: Diploma in Electrical Engineering			
Course code:	Pr.1	Semester	5th
Total Period:	90	Examination	3 hrs
Lab. periods:	6 P / week	Term Work	25
Maximum marks:	75	End Semester Examination:	50

A. RATIONALE:

The sole objective of the subject is to be familiar with machines and different parts. To perform practice of the experiments and become fit to meet the challenges in practical implementation.

In the beginning the faculties have to illustrate all the tools and instruments required/ used in conducting the experiments.

B. OBJECTIVES:

After completion of this Laboratory the student will be able to:

1. To be familiar with constructional features of 3-phase and 1-phase AC machines.
2. Starting, Speed control of 3-phase and 1-phase motors.
3. To determine efficiency, regulations of different machines.
4. To draw and study performance characteristics.
5. To be familiar with relays used in power system.

C. LIST OF EXPERIMENTS:

1. Study of (Manual and Semi automatic) Direct on Line starter, Star-Delta starter, connection and running a 3-phase Induction motor and measurement of starting current.
2. Study of (Manual and Semi automatic) Auto transformer starter and rotor resistance starter connection and running a 3-phase induction motor and measurement of starting current.
3. Study and Practice of connection & Reverse the direction of rotation of Three Phase Induction motor.
4. Study and Practice of connection & Reverse the direction of rotation of Single Phase Induction motor.
5. Heat run test of 3-phase transformer.
6. OC and SC test of alternator and determination of regulation by synchronous impedance method.
7. Determination of regulation of alternator by direct loading.
8. Parallel operation of two alternators and study load sharing.
9. Measurement of power of a 3-phase Load using two wattmeter method and

verification of the result using one 3-phase wattmeter.

10. Connection of 3-phase energy meter to a 3-phase load.
11. Study of an O.C.B.
12. Study of induction type over current / reverse power relay.
13. Study of Buchholz's relay.
14. Study of an earth fault relay.

Pr.2 POWER ELECTRONICS & PLC LAB

Name of the Course: Diploma in Electrical Engineering			
Course code:	Pr.2	Semester	5th
Total Period:	45	Examination	3 hrs
Lab. periods:	3 P / week	Term Work	25
Maximum marks:	75	End Semester Examination:	50

A. RATIONALE: The sole objective of the subject is to be familiar with solid state devices used in power system. To perform experiments for determining the characteristics of components and become fit to meet the challenges in practical implementation.

B. OBJECTIVE:

After completion of this laboratory the student will be able to:

1. Determine characteristic of semiconductor devices.
2. Develop ability to design drive circuit for above.
3. Design low voltage power circuit to be used in electronics circuit.

C. LIST OF EXPERIMENTS

(I) Power Electronics

1. Study of switching characteristics of a power transistor.
2. Study of V-I characteristics of SCR.
3. Study of V-I characteristics of TRIAC.
4. Study of V-I characteristics of DIAC.
5. Study of drive circuit for SCR & TRIAC using DIAC.
6. Study of drive circuit for SCR & TRIAC using UJT.
7. To study phase controlled bridge rectifier using resistive load.
8. To study series Inverter.
9. Study of voltage source Inverter.
10. To perform the speed control of DC motor using Chopper.
11. To study single-phase Cyclo-converter

(II) PLC Programming

1. Introduction/Familiarization PLC Trainer & its Installation with PC
   (a) Learn the basics and hardware components of PLC
   (b) Understand configuration of PLC system
   (c) Study various building blocks of PLC
   (d) Determine the No. of digital I/O & Analog I/O
2. Execute the different Ladder Diagrams
   (a) Demonstrate PLC and Ladder diagram-Preparation downloading and running
   (b) Execute Ladder diagrams for different Logical Gates
   (c) Execute Ladder diagrams using timers & counters
3. Execute the Ladder Diagrams with model applications
   (i) DOL starter (ii)Star- Delta starter
4. Execute Ladder diagrams with model applications (i) Stair case lighting (ii) Traffic light controller

Pr.3 DIGITAL ELECTRONICS & MICROPROCESSOR LAB

Name of the Course: Diploma in Electrical Engineering			
Course code:	Pr.3	Semester	5th
Total Period:	45	Examination	3 hrs
Lab. periods:	3 P / week	Term Work	25
Maximum marks:	75	End Semester Examination:	50

A. RATIONALE

In this practical work students knowledge about the Digital systems will be reinforced. They will become capable of developing and implementing Digital Circuits. They will also be able to acquire skills of operating A/D and D/A converters, counters and display system.

B. OBJECTIVE

On completion of the Lab course the student will able to

1. Understand and comprehended the simple the Digital design Circuits.
2. Assembly Language Program using 8085 instruction
3. Application of 8085 using interfacing

C. COURSE CONTENT IN TERMS OF SPECIFIC OBJECTIVES

(I) Digital Electronics

1. Verify truth tables of AND, OR, NOT, NOR, NAND, XOR, XNOR gates.
2. Implement various gates by using universal properties of NAND & NOR gates and verify truth table.
3. Implement half adder and Full adder using logic gates.
4. Implement half subtractor and Full subtractor using logic gates.
5. Implement a 4-bit Binary to Gray code converter.
6. Implement a Single bit digital comparator.
7. Study Multiplexer and demultiplexer.
8. Study of flip-flops.
   i) S-R flip flop ii) J-K flip flop iii) flip flop iv) T flip flop
9. Realize a 4-bit asynchronous UP/Down counter with a control for up/down counting.
10. Realize a 4-bit synchronous UP/Down counter with a control for up/down counting.
11. Implement Mode-10 asynchronous counters.
12. Study shift registers.

(II) Microprocessor

(A) General Programming using 8085A development board

1. a. 1'S Complement. b. 2'S Complement.
2. a. Addition of 8-bit number. b. Subtraction of 8-bit number resulting 8/16 bit number.
3. a. Decimal Addition 8-bit number. b. Decimal Subtraction 8-bit number
3. a. Compare between two numbers. b. Find the largest in an Array
5. Block Transfer.

(B) Interfacing using 8085

1. Traffic light control using 8255.
2. Generation of square wave using 8255

Learning Resources:

Electronics Lab premier by Sacikala - (S. Chand)

Pr.4 PROJECT WORK (Phase-I)

Name of the Course: Diploma in Electrical Engineering			
Course code:	Pr.4	Semester	5th
Total Period:	45	Examination	----
Lab. periods:	3 P / week	Term Work	25
Maximum marks:	25	End Semester Examination:	---

A. RATIONALE

Students' Project Work aims at developing innovative skills in the students whereby they apply the knowledge and skills gained through the course covered in many subjects and Labs, by undertaking a project. The individual students have different aptitudes and strengths. Project work, therefore, should match the individual strengths of students. The prime emphasis of the project work is to understand and apply the basic knowledge of the principles of software engineering/ Hardware design and practices in real life situations, so as to participate and manage a large software engineering projects and /or appropriate Hardware with embedded software in future.

Entire Project shall spread over 5th and 6th Semester. Part of the Project covered in 5th Semester shall be named as *Project Phase-I* and balance portion to be covered in 6th Semester shall be named as *Project Phase-II*.

B. OBJECTIVES

After undergoing the Project Work, the student will be able to:

- Implement the theoretical and practical knowledge and skills gained through various subjects/courses into an application suitable for a real practical working environment, preferably in an industrial environment.
- Develop software packages or applications and implement these for the actual needs of the community/industry.
- Identify and contrast gap between the technological knowledge acquired through curriculum and the actual industrial need and to compensate it by acquiring additional knowledge as required.
- Carry out cooperative learning through synchronous guided discussions within the class in key areas, asynchronous document sharing and discussions, as well as prepare collaborative edition of the final project report.
- Field computing and to achieve real life experience in software/hardware design.

C. GENERAL GUIDELINES

The individual students have different aptitudes and strengths. Project work, therefore, should match the strengths of students. For this purpose, students should be asked to identify the type of project work, they would like to execute. The activity of problem identification should begin well in advance (right from beginning of 5th semester).

Students should be allotted a problem of interest to him/her as a project work. It is also essential that the faculty of the respective department may have a brainstorming session to identify suitable project assignments for their students. The project assignment can be individual assignment or a group assignment. Preferably there should not be more than 5 students if the project work is given to a group. The project work identified in collaboration with industry should be preferred.

Following are the broad suggestive areas of project work

- ✓ Speed control techniques using thyristor.
- ✓ Battery design & its maintenance.
- ✓ Energy management Techniques.
- ✓ Dynamic models of Electrical machine.
- ✓ Solar based cooker, lamp, water heater etc. & Solar operated vehicles.
- ✓ Remote control operated Electrical devices.
- ✓ Advanced energy meter.
- ✓ Design of Illumination techniques using advanced luminaries etc.
- ✓ Dynamic models of Electrical Machine.
- ✓ PLC & Microprocessor based project.
- ✓ Any other related area found worth.

A suggestive criterion for assessing student performance by the external (preferably person from industry) and internal (teacher) examiner is given in table below:

Sl. No.	**Performance Criteria**
1.	Selection of project assignment
2.	Planning and execution of considerations
3.	Quality of performance
4.	Providing solution of the problems or production of final product
5.	Sense of responsibility
6.	Self-expression/ communication/ Presentation skills
7.	Interpersonal skills/human relations
8.	Report writing skills
9.	Viva voce

The teachers are free to evolve other criteria of assessment, depending upon the type of project work.
It is proposed that the institute may organize an annual exhibition of the project work done by the students and invite leading Industrial organizations to such an exhibition.

D. PROJECT PHASE-I AND PHASE-II

The Project work duration shall cover two semesters (5^{th} and 6^{th} sem). The Grouping of students, selection of Project, assignment of Project Guide to the Group shall be done in the beginning of 5^{th} sem under Project Phase-I. The students may be allowed to study literature, any existing system and then define the Problem/objective of the Project. Requirements specification, Circuit Diagram with brief description and Design of the system have to be complete in Phase-I. Preliminary analysis/modelling/simulation/experiment/feasibility can also begin in this phase. Project Milestones are to be set so that progress can be tracked. In Phase- II Design, Testing, Documentation have to be complete. Project Report have to be complete in Phase-II. All Project reports should be organized uniformly in proper order, irrespective of group. Teacher Guides can make suitable alteration in the schedule.
At the end of Project Phase-I in 5^{th} semester there shall be one presentation by each group to mark to progress and also to judge whether the Project is moving in right direction as per the objective of the Project.

EQUIPMENT LIST

1. 3-phase Squirrel Cage Induction Motor
2. 3-phase Slip Ring Induction Motor
3. DC Shunt Motor coupled with Alternator set with Synchronization panel of Two Alternators
4. 1-phase Capacitor Start Capacitor Run Motor
5. 3-phase Transformer
6. 3-phase wattmeter
7. 1-phase wattmeter
8. 3-Phase Variac
9. DOL starter
10. Star-Delta Starter
11. Rotor Resistance starter
12. Auto Transformer Starter
13. 3-Point Starter
14. Field Regulator
15. DC Voltmeter
16. DC Ammeter
17. AC Voltmeter
18. AC Ammeter
19. 3-Phase Resistive Load Box
20. 3-Phase Energy meter
21. Demonstrational model of Oil Circuit Breaker
22. Reverse Current Relay kit
23. Demonstrational model of Buchholz's Relay Trainer Kit
24. Earth fault relay test kit
25. Power Electronics trainer kit to perform (a) switching characteristics of a power transistor (b) V-I characteristics of SCR, TRIAC, DIAC (c) Drive circuit for SCR & TRIAC using DIAC & UJT (d) phase controlled bridge rectifier using resistive load (e) series Inverter (f) voltage source Inverter (g) speed control of DC motor using Chopper (h) single-phase Cyclo-converter
26. 8085 microprocessor trainer kit
27. Traffic Light controller interfacing module
28. Digital electronics trainer kit
29. PLC trainer kit

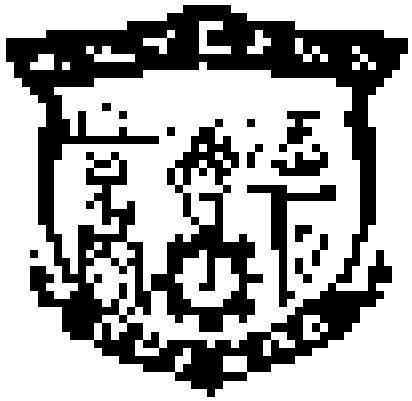
STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA									
TEACHING AND EVALUATION SCHEME FOR 6th Semester (Electrical)(wef 2020-21)									
Subject Number	Subject Code	Subject	Periods/week			Evaluation Scheme			
			L	T	P	Internal Assessment/ Sessional	End Sem Exams	Exams (Hours)	Total
		Theory							
Th.1		Electrical Installation And Estimating	4	1	-	20	80	3	100
Th.2		Switch Gear And Protective Devices	4	1	-	20	80	3	100
Th.3		Control System Engineering	4	1	-	20	80	3	100
Th.4		Elective (Any one to be opted) (a) Testing And Maintenance of Electrical Machine (b) Renewable Energy (c) Electric vehicle	4	1		20	80	3	100
		Total	*16*	*04*		*80*	*320*	-	*400*
		Practical							
Pr.1		Electrical Workshop	-	-	6	50	100	3	150
Pr.2		Project Phase- II			8	50	100	3	150
Pr.3		Life Skill	-	-	2	50	-	3	50
		Student Centred Activities(SCA)		-	3	-	-	-	-
		Total	-	-	*19*	*150*	*200*	-	*350*
		Grand Total	**16**	**04**	**19**	**205**	**545**	**-**	**750**
Abbreviations: L-Lecturer, T-Tutorial, P-Practical . Each class is of minimum 55 minutes duration									
Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50% and in Aggregate is 40%									
SCA shall comprise of Extension Lectures/ Personality Development/ Environmental issues /Quiz /Hobbies/ Field visits/ cultural activities/Library studies/Classes on MOOCS/SWAYAM/Idea Tinkering and Innovation Lab Practice etc. ,Seminar and SCA shall be conducted in a section.									
There shall be 1 Internal Assessment done for each of the Theory Subject. Sessional Marks shall be total of the performance of individual different jobs/ experiments in a subject throughout the semester									

CURRICULLUM OF 6TH SEMESTER

For

DIPLOMA IN ELECTRICAL ENGINEERING

(Effective from 2020-21 Sessions)



STATE COUNCIL FOR TECHNICAL EDUCATION & VOCATIONAL TRAINING, ODISHA, BHUBANESWAR

Th1. ELECTRICAL INSTALLATION AND ESTIMATING

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	6th
Total Period:	60	Examination	3 hrs
Theory periods:	4P / week	Class Test:	20
Tutorial:	1 P / week	End Semester Examination:	80
Maximum marks:	100		

A. RATIONALE:

Prior to implementation of a project in the power transmission and distribution sectors, a material estimate is required in various stages: like i) transmission line construction ii) distribution line construction iii) erection of domestic installation iv) service connection to industrial installation etc. In estimating, calculation of quantity of material is estimated by the estimator. This subject ‗Electrical Installation and Estimating' is meant for learning the estimation process by the final semester students

B. OBJECTIVE:

After completion of this subject the student will be able:

1. To write down detailed specification and numbers required of different materials.
2. To determine the size and material of conductor and cable from electrical and mechanical consideration. As such to prepare a detailed list of materials with complete specifications.

C. Topic wise distribution of periods:

Sl. No.	Topics	Periods
1.	Indian electricity rules	06
2.	Electrical installations	12
3.	Internal wiring	12
4.	Over head installation	12
5.	Over head service lines	12
6.	Estimating for distribution substations	06
	Total	**60**

D. COURSE CONTENTS

1. INDIAN ELECTRICITY RULES

1.1 Definitions, Ampere, Apparatus, Accessible, Bare, cable, circuit, circuit breaker, conductor voltage (low, medium, high, EH), live, dead, cut-out, conduit, system, danger, Installation, earthing system, span, volt, switch gear, etc.

1.2 General safety precautions, rule 29, 30, 31, 32, 33, 34, 35, 36, 40, 41, 43, 44, 45, 46.

1.3 General conditions relating to supply and use of energy : rule 47, 48, 49, 50, 51, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 70.

1.4 OH lines : Rule 74, 75, 76, 77, 78, 79, 80, 86, 87, 88, 89, 90, 91

2. ELECTRICAL INSTALLATIONS

2. 1 Electrical installations, domestics, industrial, Wiring System, Internal distribution of Electrical Energy. Methods of wiring, systems of wiring, wire and cable, conductor materials used in cables, insulating materials mechanical protection. Types of cables used in internal wiring, multi-stranded cables, voltage grinding of cables, general specifications of cables.

2. 2 ACCESSORIES: Main switch and distribution boards, conduits, conduit accessories and fittings, lighting accessories and fittings, fuses, important definitions, determination of size of fuse — wire, fuse units. Earthing conductor, earthing, IS specifications regarding earthing of electrical installations, points to be earthed. Determination of size of earth wire and earth plate for domestic and industrial installations. Material required for GI pipe earthing.

2. 3 LIGHTING SCHEME: Aspects of good lighting services. Types of lighting schemes, design of lighting schemes, factory lighting, public lighting installations, street lighting, general rules for wiring, determination of number of points (light, fan, socket, outlets), determination of total load, determination of Number of sub-circuits.

3. INTERNAL WIRING

3 . 1 Type of internal wiring, cleat wiring, CTS wiring, wooden casing capping, metal sheathed wiring, conduit wiring, their advantage and disadvantages comparison and applications.

3 . 2 Prepare one estimate of materials required for CTS wiring for small domestic installation of one room and one verandah within 25 m^2 with given light, fan & plug points.

3 . 3 Prepare one estimate of materials required for conduit wiring for small domestic installation of one room and one verandha within 25 m^2 with given light, fan & plug points.

3 . 4 Prepare one estimate of materials required for concealed wiring for domestic installation of two rooms and one latrine, bath, kitchen & verandah within 80m^2 with given light, fan & plug points.

3 . 5 Prepare one estimate of materials required for erection of conduct wiring to a small workshop installation about 30m^2 and load within 10 KW.

4. OVER HEAD INSTALLATION

4.1. Main components of overhead lines, line supports, factors Governing Height of pole, conductor materials, determination of size of conductor for overhead transmission line, cross arms, pole brackets and clamps, guys and stays, conductors configurations, spacing and clearances, span lengths, overhead line insulators, types of insulators, lighting arresters, danger plates, anti-climbing devices, bird guards, beads of jumpers, jumpers, tee-offs, guarding of overhead lines.

4.2. Prepare an estimate of materials required for LT distribution line within load of 100 KW maximum and standard spans involving calculation of the size of conductor (from conductor chart), current carrying capacity and voltage regulation

consideration using ACSR.

4.3. Prepare an estimate of materials required for LT distribution line within load of 100 KW maximum and standard spans involving calculation of the size of conductor (from conductor chart), current carrying capacity and voltage regulation consideration using ACSR.

4.4. Prepare an estimate of materials required for HT distribution line (11 KV) within 2 km and load of 2000 KVA maximum and standard spans involving calculation of the size of conductor (from conductor chart), current carrying capacity and voltage regulation of the size of conductor (from conductor chart), current carrying capacity and voltage regulation consider action using ACSR.

5. OVER HEAD SERVICE LINES

5.1 Components of service lines, service line (cables and conductors), bearer wire, lacing rod. Ariel fuse, service support, energy box and meters etc.

5.2 Prepare and estimate for providing single phase supply of load of 5 KW (light, fan, socket) to a single stored residential building.

5.3 Prepare and estimate for providing single phase supply load of 3KW to each floor of a double stored building having separate energy meter.

5.4 Prepare one estimate of materials required for service connection to a factory building with load within 15 KW using insulated wire.

5.5 Prepare one estimate of materials required for service connection to a factory building with load within 15 KW using bare conductor and insulated wire combined.

6. ESTIMATING FOR DISTRIBUTION SUBSTATIONS

6.1 Prepare one materials estimate for following types of transformer substations.

6.1.1 Pole mounted substation.

6.1.2 Plinth Mounted substation.

Syllabus coverage up to Internal assessment

Chapters: 1, 2 and 3.

Learning Resources:

Sl.No	Name of Authors	Title of the Book	Name of Publisher
1	Surjit Singh	Electrical Installation and Estimating	Dhanpatrai and sons
2	J B Gupta	A course in Electrical Installation, Estimating and costing	S K Kataria and Sons
3	N. Alagappan S.Ekambaram	Electrical Estimating and Costing	TATA McGRAW HILL

Th2. SWITCH GEAR AND PROTECTIVE DEVICES

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	6th
Total Period:	75	Examination	3 hrs
Theory periods:	4P / week	Class Test:	20
Tutorial:	1P / week	End Semester Examination:	80
Maximum marks:	100		

A. RATIONALE:

Switch gear and protection plays an important role in the protection of electrical power system. Since the demand of electrical power is increasing the job of generation, transmission & distribution of electrical energy is becoming very completed. To maintain the energy supply to the consumer switching producer with protection is to be maintained moreover new models of switch gear and protection circuits are also being developed. The use of interconnection bus with National power grid type of switch gear and protecting devices need to be trained in proper manners. In the subject information on above context has been included so that the updated knowledge can be given to the students.

B. OBJECTIVE:

After completion of this subject the student will be able to know:

1) The basic principles of protection of alternator, transformer and feeders.
2) Fuse and Circuit breaker.
3) Protective Relay.
4) Lighting Arrestor.
5) Calculation of symmetrical fault current.

C. Topic wise distribution of periods:

Sl. No.	Topics	Period
1	Introduction to switchgear	6
2	Fault calculation	10
3	Fuses	6
4	Circuit breakers	10
5	Protective relays	8
6	Protection of electrical power equipment and lines	6
7	Protection against over voltage and lighting	8
8	Static relay	6
	Total:	**75**

D. COURSE CONTENTS:

1. INTRODUCTION TO SWITCHGEAR

1.1 Essential Features of switchgear.
1.2 Switchgear Equipment.
1.3 Bus-Bar Arrangement.
1.4 Switchgear Accommodation.
1.5 Short Circuit.
1.6 Short circuit.
1.7 Faults in a power system.

2. FAULT CALCULATION

2.1 Symmetrical faults on 3-phase system.
2.2 Limitation of fault current.

2.3 Percentage Reactance.
2.4 Percentage Reactance and Base KVA.
2.5 Short – circuit KVA.
2.6 Reactor control of short circuit currents.
2.7 Location of reactors.
2.8 Steps for symmetrical Fault calculations.
2.9 Solve numerical problems on symmetrical fault.

3. FUSES

3.1 Desirable characteristics of fuse element.
3.2 Fuse Element materials.
3.3 Types of Fuses and important terms used for fuses.
3.4 Low and High voltage fuses.
3.5 Current carrying capacity of fuse element.
3.6 Difference Between a Fuse and Circuit Breaker.

4. CIRCUIT BREAKERS

4.1 Definition and principle of Circuit Breaker.
4.2 Arc phenomenon and principle of Arc Extinction.
4.3 Methods of Arc Extinction.
4.4 Definitions of Arc voltage, Re-striking voltage and Recovery voltage.
4.5 Classification of circuit Breakers.
4.6 Oil circuit Breaker and its classification.
4.7 Plain brake oil circuit breaker.
4.8 Arc control oil circuit breaker.
4.9 Low oil circuit breaker.
4.10 Maintenance of oil circuit breaker.
4.11 Air-Blast circuit breaker and its classification.
4.12 Sulphur Hexa-fluoride (SF6) circuit breaker.
4.13 Vacuum circuit breakers.
4.14 Switchgear component.
4.15 Problems of circuit interruption.
4.16 Resistance switching.
4.17 Circuit Breaker Rating.

5. PROTECTIVE RELAYS

5.1 Definition of Protective Relay.
5.2 Fundamental requirement of protective relay.
5.3 Basic Relay operation
  5.3.1. Electromagnetic Attraction type
  5.3.2. Induction type
5.4 Definition of following important terms
5.5 Definition of following important terms.
  5.5.1. Pick-up current.
  5.5.2. Current setting.
  5.5.3. Plug setting Multiplier.
  5.5.4. Time setting Multiplier.
5.6 Classification of functional relays
5.7 Induction type over current relay (Non-directional)
5.8 Induction type directional power relay.
5.9 Induction type directional over current relay.

5.10 Differential relay
5.10.1. Current differential relay
5.10.2. Voltage balance differential relay.
5.11 Types of protection

6. PROTECTION OF ELECTRICAL POWER EQUIPMENT AND LINES

6.1 Protection of alternator.
6.2 Differential protection of alternators.
6.3 Balanced earth fault protection.
6.4 Protection systems for transformer.
6.5 Buchholz relay.
6.6 Protection of Bus bar.
6.7 Protection of Transmission line.
6.8 Different pilot wire protection (Merz-price voltage Balance system)
6.9 Explain protection of feeder by over current and earth fault relay.

7. PROTECTION AGAINST OVER VOLTAGE AND LIGHTING

7.1. Voltage surge and causes of over voltage.
7.2. Internal cause of over voltage.
7.3. External cause of over voltage (lighting)
7.4. Mechanism of lightning discharge.
7.5. Types of lightning strokes.
7.6. Harmful effect of lightning.
7.7. Lightning arresters and Type of lightning Arresters.
7.7.1. Rod-gap lightning arrester.
7.7.2. Horn-gap arrester.
7.7.3. Valve type arrester.
7.8. Surge Absorber

8. STATIC RELAY:

8.1 Advantage of static relay.
8.2 Instantaneous over current relay.
8.3 Principle of IDMT relay.

Syllabus coverage up to Internal assessment

Chapters: 1, 2, 3 and 4.

Learning Resources:			
Sl.No	**Title of the Book**	**Name of Authors**	**Publisher**
1	Principle of power system	V. K. Mehta	S Chand
2.	Protection and Swwitchgear	Bhavesh Bhalja R.P Maheshwari Nilesh G. Chothani	OXFORD
2	Electrical power	Soni, Gupta and Bhatnagar	Dhanpat Rai & Sons
3	Power system protection & switch gear	Bhuvanesh Oza	TMH
4	Electrical Power	S. L. Uppal	Khanna Publisher
5	Protection and Switchgear	Raghuraman	SCITECH

Th3.CONTROL SYSTEM ENGINEERING

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	6th
Total Period:	75	Examination	3 hrs
Theory periods:	4 P / week	Class Test:	20
Tutorial:	1 P / week	End Semester Examination:	80
Maximum marks:	100		

A. RATIONALE:

Automatic control has played a vital role in modern Engineering and Science. It has become an indispensable part of modern manufacturing and industrial process. So knowledge of automatic control system is dreadfully essential on the part of an Engineer. Basic approach to the automatic control system has been given in the subjects, so that students can enhance their knowledge in their future professional carrier.

B. OBJECTIVE:

Study of ‗Control System' enhances the ability of the student on:

1. Acquire knowledge about Mathematical modeling, Block diagram algebra, signal flow graphs and control system components.
2. Ability to deal with time response analysis of various systems.
3. Finding out steady state error and error constants.
4. Acquire knowledge about the analysis of stability in Root locus technique.
5. Learning about frequency response analysis of control system.
6. To use Bode plot and Nyquist plot for judgments about stability of a system.

C. Topic wise distribution of periods:

Sl. No.	Topics	Periods
1.	Fundamental of control system	04
2.	Mathematical model of a system	04
3.	Control system components	04
4.	Block diagram algebra & signal flow graphs	08
5.	Time response analysis	10
6.	Analysis of stability by root locus technique	10
7.	Frequency response of system	10
8.	Nyquist plot	10
	Total	**60**

D. COURSE CONTENTS

1. FUNDAMENTAL OF CONTROL SYSTEM

1.1. Classification of Control system
1.2. Open loop system & Closed loop system and its comparison
1.3. Effects of Feed back
1.4. Standard test Signals(Step, Ramp, Parabolic, Impulse Functions)
1.5. Servomechanism

2. MATHEMATICAL MODEL OF A SYSTEM

2.1. Transfer Function & Impulse response,
2.2. Properties, Advantages & Disadvantages of Transfer Function
2.3. Poles & Zeroes of transfer Function
2.4. Simple problems of transfer function of network.
2.5. Mathematical modeling of Electrical Systems(R, L, C, Analogous systems)

3. CONTROL SYSTEM COMPONENTS

3.1. Components of Control System
3.2. Gyroscope, Synchros, Tachometer, DC servomotors, Ac Servomotors.

4. BLOCK DIAGRAM ALGEBRA & SIGNAL FLOW GRAPHS

4.1. Definition: Basic Elements of Block Diagram
4.2. Canonical Form of Closed loop Systems
4.3. Rules for Block diagram reduction
4.4. Procedure for of Reduction of Block Diagram
4.5. Simple Problem for equivalent transfer function
4.6. Basic Definition in Signal Flow Graph & properties
4.7. Construction of Signal Flow graph from Block diagram
4.8. Mason‘s Gain formula
4.9. Simple problems in Signal flow graph for network

5. TIME RESPONSE ANALYSIS.

5 . 1 Time response of control system.
5 . 2 Standard Test signal.
  5.2.1. Step signal,
  5.2.2. Ramp Signal
  5.2.3. Parabolic Signal
  5.2.4. Impulse Signal
5 . 3 Time Response of first order system with:
  5.3.1. Unit step response
  5.3.2. Unit impulse response.
5 . 4 Time response of second order system to the unit step input.
  5.4.1. Time response specification.
  5.4.2. Derivation of expression for rise time, peak time, peak overshoot, settling time and steady state error.

5.4.3. Steady state error and error constants.

5 . 5 Types of control system.[Steady state errors in Type-0, Type-1, Type-2 system]

5 . 6 Effect of adding poles and zero to transfer function.

5 . 7 Response with P, PI, PD and PID controller.

6. ANALYSIS OF STABILITY BY ROOT LOCUS TECHNIQUE.

6 . 1 Root locus concept.

6 . 2 Construction of root loci.

6 . 3 Rules for construction of the root locus.

6 . 4 Effect of adding poles and zeros to G(s) and H(s).

7. FREQUENCY RESPONSE ANALYSIS.

7 . 1 Correlation between time response and frequency response.

7 . 2 Polar plots.

7 . 3 Bode plots.

7 . 4 All pass and minimum phase system.

7 . 5 Computation of Gain margin and phase margin.

7 . 6 Log magnitude versus phase plot.

7 . 7 Closed loop frequency response.

8. NYQUIST PLOT

8.1 Principle of argument.

8.2 Nyquist stability criterion.

8.3 Niquist stability criterion applied to inverse polar plot.

8.4 Effect of addition of poles and zeros to G(S) H(S) on the shape of Niquist plot.

8.5 Assessment of relative stability.

8.6 Constant M and N circle

8.7 Nicholas chart.

Syllabus coverage up to Internal assessment

Chapters: 1, 2, 3, 4 and 5.

Learning Resources:			
Sl.No	**Title of the Book**	**Name of Authors**	**Name of Publisher**
1.	Control System	A. Ananda Kumar	PHI
3.	Control System	K. Padmanavan	IK
2.	Control system Engineering	I. J. Nagarath, M. Gopal	WEN
4.	Control system Engineering	A Natrajan,Ramesh Babu	Scientific
5.	Control Systems	D N Manik	Cengage
6.	Control Systems	S P Eugene Xavier, J Joseph Cyril Babu	S Chand

Th4.TESTING AND MAINTENANCE OF ELECTRICAL MACHINE

(Elective- A)

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	6th
Total Period:	75	Examination	3 hrs
Theory periods:	4 P / week	Class Test:	20
Tutorial:	1 P / week	End Semester Examination:	80
Maximum marks:	100		

A. RATIONALE:

This subject intends to be acquainted with application level technology, normally adopted in Industries, commercial, public utility departments such as Electrical transmission and distribution, Irrigation, Water supply etc. The knowledge in this subject will make the readers able for inspection, testing, installation and commissioning of electrical machines as per IS standards. This will help him to initiate total productive maintenance.

B. OBJECTIVE:

After completion of this subject the student will be able to:

1. To acquire knowledge on safety measures and precautions.
2. Testing of DC and AC rotating machines and transformers.
3. Identify common troubles in Electrical machines and switch gear.
4. Plan and carryout routine and preventive maintenance.
5. Install LV switch gear and maintain it.
6. Ascertain the condition of insulation and varnishing. (if necessary)
7. Initiate total productive maintenance.

C. Topic wise distribution of periods:

Sl. No.	Topics	Periods
1.	Installation, Commissioning and Testing of Machine	15
2.	Installation, Commissioning and Testing of Transformer	15
3.	Installation, Commissioning & Testing of Sub-station.	15
4.	Maintenance	15
	Total	**60**

D. COURSE CONTENTS

1. Installation, Commissioning and Testing of Machine:

1.1. Inspection of arrival of machine and inspection procedure before its installation.
1.2. Generalized procedure of installation of Electrical machines.
1.3. Electric wiring for motors and switch gears.
1.4. General requirement for Electric Installation according to Indian Electricity rules.
1.5. Necessity of starters and relays for both DC and AC machines.
1.6. Testing before giving supply and testing report.

2. Installation, Commissioning and Testing of Transformer:

2. 1 Basic idea on dispatch, inspection, storage and handling of transformer.
2. 2 Civil construction feature regarding connection like ventilation, noise level, space for free movement.
2. 3 Foundation and drainage of oil.
2. 4 Cabling and cable box for transformer.
2. 5 Provision for fire protection.
2. 6 Provision for bushing support location of switch gear.
2. 7 Steps for commissioning fitting of all accessories.
2. 8 Filling of oil, drying out.
2. 9 Charging the breather with fresh silica gel.
2. 10 Cleaning of bushing, fixing of conductor & cables, earthing of tank and cover, neutral earthing.
2. 11 Fixing of protection circuits and setting of relays.

3. Installation, Commissioning & Testing of Sub-station.

3 . 1 Design and planning of indoor substation.
3 . 2 General requirement of layout of indoor substation with key diagram.
3 . 3 Consideration of safe operation of substation
3 . 4 Installation of outdoor substation:
3.4.1 Selection of site, transport & receipt of transformer, checking of insulation resistance of the winding, testing of transformer oil, protection fittings, construction of mounting, earthing arrangement and final commissioning.
3 . 5 Testing and commissioning of substation.
3.5.1. Installation of control and relay panels.
3.5.2. Preliminary preparation.
3.5.3. Sequence card for erection of switch gear equipments.
3.5.4. Location of place
3.5.5. Unpacking
3.5.6. Foundation
3.5.7. Erection
3.5.8. Relays
3 . 6 Bus-bar earthing connection, Earthing.
8.3.1. Connection to main cable.
3.6.2. Safety precaution
3 . 7 Installation of outdoor circuit breaker:
3.7.1. Receipt and storage.

3.7.2. Civil works.
3.7.3. Various steps for installation.
3 . 8 Pre-commissioning tests.

4. Maintenance:

4.1 Fundamental of maintenance.
4.2 Preventive maintenance and planning.
[Daily, Weekly, Monthly, Half-yearly and Yearly maintenance.]
4.3 Advantages of Preventive maintenance:
4.4 Breakdown maintenance: List of tools / instruments and materials used for maintenance.
4.5 Making or Preparing Maintenance schedule of DC machines, Induction machines, Synchronous machines, Transformer, Transmission line, Distribution lines, Underground cables, Circuit breakers, Switch gear and protective relays and substations, SF-6 circuit breakers, Batteries in substation.

Syllabus coverage up to Internal assessment

Chapters: 1, and 2.

Learning Resources:			
Sl.No	**Title of the Book**	**Name of Authors**	**Name of Publisher**
1	Installation Commissioning & Maintenance of Electrical Equipments	Tarlok Singh	S. K. Kataria & Sons
2.	Installation Servicing and Maintenance	S N Bhattacharya	S Chand
3.	Testing Commissioning Operation and Maintenance of Electrical Equipments	S Rao	Khanna Publisher
4.	Hand book of Inspection, for all type of Electrical Instruments	Er. R. N. Sahoo	Orissa Power Generation consultants and services
5.	Installation, Maintenance and Repair of Electrical Machines and Equipments	Madhvi Gupta	Katson Books

Th4. RENEWABLE ENERGY SYSTEMS
(Elective – B)

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	6th
Total Period:	75	Examination	3 hrs
Theory periods:	4 P / week	Class Test:	20
Tutorial:	1 P / week	End Semester Examination:	80
Maximum marks:	100		

A. RATIONALE:

It is well known that a plenty of energy is needed to sustain industrial growth and agricultural production. The existing sources energy such as coal, oil, uranium etc may not be sufficient to meet the ever increasing energy demands. These conventional sources of energy are also depleting and may be exhausted at the end of the century or the beginning of the next century.

Consequently sincere efforts shall have to be made by the scientists and engineers in exploring the possibilities of harnessing energy from several energy sources.

B. OBJECTIVE:

After completion of this subject the student will be able:

1. Power production from pollution free forces and environment friendly resources.
2. Production of power form nature at free of cost.
3. Solar energy conversion is noiseless and cheap.

C. Topic wise distribution of periods:

Sl. No.	Topics	Periods
1.	Introduction to Renewable energy	5
2.	Solar Energy	15
3.	Wind Energy	12
4.	Biomass Power	12
5.	Other Energy Sources	16
	Total	**60**

D. COURSE CONTENTS

1. Introduction to Renewable energy:

1.1. Environmental consequences of fossil fuel use.
1.2. Importance of renewable sources of energy.
1.3. Sustainable Design and development.
1.4. Types of RE sources.
1.5. Limitations of RE sources.
1.6. Present Indian and international energy scenario of conventional and RE sources

2. Solar Energy:

2.1. Solar photovoltaic system-Operating principle.

2.2. Photovoltaic cell concepts

2.2.1. Cell, module, array, Series and parallel connections. Maximum power point tracking (MPPT).

2.3. Classification of energy Sources.

2.4. Extra-terrestrial and terrestrial Radiation.

2.5. Azimuth angle, Zenith angle, Hour angle, Irradiance, Solar constant.

2.6. Solar collectors, Types and performance characteristics,

2.7. Applications: Photovoltaic - battery charger, domestic lighting, street lighting, water pumping, solar cooker, Solar Pond.

3. Wind Energy:

3.1. Introduction to Wind energy.

3.2. Wind energy conversion.

3.3. Types of wind turbines

3.4. Aerodynamics of wind rotors.

3.5. Wind turbine control systems; conversion to electrical power:

3.6. Induction and synchronous generators.

3.7. Grid connected and self excited induction generator operation.

3.8. Constant voltage and constant frequency generation with power electronic control.

3.9. Single and double output systems.

3.10. Characteristics of wind power plant.

4. Biomass Power:

4.1. Energy from Biomass.

4.2. Biomass as Renewable Energy Source

4.3. Types of Biomass Fuels - Solid, Liquid and Gas.

4.4. Combustion and fermentation.

4.5. Anaerobic digestion.

4.6. Types of biogas digester.

4.7. Wood gassifier.

4.8. Pyrolysis,.

4.9. Applications: Bio gas, Bio diesel

5. Other Energy Sources

5.1. Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems.

5.2. Ocean Thermal Energy Conversion (OTEC).

5.3. Geothermal Energy – Classification.

5.4. Hybrid Energy Systems.

5.5. Need for Hybrid Systems.

5.6. Diesel-PV, Wind-PV, Microhydel-PV.

5.7. Electric and hybrid electric vehicles.

<u>Syllabus coverage up to Internal assessment</u>

Chapters: 1, 2 and 3.

Learning Resources:			
Sl.No	**Title of the Book**	**Name of Authors**	**Name of Publisher**
1.	*Renewable Energy Sources and Emerging Technologies*	*D.P.Kothari, K.C Singal, Rakesh Ranjan*	*PHI Learning Pvt.Ltd, New Delhi*
2.	*Non-Conventional Energy Resources*	*B.H.Khan*	*Tata McGrawHill*
3	*Non-Conventional Energy Resources*	*J.P Navani & Sonal Sapra*	*S chand*
4.	*Non Conventional Energy sources and Utilisation*	*R K Rajput*	*S Chand*
5	*Wind Electrical Systems*	*S. N. Bhadra, D. Kastha, S. Banerjee*	*Oxford Univ. Press, New Delhi*
6.	*Non Conventional Energy Resources*	*N K Bansal*	*S Chand*

Th4. ELECTRIC VEHICLES

(Elective- C)

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester:	6th
Total Period:	75	Examination:	3 hrs
Theory periods:	4 P / week	Class Test:	20
Tutorial:	1 P / week	End Semester Examination:	80
Maximum marks:	100		

A. RATIONALE:

The sole objective of this subject to be familiar with advanced Electric drive vehicle technology, its economic analysis, comparative study and environmental aspects.

B. OBJECTIVE:

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry oriented COs associated with the above mentioned competency:

a) Interpret the salient features of Hybrid electric vehicles.
b) Interpret the Dynamics of hybrid and Electric vehicles
c) Maintain the DC-DC converters in EV applications.
d) Maintain the DC-AC converters in EV applications
e) Select the batteries for EV applications, its charging.

C. Topic wise distribution of periods:

Sl. No.	Topics	Periods
1.	Introduction to Hybrid Electric Vehicles	10
2.	Dynamics of hybrid and Electric vehicles	10
3.	DC-DC Converters for EV and HEV Applications	15
4.	DC-AC Inverter & Motors for EV and HEVs	15
5.	Batteries	10
	Total	**60**

D. COURSE CONTENTS

Unit – I Introduction to Hybrid Electric Vehicles

Evolution of Electric vehicles, Advanced Electric drive vehicle technology Vehicles- Electric vehicles (EV), Hybrid Electric drive (HEV), Plug in Electric vehicle (PIEV), Components used Hybrid Electric Vehicle ,Economic and environmental impacts of Electric hybrid vehicle Parameters affecting Environmental and economic analysis. Comparative study of vehicles for economic, environmental aspects.

Unit – II Dynamics of hybrid and Electric vehicles

General description of vehicle movement, Factors affecting vehicle motion- Vehicle resistance, tyre ground adhesion, rolling resistance, aerodynamic drag, equation of grading resistance, dynamic equation. Drive train configuration, Automobile power train, classification of vehicle power plant. Performance characteristics of IC engine, electric motor, need of gear box. Classification of motors used in Electric vehicles. Basic architecture of hybrid drive trains, types of HEVs Energy saving potential of hybrid drive trains ,HEV Configurations-Series, parallel, Series-parallel, complex.

Unit– III DC-DC Converters for EV and HEV Applications

EV and HEV configuration based on power converters, Classification of converters — unidirectional and bidirectional, Principle of step down operation, Boost and Buck- Boost converters, Principle of Step-Up operation, Two quadrant converters; multi quadrant converters, Electrical Engineering Curriculum Structure 210.

Unit– IV DC-AC Inverter & Motors for EV and HEVs

DC-AC Converters, Principle of operation of half bridge DC-AC inverter (R load, R-L load), Single phase Bridge DC-AC inverter with R load, R-L load, Electric Machines used in EVs and HEVs, principle of operation, working & control , Permanent magnet motors, their drives, switched reluctance motor, Characteristics and applications of above motors.

Unit– V Batteries

Overview of batteries, Battery Parameters, types of batteries, Battery Charging, alternative novel energy sources-solar photovoltaic cells, fuel cells, super capacitors, flywheels , Control system for EVs and HEVs, overview, Electronic control unit ECU, Schematics of hybrid drive train, control architecture Regenerative braking in EVs.

Syllabus coverage up to Internal assessment

Unit: 1,2

Learning Resources:			
Sl.No	**Title of the Book**	**Name of Authors**	**Name of Publisher**
1	Electric & Hybrid Vehicles	A.K. Babu	Khanna Publishing House
2.	A. E. Hybrid Vehicles and the Future of Personal Transportation	Fuhs	CRC Press
3.	I. *Electric and Hybrid Electric Vehicles*	Husain	CRC Press
4.	*Modern Electric Vehicle Technology*	Chan C. C. and K. T. Chau	Oxford Science Publication,
5.	M. H. *Power Electronics: Circuits, Devices and Applications*,	Rashid	3rd edition, Pearson,

Pr1.ELECTRICAL WORKSHOP PRACTICE

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	6th
Total Period:	90	Examination	3 hrs
Lab. periods:	6 P / week	Sessional:	50
Maximum marks:	150	End Semester Examination:	100

A. **RATIONALE:** The sole objective of the subject is skill development among the students after performing practice of the experiments and become fit to meet the challenges in practical installation.
In the beginning all the tools and instruments required/ used in conducting this subject are to be illustrated. The students are required to make a thorough hand on approach in practicing the experiments.

B. **OBJECTIVE:**
After completion of this workshop the student will be able to:
1. To be familiar with different cable and overhead line joints.
2. To be familiar with Electrical installation of residential building and to identify and maintenances of different electrical gadgets.
3. Fault finding, repairing of DC and AC machines with their accessories.

C. **LIST OF EXPERIMENT:**

1. Identification of single core (SC), twin core (TC), three cores (3c), four cores (4c); copper and aluminum PVC, VIR & Weather proof (WP) wire and prepare Britannia T- joint and Married joint.
2. Cutting copper and aluminum cable and crimping lug to them from 2.5mm^2 to 6 mm^2 cross section.
3. Connection and testing of fluorescent tube light, high pressure M.V. lamp, sodium vapor lamp, M.H lamp, CFL and latest model lamps — measure inductance, Lux/ lumens (intensity of illumination) in each case-prepare lux table .
4. Study battery charger and make charging of lead acid battery (record charging voltage, current and specific gravity).
5. Erection of residential building wiring by CTS and conduit wiring system using main two points and test installation by test lamp method and a meggar.
6. Fault finding & repairing of Ceiling Fan – prepare an inventory list of parts.
7. Find out fault of D.C. generator, repair and test it to run.
8. Find out fault of D.C. motor starters and A.C motor starter — prepare an inventory list of parts used in different starters.
9. Dismantle, over haul and assemble a single phase induction motor. Test and run it. — prepare an inventory list.
10. Dismantle over haul and assemble a three phase squirrel cage and phase wound motor. Test and run them.
11. Overhaul a single phase and 3-phase variac.

Pr2. PROJECT Phase - II

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	6th
Total Period:	120	Examination	3 hrs
Lab. periods:	8 P / week	Sessional	50
Maximum marks:	150	End Sem Examination	100

RATIONALE

Students' Project Work aims at developing innovative skills in the students whereby they apply the knowledge and skills gained through the course covered in many subjects and Labs, by undertaking a project. The prime emphasis of the project work is to understand and apply the basic knowledge of the principles of Electrical engineering and practices in real life situations, so as to participate and manage a large Electrical engineering projects, in future. Entire Project spreads over 5th and 6th Semester. Part of the Project covered in 5th Semester was named as *Project Phase-I* and balance portion to be covered in 6th Semester shall be named as *Project Phase-II*.

OBJECTIVES

After undergoing the Project Work, the student will be able to:

- Implement the theoretical and practical knowledge and skills gained through various subjects/courses into an application suitable for a real practical working environment, preferably in an industrial environment.
- Develop software packages or applications and implement these for the actual needs of the community/industry.
- Identify and contrast gap between the technological knowledge acquired through curriculum and the actual industrial need and to compensate it by acquiring additional knowledge as required.
- Carry out cooperative learning through synchronous guided discussions within the class in key areas, asynchronous document sharing and discussions, as well as prepare collaborative edition of the final project report.
- To achieve real life experience in Project design.
- To develop the skill of writing Project Report

Project Phase-I and Phase-II

The Project work duration covers 2 semesters(5th and 6th sem). The Grouping of students, selection of Project, assignment of Project Guide to the Group was done in the beginning of 5th semester under Project Phase-I. The students were allowed to study literature, any existing system and then define the Problem/objective of the Project. Preliminary work and Design of the system also have to be complete in Phase-I. Development may also begin in this phase. Project Milestones are to be set so that progress can be tracked .

In Phase-II Development, Testing, Documentation and Implementation have to be complete. Project Report have to be prepared and complete in Phase-II. All Project reports should be organized uniformly in proper order, irrespective of group. Teacher Guides can make suitable

alteration in the components of Task and schedule.
At the end of Project Phase-II in 6th semester there shall be one presentation by each group on whole Project work undertaken by them.

A suggestive criterion for assessing student performance by the external (preferably person from industry) and internal (teacher) examiner is given in table below:

Sl. No.	**Performance Criteria**
1.	Selection of project assignment
2.	Planning and execution of considerations
3.	Quality of performance
4.	Providing solution of the problems or production of final product
5.	Sense of responsibility
6.	Self expression/ communication/ Presentation skills
7.	Interpersonal skills/human relations
8.	Report writing skills
9	Viva voce

The teachers are free to evolve other criteria of assessment, depending upon the type of project work.
It is proposed that the institute may organize an annual exhibition of the project work done by the students and invite leading Industrial organisations to such an exhibition.

The Project Report need to be prepared as per standard format and following is the indicative format. The Teacher Guide may make minor alteration keeping the sense in tact.

Organization of Project Report

1. Cover page:
   It should contain the following (in order)
   (i) Title of the Project
   (ii) —Submitted in partial fulfillment of the requirements for the Diploma in <Branch Name>ll
   (iii) By Name of the Student(s)
   (iv) Logo of the Institution
   (v) Branch Name/Depart Name and Institution Name with Address
   (vi) Academic Year
2. 1st Inner page
   Certificate:

It should contain he following

—This is to certify that the work in this Project Report entitled <Project Title> by <Name of student(s)> has been carried out under my supervision in partial fulfillment of the requirements for the Diploma in <Branch Name>‖ during session <session > in <Branch /Department Name> of <Institute name> and this work is the original work of the above student(s).

Seal and signature of the Supervisor/Guide with date

3. 2nd Inner Page
   Acknowledgement by the Student(s)
4. Contents.
5. Chapter wise arrangement of Reports
6. Last Chapter: Conclusion
   It should contain
   (i) Conclusion
   (ii) Limitations
   (iii) Scope for further Improvement
7. References

Pr-3 LIFE SKILL

(Common to All Branches)

Practical	**2 Periods/ week**	**Sessional**	**50 Marks**
Total Periods	**30 Periods**	**Total Marks**	**50 Marks**

Objective: After completion of this course the student will be able to**:**

- Develop team spirit i.e. concept of working in team
- Apply problem solving skills for a given situation
- Use effective presentation techniques
- Apply task management techniques for given projects
- Enhance leadership traits
- Resolve conflict by appropriate method
- Survive self in today‘s competitive world
- Face interview without fear

DETAIL CONTENTS:

1. SOCIAL SKILL

Society, Social Structure, Develop Sympathy and Empathy
Swot Analysis — Concept, How to make use of SWOT
Inter personal Relation**:** Sources of conflict, Resolution of conflict ,
Ways to enhance interpersonal relation

2. PROBLEM SOLVING

Steps of Problem solving**:**

- Identify and clarify the problem,
- Information gathering related to problem,
- Evaluate the evidence,
- Consider alternative solutions and their implications,
- Choose and implement the best alternative,
- Review
- Problem solving techniques:

1) Trial and error, 2) Brain storming, 3) Lateral (Out of Box) thinking

3. PRESENTATION SKILL

Body language , Dress like the audience
Posture, Gestures, Eye contact and facial expression. STAGE FRIGHT,
Voice and language — Volume, Pitch, Inflection, Speed, Pause
Pronunciation, Articulation, Language, Practice of speech.
Use of AV aids such as Laptop with LCD projector, white board etc.

4. GROUP DISCUSSION AND INTERVIEW TECHNIQUES

Group Discussion:
Introduction to group discussion, Ways to carry out group discussion,

Parameters— Contact, body language, analytical and logical thinking,
decision making
Interview Technique :
Dress, Posture, Gestures, facial expression, Approach
Tips for handling common questions.

5. WORKING IN TEAM

Understand and work within the dynamics of a groups.
Tips to work effectively in teams,
Establish good rapport, interest with others and work effectively with them
to meet common objectives,
Tips to provide and accept feedback in a constructive and considerate way ,
Leadership in teams, Handling frustrations in group.

6. TASK MANAGEMENT

Introduction, Task identification, Task planning ,
organizing and execution, Closing the task

PRACTICAL

List of Assignment: *(Any Five to be performed including Mock Interview)*

1. SWOT analysis:-

Analyse yourself with respect to your strength and weaknesses, opportunities and threats. Following points will be useful for doing SWOT.

a) Your past experiences,
b) Achievements,
c) Failures,
d) Feedback from others etc.

2. Solve the True life problem assigned by the Teacher.

3. Working in a Team

Form a group of 5-10 students and do a work for social cause e.g. tree plantation, blood donation, environment protection, camps on awareness like importance of cleanliness in slum area, social activities like giving cloths to poor etc.(One activity per group where Team work shall be exhibited)

4. Mock Interview

5. Discuss a topic in a group and prepare minutes of discussion.

6. Deliver a seminar for 5 minutes using presentation aids on the topic given by your teacher.

7. Task Management

Decide any task to be completed in a stipulated time with the help of teacher. Write a report considering various steps in task management (with Break up into sub tasks and their interdependencies and Time)

Note: -1. Please note that these are the suggested assignments on given contents/topic. These assignments are the guide lines to the subject teachers. However the subject teachers are free to design any assignment relevant to the topic.

Note: -2. The following Topics may be considered for Seminar/GD in addition to other Topics

at the discretion of the Teacher.
(Comparison with developed countries, Occupational Safety, Health Hazard, Accident & Safety, First-Aid, Traffic Rules, Global Warming, Pollution, Environment, Labour Welfare Legislation, Labour Welfare Acts, Child Labour Issues, Gender Sensitisation ,Harassment of Women at Workplace)

METHODOLOGY:

The Teacher is to explain the concepts prescribed in the contents of the syllabus and then assign different Exercises under Practical to the students to perform.

Books Recommended:-

Sl.No	Name of Authors	Title of the Book	Name of the Publisher
01	E.H. Mc Grath , S.J	Basic Managerial Skills for All	PHI
02	Lowe and Phil	Creativity and problem solving	Kogan Page (I) P Ltd
03	Adair, J	Decision making & Problem Solving	Orient Longman
04	Bishop , Sue	Develop Your Assertiveness	Kogan Page India
05	Allen Pease	Body Language	Sudha Publications Pvt. Ltd.

EQUIPMENT LIST OF ELECTRICAL WORKS PRACTICE

Sl NO	EQUIPMENT LIST
1.	Single Core,Twin Core,Three Core,Four Core Copper and Aluminium PVC,VIR,and Weatherproof Wire
2.	Copper and Aluminium Cable ,Crimping Lug
3.	Flourescent Tube Light
4.	High Pressure M.V Lamp
5.	Sodium Vapour Lamp
6.	M.H Lamp
7.	CFL
8.	Battery Charger and Lead Acid Battery
9.	Single Phase Motor(Fan)
10.	DC Generator
11.	DC Motor with Starter
12.	AC Motor with Starter
13.	L.T And H.T Aluminium Cable
14.	Crimping Tools and Lug
15.	Single Phase Induction Motor
16.	Three Phase Squirrel Cage Induction Motor
17.	Phase Wound Motor
18.	Single Phase/ Three phase Variac
19.	Megger

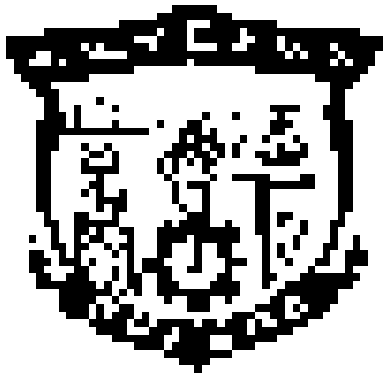
STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA									
TEACHING AND EVALUATION SCHEME FOR 3rd Semester Mechanical Engg.(wef 2019-20)									
Subject Number	Subject Code	Subject	Periods/week			Evaluation Scheme			
			L	T	P	Internal Assessment/ Sessional	End Sem Exams	Exams (Hours)	Total
		Theory							
Th.1		Production Technology	4		-	20	80	3	100
Th.2		Strength of Material	4		-	20	80	3	100
Th.3		Engineering. Material	4		-	20	80	3	100
Th.4		Thermal Engineering-I	4			20	80	3	100
Th.5		Environmental studies	4			20	80	3	100
		Total	20			100	400	-	500
		Practical							
Pr.1		Mechanical Engg. Drawing	-	-	6	25	50	3	75
Pr.2		Mechanical Engg. Lab-I	-	-	4	25	50	3	75
Pr.3		Workshop-II	-	-	6	50	50	4	100
		Student Centred Activities(SCA)		-	3	-	-	-	-
		Total	-	-	*19*	*100*	*150*	-	*250*
		Grand Total	**20**	**-**	**19**	**200**	**550**	**-**	**750**
Abbreviations: L-Lecturer, T-Tutorial, P-Practical . Each class is of minimum 55 minutes duration									
Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50% and in Aggregate is 40%									
SCA shall comprise of Extension Lectures/ Personality Development/ Environmental issues /Quiz /Hobbies/ Field visits/ cultural activities/Library studies/Classes on MOOCS/SWAYAM etc. ,Seminar and SCA shall be conducted in a section.									
There shall be 1 Internal Assessment done for each of the Theory Subject. Sessional Marks shall be total of the performance of individual different jobs/ experiments in a subject throughout the semester									

CURRICULLUM OF 3RDSEMESTER

For

DIPLOMA IN MECHANICAL ENGINEERING

(Effective FROM 2019-20 Sessions)



STATE COUNCIL FOR TECHNICAL EDUCATION & VOCATIONAL TRAINING, ODISHA, BHUBANESWAR

TH-1 PRODUCTION TECHNOLOGY

Name of the Course: Diploma in **Mech/Auto/Aero & Other Mechanical Allied Branches**

Course code:		Semester	3rd
Total Period:	60	Examination	3 hrs
Theory periods:	4 P/W	I.A	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONALE :

Production Technology involves a working knowledge in the field of product design, product development and rapid part production. It deals with the production methodology and its management to make a complete analysis on the products.

B. COURSE OBJECTIVES

At the end of the course the students will be able to

1. Understand the different components and processes involved in press tool operation.
2. Understand how to minimize the job setting and tool setting times in mass production.
3. Understand the industrial requirements of fabrication systems.
4. Understand the manufacturing processes like casting and powder metallurgy.

C. CHAPTER WISE DISTRIBUTION OF PERIODS

Sl. No.	Topic	Periods
01	Metal Forming Processes	07
02	Welding	16
03	Casting	16
04	Powder Metallurgy	07
05	Press Work	07
06	Jigs and fixtures	07
	Total Period:	60

D. COURSE CONTENTS

1.0 Metal Forming Processes

1.1 Extrusion: Definition & Classification
1.2 Explain direct, indirect and impact extrusion process.
1.3 Define rolling. Classify it.
1.4 Differentiate between cold rolling and hot rolling process.
1.5 List the different types of rolling mills used in Rolling process.

2.0 Welding

2.1 Define welding and classify various welding processes.
2.2 Explain fluxes used in welding.
2.3 Explain Oxy-acetylene welding process.
2.4 Explain various types of flames used in Oxy-acetylene welding process.
2.5 Explain Arc welding process.
2.6 Specify arc welding electrodes.
2.7 Define resistance welding and classify it.
2.8 Describe various resistance welding processes such as butt welding, spot welding, flash welding, projection welding and seam welding.

2.9 Explain TIG and MIG welding process
2.10 State different welding defects with causes and remedies.

3.0 Casting

3.1 Define Casting and Classify the various Casting processes.
3.2 Explain the procedure of Sand mould casting.
3.3 Explain different types of molding sands with their composition and properties.
3.4 Classify different pattern and state various pattern allowances.
3.5 Classify core.
3.6 Describe construction and working of cupola and crucible furnace.
3.7 Explain die casting method.
3.8 Explain centrifugal casting such as true centrifugal casting, centrifuging with advantages, limitation and area of application.
3.9 Explain various casting defects with their causes and remedies.

4.0 Powder Metallurgy

4.1 Define powder metallurgy process.
4.2 State advantages of powder metallurgy technology technique
4.3 Describe the methods of producing components by powder metallurgy technique.
4.4 Explain sintering.
4.5 Economics of powder metallurgy.

5.0 Press Work

5.1 Describe Press Works: blanking, piercing and trimming.
5.2 List various types of die and punch 7
5.3 Explain simple, Compound & Progressive dies
5.4 Describe the various advantages & disadvantages of above dies

6.0 Jigs and fixtures

6.1 Define jigs and fixtures
6.2 State advantages of using jigs and fixtures
6.3 State the principle of locations
6.4 Describe the methods of location with respect to 3-2-1 point location of rectangular jig
6.5 List various types of jig and fixtures.

Syllabus to be covered up to IA- Chapters 1, 2&3

LEARNING RESOURCES

Sl. No.	Author	Title of the book	Publisher
01	O.P. Khanna	Production Technology, Vol- I& II	Dhanpat Rai Publication
02	B.S Raghuwanshi	Workshop technology, Vol- I& II	Dhanpat Rai & Co
03	P.N. Rao	Manufacturing technology, Vol-I&II	TMH
04	P.C.Sharma	Manufacturing technology, Vol- I	S. Chand

TH-2 STRENGTH OF MATERIAL

Name of the Course: Diploma in **Mech/Auto/Aero & Other Mechanical Allied Branches**			
Course code:		Semester	3rd
Total Period:	60	Examination	3 hrs
Theory periods:	4 P/W	I.A TEST	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONALE :

Strength of material deals with the internal behaviors of solid bodies under the action of external force. The subject focuses on mechanical properties of material analysis of stress, strain and deformations. Therefore it is an important basic subject of students for Mechanical and Automobile Engg.

B. COURSE OBJECTIVES:

Students will develop ability towards

- Determination of stress, strain under uniaxial loading (due to static or impact load and temperature) in simple and single core composite bars.
- Determination of stress, strain and change in geometrical parameters of cylindrical and spherical shells due to pressure
- Realization of shear stress besides normal stress and computation of resultant stress in two dimensional objects.
- Drawing bending moment and shear force diagram and locating points in a beam where the effect is maximum or minimum.
- Determination of bending stress and torsional shear stress in simple cases
- Understanding of critical load in slender columns thus realizing combined effect of axial and bending load.

C. CHAPTER WISE DISTRIBUTION OF PERIODS

Sl. No.	Topic	Periods
01	Simple Stress & Strain	10
02	Thin cylindrical and spherical shell under internal pressure	08
03	Two dimensional stress systems	10
04	Bending moment& shear force	10
05	Theory of simple bending	10
06	Combined direct & Bending stresses	06
07	Torsion	06
	Total Period:	60

D. COURSE CONTENTS

1.0 Simple stress& strain

1.1 Types of load, stresses & strains,(Axial and tangential) Hooke's law, Young's modulus, bulk modulus, modulus of rigidity, Poisson's ratio, derive the relation between three elastic constants,

1.2 Principle of super position, stresses in composite section

1.3 Temperature stress, determine the temperature stress in composite bar (single core)

1.4 Strain energy and resilience, Stress due to gradually applied, suddenly applied and impact load

1.5 Simple problems on above.

2.0 Thin cylinder and spherical shell under internal pressure

2.1 Definition of hoop and longitudinal stress, strain

2.2 Derivation of hoop stress, longitudinal stress, hoop strain, longitudinal strain and volumetric strain

2.3 Computation of the change in length, diameter and volume

2.4 Simple problems on above

3.0 Two dimensional stress systems

3.1 Determination of normal stress, shear stress and resultant stress on oblique plane

3.2 Location of principal plane and computation of principal stress

3.3 Location of principal plane and computation of principal stress and Maximum shear stress using Mohr's circle

4.0 Bending moment& shear force

4.1 Types of beam and load

4.2 Concepts of Shear force and bending moment

4.3 Shear Force and Bending moment diagram and its salient features illustration in cantilever beam, simply supported beam and over hanging beam under point load and uniformly distributed load

5.0 Theory of simple bending

5.1 Assumptions in the theory of bending,

5.2 Bending equation, Moment of resistance, Section modulus& neutral axis.

5.3 Solve simple problems.

6.0 Combined direct & bending stresses

6.1 Define column

6.2 Axial load, Eccentric load on column,

6.3 Direct stresses, Bending stresses, Maximum& Minimum stresses. Numerical problems on above.

6.4 Buckling load computation using Euler's formula (no derivation) in Columns with various end conditions

7.0 Torsion

7.0 Assumption of pure torsion

7.1 The torsion equation for solid and hollow circular shaft

7.2 Comparison between solid and hollow shaft subjected to pure torsion

Syllabus to be covered up to I.A - Chapters 1, 2, 3&4

Learning resources:

Sl. No.	Author	Title of the book	Publisher
01	S Ramamrutham	Strength of Materials	Dhanpat Rai
02	R K Rajput	Strength of Materials	S.Chand
03	R.S khurmi	Strength of Materials	S.Chand
04	G H Ryder	Strength of Materials	Mc millon and co. lmtd
05	S Timoshenko and D H Young	Strength of Materials	TMH

TH-3 ENGINEERING MATERIAL

Name of the Course: Diploma in **Mech/Auto/Aero & Other Mechanical Allied Branches**			
Course code:		Semester	3rd
Total Period:	60	Examination	3 hrs
Theory periods:	4 P/week	IA	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONALE:

Entire field of engineering deals with use of host of materials for making objects for human need. These materials include wide spectrum of element, metals, alloys and compounds with diverse properties. It is imperative that an engineer from any field should have a good knowledge of such materials and their properties.

B. COURSE OBJECTIVES:

After completion of the course students will have the ability of

- Realizing material requirements
- Realizing application area of ferrous, non ferrous and alloys
- Comprehending micro-structural changes during iron-carbon phase transformation process
- Comprehending effect of heat treatment and its effect towards change in material properties
- Comprehending continuity during evolution in engineering materials and development of modern engineering materials.

C. CHAPTER WISE DISTRIBUTION OF PERIODS

Sl. No.	Topic	Periods
01	Engineering materials and their properties	05
02	Ferrous Materials and alloy	05
03	Iron – Carbon system	08
04	Crystal imperfections	10
05	Heat Treatment	10
06	Non-ferrous alloys	10
07	Bearing Material	03
08	Spring materials	03
09	Polymers	03
10	Composites and Ceramics	03
	Total Period:	60

D. COURSE CONTENT:

1.0 Engineering materials and their properties

1.1 Material classification into ferrous and non ferrous category and alloys
1.2 Properties of Materials: Physical , Chemical and Mechanical
1.3 Performance requirements
1.4 Material reliability and safety

2.0 Ferrous Materials and alloys

2.1 Characteristics and application of ferrous materials
2.2 Classification, composition and application of low carbon steel, medium carbon steel and High carbon steel
2.3 Alloy steel: Low alloy steel, high alloy steel, tool steel and stainless steel
2.4 Tool steel: Effect of various alloying elements such as Cr, Mn, Ni, V, Mo,

3.0 Iron – Carbon system

3.1 Concept of phase diagram and cooling curves
3.2 Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel

4.0 Crystal imperfections

4.1 Crystal defines, classification of crystals, ideal crystal and crystal imperfections
4.2 Classification of imperfection: Point defects, line defects, surface defects and volume defects
4.3 Types and causes of point defects: Vacancies, Interstitials and impurities
4.4 Types and causes of line defects: Edge dislocation and screw dislocation
4.5 Effect of imperfection on material properties
4.6 Deformation by slip and twinning
4.7 Effect of deformation on material properties

5.0 Heat Treatment

5.1 Purpose of Heat treatment
5.2 Process of heat treatment: Annealing, normalizing, hardening, tampering, stress relieving measures
5.3 Surface hardening: Carburizing and Nitriding
5.4 Effect of heat treatment on properties of steel
5.5 Hardenability of steel

6.0 Non-ferrous alloys

6.1 Aluminum alloys: Composition, property and usage of Duralmin, y- alloy.
6.2 Copper alloys: Composition, property and usage of Copper- Aluminum, Copper-Tin, Babbit , Phosperous bronze, brass, Copper- Nickel

6.3 Predominating elements of lead alloys, Zinc alloys and Nickel alloys
6.4 Low alloy materials like P-91, P-22 for power plants and other

high temperature services. High alloy materials like stainless steel grades of duplex, super duplex materials etc.

7.0 Bearing Material

7.1 Classification, composition, properties and uses of Copper base, Tin Base, Lead base, Cadmium base bearing materials

8.0 Spring materials

8.1 Classification, composition, properties and uses of Iron- base and Copper base spring material

9.0 Polymers

9.1 Properties and application of thermosetting and thermoplastic polymers

9.2 Properties of elastomers

10.0 Composites and Ceramics

10.1 Classification, composition, properties and uses of particulate based and fiber reinforced composites

10.2 Classification and uses of ceramics

Syllabus to be covered up to I.A - Chapters 1, 2, 3, 4&5

Learning resources:

Sl. No.	Author	Title of the book	Publisher
01	O P Khanna	A Textbook of Material Science and Metallurgy	Dhantpat Rai
02	R K Rajput	Engineering materials and Metallurgy	S.Chand
03	S K Hazra choudhry	Material science & process	Imdian Book Distrubuting

TH - 4 THERMAL ENGINEERING-I

Name of the Course: Diploma in **Mech/Auto/Aero & Other Mechanical Allied Branches/E&M**			
Course code:		Semester	3rd
Total Period:	60	Examination	3 hrs
Theory periods:	4 P/week	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONALE:

Thermal Engineering is the field of applied science which deals with energy possessed by heated gases and the laws which give the conversion of this energy into mechanical energy and vice versa

B. COURSE OBJECTIVES:

After the completion of the course the students will develop ability towards.

- Comprehending significance of thermodynamics properties in order to analyze a Thermodynamic system.
- Comprehending & applying first & second law of thermodynamics in closed & open system.
- Comprehending & applying gas laws applicable to perfect gas in order to determine Thermodynamic properties.
- Comprehending the concept of I.C engine and gas power cycle & computing work done & efficiency thereof.

C. CHAPTER WISE DISTRIBUTION OF PERIODS

Sl. No.	Topic	Periods
01	Thermodynamic concept & Terminology	12
02	Laws of Thermodynamics	12
03	Properties Processes of perfect gas	10
04	Internal combustion engine	08
05	Air Standard Cycle	10
06	Fuels and Combustion	08
	Total Period:	60

D. COURSE CONTENT:

1. Thermodynamic concept & Terminology

1.1 Thermodynamic Systems (closed, open, isolated)
1.2 Thermodynamic properties of a system (pressure, volume, temperature, entropy, enthalpy, Internal energy and units of measurement).
1.3 Intensive and extensive properties
1.4 Define thermodynamic processes, path, cycle , state, path function, point function.
1.5 Thermodynamic Equilibrium.
1.6 Quasi-static Process.
1.7 Conceptual explanation of energy and its sources
1.8 Work , heat and comparison between the two.
1.9 Mechanical Equivalent of Heat.
1.10 Work transfer, Displacement work

2. Laws of Thermodynamics

2.1 State & explain Zeroth law of thermodynamics.

2.2 State & explain First law of thermodynamics.
2.3 Limitations of First law of thermodynamics
2.4 Application of First law of Thermodynamics (steady flow energy equation and its application to turbine and compressor)
2.4 Second law of thermodynamics (Claucius & Kelvin Plank statements).
2.5 Application of second law in heat engine, heat pump, refrigerator & determination of efficiencies & C.O.P (solve simple numerical)

3. Properties Processes of perfect gas

3.1 Laws of perfect gas:
Boyle's law, Charle's law, Avogadro's law, Dalton's law of partial pressure, Guy lussac law, General gas equation, characteristic gas constant, Universal gas constant.
3.2 Explain specific heat of gas (Cp and Cv)
3.3 Relation between Cp & Cv.
3.4 Enthalpy of a gas.
3.5 Work done during a non- flow process.
3.6 Application of first law of thermodynamics to various non flow process (Isothermal, Isobaric, Isentropic and polytrophic process)
3.6 Solve simple problems on above.
3.7 Free expansion & throttling process.

4. Internal combustion engine

4.1 Explain & classify I.C engine.
4.2 Terminology of I.C Engine such as bore, dead centers, stroke volume, piston speed &RPM.
4.3 Explain the working principle of 2-stroke & 4- stroke engine C.I & S.I engine.
4.4 Differentiate between 2-stroke & 4- stroke engine C.I & S.I engine.

5. Gas Power Cycle

5.1 Carnot cycle
5.2 Otto cycle.
5.3 Diesel cycle.
5.4 Dual cycle.
5.5 Solve simple numerical.

6. **Fuels and Combustion**

6.1 Define Fuel.
6.2 Types of fuel.
6.3 Application of different types of fuel.
6.4 Heating values of fuel.
6.5 Quality of I.C engine fuels Octane number, Cetane number.

Syllabus to be covered up to I.A - Chapters 1, 2&3

Learning resources:

Sl. No.	Author	Title of the book	Publisher
01	R.S. Khurmi	Thermal Engineering	S.Chand
02	A.R.Basu	Thermal Engineering	Dhanpat Rai
03	A.S. Sarao	Thermal Engineering	Satya Prakash
04	P.K.Nag	Engineering Thermodynamics	TMH

05	Mahesh M Rathore	Thermal Engineering	TMH

TH.5 ENVIRONMENTAL STUDIES

(Common to All Branches)

Theory: 4 Periods per Week — I.A: 20 Marks
Total Periods: 60 Periods — End Exam : 80 Marks
Examination: 3 Hours — TOTAL MARKS : 100 Marks

A. RATIONALE:

Due to various aspects of human developments including the demand of different kinds of technological innovations, most people have been forgetting that, the Environment in which they are living is to be maintained under various living standards for the preservation of better health. The degradation of environment due to industrial growth is very much alarming due to environmental pollution beyond permissible limits in respect of air, water industrial waste, noise etc. Therefore, the subject of Environmental Studies to be learnt by every student in order to take care of the environmental aspect in each and every activity in the best possible manner.

B. OBJECTIVES:

After completion of study of environmental studies, the student will be able to:

1. Gather adequate knowledge of different pollutants, their sources and shall be aware of solid waste management systems and hazardous waste and their effects.
2. Develop awareness towards preservation of environment.

C. Topic wise distribution of periods:

Sl. No.	Topics	Period
1	The Multidisciplinary nature of environmental studies	04
2	Natural Resources	10
3	Systems	08
4	Biodiversity and it's Conservation	08
5	Environmental Pollution.	12
6	Social issues and the Environment	10
7	Human population and the environment	08
	Total:	**60**

D.COURSE CONTENT:

Unit 1: The Multidisciplinary nature of environmental studies

Definition, scope and importance, Need for public awareness.

Unit 2: Natural Resources

Renewable and non renewable resources:

a) Natural resources and associated problems.
   - Forest resources: Use and over-exploitation, deforestation, case studies, Timber extraction mining, dams and their effects on forests and tribal people.
   - Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dam's benefits and problems.
   - Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources.
   - Food Resources: World food problems ,changes caused by agriculture and overgrazing,effectsofmodernagriculture,fertilizers-pesticidesproblems, water logging, salinity,.
   - Energy Resources: Growing energy need, renewable and non-renewable energy sources, use of alternate energy sources, case studies.
   - Land Resources: Land as a resource ,land degradation ,man induces landslides, soil erosion, and desertification.

b) Role of individual in conservation of natural resources.
c) Equitable use of resources for sustainable lifestyles.

Unit 3: Systems

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers, decomposers.
- Energy flow in the ecosystems.
- Ecological succession.
- Food chains, food web sand ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following ecosystem:
- Forest ecosystem:
- Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

Unit 4: Biodiversity and it's Conservation

- Introduction-Definition: genetics, species and ecosystem diversity.
- Biogeographically classification of India.
- Value of biodiversity: consumptive use, productive use, social ethical, aesthetic and opt in values.
- Biodiversity at global, national and local level.
- Threats to biodiversity: Habitats loss, poaching of wild life, man wildlife conflicts.

Unit 5: Environmental Pollution.

Definition Causes, effects and control measures of:

a) Air pollution.
b) Water pollution.
c) Soil pollution
d) Marine pollution

e) Noise pollution.
f) Thermal pollution
g) Nuclear hazards.

Solid waste Management: Causes, effects and control measures of urban and industrial wastes.

Role of an individual in prevention of pollution.

Disaster management: Floods, earth quake, cyclone and landslides.

Unit 6: Social issues and the Environment

From unsustainable to sustainable development**.**

- Urban problems related to energy.
- Water conservation, rain water harvesting, water shed management.
- Resettlement and rehabilitation of people; its problems and concern.
- Environmental ethics: issue and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies.
- Air (prevention and control of pollution) Act.
- Water (prevention and control of pollution) Act.
- Public awareness.

Unit 7: Human population and the environment

- Population growth and variation among nations.
- Population explosion-family welfare program.
- Environment and human health.
- Human rights.
- Value education
- Role of information technology in environment and human health.

Syllabus to be covered up to I.A **Units 1, 2, 3**

Learning Resources:			
Sl.No	Title of the Book	Name of Authors	Name of Publisher
1	Text book of Environmental studies	Erach Bharucha	#UGC
2	Fundamental concepts in Environmental Studies	,D.D .Mishra	S. Chand&Co-Ltd
3	Textbook of Environmental Studies	K.Raghavan Nambiar	SCITECH Publication Pvt. Ltd.
4	Environmental Engineering	V.M.Domkundwar	- DhanpatRai&Co

MECHANICAL ENGINEERING DRAWING (PR-1)

Name of the Course: Diploma in **Mech/Auto/Aero & Other Mechanical Allied Branches**			
Course code:		Semester	3rd
Total Period:	90	Examination	3 hrs
Lab Periods:	6 P/week	Sessional:	25
Maximum marks:	75	End Semester Examination:	50

COURSE OBJECTIVES:-

Students will develop ability towards

- Recognizing significance of standardized representations
- Comprehending role of various fastening elements and offer engineering drawing thereof in manual mode
- Comprehending geometrical constraints and function of components in assemblies such as bearings and screw jack
- Comprehending functional requirement of major components and offer engineering drawing in manual mode thereof.

Chapter **Contents**

1.0 Revision of Engineering Drawing of 1st Year

2.0 Draw plan, elevation and side view of different machine elements from their isometric view using AutoCAD & mini drafter (Minimum 5 Drawings).

3.0 Engineering drawing of fastening elements in first angle orthographic Projection

3.1 Bolt, nut and threads

3.2 Cotter joint

3.3 Knuckle joint

4.0 Details to assembly

4.1 Rigid pedestal bearing

4.2 Foot step bearing

4.3 Simple Screw jack

5.0 Assembly to details

5.1 Connecting rod of IC Engine

5.2 Boiler safety valve

5.3 Spring loaded valve

5.4 Hydraulic non return valve

5.5 Flat belt pulley

Learning Resources:

Sl No.	Author Name	Name of the Book	Publisher Name
1	N D Bhatt	Machine Drawing	Charotar
2	T Jones	Machine Drawing	Kalyani
3	R K Dhawan	Machine Drawing	S.Chand
4	T. Jeypooven	Emgg. Graphics using Autocad	CBS

MECHANICAL ENGINEERING LABORATORY (PRACTICAL-2)

Name of the Course: Diploma in **Mech/Auto/Aero & Other Mechanical Allied Branches**			
Course code:		Semester	3rd
Total Period:	60	Examination	3 hrs
Lab. periods:	4 P/week	Sessional	25
Maximum marks:	75	End Semester Examination:	50

COURSE OBJECTIVES

Students will develop ability towards

- Conducting experimentations to determine properties of a solid material subject to uniaxial loading and impact
- Conducting experimentations towards determining characteristics of a fuel
- Study of equipment employing using fuels.

1. Strength of Materials and thermal Laboratory

1.1 Determine end reactions in a simply supported beam using parallel force apparatus.

1.2 Determination of Young's modulus using Searle's apparatus

1.3 Determination of torsional rigidity of the shaft using torsion testing machine

1.4 Determination of salient points (Young's modulus, yield point, fracture point) from stress- strain curve using Universal Testing Machine

1.5 Determination of hardness number by Rockwell/Vickers hardness testing machine

1.6 Determination of toughness using Impact testing machine (Charpy/Izod)

1.7 Determination of Flash point and fire point

1.8 Joule's experiment

WORKSHOP PRACTICE-II (PRACTICAL-3)

Name of the Course: Diploma in **Mech/Auto/Aero & Other Mechanical Allied Branches**			
Course code:		Semester	3rd
Total Period:	90	Examination	4 hrs
Lab. periods:	6 P/week	Sessional	50
Maximum marks:	100	End Semester Examination:	50

COURSE OBJECTIVES:-

Students will develop ability towards

- Practicing fitting, carpentry, smithy and machining
- Understanding the tools and equipment used in the practices
- Realize the time and resource utilization in the practices

1. Fitting practices

1.1 Preparation of caliper
1.2 Preparation of try square
1.3 Preparation of hammer, square , Hexagonal

2. Smithy Practices

2.1 Preparation of door ring with hook
2.2 Preparation of hexagonal head bolt
2.3 Preparation of octagonal flat chisel

3 Carpentry Practices

3.1 Cutting of slot, botch, mortise and Tenon Joint
3.2 Preparation of single dove tail joint

4 Welding Practice

4.1 Lap & Butt Joint using Arc Welding
4.2 Lap Joint using Gas Welding
4.3 Joining Two non-ferrous parts through

LIST OF EQUIPMENTS OF MECHANICAL ENGG. LABORATORY

Sl No	NAME OF THE EQUIPMENT	Quantity
1	PARALLEL FORCE APPARATUS	2 Nos.
2	SEARLE'S APPARATUS	2 Nos.
3	TORSION TESTING MACHINE	1 Nos.
4	DIGITAL UNIVERSAL TESTING MACHINE	1 Nos.
5	HARDNESS TESTING MACHINE	1 Nos.
6	IMPACT TESTING MACHINE	1 Nos.
7	FLASH POINT AND FIRE POINT APPARATUS	1 Nos.
8	JOULES APPARATUS	1 Nos.

LIST OF EQUIPMENTS OF WORKSHOP PRACTICE

WELDING SHOP

SL. NO.	NAME OF ITEM	QUANTITY
01	OXYGEN CYLINDER	01 No.
02	ACETYLENE CYLINDER	01 No.
03	PRESSURE GAUSES	02 Nos
04	PRESSURE REGULATOR	02 Nos.
05	WELDING TORCH	01 No.
06	GOGGLES	10 Nos.
07	HOSE PIPES	10 Meters
08	AC WELDING TRANSFORMER SET	01 No.
09	CHIPPING BRUSH	02 Nos.
10	WIRE BRUSH	02 Nos.
11	ARC SHIELD (EYE PROTECTOR)	05 Nos.
12	MIG / TIG WELDING MACHINE	01 Nos.

CARPENTRY SHOP

SL. NO.	NAME OF ITEM	QUANTITY
01	STEEL RULE (SCALE) 1 Meter	10 Nos.
02	SCRIBER	10 Nos.
03	MARKING GAUGE	05 Nos.
04	MORTISE GAUGE	05 Nos.
05	TRY SQURE	10 Nos.
06	DIVIDERS	10 Nos.
07	RIP SAW	10 Nos.
08	COPING SAW	10 Nos.
09	FIRMAR CHIESEL	10 Nos.
10	GAUGE CHIESEL	02 Nos.
11	IRON JACK PLANE	02 Nos.
12	TRYING PLANE	05 Nos.
13	RASP	05 Nos.
14	HAND DRILL	05 Nos.
15	GIMLET DRILL	02 Nos.
16	CLAMPING VICE	10 Nos.
17	C-CLAMP	05 Nos.
18	CROSS PEAN HAMMER	05 Nos.
19	CLAW HAMMER	10 Nos.
20	MALLET	05 Nos.
21	WOOD WORKING LATHE	01 No.
22	CIRCULAR SAW	01 No.

FITTING SHOP

SL. NO.	NAME OF ITEM	QUANTITY
01	BENCH VICE	20 Nos.
02	PIPE VICE	04 Nos.
03	TRY SQURE	10 Nos.
04	SCRIBER & SUEFACE GAUGE	10 Nos.
05	DOT PUNCH	10 Nos.
06	CENTRE PUNCH	10 Nos.
07	SURFACE PLATE	01 No.
08	ANGLE PLATE	01 No.
09	STEEL RULE	10 Nos.
10	VERNIER CALLIPERS	05 Nos.
11	MICROMETRE	05 Nos.
12	DIVIDERS	10 Nos.
13	OUTSIDE CALLIPERS	10 Nos.
14	INSIDE CALLIPERS	05 Nos.
15	FEELER GAUGE	01 No.
16	VERNIER HEIGHT GAUGE	01 No.
17	HACKSAW (FIXED FRAME)	10 Nos.
18	ROUND FILE	10 Nos.
19	SINGLE CUT FILE	10 Nos.
20	DOUBLE CUT FILE	10 Nos.
21	BALL PEAN HAMMER	05 Nos.
22	TAP WRENCH	01 No.
23	HAND DRILLING M/C	01 No.
24	PORTABLE GRINDER	01 o.

BLACKSMITHY SHOP

SL. NO.	NAME OF ITEM	QUANTITY
01	FURNACE OF HEARTH (WITH CENTRE BLOWER)	05 Nos.
02	SHOWEL	05 Nos.
03	POKER	05 Nos.
04	ANVIL	05 Nos.
05	SCEDGE HAMMER	05 Nos.
06	PICK UP TONG	10 Nos.
07	CHIESEL TONG	05 Nos.
08	CLOSE FLAT TONG	05 Nos.
09	PINUR TONG	05 Nos.
10	HOT CHIESEL	05 Nos.
11	COLD CHIESEL	05 Nos.
12	DRIFT	02 Nos.
13	SWAGE BLOCK	01 No.
14	BALL PEAN HAMMER	05 Nos.
15	CROSS PEAN HAMMER	05 Nos.

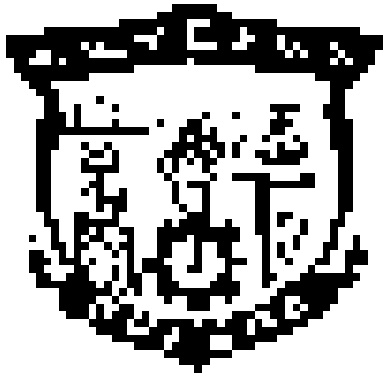
STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA									
TEACHING AND EVALUATION SCHEME FOR 4th Semester (Mechanical Engg.) (wef. 2019-20)									
Subject Number	Subject Code	Subject	Periods/week			Evaluation Scheme			
			L	T	P	Internal Assessment/ Sessional	End Sem Exams	Exams (Hours)	Total
		Theory							
Th.1		Theory of Machine	4		-	20	80	3	100
Th.2		Manufacturing Technology	4		-	20	80	3	100
Th.3		Fluid Mechanics	4		-	20	80	3	100
Th.4		Thermal Engg-II	4		-	20	80	3	100
		Total	*16*			*80*	*320*	-	*400*
		Practical							
Pr.1		Theory of Machine and Measurement lab	-	-	6	25	75	3	100
Pr.2		Mechanical Engg. Lab-II	-	-	6	25	75	3	100
Pr.3		Workshop-III	-	-	6	50	50	4	100
Pr.4		Technical Seminar			2	50			50
		Student Centered Activities(SCA)		-	3				
		Total	-	-	23	150	200	-	350
		Grand Total	**16**	**-**	**23**	**230**	**520**	**-**	**750**
Abbreviations: L-Lecturer, T-Tutorial, P-Practical . Each class is of minimum 55 minutes duration									
Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50% and in Aggregate is 40%									
SCA shall comprise of Extension Lectures/ Personality Development/ Environmental issues /Quiz /Hobbies/ Field visits/ cultural activities/Library studies/Classes on MOOCS/SWAYAM etc. ,Seminar and SCA shall be conducted in a section.									

CURRICULLUM OF 4th SEMESTER

For

DIPLOMA IN MECHANICAL ENGINEERING

(Effective FROM 2019-20 Sessions)



STATE COUNCIL FOR TECHNICAL EDUCATION & VOCATIONAL TRAINING, ODISHA, BHUBANESWAR

TH 1 - THEORY OF MACHINES

Name of the Course: Diploma in **Mech/Auto/ & Other Mechanical Allied Branches**			
Course code:		Semester	4th
Total Period:	60	Examination	3 hrs
Theory periods:	4 P/W	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

A.RATIONAL:

Mechanical and Automobile engineering is involved with design, manufacturing and use of various types of machines. Each machine consists of a large number of static and moving parts called mechanisms. Theory of machines is study of such different kind of mechanisms.

B.COURSE OBJECTIVES:

Students will develop an ability towards

- Understanding machine system consisting of different link assemblies as components
- Comprehending Working principle of machine components such as clutch, brakes, bearings based on friction
- Comprehending working principles related to power transmission systems and predicting the work involved and efficiency.
- Comprehending working principle in speed and torque regulating devices such as governor and flywheels
- Determination of amount and position of masses required towards static and dynamic balancing
- Comprehending types and causes of vibration in machines and predicting remedial measures

C. TOPIC WISE DISTRIBUTION OF PERIODS

Sl. No.	Topic	Periods
01	Simple Mechanism	08
02	Friction	12
03	Power Transmission	12
04	Governors and Flywheel	12
05	Balancing of Machine	08
06	Vibration of machine parts	08
	Total Period:	**60**

D. CONTENT

1.0 Simple mechanism

1.1 Link ,kinematic chain, mechanism, machine
1.2 Inversion, four bar link mechanism and its inversion
1.3 Lower pair and higher pair
1.4 Cam and followers

2.0 Friction

2.1 Friction between nut and screw for square thread, screw jack
2.2 Bearing and its classification, Description of roller, needle roller& ball bearings.
2.3 Torque transmission in flat pivot& conical pivot bearings.
2.4 Flat collar bearing of single and multiple types.

2.5 Torque transmission for single and multiple clutches
2.6 Working of simple frictional brakes.

2.7 Working of Absorption type of dynamometer

3.0 Power Transmission

3.1 Concept of power transmission
3.2 Type of drives, belt, gear and chain drive.
3.3 Computation of velocity ratio, length of belts (open and cross)with and without slip.
3.4 Ratio of belt tensions, centrifugal tension and initial tension.
3.5 Power transmitted by the belt.
3.6 Determine belt thickness and width for given permissible stress for open and crossed belt considering centrifugal tension.
3.7 V-belts and V-belts pulleys.
3.8 Concept of crowning of pulleys.
3.9 Gear drives and its terminology.
3.10 Gear trains, working principle of simple, compound, reverted and epicyclic gear trains.

4.0 Governors and Flywheel

4.1 Function of governor
4.2 Classification of governor
4.3 Working of Watt, Porter, Proel and Hartnell governors.
4.4 Conceptual explanation of sensitivity, stability and isochronisms.
4.5 Function of flywheel.
4.6 Comparison between flywheel &governor.
4.7 Fluctuation of energy and coefficient of fluctuation of speed.
4.8

5.0 Balancing of Machine

5.1 Concept of static and dynamic balancing.
5.2 Static balancing of rotating parts.
5.3 Principles of balancing of reciprocating parts.
5.4 Causes and effect of unbalance.
5.5 Difference between static and dynamic balancing

6.0 Vibration of machine parts

6.1 Introduction to Vibration and related terms (Amplitude, time period and frequency, cycle)
6.2 Classification of vibration.
6.3 Basic concept of natural, forced & damped vibration
6.4 Torsional and Longitudinal vibration.
6.5 Causes & remedies of vibration.

CHAPTERS COVERED UP TO IA- 1,2,3

Learning Resources:

Sl No.	Name of the Book	Author Name	Publisher
1.	Text Book of Theory of Machine	R.S Khurmi	S.Chand
2.	Text Book of Theory of Machine	R.K. Rajput	S.Chand
3.	Text Book of Theory of Machine	P.L.Ballany	Dhanpat Rai
4.	Text Book of Theory of Machine	Thomas Bevan	Pearsion

TH-2 MANUFACTURING TECHNOLOGY

Name of the Course: Diploma in **Mech/Auto/ & Other Mechanical Allied Branches**			
Course code:		Semester	4th
Total Period:	60	Examination	3 hrs
Theory periods:	4 P/W	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONAL:

Engineering basically means production of goods and services for human consumption. The major function of mechanical engineering is to manufacture various products using machineries, production processes and production management techniques. Therefore this is one of the most important subjects to be learned by a mechanical and automobile engineer.

B. COURSE OBJECTIVES:

Students will develop an ability towards

- Comprehending required material properties for cutting tools
- Comprehending machining mechanism principle and factors affecting machining performance
- Comprehendingworkingprincipleandcomponentsinmachiningtoolsincludinglathe, millin g,shaping,planning,slottingmachines
- Comprehendingrequirementofsurfacefinishandrealizeprinciplesinvolvedingrindin gands uperfinishingoperations

C. TOPIC WISE DISTRIBUTION OF PERIODS

Sl. No.	Topic	Periods
01	Tool Materials	04
02	Cutting Tools	06
03	Lathe Machine	08
04	Shaper	06
05	Planning Machine	06
06	Milling Machine	08
07	Slotter	06
08	Grinding	06
09	Internal Machining operations	06
10	Surface finish, lapping	04
	Total Period:	**60**

D. CONTENT

1.0 Tool Materials

1.1 Composition of various tool materials

1.2 Physical properties& uses of such tool materials.

2.1 Cutting Tools

2.1 Cutting action of various and tools such as Chisel, hacksaw blade, dies and reamer
2.3 Turning tool geometry and purpose of tool angle
2.5 Machining process parameters (Speed, feed and depth of cut)
2.6 Coolants and lubricants in machining and purpose

3.0 Lathe Machine

3.1 Construction and working of lathe and CNC lathe

- Major components of a lathe and their function
- Operations carried out in a lathe(Turning, thread cutting, taper turning, internal machining, parting off, facing, knurling)
- Safety measures during machining

3.2 Capstan lathe

- Difference with respect to engine lathe
- Major components and their function
- Define multiple tool holders

3.3 Turret Lathe

- Difference with respect to capstan lathe
- Major components and their function

3.4 Draw the tooling layout for preparation of a hexagonal bolt &bush

4.0 Shaper

4.1 Potential application areas of a shaper machine
4.2 Major components and their function
4.3 Explain the automatic able feed mechanism
4.4 Explain the construction &working of tool head
4.5 Explain the quick return mechanism through sketch
4.6 State the specification of a shaping machine.

5.0 Planning Machine

5.1 Application area of a planer and its difference with respect to shaper
5.2 Major components and their functions
5.3 The table drive mechanism
5.4 Working of tool and tool support
5.5 Clamping of work through sketch.

6.0 Milling Machine

6.1 Types of milling machine and operations performed by them and also same for CNC milling machine

6.2 Explain work holding attachment
6.3 Construction & working of simple dividing head, universal dividing head
6.4 Procedure of simple and compound indexing
6.5 Illustration of different indexing methods

7.0 Slotter

7.1 Major components and their function
7.2 Construction and working of slotter machine
7.3 Tools used in slotter

8.0 Grinding

8.1 Significance of grinding operations
8.2 Manufacturing of grinding wheels
8.3 Criteria for selecting of grinding wheels
8.4 Specification of grinding wheels
with example Working of

- Cylindrical Grinder
- Surface Grinder
- Centreless Grinder

9.0 Internal Machining operations

Classification of drilling machines

9.1 Working of
- Bench drilling machine
- Pillar drilling machine
- Radial drilling machine

9.2 Boring
- Basic Principle of Boring
- Different between Boring and drilling

9.3 Broaching
- Types of Broaching(pull type, push type)
- Advantages of Broaching and applications

10 Surface finish, lapping

10.1 Definition of Surface finish

10.2 Description of lapping& explain their specific cutting.

CHAPTERS COVERED UP TO IA- 1, 2,3,4,5

LearningResources:

Sl No.	Name of the Book	Author Name	Publisher
1.	Text Book of Workshop Technology	Hazra Choudhury Vol-I & II	MPP Pvt. Ltd.
2.	Text Book of Workshop Technology	W.A.S Chapman Vol-I & II	
3.	Text Book of Manufacturing Process	P.N Rao	TMH

TH-3 FLUID MECHANICS

Name of the Course: Diploma in **Mech & Other Mechanical Allied Branches**			
Course code:		Semester	4th
Total Period:	60	Examination	3 hrs
Theory periods:	4 P/W	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONAL:

Use of fluid in engineering field is of great importance. It is therefore necessary to study the physical properties and characteristics of fluids which have very important application in mechanical and automobile engineering.

B. COURSE OBJECTIVES:

Students will develop an ability towards

- Comprehending fluid properties and their measurements
- Realizing conditions for floatation
- Applying Bernoulli's theorem

C. TOPIC WISE DISTRIBUTION OF PERIODS

Sl. No.	Topic	Periods
01	Properties of Fluid	08
02	Fluid Pressure and its measurements	08
03	Hydrostatics	08
04	Kinematics of Flow	08
05	orifices, notches & weirs	08
06	Flow through pipe	10
07	Impact of jets	10
	Total Period:	**60**

D.CONTENT

1.0 Properties of Fluid

1.1 Define fluid

1.2 Description of fluid properties like Density, Specific weight, specific gravity, specific volume and solve simple problems.

1.3 Definitions and Units of Dynamic viscosity, kinematic viscosity, surface tension Capillary phenomenon

2.0 Fluid Pressure and its measurements

2.1 Definitions and units of fluid pressure, pressure intensity and pressure head.

2.2 Statement of Pascal's Law.

2.3 Concept of atmospheric pressure, gauge pressure, vacuum pressure and absolute pressure

2.4 Pressure measuring instruments
Manometers (Simple and Differential)

2.4.1 Bourdon tube pressure gauge(Simple Numerical)

2.5 Solve simple problems on Manometer.

3.0 Hydrostatics

3.1 Definition of hydrostatic pressure

3.2 Total pressure and centre of pressure on immersed bodies(Horizontal and Vertical Bodies)

3.3 Solve Simple problems.

3.4 Archimedes 'principle, concept of buoyancy, meta center and meta centric height (Definition only)

3.5 Concept of floatation

4.0 Kinematics of Flow

4.1 Types of fluid flow

4.2 Continuity equation(Statement and proof for one dimensional flow)

4.3 Bernoulli's theorem(Statement and proof)
Applications and limitations of Bernoulli's theorem (Venturimeter, pitot tube)

4.4 Solve simple problems

5.0 Orifices, notches & weirs

5.1 Define orifice

5.2 Flow through orifice

5.3 Orifices coefficient & the relation between the orifice coefficients

5.4 Classifications of notches & weirs

5.5 Discharge over a rectangular notch or weir

5.6 Discharge over a triangular notch or weir

5.7 Simple problems on above

6.0 Flow through pipe

6.1 Definition of pipe.

6.2 Loss of energy in pipes.

6.3 Head loss due to friction: Darcy's and Chezy's formula (Expression only)

6.4 Solve Problems using Darcy's and Chezy's formula.

6.5 Hydraulic gradient and total gradient line

7.0 Impact of jets

7.1 Impact of jet on fixed and moving vertical flat plates

7.2 Derivation of work done on series of vanes and condition for maximum efficiency.

7.3 Impact of jet on moving curved vanes, illustration using velocity triangles, derivation of work done, efficiency.

CHAPTERS COVERED UP TO IA- 1, 2,3,4

Learning Resources:

Sl No.	Name of the Book	Author Name	Publisher
1.	Text Book of Fluid Mechanics	R.K.Bansal	Laxmi
2.	Text Book of Fluid Mechanics	R.S khurmi	S.Chand
3.	Text Book of Fluid Mechanics	R.K.Rajput	S.Chand
4.	Text Book of Fluid Mechanics	Modi & Seth	Rajson's pub. Pvt. lt

THEORY 4 -THERMAL ENGINEERING-II

Name of the Course: Diploma in **Mech/ & Other Mechanical Allied Branches**			
Course code:		**Semester**	**4th**
Total Period:	**60**	**Examination**	**3 hr**
Theory periods:	**4 P/week**	**Class Test:**	**20**
Maximum marks:	**100**	**End Semester Examination:**	**80**

A. RATIONAL:

Modern society needs lots of applications of thermodynamics, which deals with energy possessed by hot vapors, its production and its application in different fields.

B. COURSE OBJECTIVES:

Student will develop ability towards.

- Understanding the power developed in I.C engine and efficiency.
- Understanding the principle, performance and application of air compressor.
- Determining thermodynamic properties of steam using steam tables & mollier chart.
- Comprehending the working of various steam generators i.e. boilers.
- Comprehending the vapor power cycles and computing work done & efficiencies thereof.

C. TOPIC WISE DISTRIBUTION OF PERIODS

Sl. No.	Topic	Periods
01	Performance of I. C engine	08
02	Air Compressor	12
03	Properties of steam	12
04	Steam Generator	12
05	Vapor power cycle	08
06	Heat Transfer	08
Total Period:		**60**

D. CONTENT

1. Performance of I.C engine

1.1 Define mechanical efficiency, Indicated thermal efficiency, Relative Efficiency, brake thermal efficiency overall efficiency Mean effective pressure &specific fuel consumption.

1.2 Define air-fuel ratio & calorific value of fuel.

1.3 Work out problems to determine efficiencies & specific fuel consumption.

2. Air Compressor

2.1 Explain functions of compressor & industrial use of compressor air

2.2 Classify air compressor & principle of operation.

2.3 Describe the parts and working principle of reciprocating Air compressor.

2.4 Explain the terminology of reciprocating compressor such as bore, stroke, pressure ratio free air delivered &Volumetric efficiency.

2.5 Derive the work done of single stage & two stage compressor with and without clearance.

2.6 Solve simple problems (without clearance only)

3. Properties of Steam

3.1 Difference between gas & vapours.

3.2 Formation of steam.

3.3 Representation on P-V, T-S, H-S, & T-H diagram.

3.4 Definition & Properties of Steam.

3.5 Use of steam table & mollier chart for finding unknown properties.

3.6 Non flow & flow process of vapour.

3.7 P-V, T-S & H-S, diagram.

3.8 Determine the changes in properties & solve simple numerical.

4. Steam Generator

4.1 Classification & types of Boiler.

4.2 Important terms for Boiler.

4.3 Comparison between fire tube & Water tube Boiler.

4.4 Description & working of common boilers (Cochran, Lancashire, Babcock & Wilcox Boiler)

4.5 Boiler Draught (Forced, induced & balanced)

4.6 Boiler mountings & accessories.

5. Steam Power Cycles

5.1 Carnot cycle with vapour.

5.2 Derive work & efficiency of the cycle.

5.3 Rankine cycle.

5.3.1 Representation in P-V, T-S & h-s diagram.

5.3.2 Derive Work & Efficiency.

5.3.3 Effect of Various end conditions in Rankine cycle.

5.3.4 Reheat cycle & regenerative Cycle.

5.4 Solve simple numerical on Carnot vapour Cycle & Rankine Cycle.

6. Heat Transfer

6.1 Modes of Heat Transfer (Conduction, Convection, Radiation).

6.2 Fourier law of heat conduction and thermal conductivity (k).

6.3 Newton's laws of cooling.

6.4 Radiation heat transfer (Stefan, Boltzmann & Kirchhoff's law) only statement, no derivation & no numerical problem.

6.5 Black body Radiation, Definition of Emissivity, absorptivity, & transmissibility.

CHAPTERS COVERED UP TO IA- 1, 2,3.

Sl No.	Reference Book	Author Name	Publisher Name
1	Thermal Engineering	R.S. Khurmi	S.Chand
2	Thermal Engineering	A.R.Basu	Dhanpat Rai
3	Thermal Engineering	A.S. Sarao	Satya Prakash
4	Engineering Thermodynamics	P.k.Nag	TMH
5	Thermal Engineering	Mahesh M Rathore	TMH

PR-1 THEORY OF MACHINES AND MEASUREMENTS LAB

Name of the Course : Diploma in **Mech/ & Other Mechanical Allied Branches**

Course code:		Semester	4th
Total Period:	90	Examination	3 hrs
Lab. periods:	6 P/W	Term Work	25
Maximum marks:	100	End Semester Examination:	75

SL. No Content

1. Determination of centrifugal force of a governor (Hart Nell / Watt/Porter).
2. Study & demonstration of static balancing apparatus.
3. Study & demonstration of journal bearing apparatus.
4. Study of different types of Cam and followers.
5. Study & demonstration of epicyclic gear train.
6. Determination of the thickness of ground M.S flat to an accuracy of 0.02mm using Vernier Caliper.
7. Determination of diameter of a cylindrical component to an accuracy of 0.01mm using micrometer.
8. Determine the heights of gauge blocks or parallel bars to accuracy of 0.02mm using Vernier height gauge.
9. Determine the thickness of ground MS plates using slip gauges.
10. Determination of angel of Machined surfaces of components using sin bar with slip gauges.

PR- 2 MECHANICAL ENGG. LAB –II

Name of the Course: Diploma in **Mech/ & Other Mechanical Allied Branches**

Course code		Semester	4th
Total Period:	90	Examination	3 hrs
Lab. periods:	6 P/W	Term Work	25
Maximum marks:	100	End Sem Examination:	75

SL. No	Content
1	Study of 2-S, 4-S petrol & diesel engine models
2	Determine the brake thermal efficiency of single cylinder petrol engine.
3	Determine the brake thermal efficiency of single cylinder diesel engine.
4	Determine the B.H.P, I.H.P BSFC of a multi cylinder engine by Morse test.
5	Determine the mechanical efficiency of an air Compressor.
6	Study of pressure measuring devices (manometer, Bourdon tube pressure gauge)
7	Verification of Bernoulli's theorem
8	Determination of Cd from venturimeter
9	Determination of Cc, Cv, Cd from orifice meter
10	Determine of Darcy's coefficient from flow through pipe

PR-3 WORKSHOP PRACTICE-III

Name of the Course: Diploma in **Mech/ & Other Mechanical Allied Branches**			
Course code:		Semester	4th
Total Period:	90	Examination	4 hrs
Lab. periods:	6 P/W	Teamwork	50
Maximum marks:	100	End Semester Examination:	50

Course Objectives:

Students will develop an ability towards

- Preparing components and jobs using foundry, welding and machining
- Realizing process parameters involved and their effects

1 Machining Practices

1.1 Job in evolving drilling, boring

1.2 Internal/External threading on Turning jobs

1.3 Job in evolving use of Capstan and turret lathe
(Taper Turning & Chamfering)

1.4 All gear lathe, CNC Lathe Trainer Practice
Job involving all turning process on MS Rod &
aluminum rod for jobs using CNC Lathe trainer.

2 Metal Machining

2.1 Shaper
Preparation of V Block on CI or MS Blocks

2.2 Milling Machine
Preparation of Spur gear on CI or MS round

Pr4. TECHNICAL SEMINAR

Name of the Course: Diploma in MECHANICAL ENGINEERING			
Course code:		Semester	4th
Total Period:	30		
Lab. periods:	02/week	Term Work	50
Maximum marks:	50		

OBJECTIVES:

Each student has to select a recent topic of latest technology in the area of Mechanical Engineering and present a seminar in front of all students of the class. He/She has to prepare a PowerPoint presentation of the selected topic of minimum 10 slides are the total presentation will be approximately 10 minutes duration .There will be interactive session between the presenter and rest of the students including the faculty members of the dept at the end of presentation .A student has to present at least 2 nos.of seminar during a semester and to submit the report for evaluation.

List of Equipments of Theory of Machine and Measurement Lab

Sl. No.	Name of Apparatus	QUANTITY
01	GOVERNOR APPARATUS	01No
02	STATIC AND DYNAMIC APPARATUS	01No
03	JOURNAL BEARING APPARATUS	01 No
04	CAM ANALYSIS APPARATUS	01 No
05	EPICYCLIC GEAR TRAIN	01 No
06	VERNIER CALLIPER	04 Nos.
07	MICROMETER	04 Nos.
08	VERNIER HEIGHT GAUGE	02 Nos.
09	SLIP GAUGE	02 Nos.
10	SINE BAR	02 Nos.

List of Equipments of Workshop Practice-III

Sl. No.	Name of Apparatus	QUANTITY
01	RADIAL DRILL MACHINE	01 No
02	ALL GEAR LATHE	06 Nos.
03	CAPSTAN LATHE	01 Nos.
04	CNC LATHE TRAINER	01 Nos.

List of Equipments of MEL-II

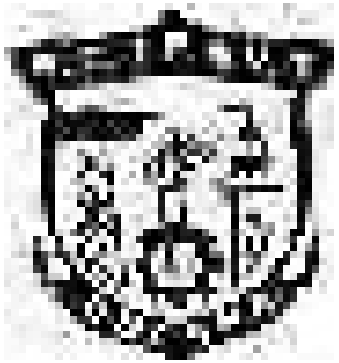
SL. NO.	NAME OF ITEM	QUANTITY
01	MODEL OF 2 STROKE PETROL ENGINE	02 Nos
02	MODEL OF 4 STROKE PETROL ENGINE	02 Nos.
03	MODEL OF 2 STROKE DIESEL ENGINE	02 Nos.
04	MODEL OF 4 STROKE DIESEL ENGINE	02Nos.
05	SINGLE CYLINDER PETROL ENGINE TEST RIG	01 No.
06	SINGLE CYLINDER DIESEL ENGINE TEST RIG	01 No.
07	MORSE TEST APPARATUS	01 No.
08	2 STAGE AIR COMPRESSOR TEST RIG	01 No.
09	PRESSURE MEASURING DEVICES (BOURDON TUBE PRESSURE GAUGE, MANOMETER)	02 Nos. each
10	BERNOULLI'S APPARATUS	01 No.
11	VENTURIMETER APPARATUS	01 No.
12	ORIFICEMETER APPARATUS	01 No
13	FLOW THROUGH PIPE APPARATUS	01 No

CURRICULLUM OF 5TH SEMESTER

For

DIPLOMA IN MECHANICAL ENGINEERING

(Effective FROM 2020-21 Sessions)



STATE COUNCIL FOR TECHNICAL EDUCATION & VOCATIONAL TRAINING, ODISHA, BHUBANESWAR

STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA									
TEACHING AND EVALUATION SCHEME FOR 5th Semester (Mechanical.) (wef 2020-21)									
Subject Number	Subject Code	Subject	Periods/week			Evaluation Scheme			
			L	T	P	Internal Assessment/ Sessional	End Sem Exams	Exams (Hours)	Total
		Theory							
Th.1		Entrepreneurship and Management & Smart Technology	4		-	20	80	3	100
Th.2		Design of Machine elements	4		-	20	80	3	100
Th.3		Hydraulic Machines &Industrial Fluid Power	4		-	20	80	3	100
Th.4		Mechatronics	4			20	80	3	100
Th.5		Refrigeration and air-conditioning	4			20	80	3	100
		Total	20			100	400	-	500
		Practical							
Pr.1		Refrigeration and Air conditioning lab	-	-	4	25	50	3	75
Pr.2		Hydraulic machines &Industrial Fluid power lab	-	-	4	25	50	3	75
Pr.3		CAD/CAM LAB	-	-	4	25	50	3	75
Pr.4		Project Work Phase -I		-	4	25	-	-	25
		Student Centered Activities (SCA)			3				
		Total	-	-	*19*	*100*	*150*	-	*250*
		Grand Total	**20**	**-**	**19**	**200**	**550**	**-**	**750**
Abbreviations: L-Lecturer, T-Tutorial, P-Practical. Each class is of minimum 55 minutes duration									
Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50% and in Aggregate is 40%									
SCA shall comprise of Extension Lectures/ Personality Development/ Environmental issues /Quiz /Hobbies/ Field visits/ cultural activities/Library studies/Classes on MOOCS/SWAYAM etc. ,Seminar and SCA shall be conducted in a section.									

There shall be 1 Internal Assessment done for each of the Theory Subject. Sessional Marks shall be total of the performance of individual different jobs/ experiments in a subject throughout the semester

Th1. ENTREPRENEURSHIP and MANAGEMENT & SMART TECHNOLOGY

(Common to All Branches)

Theory	**4 Periods per week**	**Internal Assessment**	**20 Marks**
Total Periods	**60 Periods**	**End Sem Exam**	**80 Marks**
Examination	**3hours**	**Total Marks**	**100Marks**

Topic Wise Distribution of Periods

Sl No.	Topic	Periods
1	Entrepreneurship	10
2	Market Survey and Opportunity Identification(Business Planning)	8
3	Project report Preparation	4
4	Management Principles	5
5	Functional Areas of Management	10
6	Leadership and Motivation	6
7	Work Culture, TQM & Safety	5
8	Legislation	6
9	Smart Technology	6
	TOTAL	60

RATIONALE

In the present day scenario, it has become imperative to impart entrepreneurship and management concepts to students, so that a significant percentage of them can be directed towards setting up and managing their own small enterprises. It may be further added that an entrepreneurial mind set with managerial skill helps the student in the job market. The students can also be introduced with Startup and Smart Technology concept, which shall radically change the working environment in the coming days in the face of Industry 4.0

In this subject, the Students shall be introduced/ exposed to different concepts and Terminologies in brief only, so that he/she can have broad idea about different concepts/items taught in this subject. Solving numerical problem on any topic/item is beyond the scope of this subject.

OBJECTIVES

After undergoing this course, the students will be able to :

- Know about Entrepreneurship, Types of Industries and Startups
- Know about various schemes of assistance by entrepreneurial support agencies
- Conduct market survey
- Prepare project report
- know the management Principles and functional areas of management
- Inculcate leadership qualities to motivate self and others.
- Maintain and be a part of healthy work culture in an organisation.
- Use modern concepts like TQM
- Know the General Safety Rules
- Know about IOT and its Application in SMART Environment.

DETAILED CONTENTS

1. **Entrepreneurship**
   - Concept /Meaning of Entrepreneurship
   - Need of Entrepreneurship
   - Characteristics, Qualities and Types of entrepreneur, Functions
   - Barriers in entrepreneurship
   - Entrepreneurs vrs. Manager
   - Forms of Business Ownership: Sole proprietorship, partnership forms and others
   - Types of Industries, Concept of Start-ups
   - Entrepreneurial support agencies at National, State, District Level(Sources): DIC, NSIC,OSIC, SIDBI, NABARD, Commercial Banks, KVIC etc.
   - Technology Business Incubators (TBI) and Science and Technology Entrepreneur Parks

2. **Market Survey and Opportunity Identification (Business Planning)**

   - Business Planning
   - SSI, Ancillary Units, Tiny Units, Service sector Units
   - Time schedule Plan, Agencies to be contacted for Project Implementation
   - Assessment of Demand and supply and Potential areas of Growth
   - Identifying Business Opportunity
   - Final Product selection

3. **Project report Preparation**

   - Preliminary project report
   - Detailed project report, Techno economic Feasibility
   - Project Viability

4. **Management Principles**
   - Definitions of management
   - Principles of management
   - Functions of management (planning, organising, staffing, directing and controlling etc.)
   - Level of Management in an Organisation

5. **Functional Areas of Management**
   a) Production management
      - Functions, Activities
      - Productivity
      - Quality control
      - Production Planning and control

   b) Inventory Management
      - Need for Inventory management
      - Models/Techniques of Inventory management

   c) Financial Management
      - Functions of Financial management
      - Management of Working capital
      - Costing (only concept)
      - Break even Analysis
      - Brief idea about Accounting Terminologies: Book Keeping, Journal entry, Petty Cash book, P&L Accounts, Balance Sheets(only Concepts)

   d) Marketing Management
      - Concept of Marketing and Marketing Management
      - Marketing Techniques (only concepts)
      - Concept of 4P s (Price, Place, Product, Promotion)

   e) Human Resource Management
   - Functions of Personnel Management
   - Manpower Planning, Recruitment, Sources of manpower, Selection process, Method of Testing, Methods of Training & Development, Payment of Wages

6. **Leadership and Motivation**
   a) Leadership

- Definition and Need/Importance
- Qualities and functions of a leader
- Manager Vs Leader
- Style of Leadership (Autocratic, Democratic, Participative)

b) Motivation
- Definition and characteristics
- Importance of motivation
- Factors affecting motivation
- Theories of motivation (Maslow)
- Methods of Improving Motivation
- Importance of Communication in Business
- Types and Barriers of Communication

7. **Work Culture, TQM & Safety**
- Human relationship and Performance in Organization
- Relations with Peers, Superiors and Subordinates
- TQM concepts: Quality Policy, Quality Management, Quality system
- Accidents and Safety, Cause, preventive measures, General Safety Rules , Personal Protection Equipment(PPE)

8. **Legislation**

a) Intellectual Property Rights(IPR), Patents, Trademarks, Copyrights
b) Features of Factories Act 1948 with Amendment (only salient points)
c) Features of Payment of Wages Act 1936 (only salient points)

9. **Smart Technology**
- Concept of IOT, How IOT works
- Components of IOT, Characteristics of IOT, Categories of IOT
- Applications of IOT- Smart Cities, Smart Transportation, Smart Home, Smart Healthcare, Smart Industry, Smart Agriculture, Smart Energy Management etc.

Syllabus to be covered before IA: Chapter 1,2,3,4

RECOMMENDED BOOKS

1. Entrepreneurship Development and Management by R.K Singhal, Katson Books., New Delhi
2. Entrepreneurship Development and Management by U Saroj and V Mahendiratta, Abhishek Publications, Chandigarh
3. Entrepreneurship Development and Management by Vasant Desai, Himalaya Pub.House
4. Industrial Engineering and Management by O.P Khanna ,Dhanpat Rai and Sons
5. Industrial Engineering and Management by Banga and Sharma, Khanna Publications
6. Internet of Things by Jeeva Jose, Khanna Publications, New Delhi
7. Online Resource on Startups and other concepts
8. https://www.fundable.com/learn/resources/guides/startup

TH.2 DESIGN OF MACHINE ELEMENTS

Name of the Course: Diploma in MECHANICAL ENGINEERING			
Course code:		**Semester**	**5th**
Total Period:	**60**	**Examination**	**3 hrs.**
Theory periods:	**4 P/W**	**I.A:**	**20**
Maximum marks:	**100**	**End Semester Examination:**	**80**

A. RATIONALE:

Machine design is the art of planning or devising new or improved machines to accomplish specific purposes. Idea of design is helpful in visualizing, specifying and selection of parts and components which constitute a machine. Hence all mechanical engineers should be conversant with the subject.

B. COURSE OBJECTIVES

At the end of the course the students will be able to

1. Understanding the behaviours of material and their uses.
2. Understanding the design of various fastening elements and their industrial uses.
3. Understanding the different failures of design elements.
4. Understanding the change of design to accomplish the different field of applications.
5. Design shafts, keys, couplings required for power transmission.
6. Design closed coil helical spring

C. CHAPTER WISE DISTRIBUTION OF PERIORDS

Sl.No.	Topic	Periods
01	INTRODUCTION	12
02	DESIGN OF FASTENING ELEMENTS	12
03	DESIGN OF SHAFT AND KEYS	12
04	DESIGN OF COUPLING	12
05	DESIGN OF CLOSED COIL HELICAL SPRING	12
	TOTAL	60

D. COURSE CONTENTS

1.0 Introduction:

1.1 Introduction to Machine Design and Classify it.
1.2 Different mechanical engineering materials used in design with their uses and their mechanical and physical properties.
1.3 Define working stress, yield stress, ultimate stress & factor of safety and stress –strain curve for M.S & C.I.
1.4 Modes of Failure (By elastic deflection, general yielding & fracture)
1.5 State the factors governing the design of machine elements.
1.6 Describe design procedure.

2.0 Design of fastening elements:

2.1 Joints and their classification.
2.2 State types of welded joints .
2.3 State advantages of welded joints over other joints.
2.4 Design of welded joints for eccentric loads.
2.5 State types of riveted joints and types of rivets.
2.6 Describe failure of riveted joints.
2.7 Determine strength & efficiency of riveted joints.
2.8 Design riveted joints for pressure vessel.
2.9 Solve numerical on Welded Joint and Riveted Joints.

3.0 Design of shafts and Keys:

3.1 State function of shafts.
3.2 State materials for shafts.
3.3 Design solid & hollow shafts to transmit a given power at given rpm based on
   a) Strength: (i) Shear stress, (ii) Combined bending tension;
   b) Rigidity: (i) Angle of twist, (ii) Deflection, (iii) Modulus of rigidity
3.4 State standard size of shaft as per I.S.
3.5 State function of keys, types of keys & material of keys.
3.6 Describe failure of key, effect of key way.
3.7 Design rectangular sunk key considering its failure against shear & crushing.
3.8 Design rectangular sunk key by using empirical relation for given diameter of shaft.
3.9 State specification of parallel key, gib-head key, taper key as per I.S.
3.10 Solve numerical on Design of Shaft and keys.

4.0 Design of Coupling:

4.1 Design of Shaft Coupling
4.2 Requirements of a good shaft coupling
4.3 Types of Coupling.
4.4 Design of Sleeve or Muff-Coupling.
4.5 Design of Clamp or Compression Coupling.
4.6 Solve simple numerical on above.

5.0 Design a closed coil helical spring:

5.1 Materials used for helical spring.
5.2 Standard size spring wire. (SWG).
5.3 Terms used in compression spring.
5.4 Stress in helical spring of a circular wire.
5.5 Deflection of helical spring of circular wire.
5.6 Surge in spring.
5.7 Solve numerical on design of closed coil helical compression spring.

Syllabus covered up to I.A-Chapters 1,2 &3

LEARNING RESOURCES

SL.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER
01	PANDYA AND SHAH	MACHINE DESIGN	CHAROTAR PP
02	R.S.KHURMI &J.K.GOPTA	A TEXT BOOK OF MACHINE DESIGN	S.CHAND
03	P.C.SHARMA &D.K AGRAWAL	A TEXT BOOK OF MACHINE DESIGN	S.K.KATARIY A
04	V.B.BHANDARI	DESIGNOF MACHINE ELEMENTS	TMH
05	S.MD.JALAUDEEN	DESIGN DATA BOOK	ANURADHA PUBLICATIO N

TH.3 HYDRAULIC MACHINES &INDUSTRIAL FLUID POWER

Name of the Course: Diploma in MECHANICAL ENGINEERING			
Course code:		**Semester**	**5TH**
Total Period:	**60**	**Examination**	**3 hrs.**
Theory periods:	**4 P/W**	**Class Test:**	**20**
Maximum marks:	**100**	**End Semester Examination:**	**80**

A. RATIONALE:

Use of fluids can be realized by a group of machines called hydraulic machine and use of hydraulic control and pneumatic control system in automation and in earth movers.

B. COURSE OBJECTIVES:

At the end of the course the students will be able to

1. Distinguish the working principle of pumps and turbines
2. Explain the working of centrifugal pumps and gear pumps.
3. Compare pneumatic system with hydraulic system.
4. Draw pneumatic circuits for industrial application.
5. State the properties of hydraulic system.
6. Develop hydraulic circuit for machine tool operation.

C. CHAPTERWISE DISTRIBUTION OF PERIORDS.

SL.NO	TOPICS	PERIORDS
01	HYDRAULIC TURBINES	15
02	CENTRIFUGAL PUMPS	05
03	PNEUMATIC SYSTEM	20
04	HYDRAULIC SYSTEM	20
	TOTAL	60

D. COURSE CONTENTS

1.0 HYDRAULIC TURBINES.

1.1 Definition and classification of hydraulic turbines
1.2 Construction and working principle of impulse turbine.
1.3 Velocity diagram of moving blades, work done and derivation of various efficiencies of impulse turbine.
1.4 Velocity diagram of moving blades, work done and derivation of various efficiencies of Francis turbine.
1.5 Velocity diagram of moving blades, work done and derivation of various efficiencies of Kaplan turbine

1.6 Numerical on above
1.7 Distinguish between impulse turbine and reaction turbine.

2.0 CENTRIFUGAL PUMPS

2.1 Construction and working principle of centrifugal pumps
2.2 work done and derivation of various efficiencies of centrifugal pumps.
2.3 Numerical on above

3.0 RECIPROCATING PUMPS

.
3.1 Describe construction & working of single acting reciprocating pump.
3.2 Describe construction & working of double acting reciprocating pump.
3.3 Derive the formula foe power required to drive the pump (Single acting & double acting)
3.5 Define slip.
3.5 State positive & negative slip & establish relation between slip & coefficient of discharge.
3.6 Solve numerical on above

4.0 PNEUMATIC CONTROL SYSTEM

4.1 Elements –filter-regulator-lubrication unit
4.2 Pressure control valves

4.2.1 Pressure relief valves
4.2.2 Pressure regulation valves

4.3 Direction control valves

4.3.1 3/2DCV,5/2 DCV,5/3DCV
4.3.2 Flow control valves
4.3.3. Throttle valves

4.4 ISO Symbols of pneumatic components

4.5. Pneumatic circuits

4 .5.1 Direct control of single acting cylinder
4.5.2 Operation of double acting cylinder
4.5.3 Operation of double acting cylinder with metering in and metering out control

5.0 HYDRAULIC CONTROL SYSTEM

5.1 Hydraulic system, its merit and demerits

5.2 Hydraulic accumulators

5.3.1 Pressure control valves
5.3.2 Pressure relief valves
5.3.3 Pressure regulation valves

5.3 Direction control valves
5.3.1 3/2DCV,5/2 DCV,5/3DCV
5.3.2 Flow control valves
5.3.3 Throttle valves

5.4 Fluid power pumps

5.4.1 External and internal gear pumps

5.4.2 Vane pump

5.4.3 Radial piston pumps

5.5 ISO Symbols for hydraulic components.

5.6 Actuators

5.7 Hydraulic circuits

5.7.1 Direct control of single acting cylinder

5.7.2 Operation of double acting cylinder

5.7.3 Operation of double acting cylinder with metering in and metering out control

5.8 Comparison of hydraulic and pneumatic system

Syllabus to be covered up to I.A –CHAPTER 1.,2, &3

LEARNING RESOURCES

SL.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER
01	DR.JAGDISH LAL	HYDRAULIC MACHINES	METROPOLITAN BOOK CO
02	ANDREW	HYDRAULICS	
03	K SHANMUGA, SUNDARAM	HYDRAULIC &PNEUMATIC CONTROL	S.CHAND
04	MAJUMDAR	HYDRAULIC &PNEUMATIC CONTROL	TMH
05	J.F. BLACKBURN, G.REETHOF &J.L SHEARER	FLUID POWER CONTROL	

TH.4 MECHATRONICS

Name of the Course: Diploma in Mechanical Engg.			
Course code:		Semester	5th
Total Period:	60	Examination	3 hrs.
Theory periods:	4 P/W	I.A:	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONALE:

Day by day, engineering and technology experiences a tremendous growth. Mechatronics plays a major role in developing engineering and technology. It can be defined as the applications of electronics and computer technology to control the motions of mechanical systems. With the help of microelectronics and sensor technology, mechatronics systems are providing high levels of precision and reliability.

B. COURSE OBJECTIVES:

At the end of the course the students will be able to

1. To study the definition and elements of mechatronics system.
2. To learn how to apply the principle of mechatronics for the development of productive systems.
3. To learn the CNC technology and applications of mechatronics in manufacturing automation.
4. Define different type of system and Sensors and solve the simple problems.
5. Explain the concept of Mechanical actuation, Electrical actuation and solve the simple problems.
6. Find out the various types of System Models & Input /Output parts and solve the problems.
7. Describe the programmable Logic Controller and develop programme in PLC.
8. To learn the Industrial robotics

C. CHAPTERWISE DISTRIBUTION OF PERIORDS

Sl No.	Topic	Periods
01	Introduction to Mechatronics	05
02	Sensors and Transducers	10
03	Actuators-Mechanical, Electrical	10
04	Programmable logic controllers	15
05	Elements of CNC Machines	15
06	Robotics	05

D. COURSE CONTENTS

1.0 INTRODUCTION TO MECHATRONICS

1.1 Definition of Mechatronics
1.2 Advantages & disadvantages of Mechatronics
1.3 Application of Mechatronics
1.4 Scope of Mechatronics in Industrial Sector
1.5 Components of a Mechatronics System
1.6 Importance of mechatronics in automation

2.0 SENSORS AND TRANSDUCERS

2.1 Defination of Transducers
2.2 Classification of Transducers
2.3 Electromechanical Transducers
2.4 Transducers Actuating Mechanisms
2.5 Displacement &Positions Sensors
2.6 Velocity, motion, force and pressure sensors.
2.7 Temperature and light sensors.

3.0 ACTUATORS-MECHANICAL, ELECTRICAL

3.1 Mechanical Actuators
- 3.1.1 Machine, Kinematic Link, Kinematic Pair
- 3.1.2 Mechanism, Slider crank Mechanism
- 3.1.3 Gear Drive, Spur gear, Bevel gear, Helical gear, worm gear
- 3.1.4 Belt & Belt drive
- 3.1.5 Bearings

3.2 Electrical Actuator
- 3.2.1 Switches and relay
- 3.2.2 Solenoid
- 3.2.3 D.C Motors
- 3.2.4 A.C Motors
- 3.2.5 Stepper Motors
- 3.2.6 Specification and control of stepper motors
- 3.2.7 Servo Motors D.C & A.C

4.0 PROGRAMMABLE LOGIC CONTROLLERS(PLC)

4.1 Introduction
4.2 Advantages of PLC
4.3 Selection and uses of PLC
4.4 Architecture basic internal structures
4.5 Input/output Processing and Programming
4.6 Mnemonics
4.7 Master and Jump Controllers

5.0 ELEMENTS OF CNC MACHINES

5.1 Introduction to Numerical Control of machines and CAD/CAM

5.1.1 NC machines

5.1.2 CNC

machines

5.1.3.CAD/CAM

5.1.3.1 CAD

5.1.3.2 CAM

5.1.3.3 Software and hardware for CAD/CAM

5.1.3.4 Functioning of CAD/CAM system

5.1.3.4 Features and characteristics of CAD/CAM system

5.1.3.5 Application areas for CAD/CAM

5.2 elements of CNC machines

5.2.1 Introduction

5.2.2 Machine Structure

5.2.3 Guideways/Slide ways

5.2.3.1 Introduction and Types of Guideways

5.2.3.2 Factors of design of guideways

5.2.4 Drives

5.2.4.1 Spindle drives

5.2.4.2 Feed drive

5.2.5 Spindle and Spindle Bearings

6.0 **ROBOTICS**

6.1 Definition, Function and laws of robotics

6.2 Types of industrial robots

6.3 Robotic systems

6.4 Advantages and Disadvantages of robots

Syllabus to be covered up to 1st I.A : Chapters 1,2,3 & 4

LEARNING RESOURCES:

SL.NO.	AUTHOR	TITLE OF THE BOOK	PUBLISHER
1	W. Bolton	Mechatronics	Pearson Education India
2	R.K Rajput	Text book of Mechatronics	S. Chand
3	R. RADHAKRISHNA, S,SUBRAMANIAN	CAD/CAM/CIM	NEW AGE INTERNATIONAL PVT.LTD
4	MIKELL GROVER	CAD/CAM	

Th.5 REFRIGERATION AND AIR CONDITIONING

Name of the Course: Diploma in MECHANICAL ENGINEERING			
Course code:		**Semester**	**5th**
Total Period:	**60**	**Examination**	**3 hrs**
Theory periods:	**4 P/W**	**I.A:**	**20**
Maximum marks:	**100**	**End Semester Examination:**	**80**

A. RATIONALE:

Food Preservation is the basic need of food industry to improve effective utilization of food. Hence the study of Refrigeration and Air-conditioning is essential. Comfort is the basic requirement of customers and machines through air conditioning & hence learning the concept of air-conditioning and methods of air-conditioning facilities quality design of air conditioning.

B. COURSE OBJECTIVE:

At the end of the course the students will be able to

1. Explain the working of open & closed air system of air refrigeration system
2. Describe the working and construction of compressor, Condenser, evaporator, expansion valve used for air conditioning and refrigeration.
3. Explain Vapor Compression refrigeration system.
4. Explain Vapor Absorption refrigeration system.
5. Compare different refrigerants properties.
6. Describe equipment for air conditioning.
7. Explain the cooling load for the given requirement.

C. CHAPTER WISE DISTRIBUTION OF PERIODS

Sl.No.	Topic	Periods
01	**AIR REFRIGERATION CYCLE**	05
02	**SIMPLE VAPOUR COMPRESSION REFRIGERATION SYSTEM**	10
03	**VAPOUR ABSORPTION REFRIGERATION SYSTEM**	07
04	**REFRIGERATION EQUIPMENTS**	08
05	**REFRIGERANT FLOW CONTROLS, REFRIGERANTS & APPLICATION OF REFRIGERANTS**	10
06	**PSYCHOMETRICS &COMFORT AIR CONDITIONING SYSTEMS**	10
07	**AIR CONDITIONING SYSTEMS**	10
	TOTAL	60

D. COURSE CONTENTS

1.0 AIR REFRIGERATION CYCLE.

1.1 Definition of refrigeration and unit of refrigeration.
1.2 Definition of COP, Refrigerating effect (R.E)
1.3 Principle of working of open and closed air system of refrigeration.
1.3.1 Calculation of COP of Bell-Coleman cycle and numerical on it.

2.0 **SIMPLE VAPOUR COMPRESSION REFRIGERATION SYSTEM**

2.1 schematic diagram of simple vapors compression refrigeration system'
2.2 Types
2.2.1 Cycle with dry saturated vapors after compression.
2.2.2 Cycle with wet vapors after compression.
2.2.3 Cycle with superheated vapors after compression.
2.2.4 Cycle with superheated vapors before compression.
2.2.5 Cycle with sub cooling of refrigerant
2.2.6 Representation of above cycle on temperature entropy and pressure enthalpy diagram
2.2.7 Numerical on above (determination of COP,mass flow)

3.0 VAPOUR ABSORPTION REFRIGERATION SYSTEM

3.1 Simple vapor absorption refrigeration system
3.2 Practical vapor absorption refrigeration system
3.3 COP of an ideal vapor absorption refrigeration
system 3.4.Numerical on COP.

4.0 REFRIGERATION EQUIPMENTS

4.1 REFRIGERANT COMPRESSORS

4.1.1 Principle of working and constructional details of reciprocating and rotary compressors.

4.1.2 Centrifugal compressor only theory

4.1.3 Important terms.

4.1.4 Hermetically and semi hermetically sealed compressor.

4.2 CONDENSERS

4.2.1 Principle of working and constructional details of air cooled and water cooled condenser
4.2.2 Heat rejection ratio.
4.2.3 Cooling tower and spray pond.

4.3 EVAPORATORS

1.6.1 Principle of working and constructional details of an evaporator.
1.6.2 Types of evaporator.
1.6.3 Bare tube coil evaporator, finned evaporator, shell and tube evaporator.

5.0 REFRIGERANT FLOW CONTROLS, REFRIGERANTS & APPLICATION OF REFRIGERANTS

5.1 EXPANSION VALVES

5.1.1 Capillary tube

5.1.2 Automatic expansion valve

5.2 REFRIGERANTS

5.1.3 Thermostatic expansion valve

5.2 REFRIGERANTS

5.2.1 Classification of refrigerants

5.2.2 Desirable properties of an ideal refrigerant.

5.2.3 Designation of refrigerant.

5.2.4 Thermodynamic Properties of Refrigerants.

5.2.5 Chemical properties of refrigerants.

5.2.6 commonly used refrigerants, R-11, R-12, R-22, R-134a, R-717

5.2.7 Substitute for CFC

5.3 Applications of refrigeration

5.3.1 cold storage

5.3.2 dairy refrigeration

5.3.3 ice plant

5.3.4 water cooler

5.3.5 frost free refrigerator

6.0 PSYCHOMETRICS &COMFORT AIR CONDITIONING SYSTEMS

6.1 Psychometric terms

6.2 Adiabatic saturation of air by evaporation of water

6.3 Psychometric chart and uses.

6.4 Psychometric processes

6.4.1 Sensible heating and Cooling

6.4.2 Cooling and Dehumidification

6.4.3 Heating and Humidification

6.4.4 Adiabatic cooling with humidification

6.4.5 Total heating of a cooling process

6.4.6 SHF, BPF,

6.4.7 Adiabatic mixing

6.4.8 Problems on above.

6.5 Effective temperature and Comfort chart

7.0 AIR CONDITIONING SYSTEMS

7.1 Factors affecting comfort air conditioning. .
7.2 Equipment used in an air-conditioning.
7.3 Classification of air-conditioning system
7.4 Winter Air Conditioning System
7.5 Summer air-conditioning system.
7.6 Numerical on above

Syllabus to be covered up to I.A- Chapters1.2&3.

LEARNING RESOURCES

SL.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER
01	C.P ARRORA	REFRIGERATION AND AIR CONDITIONING	TMH
02	R.S.KHURMI &J.K.GOPTA	REFRIGERATION AND AIR CONDITIONING	S.CHAND
03	P.L BALLANY	REFRIGERATION AND AIR CONDITIONING	KHANNA PUBLISHER
04	DOMKUNDRA AND ARORA	REFRIGERATION AND AIR CONDITIONING	DHANPAT RAY AND SONS

Pr.1 REFRIGERATION AND AIR CONDITIONING LAB

Name of the Course: Diploma in Mechanical Engg.			
Course code:		Semester	5th
Total Period:	60	Examination	3 hrs
Theory periods:	4 P/W	Sessional:	25
Maximum marks:	100	End Semester Examination:	50

COURSE OBJECTIVES

At the end of the course the students will be able to

1. Study the construction features of Domestic Refrigerator, water cooler, Window Air Conditioner, Split Air Conditioner
2. Determining the capacity, COP, of Refrigerator Test Rig, Window air Conditioner, Split Air Conditioner, Water cooler.
3. Evacuating the entire system
4. Locating the leakage in refrigerating system
5. Charging of the refrigerating system

List of Practicals

1. Study the construction features of Domestic Refrigerator.
2. Study the construction features of water cooler.
3. Study the construction features of window air conditioner
4. Study the construction features of split air conditioner
5. Determine the capacity and cop of vapour compression Refrigerator test rig 6.Determine the capacity and cop of water cooler
7. Determine the capacity and cop of window air conditioner 8.Determine the capacity and cop of split air conditioner
9. Determine the capacity and cop of vapour absorption Refrigerator test rig. 10.Complete charging of a domestic refrigerator and its leak test.

Pr 2. HYDRAULIC MACHINES &INDUSTRIAL FLUID POWER LAB

Name of the Course: Diploma in Mechanical Engg.			
Course code:		Semester	5th
Total Period:	60	Examination	3 hrs.
Theory periods:	4 P/W	Sessional:	25
Maximum marks:	100	End Semester Examination:	50

COURSE OBJECTIVES

At the end of the course the students will be able to

1.0 Conducting performance test on impulse and reaction turbine

2.0 Conducting performance test on centrifugal pump

3.0 Designing &operating pneumatic circuits

4.0 Designing &operating industrial fluid power circuits

List of Practicals

1.0 Performance test on impulse turbine and to find out the efficiency

2.0 Performance test on Kaplan turbine and to find out the efficiency

3.0 Performance test on Francis turbine and to find out the efficiency

4.0 Performance test on centrifugal pump and to find out the characteristic curves

5.0 Direct operation of single &double acting pneumatic cylinder.

6.0 Operating double acting pneumatic cylinder with quick exhaust valve

7.0 Speed control double acting pneumatic cylinder using metering in and metering out circuits.

8.0 Direct operation of single &double acting hydraulic cylinder

9.0 Direct operation of hydraulic motor

10.0 Speed control double acting hydraulic cylinder using metering in & metering out circuits.

Pr.3 CAD/CAM LAB

Name of the Course: Diploma in Mechanical Engg.			
Course code:		Semester	5th
Total Period:	60	Examination	3 Hrs
Theory periods:	4 P/W	Sessional:	25
Maximum marks:	75	End Semester Examination:	50

OBJECTIVES

At the end of the course the students will be able to

1. To understand the fundamentals and use of CAD.
2. To conceptualize drafting and modelling in CAD.
3. To interpret the various features in the menu of solid modelling package.
4. To synthesize various parts or components in an assembly. 5.Toprepare CNC programmes for various jobs

COURSE CONTENTS

PART-A.

INTRODUCTION:

Part modelling, Datum plane, Datum plane; constraint; dimensioning; extrude; revolve; sweep; protrusion; extrusion; rib; shell; hole; round; chamfer; copy; mirror; assembly; align; orient.

EXERCISES:

2D Drawings of Rectangle, circle, polygon and its dimensioning 3D Drawings of;

1. Gib and cutter joint
2. Screw Jack;
3. Connecting Rod;
4. Bearing Block.

Print the orthographic view from the above assembled 3Ddrawing

PART-B.

CNC Programming and Machining

INTRODUCTION;

1. Study of CNC lathe, milling;
2. Study of international codes; G-Codes and M –Codes
3. Format –Dimensioning methods;
4. Programme writing –Turning Simulator-Milling simulator IS practice-commands menus
5. Editing the programme in the CNC MACHINES;
6. Execute the programme in the CNC machines;

Exercise;

1. Print the programme and make the component in the CNC machine;
2. Using canned cycle-create a part programme for thread cutting, grooving and produce component in the CNC Turning Machine
3. Using Linear interpolation and Circular Interpolation-Create a part programme for grooving and produce component in the CNC Milling Machine

Pr 4. PROJECT WORK (Phase-I)

Course code:		Semester	5th
Total Period:	60	Examination :	-
Theory periods:	4P / week	Sessional Marks	25
		TOTAL Marks	25

RATIONALE

Students' Project Work aims at developing innovative skills in the students whereby they apply the knowledge and skills gained through the course covered in many subjects and Labs, by undertaking a project. The prime emphasis of the project work is to understand and apply the basic knowledge of the principles of mechanical engineering practices in real life situations, so as to participate and manage a large mechanical engineering projects in future.
Entire Project shall spread over 5th and 6th Semester. Part of the Project covered in 5th Semester shall be named as
Project Phase-I and balance portion to be covered in 6th Semester shall be named as *Project Phase-II*.

OBJECTIVES
After undergoing the Project Work, the student will be able to:

- Implement the theoretical and practical knowledge and skills gained through various subjects/courses into an application suitable for a real life working environment, preferably in an industrial environment.
- Develop working models or applications and implement these for the actual needs of the community/industry.
- Explain the working of industrial environment and its work ethics.
- Explain what entrepreneurship is and how to become an entrepreneur.
- Identify and contrast gap between the technological knowledge acquired through curriculum and the actual industrial need and to compensate it by acquiring additional knowledge as required.
- Carry out cooperative learning through synchronous guided discussions within the class in key areas, asynchronous document sharing and discussions, as well as prepare collaborative edition of the final project report.
- Find latest ideas on robotics, automation and mechatronics based projects.

General Guidelines

The individual students have different aptitudes and strengths and also areas of interest. Project work, therefore, should match the strengths and interest of the students. For this purpose, students should be asked to identify the type of project work, they would like to execute. The activity of problem identification should begin well in advance (right from beginning of 5th semester). Students should be allotted a problem of interest to him/her as a project work. It is also essential that the faculty of the respective department may have a brainstorming session to identify suitable project assignments for their students. The project assignment can be individual assignment or a group assignment. Preferably there should not be more than 5 students, if the project work is given to a group. The project work identified in collaboration with industry should be preferred.

Following are the broad suggestive areas of project work

- ✓ Automobile based projects.
- ✓ Refrigeration based &Air conditioning based projects.
- ✓ Hydraulic control &Pneumatic control based automation projects
- ✓ Fabrication based projects.
- ✓ Wind mill
- ✓ Solar energy based projects.
- ✓ Thermal power plant using steam.
- ✓ Hydel power dam.

- ✓ Cooling tower.

- ✓ Solenoid based hammer.
- ✓ Unmanned railway crossing.
- ✓ Engine based air compressor.
- ✓ Mobile all round year air conditioner
- ✓ Driverless car.
- ✓ Hybrid motorbike.
- ✓ Any other areas found suitable.
- ✓ Torque testing machine.
- ✓ Spring testing machine.
- ✓ Mechanical sanitizer.
- ✓ Solar powered refrigerator.
- ✓ Door opener.

A suggestive criterion for assessing student performance by the external (preferably person from industry) and internal (teacher) examiner is given in table below:

Sl. No.	**Performance Criteria**
1.	Selection of project assignment
2.	Planning and execution of considerations
3.	Quality of performance
4.	Providing solution of the problems or production of final product
5.	Sense of responsibility
6.	Self expression/ communication/ Presentation skills
7.	Interpersonal skills/human relations
8.	Report writing skills
9	Viva voce

The teachers are free to evolve other criteria of assessment, depending upon the type of project work.

It is proposed that the institute may organize an annual exhibition of the project work done by the students and invite leading Industrial organizations to such an exhibition.

Project Phase-I and Phase-II

The Project work duration shall cover 2 semesters(5^{th} and 6^{th} sem). The Grouping of students, selection of Project, assignment of Project Guide to the Group shall be done in the beginning of 5^{th} sem under Project Phase-I. The students may be allowed to study literature, any existing system and then define the Problem/objective of the Project. Preliminary work upto Design of the system have to be complete in Phase-I. Execution of work may begin in Phase-I depending on the Project. Project Milestones are to be set so that progress can be tracked . In Phase-II Execution of work and Documentation have to be complete. Project Report have to be prepared and complete in Phase-II. All Project reports should be organized uniformly in proper order, irrespective of group. Teacher Guides can make suitable alteration in the components of Task and schedule.

At the end of Project Phase-I in 5^{th} semester there shall be one presentation by each group to mark to progress and also to judge whether the Project is moving in right direction as per the objective of the Project.

EQUIPMENT LIST

REFRIGERATION AND AIR –CONDITIONING LAB

SL.NO	NAME OF THE EQUIPMENTS	QUANTITY
01	Domestic Refrigerator test rig	01 no
02	water cooler test rig	01 no
03	Window Air Conditioner test rig	01 no
04	Split Air Conditioner test rig	01 no
05	Vacuum pump set with accessories	01 no
06	Charging cylinder with accessories	02 nos
07	Halide torch or any leak tester	02 nos
08	Vapour absorption test rig	01

HYDRAULIC MACHINES & INDUSTRIAL FLUID POWER LAB

SL.NO	NAME OF THE EQUIPMENTS	QUANTITY
01	Impulse turbine(PELTON WHEEL) Test Rig with arrangements to find efficiency	01no
02	Kaplan turbine Test Rig with arrangements to find efficiency	01no
03	Francis turbine Test Rig with arrangements to find efficiency	01no
04	Centrifugal pump Test Rig with arrangements to find efficiency	01no
05	Pneumatic Trainer Kit with accessories	02nos
06	Hydraulic Trainer Kit with accessories	01no
07	Manual or Digital Tachometer	05nos

CAD/CAM LAB

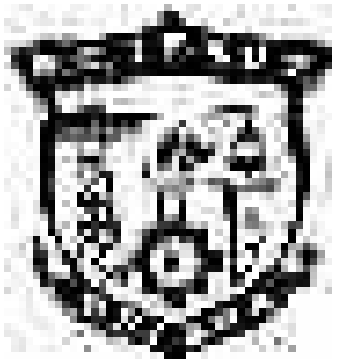
SL.NO	NAME OF THE EQUIPMENTS	QUANTITY
01	DESKTOP COMPUTER with UPS	30 no
02	AUTOCAD SOFTWARE 2D/3D	01 each
03	CNC TURNING MACHINE	01 no
04	CNC MILLING MACHINE	01 no
05	PRINTER	02 nos

CURRICULLUM OF 6TH SEMESTER

For

DIPLOMA IN MECHANICAL ENGINEERING

(Effective FROM 2020-21 Sessions)



STATE COUNCIL FOR TECHNICAL EDUCATION & VOCATIONAL TRAINING, ODISHA, BHUBANESWAR

STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA									
TEACHING AND EVALUATION SCHEME FOR 6th Semester (Mechanical Engg.) (wef 2020-21)									
Subject Number	Subject Code	Subject	Periods/week			Evaluation Scheme			
			L	T	P	Internal Assessment/ Sessional	End Sem Exams	Exams (Hours)	Total
		Theory							
Th.1		INDUSTRIAL ENGINEERING & MANAGEMENT	4		-	20	80	3	100
Th.2		AUTOMOBILE ENGINEERING AND HYBRID VEHICLES	4		-	20	80	3	100
Th.3		POWER STATION ENGINEERING	4		-	20	80	3	100
Th.4		ELECTIVE (any One)	4			20	80	3	100
Th.4(a)		COMPOSITE MATERIALS							
Th.4(b)		ADVANCE MANUFACTURING PROCESSES							
Th.4(c)		INDUSTRIAL ROBOTICS & AUTOMATION							
		Total	**16**			**80**	**320**	**-**	**400**
		Practical							
Pr.1		AUTOMOBILE ENGINEERING LAB	**-**	**-**	4	50	50	3	100
Pr.2		POWER STATION ENGINEERING LAB	**-**	**-**	4	25	50	3	75
Pr.3		PROJECT WORK PHASE -II		**-**	10	50	100	3	150
Pr.4		LIFE SKILL	**-**	**-**	2	25	-	-	25
		STUDENT CENTERED ACTIVITIES (SCA)			3				
		Total	***-***	***-***	***23***	***150***	***200***	***-***	***350***
		Grand Total	**16**	**-**	**23**	**230**	**520**	**-**	**750**
Abbreviations: L-Lecturer, T-Tutorial, P-Practical. Each class is of minimum 55 minutes duration									
Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50% and in Aggregate is 40%									

SCA shall comprise of Extension Lectures/ Personality Development/ Environmental issues /Quiz /Hobbies/ Field visits/ cultural activities/Library studies/Classes on MOOCS/SWAYAM /Idea Tinkering and Innovation Lab Practice etc. ,Seminar and SCA shall be conducted in a section.
There shall be 1 Internal Assessment done for each of the Theory Subject. Sessional Marks shall be total of the performance of individual different jobs/ experiments in a subject throughout the semester

TH1. INDUSTRIAL ENGINEERING & MANAGEMENT

Name of the Course: Diploma in MECHANICAL ENGINEERING			
Course code:		Semester	6th
Total Period:	60	Examination	3 hrs
Theory periods:	4 P/W	Internal assessment	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONALE:

Main objective of Mechanical Engineering is to produce goods and services for benefit to mankind. Such productions are done utilizing various resources like Men, Materials, machines and Money. Industrial engineering and quality control is the subject which allows optimized use of such resources and hence very important for a mechanical engineer.

B. COURSE OBJECTIVES:

After undergoing this course, the students will be able to:

1. Identify the place for a new plant set up and systematic arrangement of machinery and shop for smooth production.
2. Take right decisions to optimize resources utilizations by improving productivity of the lands ,buildings,people,material,machines,money,methods and management effectively.
3. Understanding of stock management and maintenance to reduce plant ideal time. 4 To use the charts to record the quality of products.
5. To eliminate unproductive activities under the control of the management, supervisor, worker and the design of products and processes.

C. CHAPTER WISE DISTRIBUTION OF PERIORDS

Sl No.	Topic	Periods
1	**PLANT ENGINEERING**	10
2	**OPERATIONS RESEARCH**	10
3	**INVENTORY CONTROL**	10
4	**INSPECTION AND QUALITY CONTROL**	15
5	**PRODUCTION PLANNING AND CONTROL**	15

D. COURSE CONTENT

1. PLANT ENGINEERING:

1.1 Selection of Site of Industry.
1.2 Define plant layout.
1.3 Describe the objective and principles of plant layout.
1.4 Explain Process Layout, Product Layout and Combination Layout.
1.5 Techniques to improve layout.
1.6 Principles of material handling equipment.
1.7 Plant maintenance.

1.7.1 Importance of plant maintenance.
1.7.2 Break down maintenance.
1.7.3 Preventive maintenance.
1.7.4 Scheduled maintenance.

2. OPERATIONS RESEARCH:

2.1 Introduction to Operations Research and its applications.
2.2 Define Linear Programming Problem, 2.3Solution of L.P.P. by graphical method.
2.4 Evaluation of Project completion time by Critical Path Method and PERT (Simple problems)-
2.5Explain distinct features of PERT with respect to CPM.

3. INVENTORY CONTROL:

3.1 Classification of inventory.
3.2 Objective of inventory control.
3.3 Describe the functions of inventories.
3.4 Benefits of inventory control.
3.5 Costs associated with inventory.
3.6 Terminology in inventory control
3.7 Explain and Derive economic order quantity for Basic model. (Solve numerical)
3.8 Define and Explain ABC analysis.

4. INSPECTION AND QUALITY CONTROL:

4.1Define Inspection and Quality control. 4.2Describe planning of inspection.
4.3 Describe types of inspection.
4.4 Advantages and disadvantages of quality control.
4.5 Study of factors influencing the quality of manufacture.
4.6 Explain the Concept of statistical quality control, Control charts (X, R, P and C - charts).
4.7 Methods of attributes.
4.8 Concept of ISO 9001-2008.
4.9.1 Quality management system, Registration /certification procedure.
4.9.2 Benefits of ISO to the organization.
4.9.3 JIT, Six sigma,7S, Lean manufacturing
4.9.4 Solve related problems.

5.0 PRODUCTION PLANNING AND CONTROL

5.1 Introduction
5.2 Major functions of production planning and control
5.3 Methods of forecasting
5.3.1 Routing
5.3.2Scheduling
5.3.3 Dispatching
5.3.4 Controlling
5.4 Types of production
5.4.1 Mass production
5.4.2 Batch production
5.4.3 Job order production
5.5 Principles of product and process planning.

Syllabus to be covered before IA: Chapter 1,2,3

Learning Resources:			
Sl. No.	***Name of Authors***	***Title of the Book***	***Name of the Publisher***
1	O.P.KHANNA	INDUSTRIAL ENGINEERING & MANAGEMENT	DHANPAT RAI & SONS
2	MARTAND TELSANG	INDUSTRIAL ENGG & PRODUCTION MANAGEMENT	S.CHAND
3	M.MAHAJAN	STATISTICAL QUALITY CONTROL	DHANPAT RAI &SONS
4			

TH.2 AUTOMOBILE ENGINEERING AND HYBRID VEHICLES

Name of the Course: Diploma in MECHANICAL ENGINEERING			
Course code:		Semester	6th
Total Period:	60	Examination	3 hrs
Theory periods:	4 P/W	Internal assessment	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONALE:

Automobiles are the principal mode of transport system. Their manufacture and maintenance gives a major scope for employment. Many entrepreneur pass outs go for servicing of automobiles or trading/ manufacturing of auto components. Thus automobile engineering is an important subject to be in the regular curriculum of the mechanical engineering.

B. COURSE OBJECTIVES:

At the end of the course the students will be able to:

- Understand automobile chassis, transmission, breaking and fuel system etc.
- Understand the basics of electric vehicle kinematics.
- Understand the concepts of hybrid electric vehicles.

C.TOPIC WISE DISTRIBUTION OF PERIODS

Sl No.	Topic	Periods
1	Introduction & Transmission System	12
2	Braking system	5
3	Ignition & Suspension System	10
4	Cooling and Lubrication	8
5	Fuel system	10
6	Hybrid and Electric Vehicles	15

C.COURSE CONTENTS

1.0 INTRODUCTION & TRANSMISSION SYSTEM:

1.1 Automobiles: Definition, need and classification: Layout of automobile chassis with major components (Line diagram)
1.2 Clutch System: Need, Types (Single & Multiple) and Working principle with sketch
1.3 Gear Box: Purpose of gear box, Construction and working of a 4 speed gear box
1.4 Concept of automatic gear changing mechanisms
1.5 Propeller shaft: Constructional features
1.6 Differential: Need, Types and Working principle

2.0 BRAKING SYSTEM:

2.1 Braking systems in automobiles: Need and types
2.2 Mechanical Brake
2.3 Hydraulic Brake
2.4 Air Brake
2.5 Air assisted Hydraulic Brake
2.6 Vacuum Brake

3.0 IGNITION & SUSPENSION SYSTEM:

3.1 Describe the Battery ignition and Magnet ignition system

3.2 Spark plugs: Purpose, construction and specifications

3.3 State the common ignition troubles and its remedies

3.4 Description of the conventional suspension system for Rear and Front axle

3.5 Description of independent suspension system used in cars (coil spring and tension bars)

3.6 Constructional features and working of a telescopic shock absorber

4.0 COOLING AND LUBRICATION:

4.1 Engine cooling: Need and classification

4.2 Describe defects of cooling and their remedial measures

4.3 Describe the Function of lubrication

4.4 Describe the lubrication System of I.C. engine

5.0 FUEL SYSTEM:

5.1 Describe Air fuel ratio

5.2 Describe Carburetion process for Petrol Engine

5.3 Describe Multipoint fuel injection system for Petrol Engine

5.4 Describe the working principle of fuel injection system for multi cylinder Engine 5.5 Filter for Diesel engine

5.6 Describe the working principle of Fuel feed pump and Fuel Injector for Diesel engine

6.0 ELECTRIC AND HYBRID VEHICLES:

6.1 Introduction, Social and Environmental importance of Hybrid and Electric Vehicles

6.2 Description of Electric Vehicles, operational advantages, present performance and applications of Electric Vehicles

6.3 Battery for Electric Vehicles, Battery types and fuel cells

6.4 Hybrid vehicles, Types of Hybrid and Electric Vehicles: Parallel, Series, Parallel and Series configurations;6.5 Drive train

6.6 Solar powered vehicles

D.SYLLABUS COVERED UP TO I.A-CHAPTERS 1,2 &3

E.LEARNING RESOURCES:

Sl. No.	*Name of Authors*	*Title of the Book*	*Name of the Publisher*
1	R.B.Gupta	Automobile Engineering	Satya Prakashan
2	Dr Kirpal Singh	Automobile Engineering Vol- I & II	Standard Publishers
3	C.P.Nakra	Automobile Engineering	Dhanpat Rai Publication
4	W.H.Course	Automotive Engine	McGraw Hill
5	Iqbal Hussain	Electric & Hybrid Vehicles – Design Fundamentals	CRC Press, 2
6	A.K. Babu	Statistical Electric & Hybrid Vehicles	Khanna Publishing House, New Delhi, 2018

TH.3 POWER STATION ENGINEERING

Name of the Course: Diploma in MECHANICAL ENGINEERING			
Course code:		Semester	6th
Total Period:	60	Examination	3 hrs
Theory periods:	4 P/W	Internal assessment	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONALE:

Bulk powers used in industries and for domestic purposes are generated in power stations. A large number of diverse and specialized equipment and system are used in a power plant should have this important subject in mechanical engineering.

B. COURSE OBJECTIVES:

At the end of the course the students will be able to:

- Understand the generation of power by utilizing various energy sources.
- Understand the use of steam, its operation in thermal power stations.
- Understand the nuclear energy sources and power developed in nuclear power station.
- Understand the basics of diesel electric power station and hydroelectric power station.
- Understand the basics of gas turbine power station
-

C.TOPIC WISE DISTRIBUTION OF PERIODS

Sl No.	Topic	Periods
1	**INTRODUCTION**	05
2	**THERMAL POWER STATIONS**	20
3	**NUCLEAR POWER STATIONS**	10
4	**DIESEL ELECTRIC POWER STATIONS**	10
5	HYDEL POWER STATIONS	10
6	GAS TURBINE POWER STATIONS	05

D.COURSE CONTENTS:

1.0 INTRODUCTION:

1.1 Describe sources of energy.
1.2 Explain concept of Central and Captive power station.
1.3 Classify power plants.
1.4 Importance of electrical power in day today life.
1.5 Overview of method of electrical power generation.

2.0 THERMAL POWER STATIONS:

2.1 Layout of steam power stations.
2.2 Steam power cycle. Explain Carnot vapour power cycle with P-V, T-s diagram and determine thermal efficiency.
2.3 Explain Rankine cycle with P-V, T-S & H-s diagram and determine thermal efficiency, Work done, work ratio, and specific steam Consumption.
2.4 Solve Simple Problems.
2.5. List of thermal power stations in the state with their capacities.
2.6 Boiler Accessories: Operation of Air pre heater, Operation of Economiser, Operation Electrostatic precipitator and Operation of super heater. Need of boiler mountings and operation of boiler

2.7 Draught systems (Natural draught, Forced draught & balanced draught) with their advantages & disadvantages.
2.8 Steam prime movers: Advantages & disadvantages of steam turbine, Elements of steam turbine, governing of steam turbine. Performance of steam turbine: Explain Thermal efficiency, Stage efficiency and Gross efficiency.
2.9 Steam condenser: Function of condenser, Classification of condenser. function of condenser auxiliaries such as hot well, condenser extraction pump, air extraction pump, and circulating pump.
2.10 Cooling Tower: Function and types of cooling tower, and spray ponds
2.11 Selection of site for thermal power stations.

3.0 NUCLEAR POWER STATIONS:

3.1 Classify nuclear fuel (Fissile & fertile material)
3.2 Explain fusion and fission reaction.
3.3 Explain working of nuclear power plants with block diagram .
3.4 Explain the working and construction of nuclear reactor .
3.5 Compare the nuclear and thermal plants.
3.6 Explain the disposal of nuclear waste.
3.7 Selection of site for nuclear power stations.
3.8 List of nuclear power stations.

4.0 DIESEL ELECTRIC POWER STATIONS:

4.1 State the advantages and disadvantages of diesel electric power stations.
4.2 Explain briefly different systems of diesel electric power stations: Fuel storage and fuel supply system, Fuel injection system, Air supply system, Exhaust system, cooling system, Lubrication system, starting system, governing system.
4.3 Selection of site for diesel electric power stations.
4.4 Performance and thermal efficiency of diesel electric power stations.

5.0 HYDEL POWER STATIONS:

5.1 State advantages and disadvantages of hydroelectric power plant.
5.2 Classify and explain the general arrangement of storage type hydroelectric project and explain its operation.
5.3 Selection of site of hydel power plant.
5.4 List of hydro power stations with their capacities and number of units in the state.
5.5 Types of turbines and generation used.
5.6 Simple problems.
6.0 GAS TURBINE POWER STATIONS
6.1 Selection of site for gas turbine stations.
6.2 Fuels for gas turbine
6.3 Elements of simple gas turbine power plants
6.4 Merits, demerits and application of gas turbine power plants.

Syllabus covered up to I.A-Chapters 1,2 &3

E.LEARNING RESOURCES:

Sl. No.	***Name of Authors***	***Title of the Book***	***Name of the Publisher***
1	R.K Rajput	Power Plant Engineering	Laxmi Publication
2	P.K.NAG	Power Plant Engineering	TMH
3	Nag pal G,R	Power plant Engineering	Khanna Publisher
4	P.C.SHARMA	Power Plant Engineering	S.K KATARIA &SONS

Th-4a-COMPOSITE MATERIALS (ELECTIVE)

Name of the Course: Diploma in MECHANICAL ENGINEERING			
Course code:		Semester	6th
Total Period:	60	Examination	3 hrs
Theory periods:	4 P/W	Internal assessment	20
Maximum marks:	100	End Semester Examination:	80

RATIONALE: Composite material is the advanced engineering material and plays an important Role in design of engineering products.it is s.a valuable subject for mechanical engineer

COURSE OBJECTIVES:

At the end of the course the students will be able to:

- Understand the basic concept of composite materials
- Understand the Classification of Composites
- Understand the Mechanical Properties of Composites
- Understand the Laminates
- Understand the Joining Methods and Failure Theories.

Topic Wise Distribution of Periods

Sl No.	Topic	Periods
1	Introduction	15
2	Classification of Composites	8
3	Mechanical Properties of Composites	12
4	Laminates	15
5	Joining Methods and Failure Theories	10

CHAPTERS

1.0 Introduction:

1.1 Classifications of Engineering Materials, Concept of composite materials.

1.2 Matrix materials, Functions of a Matrix, Desired Properties of a Matrix, Polymer Matrix (Thermosets and Thermoplastics), Metal matrix, Ceramic matrix, Carbon Matrix, Glass Matrix etc.

1.3 Types of Reinforcements/Fibers: Role and Selection or reinforcement materials.

1.4 Types of fibers, Glass fibers, Carbon fibers, Aramid fibers , Metal fibers, Alumina fibers, Boron Fibers, Silicon carbide fibers, Quartz and Silica fibers, Multiphase fibers, Whiskers, Flakes etc.,

1.5 Mechanical properties of fibers.

2.0 Classification of Composites:

2.1 Classification based on Matrix Material: Organic Matrix composites, Polymer matrix composites (PMC), Carbon matrix Composites or Carbon-Carbon Composites, Metal matrix composites (MMC), Ceramic matrix composites (CMC).

2.2 Classification based on reinforcements: Fiber Reinforced Composites, Fiber Reinforced Polymer (FRP) Composites, Laminar Composites, Particulate Composites.

2.3 Comparison with Metals, Advantages & limitations of Composites.

3.0 Mechanical Properties of Composites:

3.1 Geometrical aspects – volume and weight fraction.

3.2 Unidirectional continuous fiber, discontinuous fibers, Short fiber systems, woven

reinforcements – Mechanical Testing.

3.3 Determination of stiffness and strengths of unidirectional composites; tension, compression, flexure and shear.

4.0 Laminates:

4.1 Plate Stiffness and Compliance, Assumptions, Strains, Stress Resultants, Computation of Stresses.

4.2 Types of Laminates - Symmetric Laminates, Antisymmetric Laminate, Balanced Laminate, Quasi-isotropic Laminates, Cross-ply Laminate, Angle ply Laminate. Orthotropic Laminate.

4.3 Laminate Moduli, Hydrothermal Stresses.

5.0 Joining Methods and Failure Theories:

5.1 Joining –Advantages and disadvantages of adhesive and mechanically fastened joints.

5.2 Typical bond strengths and test procedures.

Syllabus covered up to I.A-Chapters 1, 2 & 3

E.LEARNING RESOURCES:

Sl. No.	***Name of Authors***	***Title of the Book***	***Name of the Publisher***
1	A.K Bhargava	Engineering Materials: Polymers, Ceramics and Composites	Prentice Hall India
2	G. Dieter	Mechanical Metallurgy	Mc-Graw Hill
3	R.F. Speyer	Thermal Analysis of Materials	Marcel Decker

TH 4b ADVANCE MANUFACTURING PROCESSES

Theory	**4 Periods per week**	**Internal Assessment**	**20 Marks**
Total Periods	**60 Periods**	**End Sem Exam**	**80 Marks**
Examination	**3hours**	**Total Marks**	**100Marks**

RATIONALE:

Advance manufacturing processes is the field of production by advance nontraditional methods which give the conversion of raw materials into finished product..

COURSE OBJECTIVES:

At the end of the course the students will be able to:

- Understand the working principle of modern machining processes.
- Understand the Plastic Processing
- Understand the additive manufacturing process
- Understand the Special Purpose Machines
- Understand the Maintenance of Machine Tools

Topic Wise Distribution of Periods

Sl No.	Topic	Periods
1	Modern Machining Processes	20
2	Plastic Processing	10
3	Additive Manufacturing Process	15
4	Special Purpose Machines	7
5	Maintenance of Machine Tools	8

DETAILED CONTENTS

1.0 Modern Machining Processes:

1.1 Introduction – comparison with traditional machining.

1.2 Ultrasonic Machining: principle, Description of equipment, applications.

1.3 Electric Discharge Machining: Principle, Description of equipment, Dielectric fluid, tools (electrodes), Process parameters, Output characteristics, applications.

1.4 Wire cut EDM: Principle, Description of equipment, controlling parameters; applications.

1.5 Abrasive Jet Machining: principle, description of equipment, Material removal rate, application.

1.5 Laser Beam Machining: principle, description of equipment, Material removal rate, application.

1.6 Electro Chemical Machining: principle, description of equipment, Material removal rate, application.

1.7 Plasma Arc Machining – principle, description of equipment, Material removal rate, Process parameters, performance characterization, Applications.

1.8 Electron Beam Machining - principle, description of equipment, Material removal rate, Process parameters, performance characterization, Applications.

2.0 Plastic Processing:

2.1 Processing of plastics.

2.2 Moulding processes: Injection moulding, Compression moulding, Transfer moulding.

2.3 Extruding; Casting; Calendering.

2.4 Fabrication methods-Sheet forming, Blow moulding, Laminating plastics (sheets, rods & tubes), Reinforcing.

2.5 Applications of Plastics.

3.0 Additive Manufacturing Process:

3.1 Introduction, Need for Additive Manufacturing

3.2 Fundamentals of Additive Manufacturing, AM Process Chain

3.3 Advantages and Limitations of AM, Commonly used Terms

3.4 Classification of AM process, Fundamental Automated Processes, Distinction between AM and CNC, other related technologies.

3.5 Application –Application in Design, Aerospace Industry, Automotive Industry, Jewelry Industry, Arts and Architecture. RP Medical and Bioengineering Applications.

3.6 Web Based Rapid Prototyping Systems.

3.7 Concept of Flexible manufacturing process, concurrent engineering, production tools like capstan and turret lathes, rapid prototyping processes.

4.0 Special Purpose Machines (SPM):

4.1 Concept, General elements of SPM, Productivity improvement by SPM, Principles of SPM design.

5.0 Maintenance of Machine Tools:

5.1 Types of maintenance, Repair cycle analysis, Repair complexity, Maintenance manual, Maintenance records, Housekeeping. Introduction to Total Productive Maintenance (TPM).

Syllabus covered up to I.A-Chapters 1,2 &3

E.LEARNING RESOURCES:			
Sl. No.	***Name of Authors***	***Title of the Book***	***Name of the Publisher***
1	O.P.KHANNA	Production technology –Vol-II	Dhanpat Rai Publication
2	B.S. Raghuwanshi	Workshop Technology, Vol – II	Dhanpat Rai Publication
3	HMT, Bangalore	Production Technology	Tata Mc-Graw Hill
4	1. Chua C.K., Leong K.F. and LIM C.S,	Rapid prototyping: Principles and Applications	WORLD SCIENTIFIC PUBLICATION,THIRD EDITION,2010
5	Stephen F. Krar & Arthur Gil	Exploring Advanced Manufacturing Technologies	1. Industrial Press

TH.4(c) INDUSTRIAL ROBOTICS & AUTOMATION (Elective)

Name of the Course: Diploma in MECHANICAL ENGINEERING			
Course code:		Semester	6th
Total Period:	60	Examination	3 hrs
Theory periods:	4 P/W	Internal assessment	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONALE:

Today's manufacturing units are using robots as substitute for workers working in hazardous atmosphere. Any automation found are using robots which are known as industrial robots and helps in mass production and assembling parts to make a finished product. So to meet the need of the day this Subject should be included in the syllabus of mechanical engineering of diploma stream.

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COURSE OBJECTIVES:

At the end of the course the students will be able to:

- Understand the basic concepts, parts of robots and types of robots.
- Understand the various drive systems for robot, sensors and their applications in robots and programming of robots.
- Understand the robots according to its usage.
- Understand the various applications of robots, justification and implementation of robot.
- Conceptualize automation and understand applications of robots in various industries.

Topic Wise Distribution of Periods

Sl No.	Topic	Periods
1	Fundamentals of Robotics	10
2	Robotic Drive System and Controller	12
3	Sensors	8
4	Introduction to Machine Vision	10
5	Robot kinematics and Robot Programming	15
6	Automation & Industrial Applications	5

CHAPTERS

1.0 Fundamentals of Robotics:

1.1 Definition; Robot anatomy (parts) and its working.
1.2 Robot Components: Manipulator, End effectors; Construction of links, Types of joints.
1.3 Classification of robots; Cartesian, Cylindrical, Spherical, Scara, Vertical articulated.
1.4 Structural Characteristics of robots; Mechanical rigidity; Effects of structure on control work envelope and work Volume.
1.5 Robot work Volumes, comparison.
1.6 Advantages and disadvantages of robots.

2.0 Robotic Drive System and Controller:

2.1 Actuators; Hydraulic, Pneumatic and Electrical drives; Linear actuator; Rotary drives.
2.2 AC servo motor; DC servo motors and Stepper motors; Conversion between linear and rotary motion.
2.3 Feedback devices; Potentiometers; Optical encoders; DC tachometers.

2.4 Robot controller; Level of Controller; Open loop and Closed loop controller.
2.5 Microprocessor based control system; Robot path control: Point to point, Continuous path control and Sensor based path control; Controller programming.

3.0 Sensors:

3.1 Requirements of a sensor.
3.2 Principles and Applications of the following types of sensors: Position sensors (Encoders, Resolvers, Piezo Electric); Range sensors (Triangulation Principle, Structured lighting approach).
3.3 Proximity sensing; Force and torque sensing.

4.0 Introduction to Machine Vision:

4.1 Robot vision system (scanning and digitizing image data); Image processing and analysis.
4.2 Cameras (Acquisition of images); Videocon camera (Working principle & construction).
4.3 Applications of Robot vision system: Inspection, Identification, Navigation & serving.

5.0 Robot kinematics and Robot Programming:

5.1 Forward Kinematics; Inverse Kinematics and Differences.
5.2 Forward Kinematics and Reverse Kinematics of Manipulators with Two Degrees of Freedom (In 2 Dimensional); Deviations and Problems.
5.3 Teach Pendant Programming; Lead through programming; Robot programming Languages; VAL Programming.
5.4 Motion Commands; Sensor Commands; End effecter commands; and Simple programs.

6.0 Automation & Industrial Applications:

6.1 Basic elements of automated system, advanced automation functions, levels of automation.
6.2 Application of robots in machining; welding; assembly and material handling.

Syllabus covered up to I.A-Chapters 1, 2 & 3

E.LEARNING RESOURCES:

Sl. No.	*Name of Authors*	*Title of the Book*	*Name of the Publisher*
1	Saeed B. Niku	Introduction to Robotics: Analysis, Systems, Applications	Pearson Education Inc.New DELHI 2006
2	M.P. Groover	Industrial Robotics: Technology, Programming and Applications	Tata Mc Graw Hill Co,2001
3	Fu K S Gonzalz R Cand Lee C S G	Robotics control,sensing,visionand intelligence	1. Mc-Graw Hill Book Co , 1987.
4	Ganesh S. Hedge	A Text book on Industrial Robotics	1. , Laxmi Publications Pvt. Ltd., New Delhi,
5	S.R. Deb & Sankha Deb	Robotics Technology and Flexible Automation Robot	1. Tata McGraw-Hill, 2010.

Pr.1 AUTOMOBILE ENGINEERING LAB

Name of the Course: Diploma in MECHANICAL ENGINEERING			
Course code:		Semester	6th
Total Period:	60	Examination	3 hrs
Practical periods:	4 P/W	Sessional	50
Maximum marks:	100	End Semester Examination:	50

COURSE OBJECTIVES

At the end of the course the students will be able to

List of Practical .

1. Study of Automobile chassis.
2. Study the differential mechanism of the Tractor.
3. Study the hydraulic braking system of automobile.
4. Study Study the cut section model of carburetor solex type and maruti car type.
5. Study the fuel pump cut section model.
6. Study the actual cut section of gear box.
7. Study of actual car engine.

Pr 2. POWER STATION ENGINEERING LAB

Name of the Course: Diploma in MECHANICAL ENGINEERING			
Course code:		Semester	6th
Total Period:	60	Examination	3 hrs
Practical periods:	4 P/W	Sessional	25
Maximum marks:	75	End Semester Examination:	50

COURSE OBJECTIVES

At the end of the course the students will be able to

List of Practical

Experiment 01-To study the modern steam power plant with model. Experiment 02-To determine the various efficiencies of steam turbine. Experiment 03-To study the cooling tower.
Experiment 04-Study of jet condenser.
Experiment 05-Study of De-lavel turbine.
Experiment 06-To study the spring loaded safety valve.
Experiment 07-To study the following steam generators (boilers)models.

a) Lancashire boiler.

b) Cornish boiler.

c) Babcock & Wilcox Boiler.

d) Vertical water tube boiler.

Pr3. PROJECT Phase - II

Name of the Course: Diploma in Mechanical Engineering			
Course code:		Semester	6th
Total Period:	150	Examination	3 hrs
Lab. periods:	10 P / week	Sessional	50
Maximum marks:	150	End Sem Examination	100

RATIONALE

Students' Project Work aims at developing innovative skills in the students whereby they apply the knowledge and skills gained through the course covered in many subjects and Labs, by undertaking a project. The prime emphasis of the project work is to understand and apply the basic knowledge of the principles of Mechanical engineering and practices in real life situations, so as to participate and manage a large Mechanical engineering projects, in future. Entire Project spreads over 5th and 6th Semester. Part of the Project covered in 5th Semester was named as *Project Phase-I* and balance portion to be covered in 6th Semester shall be named as *Project Phase-II*.

OBJECTIVES

After undergoing the Project Work, the student will be able to:

- Implement the theoretical and practical knowledge and skills gained through various subjects/courses into an application suitable for a real practical working environment, preferably in an industrial environment.
- Develop software packages or applications and implement these for the actual needs of the community/industry.
- Identify and contrast gap between the technological knowledge acquired through curriculum and the actual industrial need and to compensate it by acquiring additional knowledge as required.
- Carry out cooperative learning through synchronous guided discussions within the class in key areas, asynchronous document sharing and discussions, as well as prepare collaborative edition of the final project report.
- To achieve real life experience in Project design.
- To develop the skill of writing Project Report

Project Phase-I and Phase-II

The Project work duration covers 2 semesters(5th and 6th sem). The Grouping of students, selection of Project, assignment of Project Guide to the Group was done in the beginning of 5th semester under Project Phase-I. The students were allowed to study literature, any existing system and then define the Problem/objective of the Project. Preliminary work and Design of the system also have to be complete in Phase-I. Development may also begin in this phase. Project Milestones are to be set so that progress can be tracked .
In Phase-II Development, Testing, Documentation and Implementation have to be complete. Project Report have to be prepared and complete in Phase-II. All Project reports should be organized uniformly in proper order, irrespective of group. Teacher Guides can make suitable alteration in the components of Task and schedule.
At the end of Project Phase-II in 6th semester there shall be one presentation by each group on whole Project work undertaken by them.

A suggestive criterion for assessing student performance by the external (preferably person from industry) and internal (teacher) examiner is given in table below:

Sl. No.	Performance Criteria
1.	Selection of project assignment
2.	Planning and execution of considerations
3.	Quality of performance
4.	Providing solution of the problems or production of final product
5.	Sense of responsibility
6.	Self expression/ communication/ Presentation skills
7.	Interpersonal skills/human relations
8.	Report writing skills
9	Viva voce

The teachers are free to evolve other criteria of assessment, depending upon the type of project work.
It is proposed that the institute may organize an annual exhibition of the project work done by the students and invite leading Industrial organisations to such an exhibition.

The Project Report need to be prepared as per standard format and following is the indicative format. The Teacher Guide may make minor alteration keeping the sense in tact.

Organization of Project Report

1. Cover page:
   It should contain the following (in order)
   (i) Title of the Project
   (ii) —Submitted in partial fulfillment of the requirements for the Diploma in <Branch Name>‖
   (iii) By Name of the Student(s)
   (iv) Logo of the Institution
   (v) Branch Name/Depart Name and Institution Name with Address
   (vi) Academic Year
2. 1st Inner page
   Certificate:
   It should contain he following
   —This is to certify that the work in this Project Report entitled <Project Title> by <Name of student(s)> has been carried out under my supervision in partial fulfillment of the requirements for the Diploma in <Branch Name>‖ during session <session > in <Branch /Department Name> of <Institute name> and this work is the original work of the above student(s).

   Seal and signature of the Supervisor/Guide with date
3. 2nd Inner Page
   Acknowledgement by the Student(s)
4. Contents.
5. Chapter wise arrangement of Reports
6. Last Chapter: Conclusion
   It should contain
   (i) Conclusion
   (ii) Limitations
   (iii) Scope for further Improvement
7. References

Pr-4 LIFE SKILL

(Common to All Branches)

Practical	**2 Periods per week**	**Sessional**	**25 Marks**
Total Periods	**30 Periods**	**Total Marks**	**25 Marks**

Objective: After completion of this course the student will be able to**:**

- Develop team spirit i.e. concept of working in team
- Apply problem solving skills for a given situation
- Use effective presentation techniques
- Apply task management techniques for given projects
- Enhance leadership traits
- Resolve conflict by appropriate method
- Survive self in today's competitive world
- Face interview without fear

DETAIL CONTENTS:

1. SOCIAL SKILL

Society, Social Structure, Develop Sympathy and Empathy
Swot Analysis — Concept, How to make use of SWOT
Inter personal Relation**:** Sources of conflict, Resolution of conflict ,
Ways to enhance interpersonal relation

2. PROBLEM SOLVING

Steps of Problem solving**:**

- Identify and clarify the problem,
- Information gathering related to problem,
- Evaluate the evidence,
- Consider alternative solutions and their implications,
- Choose and implement the best alternative,
- Review
- Problem solving techniques:

1) Trial and error, 2) Brain storming, 3) Lateral (Out of Box) thinking

3. PRESENTATION SKILL

Body language , Dress like the audience
Posture, Gestures, Eye contact and facial expression. STAGE FRIGHT,
Voice and language — Volume, Pitch, Inflection, Speed, Pause
Pronunciation, Articulation, Language, Practice of speech.
Use of AV aids such as Laptop with LCD projector, white board etc.

4. GROUP DISCUSSION AND INTERVIEW TECHNIQUES

Group Discussion:
Introduction to group discussion, Ways to carry out group discussion,
Parameters— Contact, body language, analytical and logical thinking,
decision making
Interview Technique :
Dress, Posture, Gestures, facial expression, Approach
Tips for handling common questions.

5. WORKING IN TEAM

Understand and work within the dynamics of a groups.
Tips to work effectively in teams,
Establish good rapport, interest with others and work effectively with them
to meet common objectives,
Tips to provide and accept feedback in a constructive and considerate way ,
Leadership in teams, Handling frustrations in group.

6. TASK MANAGEMENT

Introduction, Task identification, Task planning ,
organizing and execution, Closing the task

PRACTICAL

List of Assignment: *(Any Five to be performed including Mock Interview)*

1. **SWOT analysis:-**
   Analyse yourself with respect to your strength and weaknesses, opportunities and threats. Following points will be useful for doing SWOT.

a) Your past experiences,
b) Achievements,
c) Failures,
d) Feedback from others etc.

2. **Solve the True life problem assigned by the Teacher.**

3. **Working in a Team**
   Form a group of 5-10 students and do a work for social cause e.g. tree plantation, blood donation, environment protection, camps on awareness like importance of cleanliness in slum area, social activities like giving cloths to poor etc.(One activity per group where Team work shall be exhibited)
4. **Mock Interview**
5. **Discuss a topic in a group and prepare minutes of discussion.**
6. **Deliver a seminar for 5 minutes using presentation aids on the topic given by your teacher.**
7. **Task Management**
   Decide any task to be completed in a stipulated time with the help of teacher. Write a report considering various steps in task management (with Break up into sub tasks and their interdependencies and Time)

Note: -1. Please note that these are the suggested assignments on given contents/topic. These assignments are the guide lines to the subject teachers. However the subject teachers are free to design any assignment relevant to the topic.
Note: -2. The following Topics may be considered for Seminar/GD in addition to other Topics at the discretion of the Teacher.
(Comparison with developed countries, Occupational Safety, Health Hazard, Accident & Safety, First-Aid, Traffic Rules, Global Warming, Pollution, Environment, Labour Welfare Legislation, Labour Welfare Acts, Child Labour Issues, Gender Sensitisation
,Harassment of Women at Workplace)

METHODOLOGY:

The Teacher is to explain the concepts prescribed in the contents of the syllabus and then assign different Exercises under Practical to the students to perform.

Books Recommended:-

Sl.No	Name of Authors	Title of the Book	Name of the Publisher
01	E.H. Mc Grath , S.J	Basic Managerial Skills for All	PHI
02	Lowe and Phil	Creativity and problem solving	Kogan Page (I) P Ltd
03	Adair, J	Decision making & Problem Solving	Orient Longman
04	Bishop , Sue	Develop Your Assertiveness	Kogan Page India
05	Allen Pease	Body Language	Sudha Publications Pvt. Ltd.

EQUIPMENT LIST

AUTOMOBILE ENGINEERING LAB

SL.NO	NAME OF THE EQUIPMENTS	QUANTITY
01	Chassis of a car	01 no
02	Differential of a Tractor	01 no
03	Hydraulic brake system of a car working model	01 no
04	Solex carburetor	01 no
05	Maruti car type carburetor	01 no
06	Cut section of a fuel pump	01 no
07	New car engine	01 no
08	Gear box	01 no
09	Journal bearing apparatus	01 no
10	Cam analysis apparatus	01 no
11	Joules apparatus	01 no
12	Epicycle gear train	01 no
13	Slip gauge	01 no

POWER STATION ENGINEERING LAB

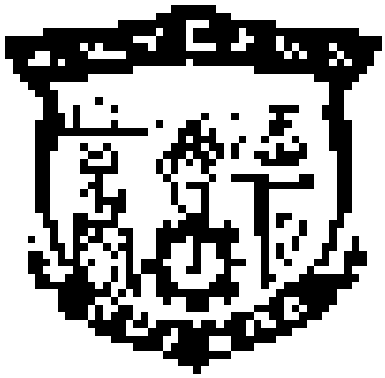
SL.NO	NAME OF THE EQUIPMENTS	QUANTITY
01	Stainless steel steam turbine test rig 01Kw 3000RPM	01no
02	Cooling Tower Apparatus or model	01no
03	Jet Condenser apparatus or model	01no
04	De Level turbine	01no
05	Spring loaded safety valve	02nos
06	Lancashire boiler model	01no
07	Babcock and Wilcox boiler model	01nos
08	Cornish boiler model	01no
09	Vertical water steam boiler model	01no
10	Pressure measuring device	01 no
11	Steam power plant model	01 no
12	Static and dynamic apparatus	01 no
13	Solex carburetor	01 no

CURRICULLUM OF 3RD SEMESTER

For

DIPLOMA IN MINING ENGINEERING

(Effective FROM 2019-20 Sessions)



STATE COUNCIL FOR TECHNICAL EDUCATION & VOCATIONAL TRAINING, ODISHA, BHUBANESWAR

STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING,ORISSA

TEACHING AND EVALUTION SCHEME FOR 3rd Semester(Branch Name- Mining)(w e f 2019-20)

SUBJECT NUMBER	SUBJECT CODE	SUBJECT	Periods/Week			Evaluation Scheme			
			L	T	P	Internal assessment / Sessional	End Sem Exams	Exams (Hours)	Total
		Theory							
Th .1		Surface Mining Technology	4			20	80	3	100
Th .2		Mine Survey -I	4			20	80	3	100
Th .3		Mine Geology -I	4			20	80	3	100
Th. 4		Mechanical Operation in Mines	4			20	80	3	100
Th. 5		Environmental Studies	4			20	80	3	100
		Total	20			100	400		500
		Practical							
Pr .1		Mine Survey -I LAB			6	50	50		100
Pr .2		Mine Geology -I LAB			6	50	50		100
Pr .3		Mechanical Operation in Mines LAB			6	25	25		50
		Student Centred Activities(SCA)			1				
		Total			19	125	125		250
		Grand Total	20		19	225	525		750

Abbreviations : L-Lecturer, T-Tutorial, P-Practical. Each class is of minimum 55 minutes duration.

Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50% and in Aggregate is 40%

SCA shall comprise of Extension Lectures/Personality Development/Environmental issues /Quiz/Hobbies/Field visits/Cultural Activities/Library Studies/Classes on MOOCS/SWAYAM etc. . SCA shall be conducted in a section.

There shall be 1 Internal Assesment done for each of Theory subject .Sessional Marks shall be total of the performance of individual different jobs/experiments in a subject throughout the semester. Industry/Mines Exposure Training can be conducted during semester break after 2nd semester and/or 4th semester.

Th.1. SURFACE MINING TECHNOLOGY

Name of the Course : Diploma in Mining Engineering			
Course code:		Semester	3rd
Total Periods:	60	Examination	3 hrs
Theory Periods:	4P/week	Internal Assessment	20
Maximum Marks:	100	End Semester Examination	80

A. RATIONALE

As a Mining Engineer, one has to develop the basic concepts and principles of winning and working in mines. Further, he should have basic knowledge of explosives for development of mines.

B. OBJECTIVES

On completion of the subject, students will be able to :

- Develop the concept of choice of Opencast Mining.
- Determine bench parameters.
- Define slope stability and types, prevention of Slope failure.
- Explain various compositions, properties of Explosives and Blasting accessories.
- State and explain different drilling methods.
- Explain blasting practice in Mines.
- Describe blasting techniques as per statutory provisions.
- Identify basic constructional features and safety provisions of magazine.

Topic- wise distribution of periods

CHAPTER	TOPICS	PERIODS
1	Choice of opencast Mining	10
2	Benching	5
3	Slope stability	6
4	Explosive and Blasting Accessories	11
5	Drilling	8
6	Blasting practices in Mines	10
7	Control Blasting as per statutory provision	6
8	Magazine	4
	Total	60

COURSE CONTENTS (Based on specific objectives).

1. **Choice of Opencast Mining**
   - State factors affecting choice of Open casting Mining method.
   - Define stripping ratio.
   - Determine overburden/ore ratio.
   - Find out cut off stripping ratio.
   - Determine quarriable limit.
   - State favorable conditions for mechanized Opencast Mines.
   - State limitations of large open pits.
   - Define Box cut and determine the location of Box cut.

2. **Benching**
   - Determine bench parameters- height, width & slope.
   - Determine length of bench for overburden and ore.

3. **Slope Stability**
   - Define slope stability.
   - Factors affecting slope stability.
   - Types of slope stability.
   - Causes and prevention of slope stability.

4. **Explosive and blasting accessories**
   - Define explosive, state constituents of explosives , properties & characteristics of explosives.
   - Classify explosives, state composition and uses of explosives.
   - Explain PMS and SMS.
   - Define permitted explosive and classify permitted explosive.
   - Explain sheathed, equivalent sheathed and ultra safe explosive.
   - State properties of permitted explosives.
   - State composition & constructional features of safety fuse, detonating fuse, detonating relay, igniter cord, nonel and raydet..
   - Describe different types of detonators and uses, state advantages of delay detonators.
   - State different types of exploder, its construction and safety features, circuit tester.
   - Describe stemming rod, crack detector knife, crimper.

5. **Drilling**
   - Explain different principles and methods of exploratory drilling in surface mining.
   - State different types of drill used in Opencast mining.
   - Describe simple constructional features of churn drill, drills master, wagon drill and jack hammer.
   - State D.T.H..
   - Describe different types of drill bits in drilling.

6. Blasting practices in Mines

- Describe preparation of charge.
- State procedure of firing shots, direct and inverse initiation, stemming materials, water ampoules, cushion firing.
- Define blasting efficiency.
- State and describe plaster shooting and pop shooting, toe blasting.

7. Controlled Blasting Techniques as per statutory provision

- State and describe pre-splitting, cushion blasting, muffle blasting, coyote hole blasting, chambered hole blasting, directional blasting, Electronics Blasting System (EBS) .

8. Magazines

- Describe layout and arrangement of different types of magazines, state their safety features.

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SYLLABUS COVERAGE UP TO I.A

Chapter 1,2,3,4.

Learning Resourses:		
Sl. No.	Title of the Book	Name of Authors
1	Surface Mining Technology	S.K. DAS
2	Blasting Manuals	Sandhu & Pradhan
3	Blasting Practices in Mines	S.K. DAS
4	EMT VOL I	D.J. DESHMUKH
5	Surface Mining	G.B. Mishra
6	SME Handbook	

Th .2. MINE SURVEY - I

Name of the Course : Diploma in Mining Engineering			
Course code:		Semester	3rd
Total Periods:	60	Examination	3 hrs
Theory Periods:	4P/week	Internal Assessment	20
Maximum Marks:	100	End Semester Examination	80

A. RATIONALE :

Before starting the actual mining operation, it is essential for mining engineer to first survey the piece of land where mining operation is contemplated. This is not possible without the knowledge of mine surveying.

B. OBJECTIVES:

On completion of the subject, students will be able to :

- Explain different chains and their use in the field.
- Explain prismatic compass and surveyor's compass and determine magnetic meridian. Explain local attraction and make necessary correction.
- Outline knowledge regarding plane table survey in the field.
- Describe general methods of determining areas.
- Describe various leveling methods.
- Describe different methods of calculating ore reserves by materials balance and decline curve way.
- Describe the application of theodolites in surveying, micro-optic and seconds theodolite.

C. Topic wise distribution of periods

CHAPTER	TOPICS	PERIODS
1	Chain Survey	10
2	Compass Survey	8
3	Plane Table Survey	8
4	Computataion of Areas	8
5	Levelling	10
6	Calculation of ore reserves	8
7	Theodolite	8
	TOTAL	60

D.COURSE CONTENTS (Based on Specific objectives)

1. Chain Survey

- Give survey conventional signs, abbreviation used.
- Give standards of lining, inking and coloring.
- Describe selection of scales used.
- Explain principle of chain surveying.
- Describe instruments used and checking their correctness.
- Explain ranging and chaining of a line.
- Calculate errors in chaining.
- Explain obstruction while chaining.
- Describe chaining along a sloping ground.
- Describe use of optical square and line range and checking optical square for correctness.
- Describe offsets and their measurements.
- Give reference sketches of stations.
- Give procedure of chain surveying.
- Explain field booking and plotting of chain survey.

2. Compass Survey

- Describe prismatic compass, its adjustments and use.
- Explain true meridians, magnetic meridian, grid line meridian and arbitrary meridian.
- Explain W.C.B. and Q.B. and conversion from one to other
- Find out fore and back bearing and their conversion.
- Compute angles from bearing and bearing angles
- Define local alteration
- Determine local alteration and necessary correction to the bearing.
- Explain closed and open compass surveying and its plotting.
- Give procedure of field booking in compass and chain traverses.
- Explain adjustment of closing error in compass traversing.
- Describe surveyor compass(miner's dial),its adjustment and use
- Compare prismatic compass with surveyor compass.

3. Plane Table Survey.

- Fundamentals of Plane Table Survey.
- Explain two point problems.
- Explain three point problems and its solution by tracing paper method.
- Describe advantages and disadvantages of plane table.

4. Computation of areas

- Explain methods of determining areas.
- Find out areas from offset to a base line using
  - Mid ordinate rule
  - Average ordinate rule
  - Trapezoidal rule
  - Simpson's rule
- Compute area by Planimeter and from graph paper.

5 Leveling

- Define benchmark M.S.L. Dumpy level.
- Adjust dumpy level, modern levels (Auto Level & etc.), and precise staff.
- Describe methods of leveling- Rise & fall method, height of instrument.
- Errors in ordinary leveling.
- Explain reciprocal leveling, subsidence leveling, setting out gradient, trigonometric leveling, geometrical leveling, and physical leveling.

6 Calculation of Ore Reserves

- Classify reserves.
- Evaluate reserves by exploratory .
- Calculate primary ore reserve by material balance method & decline curve method.

7 Theodolite

- Describe temporary and permanent adjustment of Theodolite.
- Describe the principles of operation & describe different parts.
- Measure Horizontal & Vertical angles.
- Describe setting of the instrument.
- Explain Traversing with Theodolite.

SYLLABUS COVERAGE UP TO I.A

Chapter 1,2,3,4

Learning Resourses:		
Sl. No.	Title of the Book	Name of Authors
1	Textbook of Surveying	B.C. Punmia Vol I & II
2	Textbook of Surveying	T.P Kanetkar

Th.3 MINE GEOLOGY - I

Name of the Course : Diploma in Mining Engineering			
Course code:		Semester	3rd
Total Periods:	60	Examination	3 hrs
Theory Periods:	4P/week	Internal Assessment	20
Maximum Marks:	100	End Semester Examination	80

A. RATIONALE :

In majority of the cases, materials that need to be mined in order to reach the hidden treasure are rocks and minerals. It is therefore, essential for a mining engineer to have the basic knowledge of geology.

B.OBJECTIVES:

On completion of the course, students will be able to:

- Explain the dynamic natural agencies that are constantly moulding the landscape of earth. He will be able to visualize the erosional and depositional landforms created by natural agencies.
- Distinguish between Igneous, Sedimentary and Metamorphic rocks and their texture and structures.
- Distinguish and identify the various structures that one may encounter in the field.
- Underline the importance of crystal structures in the identification and study of minerals.
- Identify minerals based on their physical properties. They will possess a sound knowledge of silicate structures.
- Identify different rocks in the laboratory.

Topic wise distribution of periods

CHAPTER	TOPIC	PERIODS
1	Physical Geology	15
2	Petrology	12
3	Structural Geology	6
4	Elements of Crystallography	12
5	Elements of Mineralogy	15
	Total	60

C. COURSE CONTENTS (Based on specific objectives)

1. Physical Geology

- Define weathering and erosion.
- Explain with suitable sketches the erosional and depositional land forms produced by wind.
- Explain with neat sketches the erosional and depositional land forms produced by river.
- Differentiate between glacier and iceberg

- Describe the erosional and depositional features produced by glacier.
- Define moraine. Describe the different type of moraine with sketches.

2. Petrology

- Define a Rock. Distinguish between a rock and a mineral.
- Define Igneous, Sedimentary and Metamorphic rocks.
- Describe the various textures and structures found in Igneous rocks.
- Describe some important structures of sedimentary rocks along with neat sketches.
- Describe various structure found in metamorphic rocks.

3. Structural Geology

- Define Dip. Distinguish between true dip and apparent dip.
- Define strike.
- Define folds. Classify folds and describe them.
- Define faults. Describe the various types of fault.
- Define unconformity. Describe the various type of unconformity with neat sketches.
- Define joints. Describe various joints.

4. Element of Crystallography

- Define a crystal.
- Explain Miller's indices.
- Describe the Symmetry elements and forms present in the normal class of isometric system.

5. Elements of Mineralogy

- Define a mineral.
- Enumerate and describe the physical properties of minerals.
- Describe various optical properties of minerals.
- Explain briefly the silicate structures along with diagrams.
- Classify minerals.
- Describe mineralogy and physical properties of Olivine, Quartz, Feldspar and Pyroxene group of minerals.

SYLLABUS COVERAGE UP TO I.A

Chapter 1,2,3

Learning Resourses:		
Sl. No.	Title of the Book	Name of Authors
1	Textbook of Geology	P.K Mukharjee
2	Textbook of Geology	G.B. Mohapatra
3	Ruttley's Elements of Mineralogy	H.H. Reid
4	Petrology	G.W. Tyrrel
5	Structural Geology	M.P. Billings
6	Structural Geology of Rocks at Regions	H.Davids,J Reynolds

Th. 4 MECHANICAL OPERATIONS IN MINE

Name of the Course : Diploma in Mining Engineering			
Course code:		Semester	3rd
Total Periods:	60	Examination	3 hrs
Theory Periods:	4P/week	Internal Assessment	20
Maximum Marks:	100	End Semester Examination	80

A. RATIONALE :

As Mining Engineer it is essential to have the fundamental concept of mechanical engineering specially related to working of machines, which are used in mines.

: **B.OBJECTIVES:**

On completion of the subject, students will be able to:

- Describe the concept of stress, strain, bending moment and shear force, torsion with power transmission.
- Explain Fluid static's and dynamics with solution of problems.
- Explain the use of compressed air and different types of air compressor.
- Explain the concept of Internal Combustion engines.

C. Topic wise distribution of periods

CHAPTER	TOPIC	PERIODS
1	Strength of Materials & Power Transmission	20
2	Elements of Hydraulics	15
3	Compressed Air	15
4	Internal Combustion Engines	10
	Total	60

D. COURSE CONTENTS (Based on Specific Objectives)

1. Strength of Materials and Power Transmission.

- Define
  - Elasticity
  - Hook's Law
  - Limit of Proportionality.
  - Young's Modulus
  - Factor of safety. Lateral strain and Poisson's ratio.
- Explain stress-strain curve for ductile materials.
- Explain the effect of axial load on bar of
  - Uniform section
  - Variable section
- Solve numerical problems on above
- Define bending moment and shear force.
- State types of beam and types of loading.
- Explain shear force diagram and bending moment diagram for
  - Cantilever with concentrated loading.

        - Cantilever with U.D.I. over whole span.
        - Simply supported beam with concentration loading.
        - Simply supported beam with U.D.I. over whole span.
    - State bending formula.
    - Define section modules.
        - Find out section modules for beam section of simple cases.
    - Define torsion and state its effects.
    - State application of torsion formula.
    - Explain working of
        - Shaft couplings such as hydraulic and magnetic couplings.
        - Belt, chain and rope Drive.
        - Simple and compound gear train.
        - Torque converters.
    - State function of flywheel and governors.
    - Explain working of watt, purler and proel governors.

2. Elements of Hydraulics.

- State various fluid properties.
- Define pressure of fluid and pressure head.
- State and explain working principle of various pressure measuring devices such as:
    - Pieccometer tube.
- State and explain continuity equation.
- State and explain Bernoulli's theorem.
- Explain working of venturimeter.
- Solve numerical problems on above.
- Define and classify orifices.
- State the formula and discharge for rectangular orifices and solve problems.
- Define and differentiate between orifice and notch.
- Classify notches.
- State formula for discharge through notches & solve problem on above.
- State and explain laws of fluid friction.
- State and explain loss of head due to friction (Darcy weisbach formula)
- Explain hydraulic gradient and energy gradient.
- Solve numerical problems as above.

3. Compressed Air

- Explain introduction of compressed air as a power.
- Classify Compressor & state working principle.
- State the various methods of transmission and storage of compressed air.
- State and explain the advantages of use of compressed air in mines.
- Explain the working principle of pneumatic machines.

4. Internal Combustion Engines

- Explain various air cycles utilized in I/C Engines such as:
    - OTTO Cycle.
    - Diesel Cycle.
- Explain working principle of 2 stroke and 4 stroke petrol and diesel engines.
- Define I.H.P., B.H.P. & Mechanical efficiency of I/C Engine.
- State various applications of I/C Engines in Mining field.

SYLLABUS COVERAGE UP TO I.A

Chapter 1,2

Learning Resourses:		
Sl. No.	Title of the Book	Name of Authors
1	Strength of Materials	Ramrutham
2	Applied Mechanics	Khurmi & Gupta
3	Fluid Mechanics	Ramrutham
4	Thermal Engineering	Rav Saro

Th5. ENVIRONMENTAL STUDIES

(Common to all Branches)

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	3rd
Total Period:	60	Examination :	3 hrs
Theory periods:	4P / week	Internal Assessment:	20
Maximum marks:	100	End Semester Examination ::	80

A. RATIONALE:

Due to various aspects of human developments including the demand of different kinds of technological innovations, most people have been forgetting that, the Environment in which they are living is to be maintained under various living standards for the preservation of better health. The degradation of environment due to industrial growth is very much alarming due to environmental pollution beyond permissible limits in respect of air, water industrial waste, noise etc. Therefore, the subject of Environmental Studies to be learnt by every student in order to take care of the environmental aspect in each and every activity in the best possible manner.

B. OBJECTIVE:

After completion of study of environmental studies, the student will be able to:

1. Gather adequate knowledge of different pollutants, their sources and shall be aware of solid waste management systems and hazardous waste and their effects.
2. Develop awareness towards preservation of environment.

C. Topic wise distribution of periods:

Sl. No.	Topics	Period
1	The Multidisciplinary nature of environmental studies	04
2	Natural Resources	10
3	Systems	08
4	Biodiversity and it's Conservation	08
5	Environmental Pollution	12
6	Social issues and the Environment	10
7	Human population and the environment	08
	Total:	**60**

D. COURSE CONTENTS

1. The Multidisciplinary nature of environmental studies:

1.1 Definition, scope and importance.

1.2 Need for public awareness.

2. Natural Resources:

Renewable and non renewable resources:

a) Natural resources and associated problems.

2.1.1. Forest resources: Use and over-exploitation, deforestation, case studies, Timber extraction mining, dams and their effects on forests and tribal people.

2.1.2. Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dam's benefits and problems.

2.1.3. Mineral Resources: Use and exploitation, environmental effects of extracting and using mineralresources.

2.1.4. Food Resources: World food problems, changes caused by agriculture and over grazing, effects of modern agriculture, fertilizers- pesticides problems, water logging, salinity, .

2.1.5. Energy Resources: Growing energy need, renewable and non-renewable energy sources, use of alternate energy sources, case studies.

2.1.6. Land Resources: Land as a resource, land degradation, man induces landslides, soil erosion, and desertification.

b) Role of individual in conservation of natural resources.

c) Equitable use of resources for sustainable life styles.

3. **Systems:**

3.1. Concept of an eco system.
3.2. Structure and function of an eco system.
3.3. Producers, consumers, decomposers.
3.4. Energy flow in the eco systems.
3.5. Ecological succession.
3.6. Food chains, food webs and ecological pyramids.
3.7. Introduction, types, characteristic features, structure and function of the following eco system:
3.8. Forest ecosystem:
3.9. Aquatic eco systems (ponds, streams, lakes, rivers, oceans, estuaries).

4. **Biodiversity and it' s Conservation:**

4.1. Introduction-Definition: genetics, species and ecosystem diversity.
4.2. Biogeographically classification of India.
4.3. Value of biodiversity: consumptive use, productive use, social ethical, aesthetic and optin values.
4.4. Biodiversity at global, national and local level.
4.5. Threats to biodiversity: Habitats loss, poaching of wild life, man wildlife conflicts.

5. **Environmental Pollution:**

5.1. Definition Causes, effects and control measures of:

a) Air pollution.
b) Water pollution.
c) Soil pollution
d) Marine pollution
e) Noise pollution.
f) Thermal pollution
g) Nuclear hazards.

5.2. Solid waste Management: Causes, effects and control measures of urban

and industrial wastes.

5.3. Role of an individual in prevention of pollution.

5.4. Disaster management: Floods, earth quake, cyclone and landslides.

6. **Social issues and the Environment:**

6.1. Form unsustainable to sustainable development.
6.2. Urban problems related to energy.
6.3. Water conservation, rain water harvesting, water shed management.
6.4. Resettlement and rehabilitation of people; its problems and concern.
6.5. Environmental ethics: issue and possible solutions.
6.6. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies.
6.7. Air (prevention and control of pollution) Act.
6.8. Water (prevention and control of pollution) Act.
6.9. Public awareness.

7. **Human population and the environment:**

7.1. Population growth and variation among nations.
7.2. Population explosion- family welfare program.
7.3. Environment and humanhealth.
7.4. Human rights.
7.5. Value education
7.6. Role of information technology in environment and human health.

Syllabus coverage up to Internal assessment

Chapters: 1, 2 and 3.

Learning Resources:

Sl.No	Title of the Book	Name of Authors	Name of Publisher
1.	Textbook of Environmental studies	Erach Bharucha	#UGC
2.	Fundamental concepts in Environmental Studies	D.D. Mishra	S.Chand & Co-Ltd
3.	Text book of Environmental Studies	K.Raghavan Nambiar	SCITECH Publication Pvt. Ltd.
4.	Environmental Engineering	V.M.Domkundwar	Dhanpat Rai & Co

Pr.1. MINE SURVEY – I LAB

Name of the Course : Diploma in Mining Engineering			
Course code:		Semester	3rd
Total Periods:	90	Examination	3 hrs
Theory Periods:	6P/week	Internal Assessment	50
Maximum Marks:	100	End Semester Examination	50

A. RATIONALE:

In the field of mining, it will help in all measurements,calculations & mapping at all stages from prospecting to exploitation and utilizing mineral deposits by both surface & underground working.

B. OBJECTIVE:

On completion of lab students will able to :

- Develop a clear idea about Chain survey & Compass survey.
- Know various components of Level and Theodolite & their uses.
- Distinguish methods employed for measurement of horizontal and vertical angle.

Topic wise distribution of periods

CHAPTER	TOPIC	PERIODS
1	Chain Survey	15
2	Compass Survey	15
3	Levels	15
4	Theodolite	15
5	Measurement of Horizontal angle	15
6	Measurement of Vertical angle	15
	Total	90

C. Course Content

1. Chain Survey

- Ranging a line more than 100 m in length and measuring its correct length applying corrections.
- Taking offsets of objects on both sides of a line.
- Plotting the above details.
- Overcoming obstructions in chaining.
  - Vision free, chaining obstructed (Pond, river)
  - Chaining free, vision obstructed (Raising ground)
  - Both vision and chaining obstructed (Building)
- Measuring on sloping ground.
- Chain surveying and plotting of small plot by triangulation.

2. Compass Survey

- Finding bearing of line and applying check.
- Closed traversing of a small plot with station (without intermediate filling)
- Open traversing of a small length with few station (without offsets)
- Plotting both the above traverses applying correction.

3 **Levels**:

- Temporary and permanent adjustment, sensitivity of bubble tube practice with different types of level(Auto Level & etc.)

4. Temporary & permanent adjustment of theodolite.

5. Measurement of horizontal angle by reiteration and repetition methods.

6. Measurement of vertical angle

Pr.2. MINE GEOLOGY – I LAB

Name of the Course : Diploma in Mining Engineering			
Course code:		Semester	3rd
Total Periods:	90	Examination	3 hrs
Theory Periods:	6P/week	Internal Assessment	50
Maximum Marks:	100	End Semester Examination	50

A. RATIONALE:

In majority of the cases, materials that need to be explored comprise of rocks & minerals. It is therefore, essential for an engineer to have basic knowledge regarding the composition, structure & texture of both rock and minerals.

B. OBJECTIVE:

On completion of Lab students will able to:

- Identify ore forming & rock forming minerals.
- Determine specific gravity of minerals by workers steel yard balance.
- Analyze thin section of minerals and rocks under microscope.

Topic wise distribution of periods

CHAPTER	TOPIC	PERIODS
1	Identification of Minerals	30
2	Specific Gravity by Steel yard Balance	30
3	Analysis of Thin section of Minerals and Rocks	30
	Total	90

C. Course Content:

- Identification of rock forming and ore minerals in hand specimens.
- Determinations of specific gravity by workers steel yard balance.
- Analysis of thin sections of minerals and rocks under the microscopes.

Pr.3 . MECHANICAL OPERATION IN MINES

Name of the Course : Diploma in Mining Engineering			
Course code:		Semester	3rd
Total Periods:	90	Examination	3 hrs
Theory Periods:	6P/week	Internal Assessment	25
Maximum Marks:	50	End Semester Examination	25

A. RATIONALE

As mechanisation is a common trend now-a-days in mining sector.So as a mining engineer, one should have some fundamental knowledge regarding the machines used in mines.

B. OBJECTIVE:

On the completion of Lab students will able to:

- Know application of Bernouli's Theorem
- Determine velocity of air
- Determine volumetric efficiency of air compressor.
- Distinguish construction and working procedure of 2- stroke and 4 - stroke diesel engine.
- Describe I.C. Engine Test.

Topic wise Distribution of Periods

CHAPTER	TOPIC	PERIODS
1	Verify Bernoulli's Theorem	15
2	Determine rate of flow of air	15
3	Conduct Tensile test of a mild steel specimen	15
4	Determine volumetric efficiency of Air compressor	15
5	Study of 2-Stroke and 4-Stroke diesel engines	15
6	Conduct of I.C Engine Test	15
	Total	90

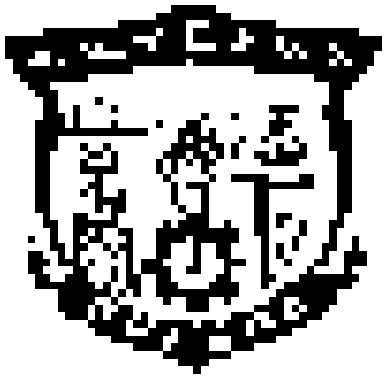
C. Course Content:

- Bernoulli's Theorem by Bernoulli's Verification Apparatus.
- Determine rate of flow through the venturimeter set-up.

- Conduct tensile test of a mild steel specimen and plot stress-stain curve, show salient points on it.
- Determine volumetric efficiency of air- compressor.
- Study of 2-stroke & 4-stroke diesel engines.
- Conduct I/C engine testing on single cylinder diesel engine & find out I.H.P., B.H.P. & mechanical efficiency.

CURRICULLUM OF 4TH SEMESTER
For
DIPLOMA IN MINING ENGINEERING

(Effective FROM 2019-20 Sessions)



STATE COUNCIL FOR TECHNICAL EDUCATION & VOCATIONAL TRAINING, ODISHA, BHUBANESWAR

STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING,ORISSA

TEACHING AND EVALUTION SCHEME FOR 4th Semester Mining Engg.(wef 2019-20)

SUBJECT NUMBER	SUBJECT CODE	SUBJECT	Periods/Week			Evalution Scheme			
			L	T	P	Internal assessment/Sessional	End Sem Exams	Exams (Hours)	Total
		Theory							
Th .1		Underground Coal Mining	4			20	80	3	100
Th .2		Mine Survey -II	4			20	80	3	100
Th .3		Mine Ventilation	4			20	80	3	100
Th. 4		Electrical Equipment in Mines	4			20	80	3	100
		Total	16			80	320		400
		Practical							
Pr .1		Mine Survey -II LAB			06	50	50		100
Pr .2		Mine Ventilation LAB			06	50	50		100
Pr .3		Electrical Equipment in Mines LAB			06	50	50		100
Pr .4		Technical Seminar			02	50	-		50
		Student Centered Activities(SCA)			3				
		Total			23	200	150		350
		Grand Total	16		23	280	470		750

Abbreviations: L-Lecturer ,T-Tutorial ,P-Practical .Each class is of minimum 55 minutes duration.

Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50% and in Aggregate is 40%

SCA shall comprise of Extension Lectures/Personality Development/Environmental issues/Quiz/Hobbies/Field Visits/cultural activities/Library studies/Classes on MOOCS/SWAYAM etc., Seminar and SCA shall be conducted in a section.

There shall be 1 Internal Assessment done for each of the Theory subject. Sessional Marks shall be total of the performance of individual different jobs/experiments in a subject throughout the semester.

Industry/Mines Exposure Training can be conducted during semester break after 4th semester.

Th .1. UNDERGROUND COAL MINING

Name of the Course : Diploma in Mining Engineering			
Course code:		Semester	4th
Total Periods:	60	Examination	3 hrs
Theory Periods:	4P/week	Internal Assessment	20
Maximum Marks:	100	End Semester Examination	80

Topic- wise distribution of periods

CHAPTER	TOPIC	PERIODS
1	Introduction to Method of working	4
2	Bord & Pillar Method	15
3	Long wall Mining Method	10
4	Thick seam Mining Method	8
5	Horizon Mining Method	3
6	Hydraulic & Pneumatic Stowing Method	3
7	Support system & Roof control	10
8	Subsidence due to Mining	3
9	Shaft sinking	4
	Total	60

RATIONALE

As a Mining Engineer, one should know different methods of underground working in coal mining and operational principles.

OBJECTIVES

On completion of the course, students will be able to :

- Explain different mining methods and their selection.
- Describe details working of B.P. method and its development & depillaring, precautions against fire and water and B.P. layout.
- Explain long wall working.
- Describe elementary idea about thick seam mining.
- Describe horizon mining.
- Explain various practices of filling of goaf and their layout.
- Describe roof behaviors and support required in Mines.
- Identify causes of subsidence and its prevention.
- Describe various methods of shaft sinking.

COURSE CONTENTS

1. Introduction to Underground Coal Mining
   - Define mine and different methods of mining.
   - Classify Undergound Coal Mining Methods.
2. Bord and Pillar Method
   - Describe the various application of Bord & Pillar method.
   - Describe various layouts of Bord & Pillar method.
   - Describe depillaring method with stowing and caving.
   - State precautions against fire and water during and after depillaring.
   - State and describe various machineries used in working face.
   - Define contigeous seam.
   - Describe working of contiguous seams.
   - Describe working of seams above and below goaved out area.
   - State advantages and disadvantages of Bord & Pillar method.
3. Longwall Method
   - Describe Longwall advancing and retreating methods.
   - Define single unit and double unit face.
   - Describe cyclic and non-cyclic L/W layouts.
   - Describe mechanized longwall working with armoured flexible conveyor, shield support and shearer loader.
4. Thick seam Mining
   - Define Thick seams.
   - Classify Thick seam Mining.
   - Describe layouts of horizontal slicing, incline slicing, blasting gallery and sublevel caving.
5. Horizon Mining
   - State conditions, advantages, disadvantages and limitations of Horizon Mining.
   - Describe the layout of Horizon Mining.
6. Hydraulic and Pneumatic stowing
   - Describe hydraulic stowing.
   - Describe Pneumatic stowing.
7. Support and roof control in Mines
   - State properties of various types of roof & roof behavior, Pressure arch theory in B&P
   - and longwall working.
   - Describe testing of roof.
   - Classify support system in Mines construction, principle of operation application and load bearing capacity assessment.
8. Subsidence due to Mining
   - Define angle of draw
   - State factors of subsidence, critical area of extraction
   - Describe the factors affecting subsidence
   - State & describe precautionary measures against damage due to subsidence
   - Define shaft pillar.
9. Shaft Sinking
   - Describe vertical shaft and inclined shaft; determine shape and size of shaft, location of shaft. Describe sinking through normal ground. State shaft plumbing.
   - Describe sinking through difficult ground, cementation, freezing, mechanized shaft sinking, sinking upward, widening and deepening of shafts.

SYLLABUS COVERAGE UP TO I.A.

Chapter 1,2,3,4.

BOOKS RECOMMENDED :

Sl. No.	Title of the Book	Name of Authors
1	Coal Mining	S. Mathur
2	EMT VOL I,III	D.J. Deshmukh
3	Modern Coal Mining	S.K. Das
4	Advanced Coal Mining	RT Deshmukh & B.Borovjev
5	UMS	
6	Coal Mine Ground Control	S S Peng
7	SME Mining Engg. Handbook	
8	Strata Control	Jermic

Th. 2 . MINE SURVEY – II

Name of the Course : Diploma in Mining Engineering			
Course code:		Semester	4th
Total Periods:	60	Examination	3 hrs
Theory Periods:	4P/week	Internal Assessment	20
Maximum Marks:	100	End Semester Examination	80

Topic- wise distribution of periods

CHAPTER	TOPIC	PERIODS
1	Tacheometry	10
2	Triangulation & Trilateration	12
3	Co-relation of Surface & Underground Survey	10
4	Setting out curves	10
5	Stope Surveying	10
6	G.P.S & Total Station	8
	Total	60

RATIONALE

Before starting the actual mining operation, it is essential for mining engineer to first survey the piece of land where mining operation is contemplated. This is not possible without the knowledge of mine surveying.

OBJECTIVES

On completion of the subject, students will be able to :

- Comprehend principle of tachometry & its application in measurement of distance.
- Explain principle of triangulation & trilateration.
- Explain principles of correlations by different methods.
  Define various terms in connection with cove setting, laying out of curves by different methods.
- Explain different methods of stope surveying, transfer of stope faces to mine Plan.
- Explain the basic principle of global positioning systems & total station.

COURSE CONTENTS

1. Tacheometry
   - Define stadia & its principle.
   - Explain diaphragm, reticules, tacheometer, instruments constants.
   - Find out height & distance from stadia intercepts, tangential systems, movable hair method.
2. Triangulation and Trilateration.
   - State purpose & principle involved in triangulation & trilateration method.
   - Classify various methods of triangulation survey primary, secondary & tertiary colliery triangulation.
   - Develop concept about reconnaissance survey. Describe methods of measuring angle, types of theodolite used in triangulation survey.
   - Describe the methods of base line measurement using E.D.M.
   - Define tape correction.
   - State construction of triangulation station of permanent nature.
3. Correlation of surface and underground survey
   - State direct correlation by traversing & optical methods.
   - Describe orientation by wires in two shafts.
   - Explain correlation by mines in vertical shafts.
   - State co-planning/ alignment, weissbach triangle weis-quadrilateral methods, precise magnetic correlation.

4. Setting out curves
   - State elements of curves.
   - Define designation of curves, simple, compound & reverse curves.
   - Explain setting out of surface & underground curves by chords & offsets, chords and angle, tangent and offset, plate layers method.
   - Describe various setting out by chain & one theodolite, two theodolites.
   - Define super elevation, transition and vertical curves.
5. Stope Surveying
   - Explain tape triangulation, instrumental survey.
   - Determine stope face.
   - State preparation of stope planes, plotting the stope station, plotting of stope face to the mine plan.
   - Find out area of extraction by Planimeter and calculation of triangle thereof.

6. G.P.S. & Total Station
   - Explain the basic principles of global positioning system & total station.
   - Introduction to DGPS.

SYLLABUS COVERAGE UP TO I.A.

Chapter 1,2,3

RECOMMENDED BOOKS

Sl. No.	Title of the Book	Name of Authors
1	Surveying Vol I	E.Mason
2	Surveying and Levelling	T.P. Kanetkar
3	Geodetic Surveying Vol I	David Clerk
4	Mineral Economics	Sinha & Sharma

Th. 3. MINE VENTILATION

Name of the Course : Diploma in Mining Engineering			
Course code:		Semester	4th
Total Periods:	60	Examination	3 hrs
Theory Periods:	4P/week	Internal Assessment	20
Maximum Marks:	100	End Semester Examination	80

Topic wise distribution of Periods

CHAPTER	TOPIC	PERIODS
1	Natural Ventilation	8
2	Air Crossing & Distribution	10
3	Mechanical Ventilation	9
4	Booster Fan & Its Effect	10
5	Auxiliary Ventilation	7
6	Ventilation Survey	10
7	Leakage of air in Mines	6
	Total	60

RATIONALE

The provision of proper ventilation is very essential for any underground mining operation. As a mining Engineer, one should have the thorough knowledge of types of ventilation, methods of air crossing, types of fans etc

OBJECTIVES

On completion of the course, students will be able to :

- Describe different instruments measuring temperature, pressure and humidity and have idea on natural ventilation and laws of mine air friction.
- Describe different types of ventilation and methods of air crossings and distribution.
- Illustrate different types of fans, fan characteristics, Mine characteristics and selection of fans.
- Identify different locations of booster fan and solve simple problems relating to this.
- Explain different systems of auxiliary ventilation and its advantages and disadvantages.
- Explain different ways of pressure survey, quantity survey & quality survey.
- Explain causes & preventives measure of leakage of air in mines.

COURSE CONTENTS

1. Natural Ventilation
   - Definition of natural ventilation and factors affecting natural ventilation.
   - Describe the different types of Thermometer.
   - Describe the different types of Barometer.
   - Describe kata thermometer.
   - Describe water gauge.
   - Calculate ventilation pressure by using piton static tube.

- Explain effects of heat & humidity.
- Explain natural ventilation motive column, geothermic gradient.
- Enumerate laws of mine air friction and solve problems on above.
- Statutory provision as per CMR 2017,MMR 1961.

2. Air Crossing and distribution
   - Describe ventilation stopping, air crossing, ventilation door, brattice partition.
   - Describe different types of ventilation.
   - Accessional & declensional ventilation.
   - Homotropal & Antitropal ventilation.
   - Boundary ventilation.
   - Central & combined ventilation.
   - Explain splitting of air current & solve numerical problems on splitting.
   - Describe air locks at pit top.

3. Mechanical Ventilation
   - Explain construction & principle of operation of centrifugal flow fans.
   - State fan laws & calculate fan efficiency and capacity.
   - Explain installation of mine fan with reversal arrangement.
   - Describe fan drift, fan drive, evasee and diffusers.

Explain fan characteristics and mine characteristics.
   - Describe methods of output of mine fans.

4. Booster fan and its Effects
   - Describe installation, location and purpose of booster fan.
   - Solve problems relating to booster fan.

5. Auxiliary Ventilation
   - Describe systems of auxiliary ventilation.
   - Describe advantages & disadvantages of auxiliary ventilation.

6. Ventilation Survey
   - Describe methods of pressure survey using barometer, gauge and pitot tube with manometer.
   - Describe the method of measurement of cross-sectional area.
   - Describe the method of velocity measurements by using anemometer, voltmeter, and pitot- static tube and smoke & cloud method.
   - Determine percentage of oxygen, methane, carbon monoxide SO_2 & H_2S.

7. Leakage of air in Mines
   - Describe causes and preventive measures of leakage of air in mines.

SYLLABUS COVERAGE UP TO I.A.

Chapter 1,2,3

RECOMMENDED BOOKS

Sl. No.	Title of the Books	Name of Authors
1	Mine Ventilation	G B Mishra
2	EMT II	D J Deshmukh
3	Coal Mine Practices	E. Mason
4	Mine Ventilation	L C KAKU
5	UMS Volume -I	
6	SME HANDBOOK VOL-I & III	

Th. 4. ELECTRICAL EQUIPMENT IN MINES

Name of the Course : Diploma in Mining Engineering			
Course code:		Semester	4th
Total Periods:	60	Examination	3 hrs
Theory Periods:	4P/week	Internal Assessment	20
Maximum Marks:	100	End Semester Examination	80

Topic- wise distribution of periods

CHAPTER	TOPIC	PERIODS
1	Electrical cables for Mining use	5
2	Protective systems including Fuses & Circuit Breakers	14
3	Fundamentals of Transformer	10
4	Industrial drives-Mining Type	4
5	Electric Braking Used in Mines	8
6	Flame proof and intrinsically safe apparatus	5
7	Underground signaling arrangement	4
8	Sensors & their applications	5
9	Describe Battery locomotive and Electric LHD	5
	Total	60

RATIONALE

For a Mining Engineer, it is essential to have the fundamental concepts of electrical engineering and its applications in mining operation.

OBJECTIVES

On completion of the course, students will be able to :

- Describe various types of electrical cables used in Mines.
- State & explain the purposes of uses.
- Describe and explain circuit breakers and draw circuit diagram of gate-end box and drill panel.
- Describe different types of protective system.
- Select electric drives for mining use.
- Describe & explain different types of electric braking.
- Describe proof apparatus and intrinsically safe apparatus.
- Explain underground signaling arrangement.

COURSE CONTENTS

1. Electrical cables for Mining use
   - Classify cables for mining use.
   - Constructional features of high tension and low-tension cables armored & trailing cables.
     - State size of cables & their use.

        - State procedures of cable laying at surface, underground roadway & in shafts.
    - Describe cable joint box mining type.

2. Protective Systems
    - Fuses.
        - Fuse Materials
        - Rewireable Fuse, HRC Fuse.
        - Uses of Fuse.
    - Circuit Breakers.
        - Describe & Explain Air Circuit Breaker.
        - Describe & Explain Minimum Oil Circuit Breaker (MOCB).
        - Describe & Explain Bulk Oil Circuit Breaker (BOCB).
        - Describe & Explain Air Blast Circuit Breaker.
        - Describe SF6 Circuit Breaker.
    - Explain essential qualities of a good protective system.
    - State & describe types of relays (plunger, induction & direction over current, over loads, no volt and latching relay, frequency relay and Earth leakage relay)
    - Describe protection of transformer by differential relay.
    - Describe general principle of working-basis remote control circuit & various protective devices of Gate-End Box.
    - Describe functions & operation of drill panel.
    - Earthing system in mines.
    - Voltage limit.

3. Fundamentals of Transformer (without numerical problems)

4. Industrial drives- Mining type
    - Explain starting & running characteristics of D.C. & A.C. Motors.
    - State selection of motors for mining use.
5. Electric braking used in Mines
    - Describe & explain regenerative braking.
    - Describe & explain magnetic braking.
6. Flame proof & intrinsically safe apparatus
    - Define flame proof apparatus & intrinsically safe apparatus.
    - Describe & explain the safety features of flame proof & intrinsically safe apparatus.

7. Underground signaling arrangement
    - Describe signals & shaft signal.
    - Describe communication system in U/G mines.
    - Point to point communication.
    - Intercom system/Telephone
    - Cordless system.
8. Sensors & their applications.
9. Battery locomotive, Automation with Thyroster control, Elecrical LHD, Electric mine phone.

SYLLABUS COVERAGE UP TO I.A.

Chapter 1,2,3.4.

RECOMMENDED BOOKS

Sl. No.	Title of the Books	Name of Authors
1	Electrical Equipment in Mines	H.Cotton
2	Electrical Power System	V K Mehta
3	Power Electronics	P S Punmia

Pr.1 . MINE SURVEY – II LAB

Name of the Course : Diploma in Mining Engineering			
Course code:		Semester	4th
Total Periods:	90	Examination	3 hrs
Practical Periods:	6P/week	Sessional Exam	50
Maximum Marks:	100	End Semester Examination	50

Topic wise Distribution of Periods

CHAPTER	TOPIC	PERIODS
1	Study of Tacheometer	15
2	Study of GPS	15
3	Study of DGPS	15
4	Study of Total Station	15
5	Uses of Autocad in survey	15
6	Software based Mine planning	15
	Total	90

A. **RATIONALE**:

In the field of mining, it will help in all measurements,calculations & mapping at all stages from prospecting to exploitation and utilizing mineral deposits by both surface & underground working.

B. OBJECTIVE:
On completion of lab students will able to :

- Develop a clear idea about Tacheometer and Tacheometry.
- Know various components of GPS and DGPS & their uses.
- Use Total station in calculations of various components in mining field.
- Learn uses of Autocad and software in Mine planning.

C. Course Contents

- Fix triangulation and measurement of peripheral and hub angles. Base line measurement applying all corrections and plotting by co-ordinates.
- Determine the north.
- Set out curves by Total Station and Theodolites.
- Correlate underground and surface survey during survey camp.
- Measurement of Horizontal & Vertical angles, measurement of distance by Total Station.
- Mining lease boundary survey using Total Station .
- Base line fixation using Total Station.
- Coordinate point shifting and reference point shifting by Total Station .

- Fixation of control point by 02 traversing (both Horizontal and Vertical control points) with Total Station and auto level.
- Topographic survey & existing features.
- Area calculation using software.
- Volume calculation using software
- GPS Survey.
- Preparation of plan and section using AUTOCAD.
- DGPS Survey.
- Reserve calculation of Ore.

Pr.2 .MINE VENTILATION LAB

Name of the Course : Diploma in Mining Engineering			
Course code:		Semester	4th
Total Periods:	90	Examination	3 hrs
Practical Periods:	6P/week	Sessional Examination	50
Maximum Marks:	100	End Semester Examination	50

Topic wise distribution of Periods

CHAPTER	TOPIC	PERIODS
1	Calculation of relative humidity by stationary hygrometer	8
2	Study of relative humidity by storrow's hygrometer	7
3	Calculation of cooling power of mine air using Kata thermometer.	8
4	Study of air crossing, ventilation doors at pit-top	8
5	Study & use of Vane Anemometer,Digital Anemometer, Velometer	9
6	Determination of duct characteristic.	9
7	Study of constructional features of axial flow and centrifugal fans.	9
8	Determination of fan characteristic curve.	8
9	Study and sketching of regulator, airlocks	8
10	Study and use of digital anemometer.	8
11	Measurement of quantity of air flow by digital anemometer.	8
	Total	90

A. RATIONALE

The provision of proper ventilation is very essential for any underground mining operation. As a mining Engineer, one should have the thorough knowledge about types of mechanical ventilators,different measuring instruments & air leakage protecting devices used in mines.

B. OBJECTIVES

On completion of the lab, students will be able to :

- Know uses of stationary & storrow's hygrometer in calculation of relative humidity.
- Calculate cooling power of air with help of kata thermometer.
- Illustrate different types of fans, fan characteristics and selection of fans.
- Explain the uses of Regulators and Air locks in different parts of mine.
- Calculate velocity of air with the help of vane anemometer.
- Explain different ways of pressure survey, quantity survey & quality survey.

C. Course Contents

- Determine the relative humidity by stationary hygrometer.
- Determine the relative humidity by storrow's hygrometer.
- Determine the cooling power of mine air using Kata thermometer.
- Study and sketching of air crossing, ventilation doors at pit-top & different types of explosive proof fire stopping.
- Study & use of Vane Anemometer,Digital Anemometer, Velometer, Pitot static-tube measurement of quantity of air flow. Study of digital pressure meter.
- Determination of duct characteristic.
- Study of constructional features of axial flow and centrifugal fans.
- Determination of fan characteristic curve.
- Study and sketching of regulator, airlocks.
- Study and use of digital anemometer.
- Measurement of quantity of air flow by digital anemometer.

Pr .3 . ELECTRICAL EQUIPMENT IN MINE LAB

Name of the Course : Diploma in Mining Engineering			
Course code:		Semester	4th
Total Periods:	90	Examination	3 hrs
Practical Periods:	6P/week	Sessional Examination	50
Maximum Marks:	100	End Semester Examination	50

Topic wise Distribution of Periods

CHAPTER	TOPIC	PERIODS
1	Preparation of Electrical switch board to control two light points, one plug point	15
2	Study of circuit breakers	15
3	Study of Gate End Box	15
4	Study of Relays	15
5	Identify the different part of given cable	15
6	Use of Megger check and the continuity of windings	15
	Total	90

A. RATIONALE

For a Mining Engineer, it is essential to have the fundamental concepts of electrical engineering and its applications in mining operation.

B. OBJECTIVES

On completion of the lab, students will be able to :

- Prepare an electrical switch board to control 2 light points & 1 plug points.
- Describe and explain circuit breakers and draw circuit diagram of gate-end box and drill panel.
- Describe different types of protective system and Relays.
- Distinguish different types of cables used for mining purpose
- Explain the uses of Megger check and continuity of windings.

C. **Course Contents**

- Prepare an Electrical switch board to control two light points, one plug point, one fan point and put a required fuse.
- Study of circuit breakers (Air Circuit Breaker & Oil Circuit Breaker).
- Study of Gate End Box.
- Study of Relays (Buchholz Relay , Over Current Relay).
- Identify the different part of given cable and find fault on the cable.
- By the use of Megger check the continuity of windings, body to winding, body to earth of an 3-Phase induction Motor.

Pr. 4. Technical Seminar

Name of the Course : Diploma in Mining Engineering			
Course code:		Semester	4th
Total Periods:	30	Examination	-
Practical Periods:	2P/week	Sessional Examination	50
Maximum Marks:	50		

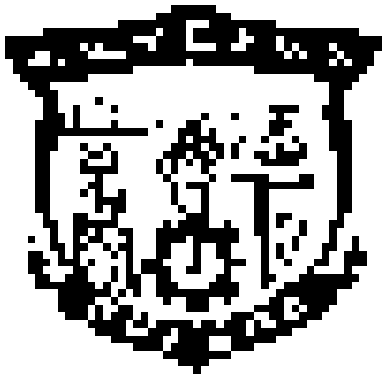
Each student has to select a recent topic of latest technology in the area of Mining Engineering and present a seminar in front of all students of the class. He/She has to prepare a PowerPoint presentation of the selected topic of minimum 10 slides are the total presentation will be approximately 10 minutes duration .There will be interactive session between the presenter and rest of the students including the faculty members of the dept at the end of presentation .A student has to present at least 2 nos. of seminar during a semester and to submit the report for evaluation.

CURRICULLUM OF 5TH SEMESTER

For

DIPLOMA IN MINING ENGINEERING

(Effective FROM 2020-21 Sessions)



STATE COUNCIL FOR TECHNICAL EDUCATION & VOCATIONAL TRAINING, ODISHA, BHUBANESWAR

STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING,ORISSA

TEACHING AND EVALUTION SCHEME FOR 5th Semester Mining Engg. (w e f 2020-21)

SUBJECT NUMBER	SUBJECT CODE	SUBJECT	Periods/Week			Evaluation Scheme			
			L	T	P	Internal assessment /Sessional	End Sem Exam	Exams (Hours)	Total
		Theory							
Th. 1		Entrepreneurship and Management & Smart Technology	4	-	-	20	80	3	100
Th .2		Mine Hazard and Safety	4	-	-	20	80	3	100
Th .3		Mine Legislation and General Safety -I	4	-	-	20	80	3	100
Th .4		Mine Machinery -I	4	-	-	20	80	3	100
Th. 5		Underground Metal Mining	4	-	-	20	80	3	100
		Total	20			100	400		500
		Practical							
Pr .1		Mine Hazard and Safety Lab	-	-	6	50	50	3	100
Pr .2		Mine Machinery -I Lab	-	-	6	50	50	3	100
Pr .3		Project Phase - I	-	-	4	50	-		50
		Student Centred Activities(SCA)	-	-	3	-	-		
		Total			19	150	100		250
		Grand Total	20		19	250	500		750

Abbreviations : L-Lecturer ,T-Tutorial ,P-Practical .Each class is of minimum 55 minutes duration.

Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50% and in Aggregate is 40%

SCA shall comprise of Extension Lectures/Personality Development/Environmental issues /Quiz/Hobbies/Field visits/Cultural Activities/Library Studies/Classes on MOOCS/SWAYAM etc. ,Seminar and SCA shall be conducted in a section.

There shall be 1 Internal Assesment done for each of Theory subject .Sessional Marks shall be total of the performance of individual different jobs/experiments in a subject throughout the semester

Th1. ENTREPRENEURSHIP and MANAGEMENT & SMART TECHNOLOGY

(Common to All Branches)

Theory	**4 Periods per week**	**Internal Assessment**	**20 Marks**
Total Periods	**60 Periods**	**End Sem Exam**	**80 Marks**
Examination	**3hours**	**Total Marks**	**100Marks**

Topic Wise Distribution of Periods

Sl No.	Topic	Periods
1	Entrepreneurship	10
2	Market Survey and Opportunity Identification(Business Planning)	8
3	Project report Preparation	4
4	Management Principles	5
5	Functional Areas of Management	10
6	Leadership and Motivation	6
7	Work Culture, TQM & Safety	5
8	Legislation	6
9	Smart Technology	6
	TOTAL	60

RATIONALE

In the present day scenario, it has become imperative to impart entrepreneurship and management concepts to students, so that a significant percentage of them can be directed towards setting up and managing their own small enterprises. It may be further added that an entrepreneurial mind set with managerial skill helps the student in the job market. The students can also be introduced with Startup and Smart Technology concept, which shall radically change the working environment in the coming days in the face of Industry 4.0

In this subject, the Students shall be introduced/ exposed to different concepts and Terminologies in brief only, so that he/she can have broad idea about different concepts/items taught in this subject. Solving numerical problem on any topic/item is beyond the scope of this subject.

OBJECTIVES

After undergoing this course, the students will be able to :

- Know about Entrepreneurship, Types of Industries and Startups
- Know about various schemes of assistance by entrepreneurial support agencies
- Conduct market survey
- Prepare project report
- know the management Principles and functional areas of management
- Inculcate leadership qualities to motivate self and others.
- Maintain and be a part of healthy work culture in an organisation.
- Use modern concepts like TQM
- Know the General Safety Rules
- Know about IOT and its Application in SMART Environment.

DETAILED CONTENTS

1. **Entrepreneurship**
   - Concept /Meaning of Entrepreneurship
   - Need of Entrepreneurship
   - Characteristics, Qualities and Types of entrepreneur, Functions
   - Barriers in entrepreneurship

- Entrepreneurs vrs. Manager
- Forms of Business Ownership: Sole proprietorship, partnership forms and others
- Types of Industries, Concept of Start-ups
- Entrepreneurial support agencies at National, State, District Level(Sources): DIC, NSIC,OSIC, SIDBI, NABARD, Commercial Banks, KVIC etc.
- Technology Business Incubators (TBI) and Science and Technology Entrepreneur Parks

2. **Market Survey and Opportunity Identification (Business Planning)**

- Business Planning
- SSI, Ancillary Units, Tiny Units, Service sector Units
- Time schedule Plan, Agencies to be contacted for Project Implementation
- Assessment of Demand and supply and Potential areas of Growth
- Identifying Business Opportunity
- Final Product selection

3. **Project report Preparation**

- Preliminary project report
- Detailed project report, Techno economic Feasibility
- Project Viability

4. **Management Principles**
- Definitions of management
- Principles of management
- Functions of management (planning, organising, staffing, directing and controlling etc.)
- Level of Management in an Organisation

5. **Functional Areas of Management**

a) Production management
- Functions, Activities
- Productivity
- Quality control
- Production Planning and control

b) Inventory Management
- Need for Inventory management
- Models/Techniques of Inventory management

c) Financial Management
- Functions of Financial management
- Management of Working capital
- Costing (only concept)
- Break even Analysis
- Brief idea about Accounting Terminologies: Book Keeping, Journal entry, Petty Cash book, P&L Accounts, Balance Sheets(only Concepts)

d) Marketing Management
- Concept of Marketing and Marketing Management
- Marketing Techniques (only concepts)
- Concept of 4P s (Price, Place, Product, Promotion)

e) Human Resource Management
- Functions of Personnel Management

- Manpower Planning, Recruitment, Sources of manpower, Selection process, Method of Testing, Methods of Training & Development, Payment of Wages

6. **Leadership and Motivation**

a) Leadership
- Definition and Need/Importance
- Qualities and functions of a leader
- Manager Vs Leader
- Style of Leadership (Autocratic, Democratic, Participative)

b) Motivation
- Definition and characteristics
- Importance of motivation
- Factors affecting motivation
- Theories of motivation (Maslow)
- Methods of Improving Motivation
- Importance of Communication in Business
- Types and Barriers of Communication

7. **Work Culture, TQM & Safety**
- Human relationship and Performance in Organization
- Relations with Peers, Superiors and Subordinates
- TQM concepts: Quality Policy, Quality Management, Quality system
- Accidents and Safety, Cause, preventive measures, General Safety Rules , Personal Protection Equipment(PPE)

8. **Legislation**

a) Intellectual Property Rights(IPR), Patents, Trademarks, Copyrights
b) Features of Factories Act 1948 with Amendment (only salient points)
c) Features of Payment of Wages Act 1936 (only salient points)

9. **Smart Technology**
- Concept of IOT, How IOT works
- Components of IOT, Characteristics of IOT, Categories of IOT
- Applications of IOT- Smart Cities, Smart Transportation, Smart Home, Smart Healthcare, Smart Industry, Smart Agriculture, Smart Energy Management etc.

Syllabus to be covered before IA: Chapter 1,2,3,4

RECOMMENDED BOOKS

1. Entrepreneurship Development and Management by R.K Singhal, Katson Books., New Delhi
2. Entrepreneurship Development and Management by U Saroj and V Mahendiratta, Abhishek Publications, Chandigarh
3. Entrepreneurship Development and Management by Vasant Desai, Himalaya Pub.House
4. Industrial Engineering and Management by O.P Khanna ,Dhanpat Rai and Sons
5. Industrial Engineering and Management by Banga and Sharma, Khanna Publications
6. Internet of Things by Jeeva Jose, Khanna Publications, New Delhi
7. Online Resource on Startups and other concepts
8. https://www.fundable.com/learn/resources/guides/startup

Th.2. MINE HAZARD AND SAFETY

Name of the Course : Diploma in Mining Engineering			
Course code:		Semester	5th
Total Periods:	60	Examination	3 hrs
Theory Periods:	4P/week	Internal Assessment	20
Maximum Marks:	100	End Semester Examination	80

RATIONALE

As a Mining Engineer, one must be thoroughly conversant with various sources of mining hazards as also the remedial measures needed to be undertaken to avoid any mishap and able to understand total operation of rescue and recovery.

OBJECTIVES

After completion of the subject, students will be able to:

- Testing of different mine gases. Physiological effect on miners, detection of fire damp by flame safety lamp, explains the method of gas testing by CO-detectors & methanometer.
- Explain how firedamp is emitted in mines.
- Explain causes of mine fires & spontaneous heating.
- Define explosion, explain causes & elaborate necessary steps required for prevention of coal dust & firedamp explosion.
- Define mine inundation, explain causes & elaborate necessary preventive measures required.
- Describe lighting arrangement, lighting standards explain glare & its effect
- Explain the effect of noise & vibration on miners & mine structures & other surface structure.
- Explain rescue and recovery work when mine hazard occurs.

Topic- wise distribution of periods

CHAPTER	TOPIC	PERIODS
1	Mine gases & gas testing	6
2	Emission of firedamp in U/g coal mines	6
3	Mine fires & spontaneous heating	10
4	Mine Explosion	10
5	Mine Inundation	8
6	Mine lighting & Illumination	5
7	Noises & Vibration	5
8	Mine Rescue and Recovery	10
	Total	60

COURSE CONTENTS

1. **Mine gases & gas testing**
   - Composition of atmospheric air. Different mine gases, their properties and physical effects .
   - State fire damps, black damp, stink damp, white damp and after damp in mines.
   - Describe flame safety lamp & its working principle.
   - Explain gas testing by flame safety lamp by accumulation test & percentage test.
   - State precaution for gas testing.
   - Describe various parts of flame safety lamp, special features.
   - State limitations of flame safety lamp.

2. **Emission of firedamp in U/g workings**
   - Describe gradual exudation, blower & outbursts of firedamp in U/g workings.

3. **Define fires & spontaneous heating**
   - Define incubation period
   - Define spontaneous heating and its causes and effects.
   - State preventive measures against spontaneous heating.
   - Explain CO/O_2 ratio & CO_2/O_2 ratio.

4. **Mine Explosion**
   - Describe coal dust explosion & fire damp explosion with their causes & prevention.
   - State inflammability of coal dust & fire damp.
   - Explain Coward's diagram.
   - State prevention, suppression & treatment of dust.
   - Describe sampling of dust in Mines.
   - Stone dust barrier.

5. **Mine Inundation**
   - State sources of water in mines & its danger.
   - State precaution against inundation.
   - Describe burnside safety boring apparatus.
   - State precaution while approaching water logged area.
   - Describe water dams- its construction & design. (Without derivation of formula)
   - Explain water danger plan.
   - Statutory provision for working near water body.

6. **Mine lighting & illumination**
   - Define illumination and its units.
   - Standards of lighting at different parts of mine as per mine regulation.

7. **Noise and Vibration .**
   - Explain the effect of noise & vibration on miners & mine structures & other surface structure with respect to statutory provision.

8. **Mine Rescue and Recovery**
   - Proto-IV, Proto-V, Drager BG-174, Self rescuer, Smoke helmet, Gas mask.
   - Construction of Rescue brigade and their role in rescue and recovery operation.
   - Mine Rescue rules 1985 Annexure I,II,III.

SYLLABUS COVERAGE UP TO I.A

Chapter 1,2,3,4

Learning Resourses:		
Sl. No.	Title of the Book	Name of Authors
1	Mine Ventilation	G B Mishra
2	EMT - II	D J Deshmukh
3	Coal Mine Practices	E Mason
4	UMS Vol - I	
5	Coal mine Regulations - 2017	
6	Mine Rescue	M A Ramlu

Th. 3. MINE LEGISLATION & GENERAL SAFETY-I

Name of the Course : Diploma in Mining Engineering			
Course code:		Semester	5th
Total Periods:	60	Examination	3 hrs
Theory Periods:	4P/week	Internal Assessment	20
Maximum Marks:	100	End Semester Examination	80

RATIONALE

Since Mining operations involve frequent accidents, it is very important for a mining engineer to be thoroughly conversant with various acts & rules framed for providing safety to workers.

OBJECTIVES

On completion of the course, students will be able to :

- Describe various aspects of Mines Act 1952.
- Describe various aspects of Mines Rule 1955.
- Describe various aspects of Coal Mines Regulations 2017.
- Describe various aspects of Mines Rescue Rules 1985.
- Describe various aspects of Indian Explosive Rules 2008.
- Describe various aspects of Central Electricity Authority 2010.

Topic- wise distribution of periods

CHAPTER	TOPIC	PERIODS
1	Mines Act 1952	14
2	Mines Rules 1955	10
3	Coal Mines Regulations 2017	18
4	Mine Rescue Rules 1985	5
5	Indian Explosive Rule 2008	7
6	Central Electricity Authority 2010	6
	Total	60

COURSE CONTENTS

1. **Mines Act 1952**
   - Discuss various provisions of Mines Act 1952.

2. **Mines Rules 1955**
   - Discuss various provisions of Mines Rule 1955.

3. **Coal Mines Regulation 2017**
   - Discuss various Provisions of C.M.R. 2017.

4. **Mines Rescue Rules 1985**
   - Discuss various provisions of Mines Rescue Rules 1985.

5. **Indian Explosive Rules 2008**
   - Discuss various provisions of Indian Explosive Rules 2008.

6. **Central Electricity Authority 2010**
   - Discuss various provisions of Central Electricity Authority 2010.

SYLLABUS COVERAGE UP TO I.A

Chapter 1,2

Learning Resourses		
Sl. No.	Title of the Book	Name of Authors
1	Mines Act - 1952	
2	Mines Rules - 1955	
3	Coal Mine Regulations - 2017	
4	Mines Rescue Rules - 1985	
5	Indian Explosive Rules - 2008	
6	Central Electricity Authority - 2010	

Th.4. MINE MACHINERY – I

Name of the Course : Diploma in Mining Engineering			
Course code:		Semester	5th
Total Periods:	60	Examination	3 hrs
Theory Periods:	4P/week	Internal Assessment	20
Maximum Marks:	100	End Semester Examination	80

RATIONALE

It is imperative that a Mining Engineer should be thoroughly conversant with various types of machine used in mining operations.

OBJECTIVES

On completion of the subject, students will be able to:

- Describe type & construction of wire, their uses, maintenance & related calculation.
- Describe different types of transportation methods in mines.
- Explain headgear's functions & its design factors.
- Describe constructional & safety features of cage and shaft.
- Describe different profiles of winding drum, various safety devices & related calculations.
- Describe different types of friction winding & its function.
- Explain skip-winding arrangements.
- Draw various arrangements at pit top & pit bottom layouts.

Topic- wise distribution of periods

CHAPTER	TOPIC	PERIODS
1	Wire ropes	12
2	Rope Haulage	14
3	Headgear	5
4	Cage & shaft fittings	6
5	Winding drum	6
6	Friction Winding	5
7	Skip Winding	6
8	Pit top & Bottom Layout	6
	Total	60

COURSE CONTENTS

1. **Wire Ropes**
   - State the types of wire ropes used in Mines.
     - Describe constructional features of wire ropes & lay of wire ropes.
   - Define factor of safety to wire ropes nominal & actual factor of safety of wire ropes.
     - State factors influencing the F.O.S.
   - State efficiency of rope construction, space factor & cross sectional area rope.
   - State factors affecting deterioration of ropes.
   - Describe care & maintenance of ropes.
   - State & describe testing & examination of wire ropes.
   - Give the procedure of splicing of wire rope
   - Describe rope capel for haulage winding & recapping.

2. **Rope Haulage**
   - Transportation in mines by rope haulage.
   - State type of rope haulage.
   - Describe various types of rope haulage with simple sketches.
   - State & describe different type of safety devices on rope haulage roadways.
   - State & describe different types of clips & couplings.

3. **Headgear**
   - State function of headgear.
   - Describe constructional features of headgear pulley.
   - Define angle of fleet.

4. **Cage and shaft fittings**
   - Describe cage, cage suspension gear, detaching hooks & its function, safety catch at headgear & keps.
   - State types of guide.
   - State & describe rigid guide, flexible shoes, guide rope suspension & tensioning arrangement.

5. **Winding drum**
   - State different profiles of winding Drum.
   - Describe different types of winding brake.
   - Describe various types of safety devices on winding system.

6. **Friction Winding**
   - State & describe principle & constructional features of ground-mounted & tower-mounted koepe winder.
   - State advantages & disadvantages of koepe winding.
   - Describe multirope system of koepe winding.

7. **Skip winding**
   - Describe constructional features bottom discharge skip, Top discharge skip.
   - Compare skip winding cage winding.

8. **Pit top & Pit bottom circuit layout**
   - State factors affecting pit top & pit bottom layouts.
   - Describe different types of pit top & pit bottom car/tub circuit layouts.

SYLLABUS COVERAGE UP TO I.A.

Chapter 1,2.3.4

Learning Resourses		
Sl. No.	Title of the Book	Name of Authors
1	Mine Hoisting	M A Ramulu
2	SME Mining Engg Handbook	
3	Material Handling in Mines,IIT KGP	
4	EMT III	D.J.Desmukh
5	Mine Transport	N.T Kerlin
6	UMS Volume	

Th. 5. UNDERGROUND METAL MINING

Name of the Course : Diploma in Mining Engineering			
Course code:		Semester	5th
Total Periods:	60	Examination	3 hrs
Theory Periods:	4P/week	Internal Assessment	20
Maximum Marks:	100	End Semester Examination	80

RATIONALE

As Mining Engineer, one should have the knowledge in fundamental principles of generation in underground metal mines.

OBJECTIVES

On completion of the subject, students will be able to :

- Describe various methods to access an ore body.
- Explain various methods of development used in underground metal mines.
- Compare between coal & metal mining.
- Explain various stopping methods used in u/g metal mines.
- Stone Drifting.
- Explain causes & prevention of rock burst.
- Describe about face mechanization.

Topic- wise distribution of periods

CHAPTER	TOPIC	PERIODS
1	Access to ore body	5
2	Development in underground metal mines	12
3	Comparative study between Coal & Metal Mining	3
4	Stoping Method	18
5	Stone Drifting.	7
6	Rock burst.	5
7	Face mechanization	10
	Total	60

COURSE CONTENTS (Based on specific objectives)

1. Access to ore body

- Classify modes of entries — Adits , inclines and shafts ,applicability of entries.

2. Development in underground Metal Mine.

- Explain formation of blocks of mineral deposit.

- Explain level interval
- Describe
- Open raising method
- Two compartment method
- Jora raise lift
- Long hole drilling method./Vertical Crater retreat (VCR) method.
- Alimak raise climber
- Raise borer.
- Development of Ore passe system.

3. Give a comparative study between coal and metal Mining.

4. Stoping methods.

- Classify stoping methods with application and factors affecting methods of stopping.
- Preparatory arrangement for stoping.
- Describe the following methods with layout including drilling, blasting, transportation and supports.
- Open stoping.
- Open stoping with pillar support.
- Shrinkage stoping.
- Cut & fill stoping.
- Square set stoping.
- Block caving.
- Sub-level caving.
- Top slicing.

5. Stone Drifting

- Describe conventional methods of drifting. Find out direction gradient of drift. Describe drilling and blasting, support, transportation, drainage, ventilation and lighting arrangements, organization and supervision in mechanised method of drifting.

6. Rock Burst

- Explain causes and prevention of rock burst.

7. Face mechanization

- Describe use of jumbo drill with air leg.
- Describe various Loading & Transportation System like
  - L.H.D., L.P.D.T.(Low Profile Dump Truck), rocker shovel, spiral chutes and draw points, Scraper etc.

SYLLABUS COVERAGE UP TO I.A.

Chapter 1,2,3

Learning Resourses		
Sl. No.	Title of the Book	Name of Authors
1	SME Mining Engineering Hand Book Vol.I & II-1993 edition.	
2	Metal Mining	Chacharker
3	Mining Engineering Hand Book	Peele
4	EMT Vol.II	D.J.Desmukh
5	Mining Ground control	Prof. B.S. Verma
6	Rock Mechanics	Jermic
7	Rock Mechanics	Jugger & Cook
8	Metalliferous Mining	Higam
9	Underground Mining Method	Bullock.

Pr.1 MINING HAZARDS & SAFETY LAB

Name of the Course : Diploma in Mining Engineering			
Course code:		Semester	5th
Total Periods:	90	End Examination	50
Practical Periods:	6P/week	Sessional	50
		Total	100

A. RATIONALE:

As a Mining Engineer, one must be thoroughly conversant with various sources of mining hazards as also the remedial measures needed to be undertaken to avoid any mishap and able to understand total operation of rescue and recovery.

B. OBJECTIVES:

On completion of lab students will able to :

- Develop a clear idea about Methanometer & CO detector.
- Know details about procedure of analysis of gases by halden & Orsat apparatus.
- Sample the dust particles by using Gravimetric dust Sampler.

Topic wise distribution of periods

CHAPTER	TOPIC	PERIODS
1	Estimation of CH_4 in air sample using flame safety lamp and methanometer.	18
2	Study & use of different types of methonometer.	10
3	Determination of CO by using CO-dectector.	6
4	Determination of CO_2 in air sampling by CO_2 detectors	10
5	Gas analysis by (I) Orsat apparatus.	8
6	Haldane apparatus for gas analysis.	8
7	Study & uses of Konimeter.	6
8	Sampling of dust by gravimetric dust sampler.	10
9	Study of Rescue Apparatus	6
10	Multi gas Detector (NOx, H_2S, CO, CO_2)	8
	Total	90

C. COURSE CONTENT.

- Estimation of CH_4 in air sample using flame safety lamp and detection by a methanometer.
  - Accumulation & percentage test of CH_4 by flame safety lamp.

- Study & use of different types of methonometer.
- Determination of CO by using CO-dectector.
- Determination of CO_2 in air sampling by CO_2 detectors.
- Gas analysis by (I) Orsat apparatus.
- Haldane apparatus for gas analysis.
- Study & uses of Konimeter.
- Sampling of dust by gravimetric dust sampler.
- Study of Rescue Apparatus.
- Multi gas Detector (NOx, H_2S, CO, CO_2

Pr.2. MINE MACHINERY – I LAB.

Name of the Course : Diploma in Mining Engineering			
Course code:		Semester	5th
Total Periods:	90	End Examination	50
Practical Periods:	6P/week	Sessional	50
		Total	100

RATIONALE

It is imperative that a Mining Engineer should be thoroughly conversant with various types of machine used in mining operations.

OBJECTIVES:

On completion of lab students will able to :

- Develop a clear idea about Wire rope,rope splicing & capeling.
- Know details about Safety hook,keps & rope guides.
- Generate a clear idea about head gear structure,suspension gear & winding drum.

Topic wise distribution of periods

CHAPTER	TOPIC	PERIODS
1	Study of Wire rope.	8
2	Study of rope splicing.	8
3	Study of rope capel.	8
4	Study of safety hook.	10
5	Study of keps.	8
6	Study of guide in shaft.	8
7	Study of clips used in endless rope haulage.	8
8	Model Development of Headgear Structure.	8
9	Model Development of Suspension Gear.	8
10	Model Development of different types of winding drum.	8
11	Model development of different types of safety devices used in haulage.	8
	Total	90

COURSE CONTENT.

- Study of Wire rope.
- Study of rope splicing.

- Study of rope cappel.
- Study of safety hook.
- Study of keps.
- Study of guide in shaft.
- Study of clips used in endless rope haulage.
- Model Development of Headgear Structure.
- Model Development of Suspension Gear.
- Model Development of different types of winding drum.
- Model development of different types of safety devices used in haulage roadways.

Pr 3. PROJECT WORK (Phase-I)

Name of the Course: Diploma in Mining			
Course code:		Semester	5th
Total Period:	60	Examination :	-
Theory periods:	4P / week	Sessional Marks	50
		TOTAL Marks	50

RATIONALE

Students' Project Work aims at developing innovative skills in the students whereby they apply the knowledge and skills gained through the course covered in many subjects and Labs, by undertaking a project. The prime emphasis of the project work is to understand and apply the basic knowledge of the principles of Mining Engineering and practices in real life situations, so as to participate and manage a Mining projects in future.
Entire Project shall spread over 5th and 6th Semester. Part of the Project covered in 5th Semester shall be named as *Project Phase-I* and balance portion to be covered in 6th Semester shall be named as *Project Phase-II*.

OBJECTIVES

After undergoing the Project Work, the student will be able to:

- Implement the theoretical and practical knowledge and skills gained through various subjects/courses into an application suitable for a real practical working environment, preferably in an industrial environment.
- Identify and contrast gap between the technological knowledge acquired through curriculum and the actual industrial need and to compensate it by acquiring additional knowledge as required.
- Carry out cooperative learning through synchronous guided discussions within the class in key areas, asynchronous document sharing and discussions, as well as prepare collaborative edition of the final project report.
- To achieve real life experience in Mines operation and management.
- To develop the skill of writing Project Report

General Guidelines

The individual students have different aptitudes and strengths and also areas of interest. Project work, therefore, should match the strengths and interest of the students. For this purpose, students should be asked to identify the type of project work, they would like to execute. The activity of problem identification should begin well in advance (right from beginning of 5th semester). Students should be allotted a problem of interest to him/her as a project work. It is also essential that the faculty of the respective department may have a brainstorming session to identify suitable project assignments for their students. The project assignment can be individual assignment or a group assignment. Preferably there should not be more than 5 students, if the project work is given to a group. The project work identified in collaboration with industry should be preferred.

A suggestive criterion for assessing student performance by the external (preferably person from industry) and internal (teacher) examiner is given in table below:

Sl. No.	Performance Criteria
1.	Selection of project assignment
2.	Planning and execution of considerations
3.	Quality of performance
4.	Providing solution of the problems or production of final product
5.	Sense of responsibility
6.	Self expression/ communication/ Presentation skills
7.	Interpersonal skills/human relations
8.	Report writing skills
9	Viva voce

The teachers are free to evolve other criteria of assessment, depending upon the type of project work.
It is proposed that the institute may organize an annual exhibition of the project work done by the students and invite leading Industrial organisations to such an exhibition.

Project Phase-I and Phase-II
The Project work duration shall cover 2 semesters(5^{th} and 6^{th} sem). The Grouping of students, selection of Project, assignment of Project Guide to the Group shall be done in the beginning of 5^{th} sem under Project Phase-I. The students may be allowed to study literature, any existing system and then define the Problem/objective of the Project. Preliminary work including Design of the system have to be complete in Phase-I. Project Milestones are to be set so that progress can be tracked . In Phase-II detailed work, Testing, Documentation have to be complete. Project Report have to be prepared and complete in Phase-II. All Project reports should be organized uniformly in proper order, irrespective of group. Teacher Guides can make suitable alteration in the components of Task and schedule.
At the end of Project Phase-I in 5^{th} semester there shall be one presentation by each group to mark to progress and also to judge whether the Project is moving in right direction as per the objective of the Project.

Equipment List

MINE HAZARD AND SAFETY LAB

(a) GL50 and GL60 flame safety lamp.
(b) MSA D6 Methanometer.
(c) CO detector.
(d) CO2 detector.
(e) Orsat apparatus
(f) Konometer.
(g) GDS dust sampler.
(h) Multigas detector
(i) Hygrometer.
(j) Haldane apparatus.
(k) DRAGER BG174 self-contained breathing apparatus.
(l) Self-contained open circuit breathing apparatus.
(m) Face mask for rescue apparatus.

MINE MACHINERY –I LAB

(a) Pieces of standard and non standard Rope.
(b) Model of rope splicing.
(c) Rope splicing tools.
(d) King detaching safety hook.
(e) Ormoured safety hook.
(f) Model of Keps.
(g) Models of rope guide and rigid guide.
(h) Rope guide and rigid guide shoe.
(i) Model of different types of clips such as cam clip, small man clip, lashing chain, Screw clip.
(j) Model of headgear structure.
(k) Models of cylindrical drum, conical drum, bi cylindro conical drum.
(l) Models of different types of safety devices used in haulage rode way such as Back stay, Drop warrick, Runaway switches, Stop block, Monkey Catches.

STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA

TEACHING AND EVALUATION SCHEME FOR 6TH SEMESTER MINING ENGINEERING(wef 2020-21)

Subject Number	Subject Code	Subject	Periods/week			Evaluation Scheme			
			L	T	P	Internal Assessment/ Sessional	End Sem Exams	Exams (Hours)	Total
		Theory							
Th.1		Mine Machinery -II	4			20	80	3	100
Th.2		Mine Geology -II	4			20	80	3	100
Th.3		Mine Legislation & General Safety - II	4			20	80	3	100
Th.4 Elective (Any One)		(a)Mineral Dressing (b)Advanced Mine Survey (c) Material handling & Logistics	4			20	80	3	100
		Total	*16*			*80*	*320*		*400*
		Practical							
Pr.1		Mine Geology -II Lab			6	25	50	3	75
Pr.2		Mine Machinery -II Lab			6	50	50	3	100
Pr.3		Project Phase -II			6	50	100	3	150
Pr.4		Life Skill			2	25	-	-	25
		Student Centred Activities(SCA)			3				
		Total			*23*	*150*	*200*		*350*
		Grand Total	**16**		**23**	**230**	**520**		**750**

Abbreviations: L-Lecturer, T-Tutorial, P-Practical. Each class is of minimum 55 minutes duration

Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50% and in Aggregate is 40%

SCA shall comprise of Extension Lectures/ Personality Development/ Environmental issues /Quiz /Hobbies/ Field visits/ cultural activities/Library studies/Classes on MOOCS/SWAYAM/Idea Tinkering and Innovation Lab Practice etc., Seminar and SCA shall be conducted in a section.

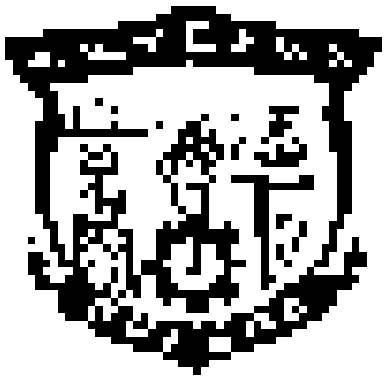
There shall be 1 Internal Assessment done for each of the Theory Subject. Sessional Marks shall be total of the performance of individual different jobs/ experiments in a subject throughout the semester

CURRICULLUM OF 6TH SEMESTER

For

DIPLOMA IN MINING ENGINEERING

(Effective FROM 2020-21 Sessions)



STATE COUNCIL FOR TECHNICAL EDUCATION & VOCATIONAL TRAINING, ODISHA, BHUBANESWAR

Th.1. MINE MACHINERY – II

Name of the Course: Diploma in Mining Engineering			
Course Code	:	Semester	: 6th
Theory Periods	: 4 Periods/week	Internal Assessment	: 20
Total Periods	: 60	End Semester Examination	: 80
Examination	: 3 Hours	Maximum Marks	: 100

RATIONALE

It is imperative that a Mining Engineer should be thoroughly conversant with various types of machine used in mining operations.

OBJECTIVES

On completion of the subject, students will be able to:

- Describe various underground face machineries & its applicability.
- Describe various opencast machineries & its applicability.
- Describe various types of pump & its applicability.
- Describe various types of Bore hole pumps & its application.
- Elaborate details about pipes and valves used in mine.

Topic- wise distribution of periods

CHAPTER	TOPIC	PERIODS
1	Underground face machineries	15
2	Opencast machineries	15
3	Mine Pumps	20
4	Bore hole pump	5
5	Pipes and valves	5
	Total	60

COURSE CONTENTS (Based on specific objectives)

1. Underground face machineries.

- Electric coal drill
  - Describe constructional features, operation, principle & use of electric coal drill.
  - State types of drill rods & drill bits used in electric coal drill.
  - Describe basic constructional features of gathering arm loader, scraper loader, side discharge loader & load & haul loader.
- Describe basic constructional features & operation principle of jack hammer drill & air leg rock drill.
- Describe basic constructional features & operation principle of road header & Shearer loader.

2. Opencast machineries

- Describe basic constructional features of surface miner, dragline, shovel & backhoe, bucket wheel excavator.
- Describe basic constructional features of dumper, dozer, scraper & road grader.

3. Mine Pumps.

- Classify mine pumps.
- Describe constructional features, working & use of ram pumps.
- Centrifugal & turbine pumps.
- Describe constructional features of centrifugal & turbine pumps.
- State principle of centrifugal & turbine pumps & its applicability.
- Explain balancing the axial thrust of turbine pumps.
- Draw characteristic curves for turbine pumps.
- Solve numerical problems on centrifugal & turbine pumps.
- Describe constructional features and working principle & use of roto pump (screw pump)
- Describe constructional features & working principle of sinking pump.
- State procedure of suspension in shaft.

4. Bore hole pump

- Describe constructional features & working of bore hole pump.
- State installation of bore hole pump.

5. Pipes and valves

- State types of pipe & valves used in Mines.
- Describe constructional features of various type of valves.
- State & describe different types of pipe joints.
- Describe support of laying main pipe in shaft.
- Discuss the Pipe line layout.

SYLLABUS COVERAGE UP TO I.A.

Chapter 1,2,3

RECOMMENDED BOOKS

- Electrical equipment in Mine – H. Cotton
- Winning and Working of Iron Ore – Desmukh & Desmukh
- E.M.T. Vol.-III – D.J.Desmukh

Th.2. MINING GEOLOGY-II

Name of the Course: Diploma in Mining Engineering			
Course Code	:	Semester	: 6th
Theory Periods	: 4 Periods/week	Internal Assessment	: 20
Total Periods	: 60	End Semester Examination	: 80
Examination	: 3 Hours	Maximum Marks	: 100

RATIONALE

In majority of the cases, materials that need to be explored comprise rocks & minerals. It is therefore, essential for an engineer to have basic knowledge of mining geology.

OBJECTIVES

On completion of the paper, students will be able to:

- Outline the importance of Stratigraphy & Geological time Scale in the study of geology.
- The major Groups & economic minerals associated with them that form the basis for the study of stratigraphy.
- Describe the use, origin mode of occurrence & distribution of fossil fuels & where to look for them.
- Explain the fundamental principles that underline the search for economic minerals. He will achieve a certain amount of clarity in using geological, geophysical & geochemical methods for looking for important mineral deposits.
- Develop a comprehensive idea regarding mineralogy mode of occurrence, uses & distribution of ores.
- Undertake sampling work according to BIS specification.

Topic- wise distribution of periods

CHAPTER	TOPIC	PERIODS
1	Stratigraphy	12
2	Fossil Fuels	12
3	Prospecting & Exploration	12
4	Economic Geology	12
5	Sampling	12
	Total	60

COURSE CONTENTS (Based on specific objectives)

1. **Stratigraphy**
   - Describe the principles of stratigraphy.
   - Describe the geological time Scale.
   - Describe the stratigraphic sequence, lithology, distribution & economic mineral deposits of Iron Ore series, Cuddpah Supergroup, Vindhyan super group & gondwana super group.
2. **Fossil fuels**
   - Coal
     - Describe the different ranks of coal.
     - Describe different grades of coal like A,B,C,D.
     - Describe the various theories accounting for the origin of coal.
     - Describe various important lower gondwana Coalfields of India.
   - Petroleum
     - Describe the organic & inorganic theories accounting for the origin of petroleum.
     - Define oil pool & oil trap.
     - Describe process of accumulation of oil.
     - Describe favorable conditions for accumulation of oil.
     - Describe different important oil fields in India.
3. **Prospecting & exploration.**
   - Define prospecting.
   - Differentiate between prospecting & exploration.
   - Use of multi shot camera for borehole direction test.
   - Enumerate & describe various criteria for geological exploration.
   - Describe various methods of Geophysical prospecting.
   - Explain Geochemical prospecting.
   - Differentiate between biogeochemical & geo botanical prospecting.
4. **Economic Geology**
   - Define ore & gangue.
   - Define tenor & grade.
   - Describe the mineralogy, mode of occurrence, distribution & use of iron ore deposits in India.
   - Describe the mineralogy, mode of occurrence, & description of Chromites deposits in India & its uses.
   - Describe the mineralogy, mode of occurrence & distribution of copper deposits in India & uses of this metal.
   - Describe the mineralogy, mode of occurrence, distribution of lead & zinc deposits in India & the uses of these metals.
   - UNFC (United Nation Framework of Classification) code of classification of reserves.
5. **Sampling**
   - Define sampling, outline the method of preparation of samples for assay.
   - Explain sampling
   - Describe the different methods of sampling as outlined by Bureau of
     - Indian Standards. (BIS)

SYLLABUS COVERAGE UP TO I.A.

Chapter 1,2,3.

RECOMMENDED BOOKS

- Geology of India & Burma – M.S. Krishnan
- An Introduction to geology of Coal & coalfields of India – N.L.Sharma, K.S.V.Ram
- Geology of petroleum – A.I.Levorsen
- Geological prospecting & Exploration – V.K.Kreiter
- A Hand Book of economic geology – A.K.Sen, P.K.Guha
- Mineral Economics – R.K. Sinha, N.L.Sharma

Th.3. MINE LEGISLATION & GENERAL SAFETY-II

Name of the Course: Diploma in Mining Engineering			
Course Code	:	Semester	: 6th
Theory Periods	: 4 Periods/week	Internal Assessment	: 20
Total Periods	: 60	End Semester Examination	: 80
Examination	: 3 Hours	Maximum Marks	: 100

CHAPTER	TOPIC	PERIODS
1	M.M.R. 1961	15
2	Mines V.T.Rules 1966	4
3	Mines Creche Rules	4
4	Maternity Benefit Act	4
5	Mines Accident & Safety	15
6	Forest Conservation Act (FCA) 1980	3
7	Environmental Protection Act 1986	5
8	MMRD & MCR	5
9	Classified circulars (DGMS)	5
	Total	60

RATIONALE

Since Mining operations involve frequent accidents, it is very important for a mining engineer to be thoroughly conversant with various acts & rules framed for providing safety to workers.

OBJECTIVES

On completion of the above topics, students will be able to :

- Describe various aspects of M.M.R. 1961.
- Describe various aspects of Mines Vocational Training Rules 1966.
- Describe various aspects of Mines Creche Rules 1966.
- Describe various aspects of Maternity Benefit Act.
- Describe various aspects of Mines Accident & Safety.
- Describe various aspects of Forest Conservation Act (FCA) 1980.
- Describe various aspects of Environmental Protection Act 1986.

COURSE CONTENTS (Based on specific objectives)

1. **Metalliferous Mines Regulations 1961**
    - Discuss various provisions of Metalliferous Mines Regulations 1961.

2. **Mines V.T. Rules 1966**
    - Discuss various provisions of Mines V.T. Rules 1966.

3. **Mines Creche Rules 1966**
    - Discuss various provisions of Mines Creche Rules 1966.

4. **Maternity Benefit Act**
    - Discuss various provisions of Maternity Benefit Act.

5. **Mines Accident & Safety**
    - Discuss their classification, causes & prevention.
    - Develop concept about accident cost, accident report, procedure for conducting an enquiry to ascertain the causes of accidents.
    - Discuss procedure for investigation & reporting Mine accident, accident proneness, fatality rate, frequency rate & severity rate.
    - Explain role of supervision in accident prevention, accident due to opencast workings, statistical analysis of accidents, accident statistics, its head & method of data processing.
    - Develop basis concepts of safety, safety & productivity, safety consciousness & safety campaign, safety organization, safety audit.
    - Describe rules of safety committee.
    - Explain the role of workmen inspectors.
    - Discuss terms like industrial fatigue, preventive maintenance, productive equipments & duties of Safety Officer.

6. **Forest Conservation Act (FCA) 1980.**
    - Discuss various provisions of Forest Conservation Act (FCA) 1980.

7. **Environmental Protection Act 1986**
    - Discuss various provisions of Environmental Protection Act 1986.

8. **MMRD Act & MCR Rules**
    - Various provisions of Mineral conservation & exploitation.
    - National Mineral policy.

9. **Classified Circulars (DGMS)**
    - As amended up-to-date.

SYLLABUS COVERAGE UP TO I.A.

Chapter 1,2,3,4.

RECOMMENDED BOOKS

- M.M.R.- 1961
- Mines V.T.Rules- 1966
- Mines Creche Rules- 1966
- Maternity Benefit Act
- Pit Head bath Rules
- Worker's compassion Act
- Environmental Protection Act-1986
- DGMS Circulars

Th.4 (a). MINERAL DRESSING (ELECTIVE)

Name of the Course: Diploma in Mining Engineering			
Course Code	:	Semester	: 6th
Theory Periods	: 4 Periods/week	Internal Assessment	: 20
Total Periods	: 60	End Semester Examination	: 80
Examination	: 3 Hours	Maximum Marks	: 100

CHAPTER	TOPIC	PERIODS
1	Introduction	2
2	Unit Operations	6
3	Grinding	6
4	Lab. Sizing	6
5	Industrial Screening	6
6	Gravity Concentration	6
7	Heavy Media Separation	8
8	Floatation	10
9	Magnetic & Electrostatic Separators	10
	Total	60

RATIONALE

In case of metalliferous mines, the ultimate goal is the extraction of metals. Prior to sending ores into the process of extraction, it requires dressing for removal of desirable gangue minerals as far as possible. So a Mining Engineer, specially attached to metalliferous mines should have some basic concepts about mineral dressing.

OBJECTIVES

On completion of the subject, students will be able to:

- Comprehend physical & chemical properties of ores, know the application in mineral dressing.
- Explain the principle of operation of Blake & Dodge jaw crushers, Gyratory Cone crushers, roll crushers.
- Explain the principle of ball mill, open circuit & close circuit Grinding.
- Explain the principle of lab.sizing.
- Explain the principle of operation of industrial screening. Comprehend the principle of operation of classifiers & their application in the field.
- Comprehend elementary idea about gravity concentration.
- Explain the principle of operation of heavy media separation.
- Comprehend elementary principle of floatation process.
- Explain the principle & application of magnetic separators.

COURSE CONTENTS (Based on specific objectives)

1. Introduction

- Describe the objective & scope of application of mineral dressing in surface & u/g mines.

2. Unit operations

- Explain the principle of Blake & dodge jaw crushers, gyratory & cone crushers, roll crusher.

3. Grinding

- Explain the principle of ball mill operation, open circuit grinding, close circuit grinding, dry & wet grinding.

4. Explain the procedure for size analysis & use of standard screen as also screening techniques employed.

5. Industrial screening

- Explain the principle of industrial screening, type of screening (without calculation)
- Explain the operation of classifier & their application.

6. Gravity concentration

- Explain the general principles of wilfly table & its operation.
- Develop elementary idea regarding the operation jigs.

7. Heavy media separation

- Explain the fundamental principle of heavy media separation – Chance process.

8. Floatation

- Comprehend elementary principle of froth floatation, practical utility of frother, collection, modifiers & depressants.
- Describe & illustrate floatation cell.

9. Magnetic & Electrostatic Separators

- Explain the principle of operation of magnetic & electrostatic separators.
- Describe the application of separators in mineral dressing.

SYLLABUS COVERAGE UP TO I.A.

Chapter 1,2,3,4.

RECOMMENDED BOOKS

- Principles of Mineral Dressing- Gaudin A.M.
- Hand Book of Mineral Dressing Ores & Minerals – A.E.Taggart
- Mineral Processing Technology – B.A.Wills.

Th.4. (b). ADVANCED MINES SURVEY (ELECTIVE)

Name of the Course: Diploma in Mining Engineering			
Course Code	:	Semester	: 6th
Theory Periods	: 4 Periods/week	Internal Assessment	: 20
Total Periods	: 60	End Semester Examination	: 80
Examination	: 3 Hours	Maximum Marks	: 100

Topic wise distribution of periods

CHAPTER	TOPIC	PERIODS
1	Spherical Trigonometry	15
2	Field Astronomy	12
3	Elements of Photogrametry	12
4	Global Positioning System	11
5	Total Station	10
	Total	60

RATIONALE

A Mining engineer entrusted with the responsibility of supervising mine survey works should be through conversant with the latest developments techniques employed in mine surveying.

OBJECTIVES

After the completion of the subject, students will develop the fundamental concepts about
:

- Spherical Trigonometry.
- File Astronomy.
- Elements of Photogrametry.
- Global Positioning System.
- Total Station

COURSE CONTENTS (Based on specific objectives)

1. Spherical Trigonometry.

- Define some common terms used in Spherical Trigonometry like Sphere. Great circle , Small circle, Side of a triangle , Angle of a Triangle, Spherical axes, Spherical Triangle, Right Angled Triangle.
- Convert rectangular to Sperical coordinates.
- Define convergence of meridian and parallel of latitude.

2. Field Astronomy.

- Define some terms used in field astronomy like, Celestial Sphere, Celestial Latitude, Celestial Longitude, Azimuth, Hour angle, Declination , Altitude, Zenith, Nadir, Right Ascension, Celestial Meridian, Celestial Equator, Zenith Distance, Vertical Circle, Celestial Horizon.
- Astronomical Triangle etc. Discuss different astronomical coordinates for heavenly bodies.
- Determine apparent time , Meantime, Sidereal time, Standard Time, Relation between different types of time.
- Determine latitude , Longitude, Time and azimuth of a place .

3. Element of Photogrammetry.

- Know the Photo theodolite.
- Define camera axis, Picture Plane, Principal points, Focal Length, Nodal Point, Prospective centre, Principal Distance, Principal Plane, Print, Isocentre in terrestrial Photogrammetry.
- Explain fundamental principles behind stereo phtogrammetry.
- Define vertical photograph , Tilted Photograph, Oblique photograph, Prospective projection, Explosure station, Flying height focal length, Principal Point, Nadir Point, Ground Nadir Point, Till, Principle plane, Principle Line, Isocentre, Azimuth of Principle Plane, Horizontal Point .Find out the scale of Photography.

4. Global Positioning System.

- Define Global Positioning System. Explain the Principle of working of the system in brief.
- Outline the application of GPS in Mining Engineering.

5. Total Station.

- Identify different components of Total Station.
- Describe the applications of Total Station in Mines.

SYLLABUS COVERAGE UP TO I.A.

Chapter 1,2.

RECOMMENDED BOOKS

- Surveying VOL.-III by Dr. B. C. Punmia
- Modern concept of Mine Surveying by Prof. Alam Chand.

Th.4. (c). MATERIAL HANDLING AND LOGISTICS (ELECTIVE)

Name of the Course: Diploma in Mining Engineering			
Course Code	:	Semester	: 6th
Theory Periods	: 4 Periods/week	Internal Assessment	: 20
Total Periods	: 60	End Semester Examination	: 80
Examination	: 3 Hours	Maximum Marks	: 100

CHAPTER	TOPIC	PERIODS
1	Introduction to surface & Underground haulage system	10
2	Conveyors	8
3	Locomotive haulage	12
4	Aerial ropeways	5
5	Introduction of hydraulic transportation	10
6	Man riding haulage	5
7	Spiral chutes	5
8	Flow of materials in bins, bunkers	5
	Total	60

RATIONALE

A Mining Engineer entrusted with the responsibility of supervising material handling in a mine should have specialized knowledge in this area including transportation in mines.

OBJECTIVES

On completion of the subject, students will be able to:

- Classify underground & surface transportation system in mines.
- Describe various types of conveyor & its design.
- Explain various types of locomotive haulage used in underground mines.
- Describe aerial ropeway & its applicability.
- Describe hydraulic transportation in mines.
- Explain man riding haulage system.
- Explain spiral chute.
- Describe flow of materials in bins & bunkers.

COURSE CONTENTS (Based on specific objectives)

1. **Introduction to surface & underground haulage system**
   - Classify underground & surface haulage system.
   - State factors affecting design of a haulage system.
   - Find out the capacity of a haulage system in a given production.

2. **Conveyors**
   - Classification of Conveyors.
   - State factors affecting design of belt conveyor, cable belt conveyor and steel cord conveyors.
   - Find out carrying capacity of belt conveyor, cable belt conveyor & steel cord conveyor.
   - Describe constructional features of belt conveyor & cable belt conveyor.
   - Describe formula to calculate drive capacity of belt conveyor & cable belt conveyor.
3. **Locomotive haulage**
   - State different types of locomotive haulage.
   - Describe basic constructional features of trolley wire, compressed air , diesel & battery locomotives.
   - State applicability, merits & demerits of locomotives.
   - Describe safety devices of diesel locomotive including flame trap around exhaust conditioner box.
   - Solve numerical problems.
4. **Aerial ropeways**
   - Classify aerial ropeways.
   - State applicability of aerial ropeways.
   - Describe constructional features of bicable and twin cable ropeways.
   - Describe loading, unloading & angle stations bicable & thin cable ropeways.
5. **Hydraulic transportation of solids**
   - Define hydraulic transportation.
   - Discuss theory of hydraulic transportation of solids in mines (without derivation)
   - Design the hydraulic transportation system.
   - State applicability, advantages & disadvantages of hydraulic transportation in Mines.
6. **Man riding haulage**
   - State different types of man riding system.
   - Describe constructional features of monorail, deorail & flight chairs & conveyor system.
7. **Spiral Chutes**
   - State capability of spiral chutes.
   - Explain working principle of spiral chutes.
   - Describe constructional features of spiral chutes.
8. **Flow of materials in bins, bunkers**

   - Describe bins & bunkers.
   - Explain flow of materials in bins & bunkers.
   - Design bunkers & bins for a given production.

SYLLABUS COVERAGE UP TO I.A.

Chapter 1,2,3,4.

RECOMMENDED BOOKS

- Mining Machinery – T. Bryson
- Material Handling in Mines IIT Kharagpur journal
- Mine Transport – N.T.Kerlin
- EMT Vol.-III – D.J.Desmukh
- S.M.E. Mining Engineering Hand Book

_Pr.1 . MINING GEOLOGY-II LAB

Name of the Course: Diploma in Mining Engineering			
Course Code	:	Semester	: 6th
Lab Periods	: 6 Periods/week	Sessional	: 25
Total Periods	: 90	End Semester Examination	: 50
Examination	: 3 Hours	Maximum Marks	: 75

Topic wise Distribution of Periods

CHAPTER	TOPIC	PERIODS
1	Megascopic identification of Igneous rocks	15
2	Megascopic identification of Sedimentary rocks	15
3	Megascopic identification of Metamorphic rocks	15
4	Interpretation of contour maps	15
5	Interpretation of geological maps	15
6	Describe the specific gravity of small specimen	15
	Total	90

- Megascopic identification of Igneous rocks in hand specimens.
- Megascopic identification of Sedimentary rocks in hand specimens.
- Megascopic identification of Metamorphic rocks in hand specimens.
- Interpretation of contour maps and preparation of the profile section for it.
- Interpretation of geological maps and preparation of the profile Section for it.
- Describe the specific gravity of small specimen by Joley's spring balance.

Pr.2. MINE MACHINERY – II LAB.

Name of the Course: Diploma in Mining Engineering			
Course Code	:	Semester	: 6th
Lab Periods	: 6 Periods/week	Sessional	: 50
Total Periods	: 90	End Semester Examination	: 50
Examination	: 3 Hours	Maximum Marks	: 100

Topic wise Distribution of Periods

CHAPTER	TOPIC	PERIODS
1	Study of Centrifugal Pumps.	9
2	Study of Turbine Pumps.	9
3	Study of Roto Pump.	9
4	Study of Sinking Pump.	9
5	Study of electric coal drills & its accessories.	9
6	Study of Jack Hammer Drill with air leg.	9
7	Study of scrapper & shaker conveyor	9
8	Study of scrapper loader.	9
9	Model Development of Gathering arm loader.	9
10	Study of Electric Coal Drill.	9
	Total	90

- Study of Centrifugal Pumps.
- Study of Turbine Pumps.
- Study of Roto Pump.
- Study of Sinking Pump.
- Study of electric coal drills & its accessories.
- Study of Jack Hammer Drill with air leg.
- Study of scrapper & shaker conveyor.
- Study of scrapper loader.
- Model Development of Gathering arm loader.
- Study of Electric Coal Drill.

Pr3. PROJECT PHASE - II

Name of the Course: Diploma in Mining Engineering			
Course Code	:	Semester	: 6th
Lab Periods	: 6 Periods/week	Sessional	: 50
Total Periods	: 90	End Semester Examination	: 100
Examination	: 3Hours	Maximum Marks	: 150

RATIONALE

Students' Project Work aims at developing innovative skills in the students whereby they apply the knowledge and skills gained through the course covered in many subjects and Labs, by undertaking a project. The prime emphasis of the project work is to understand and apply the basic knowledge of the principles of Mechanical engineering and practices in real life situations, so as to participate and manage a large Mechanical engineering projects, in future. Entire Project spreads over 5th and 6th Semester. Part of the Project covered in 5th Semester was named as *Project Phase-I* and balance portion to be covered in 6th Semester shall be named as *Project Phase-II*.

OBJECTIVES

After undergoing the Project Work, the student will be able to:

- Implement the theoretical and practical knowledge and skills gained through various subjects/courses into an application suitable for a real practical working environment, preferably in an industrial environment.
- Develop software packages or applications and implement these for the actual needs of the community/industry.
- Identify and contrast gap between the technological knowledge acquired through curriculum and the actual industrial need and to compensate it by acquiring additional knowledge as required.
- Carry out cooperative learning through synchronous guided discussions within the class in key areas, asynchronous document sharing and discussions, as well as prepare collaborative edition of the final project report.
- To achieve real life experience in Project design.
- To develop the skill of writing Project Report

Project Phase-I and Phase-II

The Project work duration covers 2 semesters(5th and 6th sem). The Grouping of students, selection of Project, assignment of Project Guide to the Group was done in the beginning of

5th semester under Project Phase-I. The students were allowed to study literature, any existing system and then define the Problem/objective of the Project. Preliminary work and Design of the system also have to be complete in Phase-I. Development may also begin in this phase. Project Milestones are to be set so that progress can be tracked .

In Phase-II Development, Testing, Documentation and Implementation have to be complete. Project Report have to be prepared and complete in Phase-II. All Project reports should be organized uniformly in proper order, irrespective of group. Teacher Guides can make suitable alteration in the components of Task and schedule.

At the end of Project Phase-II in 6th semester there shall be one presentation by each group on whole Project work undertaken by them.

A suggestive criterion for assessing student performance by the external (preferably person from industry) and internal (teacher) examiner is given in table below:

Sl. No.	**Performance Criteria**
1.	Selection of project assignment
2.	Planning and execution of considerations
3.	Quality of performance
4.	Providing solution of the problems or production of final product
5.	Sense of responsibility
6.	Self expression/ communication/ Presentation skills
7.	Interpersonal skills/human relations
8.	Report writing skills
9	Viva voce

The teachers are free to evolve other criteria of assessment, depending upon the type of project work.

It is proposed that the institute may organize an annual exhibition of the project work done by the students and invite leading Industrial organisations to such an exhibition.

The Project Report need to be prepared as per standard format and following is the indicative format. The Teacher Guide may make minor alteration keeping the sense in tact.

Organization of Project Report

1. Cover page:

   It should contain the following (in order)

   (i) Title of the Project

   (ii) —Submitted in partial fulfillment of the requirements for the Diploma in

<Branch Name>‖

(iii) By Name of the Student(s)

(iv) Logo of the Institution

(v) Branch Name/Depart Name and Institution Name with Address

(vi) Academic Year

2. 1st Inner page

   Certificate:

   It should contain he following

   —This is to certify that the work in this Project Report entitled <Project Title> by <Name of student(s)> has been carried out under my supervision in partial fulfillment of the requirements for the Diploma in <Branch Name>‖ during session <session > in <Branch /Department Name> of <Institute name> and this work is the original work of the above student(s).

   Seal and signature of the Supervisor/Guide with date

3. 2nd Inner Page

   Acknowledgement by the Student(s)

4. Contents.

5. Chapter wise arrangement of Reports

6. Last Chapter: Conclusion

   It should contain

   (i) Conclusion

   (ii) Limitations

   (iii) Scope for further Improvement

7. References

Pr-4 LIFE SKILL

(Common to All Branches)

Practical	**2 Periods per week**	**Sessional**	**25 Marks**
Total Periods	**30 Periods**	**Total Marks**	**25 Marks**

Objective: After completion of this course the student will be able to**:**

- Develop team spirit i.e. concept of working in team
- Apply problem solving skills for a given situation
- Use effective presentation techniques
- Apply task management techniques for given projects
- Enhance leadership traits
- Resolve conflict by appropriate method
- Survive self in today's competitive world
- Face interview without fear

DETAIL CONTENTS:

1. SOCIAL SKILL

Society, Social Structure, Develop Sympathy and Empathy
Swot Analysis — Concept, How to make use of SWOT
Inter personal Relation**:** Sources of conflict, Resolution of conflict ,
Ways to enhance interpersonal relation

2. PROBLEM SOLVING

Steps of Problem solving**:**

- Identify and clarify the problem,
- Information gathering related to problem,
- Evaluate the evidence,
- Consider alternative solutions and their implications,
- Choose and implement the best alternative,
- Review
- Problem solving techniques:

1) Trial and error, 2) Brain storming, 3) Lateral (Out of Box) thinking

3. PRESENTATION SKILL

Body language , Dress like the audience
Posture, Gestures, Eye contact and facial expression. STAGE FRIGHT,
Voice and language — Volume, Pitch, Inflection, Speed, Pause
Pronunciation, Articulation, Language, Practice of speech.
Use of AV aids such as Laptop with LCD projector, white board etc.

4. GROUP DISCUSSION AND INTERVIEW TECHNIQUES

Group Discussion:
Introduction to group discussion, Ways to carry out group discussion,
Parameters— Contact, body language, analytical and logical thinking,
decision making
Interview Technique :
Dress, Posture, Gestures, facial expression, Approach

Tips for handling common questions.

5. WORKING IN TEAM

Understand and work within the dynamics of a groups.
Tips to work effectively in teams,
Establish good rapport, interest with others and work effectively with them to meet common objectives,
Tips to provide and accept feedback in a constructive and considerate way ,
Leadership in teams, Handling frustrations in group.

6. TASK MANAGEMENT

Introduction, Task identification, Task planning , organizing and execution, Closing the task

PRACTICAL

List of Assignment: *(Any Five to be performed including Mock Interview)*

a. SWOT analysis:-

Analyse yourself with respect to your strength and weaknesses, opportunities and threats. Following points will be useful for doing SWOT.

a) Your past experiences,
b) Achievements,
c) Failures,
d) Feedback from others etc.

b. Solve the True life problem assigned by the Teacher.

3. Working in a Team

Form a group of 5-10 students and do a work for social cause e.g. tree plantation, blood donation, environment protection, camps on awareness like importance of cleanliness in slum area, social activities like giving cloths to poor etc.(One activity per group where Team work shall be exhibited)

4. Mock Interview

5. Discuss a topic in a group and prepare minutes of discussion.

6. Deliver a seminar for 5 minutes using presentation aids on the topic given by your teacher.

7. Task Management

Decide any task to be completed in a stipulated time with the help of teacher. Write a report considering various steps in task management (with Break up into sub tasks and their interdependencies and Time)

Note: -1. Please note that these are the suggested assignments on given contents/topic. These assignments are the guide lines to the subject teachers. However the subject teachers are free to design any assignment relevant to the topic.

Note: -2. The following Topics may be considered for Seminar/GD in addition to other Topics at the discretion of the Teacher.

(Comparison with developed countries, Occupational Safety, Health Hazard, Accident & Safety, First-Aid, Traffic Rules, Global Warming, Pollution, Environment, Labour Welfare Legislation, Labour Welfare Acts, Child Labour Issues, Gender Sensitisation ,Harassment of Women at Workplace)

METHODOLOGY:

The Teacher is to explain the concepts prescribed in the contents of the syllabus and then assign different Exercises under Practical to the students to perform.

Books Recommended:-

Sl.No	Name of Authors	Title of the Book	Name of the Publisher
01	E.H. Mc Grath , S.J	Basic Managerial Skills for All	PHI
02	Lowe and Phil	Creativity and problem solving	Kogan Page (I) P Ltd
03	Adair, J	Decision making & Problem Solving	Orient Longman
04	Bishop , Sue	Develop Your Assertiveness	Kogan Page India
05	Allen Pease	Body Language	Sudha Publications Pvt. Ltd.

EQUIPMENT LIST

DETAILS OF INSTRUMENTS / SAMPLES/ SPECIMENS - GEOLOGY LABORATORY

SUBJECT NO / SUBJECT CODE -PR.1. MINING GEOLOGY-II LAB

The following instruments / samples/ specimens are required for Geology laboratory based on the **6th Semester Mining Engineering Syllabus.**

CHAPTER	TOPIC	ITEM	SPECIFICATION	QUANTITY
1	Megascopic identification of Igneous rocks	Igneous rocks in hand specimen	Common Igneous Rocks in hand specimen along with specimen trey and primary information about the rock specimen.	30 Nos of different Igneous rock specimen
2	Megascopic identification of Sedimentary rocks	Sedimentary rocks in hand specimen	Common Sedimentary Rocks in hand specimen along with specimen trey and primary information about the rock specimen.	30 Nos of different Sedimentary rock specimen
3	Megascopic identification of Metamorphic rocks	Metamorphic rocks in hand specimen	Common Metamorphic Rocks in hand specimen along with specimen trey and primary information about the rock specimen.	30 Nos of different Metamorphic rock specimen
4	Interpretation of contour maps	Contour maps	Different topographic map worksheet with scale for Interpretation and preparation of the profile section for it.	10 nos of different topographic/contour map
5	Interpretation of geological maps	Geological Maps	Different geological map worksheet with scale for Interpretation and preparation of the profile section for it.	10 nos of different geological map

6	Describe the specific gravity of small specimen	Joley's spring balance	The Jolly balance consists essentially of a spring fastened at the top to a movable arm. At the lower end, the spring is provided with two small pans, one suspended beneath the other. The lower pan is kept always immersed to the same depth in water, while the other one hangs in the air. On the upright standard behind the spiral is a mirror on which is engraved or painted a scale of equal parts. The specific gravity of an object, typically a solid, is determined by noting the amount of lengthening of the spring when the object is resting	01 no

			in the upper pan in air (w), and the amount when it is in the lower pan and immersed in water (w'). The specific gravity is then w / (w - w').	

Pr.2. MINE MACHINERY – II LAB.

SL NO.	EQUIPMENT	NO. OF EQUIPMENT/15 STUDENTS
1	Centrifugal Pump.	1
2	Turbine Pump.	1
3	Roto Pump./Screw pump	1
4	Sinking Pump./Submersible pump	1
5	electric coal drills & its accessories.	1
6	Jack Hammer Drill with air leg.	1
7	Working model of scrapper & shaker conveyor	1
8	Working model of scrapper loader.	1
9	Working model of Gathering arm loader.	1
10	Electric Coal Drill.	1

अखिल भारतीय तकनीकी शिक्षा परिषद्
ALL INDIA COUNCIL FOR TECHNICAL EDUCATION

(भारत सरकार का एक सांविधिक संस्थान) (A STATUTORY BODY OF THE GOVERNMENT OF INDIA)

EASTERN REGIONAL OFFICE

Letter of Approval

File No. ERO/AICTE/OR/ET/07/2009-10 /1774-79 **DATE 14.07.2009**

To
The Commissioner-cum-Secretary,
Industrial Department,
Govt. of Orissa,
Bhubaneswar – 751 001, Orissa

Sub: AICTE approval to **Purna Chandra Institute of Engineering & Technology Trust, At/PO/PS - Chhendipada, Angul 759 124, Orissa** for establishment of **Purna Chandra Institute of Engineering & Technology (Polytechnic), At/PO Chhendipada, Angul 759 124.**

Sir,

Based on the recommendations of State Level Committee and subsequent clarifications, conveyed vide letter no. 9717, dated – 06.07.2009 by the Director of Technical Education and Training, Govt. of Orissa, the All India Council for Technical Education (AICTE) is according approval to **Purna Chandra Institute of Engineering & Technology Trust, At/PO/PS - Chhendipada, Angul 759 124, Orissa** for establishment of **Purna Chandra Institute of Engineering & Technology (Polytechnic), At/PO Chhendipada, Angul 759 124, Orissa** for conduct of Diploma programme in Engineering & Technology with annual Intake for each course(s) as given below:

Approved programme(s)	Approved Intake	Level	Duration (Yrs.)	Entry level	Period of approval
Electrical Engineering	60	Diploma	3 Yrs.	10+	2009-2010*
Mechanical Engineering	60	Diploma	3 Yrs.	10+	2009-2010*
Mining Engineering	60	Diploma	3 Yrs.	10+	2009-2010*
Civil Engineering	60	Diploma	3 Yrs.	10+	2009-2010*
Total	**240**				

* The approval is valid for **two years** from the date of issue of this letter. The **Society/Trust/Institution** shall obtain necessary affiliation/ permission from the concerned affiliating University/State Board/State Council as per the prescribed schedule of the University/ Admission Authority etc. The Applicant Society/Trust/Institution shall send information about commencement of the above courses to AICTE. Incase the Institution could not commence the above mentioned courses for whatsoever reasons during the two years period from the date of issue of this letter, the approval becomes invalid and the applicant society/trust shall have to make fresh application to AICTE for grant of fresh approval.

The approval is further subject to fulfillment of following conditions.

1. That the management shall provide adequate funds for development of land and building and for providing related infrastructural, instructional and other facilities as per Council's norms and standards laid down by the Council from time to time and for meeting recurring expenditure.

2. (a) That the admissions shall be made only after adequate infrastructure and all other facilities are provided as per norms and guidelines of the AICTE.

(b) That the admissions shall be made in accordance with the regulations notified by the Council from time to time.

(c) That the admissions to the courses shall be made only after the affiliating University/ State Board/State Council under whose ambit the institution is functioning has given permission to start the course.

(d) That the Institution shall not allow closure of the Institution or discontinuation of the course(s) or start any new course (s) or alter intake capacity of seats without the prior approval of the Council.

(e) That no excess admissions shall be made by the Institution over and above the approved intake under any circumstances.

4. That the tuition and other fees shall be charged as prescribed by the Competent Aut criteria prescribed the Council from time to time. No capitation fee shall students/guardians of students in any form.

5. That the accounts of the Institution shall be audited annually by a certified Chartered open for inspection by the Council or any body or person authorized by it.

6. That the Director/Principal and the teaching and other staff shall be selected a qualifications and experience prescribed by the Council from time to time and pay sc norms prescribed by the Council for time to time.

7. (a) That the institution shall furnish requisite returns and reports as desired by AICTE/S proper maintenance of administrative and academic standards.

(b) That the technical institution shall publish an information booklet before commenc year giving details regarding the institution and courses/programmes being co infrastructural facilities including faculty etc. in the form of mandatory disclosure. may be made available to the stakeholders of the technical education on cost disclosure information shall be housed in the Institution Web-Site. The information sh with updated information about all aspects of the institution.

(c) That it shall be mandatory for the technical institution to maintain a web-site information. The website information must be continuously updated as and when ch

(d) That a compliance report in the prescribed format along with mandatory disclosu above conditions, shall be submitted each year by the Institution within the time Council from time to time.

(e) That if Technical Institution fails to disclose the information or suppress and/or misre appropriate action could be initiated including withdrawal of AICTE approval.

8. That all the laboratories, workshops etc. shall be equipped as per the syllabi of University /University under whose ambit the institution is functioning, and shall be before making admissions.

9. That a library shall be established with adequate number of titles, books, journals (b as per AICTE norms.

10. That a computer center with adequate number of terminals, Printers, legal software as per AICTE norms.

11. That a Joint FDR with DTE is required to be created for an amount and period presc time to time.

12. AICTE may carry out random inspections round the year any time for verifying the to ensure maintenance of norms and standards.

13. That the AICTE / DTE may also conduct inspections with or without notifying th complaints of mis-representation, violation of norms and standards, mal-practices et

14. That the Institution by virtue of the approval given by Council shall not automaticall grant-in-aid from the Central or State Government.

15. The Institute shall take appropriate measures for prevention of ragging in any form, in the light of directions of Supreme Court of India in Writ Petition No. © 656/1998. Incase of failure to prevent the instances of ragging by the Institutions, the Council shall take appropriate action including withdrawal of approval.

16. That the Management shall strictly follow further conditions as may be specified by the AICTE/DTE from time to time.

17. In the event of non-compliance by the Institution with regard to guidelines, norms and conditions prescribed from time to time the Council shall be free to take measures for withdrawal of its approval or recognition, without consideration of any related issues and that all liabilities arising out of such withdrawal would solely be that of the Institution.

Thanking you,

Yours faithfully,

(K.K. Kataria)
Director

Copy to:

1. The Director of Technical Education & Training, Govt. of Orissa, Killa Maidan, Cuttack - 753 001. **(With a request to ensure the compliance of norms & standards of AICTE for the approved intake).**

2. The President/Chairman, **Purna Chandra Institute of Engineering & Technology Trust, At/PO/PS - Chhendipada, Angul 759 124, Orissa**
(A request to fulfill the deficiencies as annexed (if any) to this letter and submit the Compliance Report by 31st August every year to the Director of Technical Education of concerned State Govt./UT and a copy this Regional Office).

3. The Secretary, State Council of Technical Education & Industrial Training, Raj Bhavan Marg, Unit - VIII, Bhubaneswar 751 012.

4. The Advisor (E&T), AICTE, 7th floor, Chandra Lok Building, Janpath, Near Connaught Place, New Delhi – 110 001.

5. Guard file.

Dept. of Industries
Govt. of Orissa, Secretariat
Bhubaneswar 751 001

Sub: Extension of AICTE approval to Purna Chandra Institute of Engineering & Technol Chhendipada, Angul 759 124, Orissa (Diploma Engineering).

Sir,

Based on recommendations of the State Level Committee for Diploma Education vide letter n 9502/I, dated – 03.07.2010, the All India Council for Technical Education (AICTE), is pleased to **Chandra Institute of Engineering & Technology (Polytechnic), At/PO Chhendipada, Angul 759 1** approval / introduction of new course(s) / Variation in Intake, as applicable for Diploma Engineeri Intake of each course(s) as given below:

Approved Existing Course(s)	Entry Level	Duration	Approved In
			Existing
Electrical Engineering	10+	3 Yrs.	60
Mechanical Engineering	10+	3 Yrs.	60
Civil Engineering	10+	3 Yrs.	60
Mining Engineering	10+	3 Yrs.	60
Total			240

This approval has been accorded subject to fulfillment of Norms & Standards of the Council fo approved above.

Further, the observation and specific conditions (if any) of the Expert Committee are enclosed h shall fulfill all the conditions without any delay. Non-fulfillment shall lead to withdrawal of approv

The approval accorded above is subject to fulfillment of the following conditions:

1. All full time faculty members as per AICTE norms must be recruited before making adm made through the Central Counseling by the State/Central Govt. only.
2. AICTE pay scales are implemented to all faculty members & staffs.
3. All the required Laboratories/Workshops/Machineries/Equipment, as per approved Technical Education Board, must be operational before making admissions.
4. If, this letter of approval is received by you after the closing date of State/National L admissions in the concerned State/Union Territory, this letter of approval will not be val during the above specified academic year.
5. No excess admission shall be made by the institution during any academic year.

B-Block, Sector-III, Govt. College of Engg. & Leather Tech. Campus, Salt Lake City, Kolkata-
Phone 033 2335 7458 / 2445 Fax 033 2335 954 e-mail aicte@yahoo.co.in, Website: www.aic

ragging in Technical Educational Institution. The Technical Institutions also to ensure tha
place in their campuses in any form and that if such cases are reported to the Council.

It may please be noted that the AICTE had issued interim policy regulations, which has been not
on November 28, 2005. All the provisions contained in the interim policy regulations shall be
approved Institutions.

In the event of infringement/contravention of non-compliance of the above Conditions and/or t
Regulations/Guidelines/Norms and Standards as prescribed by AICTE, further actions leadir
admission or withdrawal of approval" may be take by AICTE and the liability arising out of such
Management of the Institutions.

Deficiencies / Suggestions / improvements are as follows:

NIL

Thanking you,

Copy to:

1. The Director, Dept. of Technical Education & Training, Govt. of Orissa, Killa Maidan, Cutt
(With a request to ensure the compliance of norms & standards of AICTE for the appro

2. The Principal / Director, Purna Chandra Institute of Engineering & Technology (Polyt
Angul 759 124, Orissa
(A request to fulfill the deficiencies (if any) to this letter and submit the Compliance
year to the Director of Technical Education of concerned State Govt./UT and a copy th

3. The Secretary, State Council of Technical Education & Industrial Training, Orissa,

4. Guard file.

All India Council for Technical Education
(A Statutory body under Ministry of HRD, Govt. of India)

7th Floor, Chandralok Building, Janpath, New Delhi- 110 001
PHONE: 23724151/52/53/54/55/56/57 FAX: 011-23724183 www.aicte-India.org

F.No. Eastern/1-445778291/2011/EOA Date: 01-09-2011

To,
The Commissioner cum Secretary,
Deptt. Of Higher & Technical Education,
Govt. of Orissa, Orisas Sectt.
Bhubaneshwar-751001

Sub: Extension of approval for the academic year 2011-12.
Ref : Application of the Institution for Extension of Approval for the Year 2011-12

Sir/Madam,

In terms of the Regulations notified by the Council vide F.No. 37-3/Legal/2011 dated 10/12/2010 and norms, standards, procedures and conditions prescribed by the Council from time to time, I am directed to convey the extension of approval of the Council to

Regional Office	Eastern	Application Id	1-445778291
		Permanent Id	
Name of the Institute	PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY	Institute Address	AT-CHHENDIPADA PO-CHHENDIPADA PS-CHHENDIPADA DIST-ANGUL PIN-759124 ORISSA,VILL-CHHENDIPADA,ANGUL,Orissa,759124
Name of the Society/Trust	PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY	Society/Trust Address	AT-CHHENDIPADA PO-CHHENDIPADA PS-CHHENDIPADA DIST-ANGUL ORISSA PIN-759124,CHHENDIPADA,ANGUL,Orissa,759124
Institute Type	Unaided - Private		

to conduct following courses with the intake indicated below for the academic year 2011-12

Application Id: 1-445778291			Course	Full/Part Time	Affiliating Body	Intake 2010-11	Intake Approved for 11-12	NRI	PIO	Foreign Collaboration
Program	Shift	Level								
ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	CIVIL ENGINEERING	FULL TIME	Board of Technical Education, Orissa	60	60	No	No	No
ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	ELECTRICAL ENGINEERING	FULL TIME	Board of Technical Education, Orissa	90	90	No	No	No

Note: This is a Computer generated Extension of Approval Letter. No signature is required. Date of printing: 23-02-2012
Printed By : AIC001789

All India Council for Technical Education
(A Statutory body under Ministry of HRD, Govt. of India)

7th Floor, Chandralok Building, Janpath, New Delhi- 110 001
PHONE: 23724151/52/53/54/55/56/57 FAX: 011-23724183 www.aicte-India.org

Application Id: 1-445778291			Course	Full/Part Time	Affiliating Body	Intake 2010-11	Intake Approved for 11-12	NRI	PIO	Foreign Collaboration
Program	Shift	Level								
ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	MECHANICAL ENGINEERING	FULL TIME	Board of Technical Education, Orissa	90	90	No	No	No
ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	MINING ENGINEERING	FULL TIME	Board of Technical Education, Orissa	60	60	No	No	No

The above mentioned approval is subject to the condition that PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY shall follow and adhere to the Regulations, guidelines and directions issued by AICTE from time to time and the undertaking / affidavit given by the institution along with the application submitted by the institution on portal.

In case of any differences in content in this Computer generated Extension of Approval Letter, the content/information as approved by the Executive Council / General Council as available on the record of AICTE shall be final and binding.

Strict compliance of Anti-Ragging Regulation:- Approval is subject to strict compliance of provisions made in AICTE Regulation notified vide F. No. 37-3/Legal/AICTE/2009 dated July 1, 2009 for Prevention and Prohibition of Ragging in Technical Institutions. In case Institution fails to take adequate steps to Prevent Ragging or fails to act in accordance with AICTE Regulation or fails to punish perpetrators or incidents of Ragging, it will be liable to take any action as defined under clause 9(4) of the said Regulation.

(Dr. K P Isaac)

Member Secretary, AICTE

Copy to:

1. **The Regional Officer,**
   All India Council for Technical Education
   College of Leather Technology Campus
   Block LB, Sector III, Salt Lake City
   Kolkata - 700 098, West Bengal

2. **The Director Of Technical Education,**
   Orissa

3. **The Registrar,**
   Board of Technical Education, Orissa

4. **The Principal / Director,**

Note: This is a Computer generated Extension of Approval Letter. No signature is required. Date of printing: 23-02-2012
Printed By : AIC001789

PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
AT-CHHENDIPADA
PO-CHHENDIPADA
PS-CHHENDIPADA
DIST-ANGUL
PIN-759124
ORISSA,
VILL-CHHENDIPADA,ANGUL,
Orissa,759124

5. **The Secretary / Chairman,**
PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
AT-CHHENDIPADA
PO-CHHENDIPADA
PS-CHHENDIPADA
DIST-ANGUL
ORISSA
PIN-759124,
CHHENDIPADA,ANGUL,
Orissa,759124

6. **Guard File(AICTE)**

Note: This is a Computer generated Extension of Approval Letter. No signature is required. Date of printing: 23-02-2012
Printed By : AIC001789

All India Council for Technical Education
(A Statutory body under Ministry of HRD, Govt. of India)

7th Floor, Chandralok Building, Janpath, New Delhi- 110 001
PHONE: 23724151/52/53/54/55/56/57 FAX: 011-23724183 www.aicte-India.org

F.No. Eastern/1-687414111/2012/EOA Date: 10 May 2012

To,
The Commissioner cum Secretary,
Deptt. Of Higher & Technical Education,
Govt. of Orissa, Orisas Sectt.
Bhubaneshwar-751001

Sub: Extension of approval for the academic year 2012-13

Ref: Application of the Institution for Extension of approval for the academic year 2012-13

Sir/Madam,

In terms of the provisions under the All India Council for Technical Education (Grant of Approvals for Technical Institutions) Regulations 2010 notified by the Council vide notification number F-No.37-3/Legal/2010 dated 10/12/2010 and amendment vide notification number F-No.37-3/Legal/2011 dated 30/09/2011 and norms standards, procedures and conditions prescribed by the Council from time to time, I am directed to convey the approval to

Regional Office	Eastern	Application Id	1-687414111
		Permanent Id	1-445778291
Name of the Institute	PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY	Institute Address	AT-CHHENDIPADA PO-CHHENDIPADA PS-CHHENDIPADA DIST-ANGUL PIN-759124 ORISSA, VILL-CHHENDIPADA, ANGUL, Orissa, 759124
Name of the Society/Trust	PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY	Society/Trust Address	AT-CHHENDIPADA PO-CHHENDIPADA PS-CHHENDIPADA DIST-ANGUL ORISSA PIN-759124,CHHENDIPADA,ANGUL,Orissa,759124
Institute Type	Unaided - Private		

Opted for change from Women to Co-ed	No	Opted for change of name	No	Opted for change of site	No
Change from Women to Co-ed approved	Not Applicable	Change of name Approved	Not Applicable	Change of site Approved	Not Applicable

to conduct following courses with the intake indicated below for the academic year 2012-13

Note: This is a Computer generated Extension of Approval Letter. No signature is required. Letter Printed On:17 May 2012.

Printed By : AIC001789

All India Council for Technical Education
(A Statutory body under Ministry of HRD, Govt. of India)

7th Floor, Chandralok Building, Janpath, New Delhi- 110 001
PHONE: 23724151/52/53/54/55/56/57 FAX: 011-23724183 www.aicte-India.org

Application Id: 1-687414111			Course	Full/Part Time	Affiliating Body	Intake 2011-12	Intake Approved for 12-13	NRI	PIO	Foreign Collaboration
Program	Shift	Level								
ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	CIVIL ENGINEERING	FULL TIME	Board of Technical Education, Orissa	60	60	No	No	No
ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	ELECTRICAL ENGINEERING	FULL TIME	Board of Technical Education, Orissa	90	120	No	No	No
ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	MECHANICAL ENGINEERING	FULL TIME	Board of Technical Education, Orissa	90	120	No	No	No
ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	MINING ENGINEERING	FULL TIME	Board of Technical Education, Orissa	60	60	No	No	No

The above mentioned approval is subject to the condition that PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY shall follow and adhere to the Regulations, guidelines and directions issued by AICTE from time to time and the undertaking / affidavit given by the institution along with the application submitted by the institution on portal.

In case of any differences in content in this Computer generated Extension of Approval Letter, the content/information as approved by the Executive Council / General Council as available on the record of AICTE shall be final and binding.

Note: This is a Computer generated Extension of Approval Letter. No signature is required. Letter Printed On:17 May 2012.

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All India Council for Technical Education
(A Statutory body under Ministry of HRD, Govt. of India)

7th Floor, Chandralok Building, Janpath, New Delhi- 110 001
PHONE: 23724151/52/53/54/55/56/57 FAX: 011-23724183 www.aicte-India.org

Strict compliance of Anti-Ragging Regulation:- Approval is subject to strict compliance of provisions made in AICTE Regulation notified vide F. No. 37-3/Legal/AICTE/2009 dated July 1, 2009 for Prevention and Prohibition of Ragging in Technical Institutions. In case Institution fails to take adequate steps to Prevent Ragging or fails to act in accordance with AICTE Regulation or fails to punish perpetrators or incidents of Ragging, it will be liable to take any action as defined under clause 9(4) of the said Regulation.

(Dr. K P Isaac)

Member Secretary, AICTE

Copy to:

1. **The Regional Officer,**
   All India Council for Technical Education
   College of Leather Technology Campus
   Block LB, Sector III, Salt Lake City
   Kolkata - 700 098, West Bengal

2. **The Director Of Technical Education,**
   Orissa

3. **The Registrar,**
   Board of Technical Education, Orissa

4. **The Principal / Director,**
   PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
   AT-CHHENDIPADA
   PO-CHHENDIPADA
   PS-CHHENDIPADA
   DIST-ANGUL
   PIN-759124
   ORISSA,
   VILL-CHHENDIPADA,ANGUL,
   Orissa,759124

5. **The Secretary / Chairman,**
   PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
   AT-CHHENDIPADA
   PO-CHHENDIPADA
   PS-CHHENDIPADA
   DIST-ANGUL
   ORISSA
   PIN-759124,
   CHHENDIPADA,ANGUL,
   Orissa,759124

6. **Guard File(AICTE)**

Note: This is a Computer generated Extension of Approval Letter. No signature is required. Letter Printed On:17 May 2012.

Printed By : AIC001789

Bhubaneshwar-751001

Sub: Extension of approval for the academic year 2013-14

Ref: Appli[redacted]

Sir/Madam,

In terms of the provisions under the All India Council for Technical Education (Grant of Approvals for Techn Regulations 2012 notified by the Council vide notification number F-No.37-3/Legal/2012 dated 27/08/2012 procedures and conditions prescribed by the Council from time to time, I am directed to convey the approv

Regional Office	Eastern	Application Id	1-1476843833
		Permanent Id	1-445778291
Name of the Institute	PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY	Institute Address	AT-CHHENDIPADA PO-CHHENDIPADA PS-CHHENDIPADA DIST-ANGUL PIN-759124 ORISSA, VILL-CHHEND 759124
Name of the Society/Trust	PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY	Society/Trust Address	AT-CHHENDIPADA PO CHHENDIPADA PS-CHHENDIPADA DIST-ANGUL ORISSA PIN-759124,CHHENDIPA
Institute Type	Unaided - Private		

Opted for change from Women to Co-ed	No	Opted for change of Name	No	Opted for chan site
Change from Women to Co-ed approved	Not Applicable	Change of name Approved	Not Applicable	Change of site Approved

to conduct following courses with the intake indicated below for the academic year 2013-14

ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	CIVIL ENGINEERING	FULL TIME	Directorate of Technical Education and Training, Cuttack	60	6
ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	ELECTRICAL ENGINEERING	FULL TIME	Directorate of Technical Education and Training, Cuttack	120	1
ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	MECHANICAL ENGINEERING	FULL TIME	Directorate of Technical Education and Training, Cuttack	120	1
ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	MINING ENGINEERING	FULL TIME	Directorate of Technical Education and Training, Cuttack	60	1

7th Floor, Chandralok Building, ... 53/54/55/56/57 FAX: 011-23724183 www.aicte-india.org

- Validity of the course details may be verified at www.aicte-india.org>departments>approvals

The above mentioned approval is subject to the condition that PURNA CHANDRA INSTITUTE OF ENGINEE... follow and adhere to the Regulations, guidelines and directions issued by AICTE from time to time and... given by the institution along with the application submitted by the institution on portal.

In case of any differences in content in this Computer generated Extension of Approval Letter, the conte... by the Executive Council / General Council as available on the record of AICTE shall be final and binding.

Strict compliance of Anti-Ragging Regulation:- Approval is subject to strict compliance of provisions ... notified vide F. No. 37-3/Legal/AICTE/2009 dated July 1, 2009 for Prevention and Prohibition of Ragging ... case Institution fails to take adequate steps to Prevent Ragging or fails to act in accordance with AICTE ... perpetrators or Incidents of Ragging, it will be liable to take any action as defined under clause 9(4) of the ...

Application Number: 1-1476843833* Page

Note: This is a Computer generated Extension of Approval Letter. No signature is required. Letter Printed O...

Printed By : aicb01788

Kolkata - 700 098, West Bengal

2. **The Director Of Technical Education,**
Orissa

3. **The Registrar,**

PO-CHHENDIPADA
PS-CHHENDIPADA
DIST-ANGUL
PIN-759124
ORISSA,
VILL-CHHENDIPADA,ANGUL,
Orissa,759124

5. **The Secretary / Chairman,**
PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
AT-CHHENDIPADA
PO-CHHENDIPADA
PS-CHHENDIPADA
DIST-ANGUL
ORISSA
PIN-759124,
CHHENDIPADA,ANGUL,
Orissa,759124

6. **Guard File(AICTE)**

Application Number: 1-1476843933*

Note: This is a Computer generated Extension of Approval Letter. No signature is required.

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All India Council for Technical Education
(A Statutory body under Ministry of HRD, Govt. of India)

7th Floor, Chandralok Building, Janpath, New Delhi- 110 001
PHONE: 23724151/52/53/54/55/56/57 FAX: 011-23724183 www.aicte-India.org

F.No. Eastern/1-2019865297/2014/EOA Date: 11-Mar-2014

To,
The Commissioner cum Secretary,
Deptt. Of Higher & Technical Education,
Govt. of Orissa, Orisas Sectt.
Bhubaneshwar-751001

Sub: Extension of approval for the academic year 2014-15

Ref: Application of the Institution for Extension of approval for the academic year 2014-15

Sir/Madam,

In terms of the provisions under the All India Council for Technical Education (Grant of Approvals for Technical Institutions) Regulations 2012 notified by the Council vide notification number F-No.37-3/Legal/2012 dated 27/09/2012 and norms standards, procedures and conditions prescribed by the Council from time to time, I am directed to convey the approval to

Regional Office	Eastern	Application Id	1-2019865297
		Permanent Id	1-445778291
Name of the Institute	PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY	Institute Address	AT-CHHENDIPADA PO-CHHENDIPADA PS-CHHENDIPADA DIST-ANGUL PIN-759124 ORISSA, VILL-CHHENDIPADA, ANGUL, Orissa, 759124
Name of the Society/Trust	PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY	Society/Trust Address	AT-CHHENDIPADA PO-CHHENDIPADA PS-CHHENDIPADA DIST-ANGUL ORISSA PIN-759124,CHHENDIPADA,ANGUL,Orissa,759124
Institute Type	Unaided - Private		

Opted for change from Women to Co-ed	No	Opted for change of name	No	Opted for change of site	No
Change from Women to Co-ed approved	Not Applicable	Change of name Approved	Not Applicable	Change of site Approved	Not Applicable

to conduct following courses with the intake indicated below for the academic year 2014-15

Note: This is a Computer generated Letter of Approval.No signature is required. Letter Printed On:3 April 2014

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All India Council for Technical Education
(A Statutory body under Ministry of HRD, Govt. of India)

7th Floor, Chandralok Building, Janpath, New Delhi- 110 001
PHONE: 23724151/52/53/54/55/56/57 FAX: 011-23724183 www.aicte-India.org

Application Id: 1-2019865297			Course	Full/Part Time	Affiliating Body	Intake 2013-14	Intake Approved for 14-15	NRI Approval status	PIO Approval status
Program	Shift	Level							
ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	CIVIL ENGINEERING	FULL TIME	Directorate of Technical Education and Training , Cuttack	60	60	No	No
ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	ELECTRICAL ENGINEERING	FULL TIME	Directorate of Technical Education and Training , Cuttack	120	120	No	No
ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	MECHANICAL ENGINEERING	FULL TIME	Directorate of Technical Education and Training , Cuttack	120	120	No	No
ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	MINING ENGINEERING	FULL TIME	Directorate of Technical Education and Training , Cuttack	120	120	No	No

- Validity of the course details may be verified at www.aicte-india.org>departments>approvals

The above mentioned approval is subject to the condition that PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY shall follow and adhere to the Regulations, guidelines and directions issued by AICTE from time to time and the undertaking / affidavit given by the institution along with the application submitted by the institution on portal.

In case of any differences in content in this Computer generated Extension of Approval Letter, the content/information as approved by the Executive Council / General Council as available on the record of AICTE shall be final and binding.

Strict compliance of Anti-Ragging Regulation:- Approval is subject to strict compliance of provisions made in AICTE Regulation notified vide F. No. 37-3/Legal/AICTE/2009 dated July 1, 2009 for Prevention and Prohibition of Ragging in Technical Institutions. In case Institution fails to take adequate steps to Prevent Ragging or fails to act in accordance with AICTE Regulation or fails to punish perpetrators or incidents of Ragging, it will be liable to take any action as defined under clause 9(4) of the said Regulation.

(Dr. Kuncheria P. Isaac)

Member Secretary, AICTE

Note: This is a Computer generated Letter of Approval.No signature is required. Letter Printed On:3 April 2014

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Copy to:

1. **The Regional Officer,**
   All India Council for Technical Education
   College of Leather Technology Campus
   Block LB, Sector III, Salt Lake City
   Kolkata - 700 098, West Bengal

2. **The Director Of Technical Education,**
   Orissa

3. **The Principal / Director,**
   PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
   AT-CHHENDIPADA
   PO-CHHENDIPADA
   PS-CHHENDIPADA
   DIST-ANGUL
   PIN-759124
   ORISSA,
   VILL-CHHENDIPADA,ANGUL,
   Orissa,759124

4. **The Secretary / Chairman,**
   PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
   AT-CHHENDIPADA
   PO-CHHENDIPADA
   PS-CHHENDIPADA
   DIST-ANGUL
   ORISSA
   PIN-759124,
   CHHENDIPADA,ANGUL,
   Orissa,759124

5. **Guard File(AICTE)**

All India Council for Technical Education
(A Statutory body under Ministry of HRD, Govt. of India)

7th Floor, Chandralok Building, Janpath, New Delhi- 110 001
PHONE: 23724151/52/53/54/55/56/57 FAX: 011-23724183 www.aicte-India.org

F.No. Eastern/1-2452886341/2015/EOA Date: 07-Apr-2015

To,

Sub: Extension of approval for the academic year 2015-16

Ref: Application of the Institution for Extension of approval for the academic year 2015-16

Sir/Madam,

In terms of the provisions under the All India Council for Technical Education (Grant of Approvals for Technical Institutions) Regulations 2012 notified by the Council vide notification number F-No.37-3/Legal/2012 dated 27/09/2012 and norms standards, procedures and conditions prescribed by the Council from time to time, I am directed to convey the approval to

Regional Office	Eastern	Application Id	1-2452886341
		Permanent Id	1-445778291
Name of the Institute	PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY	Institute Address	AT-CHHENDIPADA PO-CHHENDIPADA PS-CHHENDIPADA DIST-ANGUL PIN-759124 ORISSA, VILL-CHHENDIPADA, ANGUL, Odisha, 759124
Name of the Society/Trust	PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY	Society/Trust Address	AT-CHHENDIPADA PO-CHHENDIPADA PS-CHHENDIPADA DIST-ANGUL ORISSA PIN-759124,CHHENDIPADA,ANGUL,Orissa,759124
Institute Type	Unaided - Private		

Opted for change from Women to Co-ed	No	Opted for change of name	No	Opted for change of site	No
Change from Women to Co-ed approved	Not Applicable	Change of name Approved	Not Applicable	Change of site Approved	Not Applicable

To conduct following courses with the intake indicated below for the academic year 2015-16

Note: This is a Computer generated Letter of Approval.No signature is required. Letter Printed On:11 April 2015

Printed By : AIC001789

All India Council for Technical Education
(A Statutory body under Ministry of HRD, Govt. of India)

7th Floor, Chandralok Building, Janpath, New Delhi- 110 001
PHONE: 23724151/52/53/54/55/56/57 FAX: 011-23724183 www.aicte-India.org

Application Id: 1-2452886341			Course	Full/Part Time	Affiliating Body	Intake 2014-15	Intake Approved for 15-16	NRI Approval status	PIO Approval status	Foreign Collaboration Approval status
Program	Shift	Level								
ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	CIVIL ENGINEERING	FULL TIME	Directorate of Technical Education and Training , Cuttack	60	60	NA	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	ELECTRICAL ENGINEERING	FULL TIME	Directorate of Technical Education and Training , Cuttack	120	120	NA	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	MECHANICAL ENGINEERING	FULL TIME	Directorate of Technical Education and Training , Cuttack	120	120	NA	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	MINING ENGINEERING	FULL TIME	Directorate of Technical Education and Training , Cuttack	120	120	NA	NA	NA

Note: Validity of the course details may be verified at www.aicte-india.org>departments>approvals

The above mentioned approval is subject to the condition that PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY shall follow and adhere to the Regulations, guidelines and directions issued by AICTE from time to time and the undertaking / affidavit given by the institution along with the application submitted by the institution on portal.

In case of any differences in content in this Computer generated Extension of Approval Letter, the content/information as approved by the Executive Council / General Council as available on the record of AICTE shall be final and binding.

Strict compliance of Anti-Ragging Regulation:- Approval is subject to strict compliance of provisions made in AICTE Regulation notified vide F. No. 37-3/Legal/AICTE/2009 dated July 1, 2009 for Prevention and Prohibition of Ragging in Technical Institutions. In case Institution fails to take adequate steps to Prevent Ragging or fails to act in accordance with AICTE Regulation or fails to punish perpetrators or incidents of Ragging, it will be liable to take any action as defined under clause 9(4) of the said Regulation.

Note: This is a Computer generated Letter of Approval.No signature is required. Letter Printed On:11 April 2015

Printed By : AIC001789

Dr. Avinash S Pant
Actg Chairman, AICTE

Copy to:

1. **The Regional Officer,**
   All India Council for Technical Education
   College of Leather Technology Campus
   Block LB, Sector III, Salt Lake City
   Kolkata - 700 098, West Bengal

2. **The Director Of Technical Education,**
   Odisha

3. **The Registrar,**
   Directorate of Technical Education and Training , Cuttack

4. **The Principal / Director,**
   PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
   AT-CHHENDIPADA
   PO-CHHENDIPADA
   PS-CHHENDIPADA
   DIST-ANGUL
   PIN-759124
   ORISSA,
   VILL-CHHENDIPADA,ANGUL,
   Odisha,759124

5. **The Secretary / Chairman,**
   PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
   AT-CHHENDIPADA
   PO-CHHENDIPADA
   PS-CHHENDIPADA
   DIST-ANGUL
   ORISSA
   PIN-759124,
   CHHENDIPADA,ANGUL,
   Orissa,759124

6. **Guard File(AICTE)**

All India Council for Technical Education
(A Statutory body under Ministry of HRD, Govt. of India)

7th Floor, Chandralok Building, Janpath, New Delhi- 110 001
PHONE: 23724151/52/53/54/55/56/57 FAX: 011-23724183 www.aicte-India.org

F.No. Eastern/1-2811708208/2016/EOA Date: 05-Apr-2016

To,

The Commissioner cum Secretary,
Deptt. Of Higher & Technical Education,
Govt. of Orissa, Orisas Sectt.
Bhubaneshwar-751001

Sub: Extension of approval for the academic year 2016-17

Ref: Application of the Institution for Extension of approval for the academic year 2016-17

Sir/Madam,

In terms of the provisions under the All India Council for Technical Education (Grant of Approvals for Technical Institutions) Regulations 2012 notified by the Council vide notification number F-No.37-3/Legal/2012 dated 27/09/2012 and norms standards, procedures and conditions prescribed by the Council from time to time, I am directed to convey the approval to

Regional Office	Eastern	Application Id	1-2811708208
Name of the Institute	PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY	Permanent Id	1-445778291
Name of the Society/Trust	PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY	Institute Address	AT-CHHENDIPADA PO-CHHENDIPADA PS-CHHENDIPADA DIST-ANGUL PIN-759124 ORISSA, VILL-CHHENDIPADA, ANGUL, Odisha, 759124
Institute Type	Unaided - Private	Society/Trust Address	AT-CHHENDIPADA PO-CHHENDIPADA PS-CHHENDIPADA DIST-ANGUL ORISSA PIN-759124,CHHENDIPADA,ANGUL,Orissa,759124

Opted for change from Women to Co-ed and Vice versa	No	Opted for change of name	No	Opted for change of site	No
Change from Women to Co-ed approved and Vice versa	Not Applicable	Change of name Approved	Not Applicable	Change of site Approved	Not Applicable

To conduct following courses with the intake indicated below for the academic year 2016-17

Application Id: 1-2811708208			Course	Full/Part Time	Affiliating Body	Intake 2015-16	Intake Approved for 2016-17	NRI Approval status	PIO / FN / Gulf quota Approval status	Foreign Collaborarion/Twining Program Approval status*
Program	Shift	Level								

ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	CIVIL ENGINEERING	FULL TIME	Directorate of Technical Education and Training , Cuttack	60	60	NA	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	ELECTRICAL ENGINEERING	FULL TIME	Directorate of Technical Education and Training , Cuttack	120	120	NA	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	MECHANICAL ENGINEERING	FULL TIME	Directorate of Technical Education and Training , Cuttack	120	120	NA	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	MINING ENGINEERING	FULL TIME	Directorate of Technical Education and Training , Cuttack	120	120	NA	NA	NA

The above mentioned approval is subject to the condition that PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY shall follow and adhere to the Regulations, guidelines and directions issued by AICTE from time to time and the undertaking / affidavit given by the institution along with the application submitted by the institution on portal.

In case of any differences in content in this Computer generated Extension of Approval Letter, the content/information as approved by the Executive Council / General Council as available on the record of AICTE shall be final and binding.

Strict compliance of Anti-Ragging Regulation:- Approval is subject to strict compliance of provisions made in AICTE Regulation notified vide F. No. 37-3/Legal/AICTE/2009 dated July 1, 2009 for Prevention and Prohibition of Ragging in Technical Institutions. In case Institution fails to take adequate steps to Prevent Ragging or fails to act in accordance with AICTE Regulation or fails to punish perpetrators or incidents of Ragging, it will be liable to take any action as defined under clause 9(4) of the said Regulation.

Note: Validity of the course details may be verified at www.aicte-india.org

Dr. Avinash S Pant
Vice - Chairman, AICTE

Copy to:

1. **The Regional Officer,**
   All India Council for Technical Education
   College of Leather Technology Campus
   Block LB, Sector III, Salt Lake City
   Kolkata - 700 098, West Bengal

2. **The Director Of Technical Education,**
   Odisha

3. **The Registrar,**
   Directorate of Technical Education and Training , Cuttack

4. **The Principal / Director,**

PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
AT-CHHENDIPADA
PO-CHHENDIPADA
PS-CHHENDIPADA
DIST-ANGUL
PIN-759124
ORISSA,
VILL-CHHENDIPADA,ANGUL,
Odisha,759124

5. **The Secretary / Chairman,**
PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
AT-CHHENDIPADA
PO-CHHENDIPADA
PS-CHHENDIPADA
DIST-ANGUL
ORISSA
PIN-759124,
CHHENDIPADA,ANGUL,
Orissa,759124

6. **Guard File(AICTE)**

All India Council for Technical Education

(A Statutory body under Ministry of HRD, Govt. of India)

Nelson Mandela MargVasant Kunj, New Delhi-110067
PHONE: 23724151/52/53/54/55/56/57 FAX: 011-23724183 www.aicte-India.org

F.No. Eastern/1-3324460940/2017/EOA Date: 30-Mar-2017

To,

The Commissioner cum Secretary,
Deptt. Of Higher & Technical Education,
Govt. of Orissa, Orisas Sectt.
Bhubaneshwar-751001

Sub: Extension of approval for the academic year 2017-18

Ref: Application of the Institution for Extension of approval for the academic year 2017-18

Sir/Madam,

In terms of the provisions under the All India Council for Technical Education (Grant of Approvals for Technical Institutions) Regulations 2016 notified by the Council vide notification number F.No.AB/AICTE/REG/2016 dated 30/11/2016 and norms standards, procedures and conditions prescribed by the Council from time to time, I am directed to convey the approval to

Permanent Id	1-445778291	Application Id	1-3324460940
Name of the Institute	PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY	Institute Address	AT-CHHENDIPADA PO-CHHENDIPADA PS-CHHENDIPADA DIST-ANGUL PIN-759124 ORISSA, VILL-CHHENDIPADA, ANGUL, Odisha, 759124
Name of the Society/Trust	PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY	Society/Trust Address	AT-CHHENDIPADA PO-CHHENDIPADA PS-CHHENDIPADA DIST-ANGUL ORISSA PIN-759124,CHHENDIPADA,ANGUL,Orissa,759124
Institute Type	Unaided - Private	Region	Eastern

Opted for change from Women to Co-ed and Vice versa	No	Opted for change of name	No	Opted for change of site	No
Change from Women to Co-ed approved and Vice versa	Not Applicable	Change of name Approved	Not Applicable	Change of site Approved	Not Applicable
Opted for Conversion from degree to diploma	No	Opted for Conversion from diploma to degree	No	Conversion (degree to diploma or vice-a-versa) Approved	Not Applicable

To conduct following courses with the intake indicated below for the academic year 2017-18

Application Id: 1-3324460940	Course	Full/Part Time	Affiliating Body	Intake Approved for	Intake Approved for	NRI Approval status	PIO / FN / Gulf quota/ OCI/	Foreign Collaboration/Twining Program

Program	Shift	Level								
ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	CIVIL ENGINEERING	FULL TIME	Directorate of Technical Education , Odisha	60	60	NA	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	ELECTRICAL ENGINEERING	FULL TIME	Directorate of Technical Education , Odisha	120	120	NA	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	MECHANICAL ENGINEERING	FULL TIME	Directorate of Technical Education , Odisha	120	120	NA	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	MINING ENGINEERING	FULL TIME	Directorate of Technical Education , Odisha	120	120	NA	NA	NA

The above mentioned approval is subject to the condition that PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY shall follow and adhere to the Regulations, guidelines and directions issued by AICTE from time to time and the undertaking / affidavit given by the institution along with the application submitted by the institution on portal.

In case of any differences in content in this Computer generated Extension of Approval Letter, the content/information as approved by the Executive Council / General Council as available on the record of AICTE shall be final and binding.

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Note: Validity of the course details may be verified at www.aicte-india.org

Prof. A.P Mittal
Member Secretary, AICTE

Copy to:

1. **The Regional Officer,**
   All India Council for Technical Education
   College of Leather Technology Campus
   Block LB, Sector III, Salt Lake City
   Kolkata - 700 098, West Bengal

2. **The Director Of Technical Education**,**
   Odisha

Printed By : AIC001789

3. **The Registrar**,**
   Directorate of Technical Education , Odisha

4. **The Principal / Director,**
   PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
   AT-CHHENDIPADA
   PO-CHHENDIPADA
   PS-CHHENDIPADA
   DIST-ANGUL
   PIN-759124
   ORISSA,
   VILL-CHHENDIPADA,ANGUL,
   Odisha,759124

5. **The Secretary / Chairman,**
   PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
   AT-CHHENDIPADA
   PO-CHHENDIPADA
   PS-CHHENDIPADA
   DIST-ANGUL
   ORISSA
   PIN-759124,
   CHHENDIPADA,ANGUL,
   Orissa,759124

6. **Guard File(AICTE)**

Note: ** - Approval letter copy will not be communicated through post/email. However, provision is made in the portal for downloading Approval letter through Authorized login credentials allotted to concerned DTE/Registrar.

All India Council for Technical Education

(A Statutory body under Ministry of HRD, Govt. of India)

Nelson Mandela Marg,Vasant Kunj, New Delhi-110070 Website: www.aicte-india.org

APPROVAL PROCESS 2018-19

Extension of Approval (EoA)

F.No. Eastern/1-3508999181/2018/EOA

Date: 04-Apr-2018

To,

The Commissioner cum Secretary,
Deptt. Of Higher & Technical Education,
Govt. of Orissa, Orisas Sectt.
Bhubaneshwar-751001

Sub: Extension of Approval for the Academic Year 2018-19

Ref: Application of the Institution for Extension of approval for the Academic Year 2018-19

Sir/Madam,

In terms of the provisions under the All India Council for Technical Education (Grant of Approvals for Technical Institutions) Regulations 2016 notified by the Council vide notification number F.No.AB/AICTE/REG/2016 dated 30/11/2016 and amended on December 5, 2017 and norms standards, procedures and conditions prescribed by the Council from time to time, I am directed to convey the approval to

Permanent Id	1-445778291	**Application Id**	1-3508999181
Name of the Institute	PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY	**Name of the Society/Trust**	PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
Institute Address	AT-CHHENDIPADA PO-CHHENDIPADA PS-CHHENDIPADA DIST-ANGUL PIN-759124 ORISSA, VILL-CHHENDIPADA, ANGUL, Odisha, 759124	**Society/Trust Address**	AT-CHHENDIPADA PO-CHHENDIPADA PS-CHHENDIPADA DIST-ANGUL ORISSA PIN-759124,CHHENDIPADA,ANGUL,Orissa,759124
Institute Type	Unaided - Private	**Region**	Eastern

Opted for Change from Women to Co-Ed and vice versa	No	**Change from Women to Co-Ed and vice versa Approved or Not**	NA
Opted for Change of Name	No	**Change of Name Approved or Not**	NA
Opted for Change of Site	No	**Change of Site Approved or Not**	NA
Opted for Conversion from Degree to Diploma or vice versa	No	**Conversion for Degree to Diploma or vice versa Approved or Not**	NA
Opted for Organization Name Change	No	**Change of Organization Name Approved or Not**	NA

To conduct following Courses with the Intake indicated below for the Academic Year 2018-19

Program	Shift	Level	Course	FT/PT+	Affiliating Body (Univ/Body)	Intake Approved for 2018-19	NRI Approval Status	PIO / FN / Gulf quota/ OCI/ Approval Status	Foreign Collaboration /Twining Program Approval Status*
ENGINEERING AND TECHNOLOGY	1st	DIPLOMA	CIVIL ENGINEERING	FT	Directorate of Technical Education , Odisha	60	NA	NA	NA
ENGINEERING AND TECHNOLOGY	1st	DIPLOMA	ELECTRICAL ENGINEERING	FT	Directorate of Technical Education , Odisha	120	NA	NA	NA

ENGINEERING AND TECHNOLOGY	1st	DIPLOMA	MECHANICAL ENGINEERING	FT	Directorate of Technical Education , Odisha	120	NA	NA	NA
ENGINEERING AND TECHNOLOGY	1st	DIPLOMA	MINING ENGINEERING	FT	Directorate of Technical Education , Odisha	120	NA	NA	NA

+FT –Full Time,PT-Part Time

In case of any differences in content in this Computer generated Extension of Approval Letter, the content/information as approved by the Executive Council / General Council as available on the record of AICTE shall be final and binding.

Strict compliance of Anti-Ragging Regulation: - Approval is subject to strict compliance of provisions made in AICTE Regulation notified vide F. No. 37-3/Legal/AICTE/2009 dated July 1, 2009 for Prevention and Prohibition of Ragging in Technical Institutions. In case Institution fails to take adequate steps to Prevent Ragging or fails to act in accordance with AICTE Regulation or fails to punish perpetrators or incidents of Ragging, it will be liable to take any action as defined under clause 9(4) of the said Regulation.

Prof. A.P Mittal
Member Secretary, AICTE

Copy to:

1. The Regional Officer,
   All India Council for Technical Education
   College of Leather Technology Campus
   Block LB, Sector III, Salt Lake City
   Kolkata - 700 098, West Bengal
2. The Director Of Technical Education**,
   Odisha
3. The Registrar**,
   Directorate of Technical Education , Odisha
4. The Principal / Director,
   PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
   AT-CHHENDIPADA
   PO-CHHENDIPADA
   PS-CHHENDIPADA
   DIST-ANGUL
   PIN-759124
   ORISSA,
   VILL-CHHENDIPADA,ANGUL,
   Odisha,759124
5. The Secretary / Chairman,
   PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
   AT-CHHENDIPADA
   PO-CHHENDIPADA
   PS-CHHENDIPADA
   DIST-ANGUL
   ORISSA
   PIN-759124,
   CHHENDIPADA,ANGUL,
   Orissa,759124
6. Guard File(AICTE)

Note: Validity of the Course details may be verified at http://www.aicte-india.org/

** Individual Approval letter copy will not be communicated through Post/Email. However, consolidated list of Approved Institutions(bulk) will be shared through official Email Address to the concerned Authorities mentioned above.

All India Council for Technical Education

(A Statutory body under Ministry of HRD, Govt. of India)

Nelson Mandela Marg,Vasant Kunj, New Delhi-110070 Website: www.aicte-india.org

APPROVAL PROCESS 2019-20

Extension of Approval (EoA)

F.No. Eastern/1-4259577305/2019/EOA

Date: 10-Apr-2019

To,

The Commissioner cum Secretary,
Deptt. Of Higher & Technical Education,
Govt. of Orissa, Orisas Sectt.
Bhubaneshwar-751001

Sub: Extension of Approval for the Academic Year 2019-20

Ref: Application of the Institution for Extension of approval for the Academic Year 2019-20

Sir/Madam,

In terms of the provisions under the All India Council for Technical Education (Grant of Approvals for Technical Institutions) Regulations 2018 notified by the Council vide notification number F.No.AB/AICTE/REG/2018 dated 31/12/2018 and norms standards, procedures and conditions prescribed by the Council from time to time, I am directed to convey the approval to

Permanent Id	1-445778291	**Application Id**	1-4259577305
Name of the Institute	PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY	**Name of the Society/Trust**	PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
Institute Address	AT-CHHENDIPADAPO-CHHENDIPADAPS-CHHENDIPADADIST-ANGULPIN-759124ORISSA, VILL-CHHENDIPADA, ANGUL, Odisha, 759124	**Society/Trust Address**	AT-CHHENDIPADA PO-CHHENDIPADA PS-CHHENDIPADA DIST-ANGUL ORISSA PIN-759124,CHHENDIPADA,ANGUL,Orissa,759124
Institute Type	Unaided - Private	**Region**	Eastern

Opted for Change from Women to Co-Ed and vice versa	No	**Change from Women to Co-Ed and vice versa Approved or Not**	NA
Opted for Change of Name	No	**Change of Name Approved or Not**	NA
Opted for Change of Site/Location	No	**Change of Site/Location Approved or Not**	NA
Opted for Conversion from Degree to Diploma or vice versa	No	**Conversion for Degree to Diploma or vice versa Approved or Not**	NA
Opted for Organization Name Change	No	**Change of Organization Name Approved or Not**	NA
Opted for Merger of Institution	No	**Merger of Institution Approved or Not**	NA
Opted for Introduction of New Program/Level	No	**Introduction of Program/Level Approved or Not**	NA

To conduct following Courses with the Intake indicated below for the Academic Year 2019-20

Program	Shift	Level	Course	FT/PT+	Affiliating Body (Univ/Body)	Intake Approved for 2019-20	NRI Approval Status	PIO / FN / Gulf quota/ OCI/ Approval Status
Engineering And Technology	1st	Diploma	Civil Engineering	FT	Directorate of Technical Education , Odisha	60	NA	NA
Engineering And	1st	Diploma	Electrical	FT	Directorate of Technical	120	NA	NA

Technology			Engineering		Education , Odisha			
Engineering And Technology	1st	Diploma	Mechanical Engineering	FT	Directorate of Technical Education , Odisha	120	NA	NA
Engineering And Technology	1st	Diploma	Mining Engineering	FT	Directorate of Technical Education , Odisha	120	NA	NA

+FT –Full Time,PT-Part Time

In case of any differences in content in this Computer generated Extension of Approval Letter, the content/information as approved by the Executive Council / General Council as available on the record of AICTE shall be final and binding.

Strict compliance of Anti-Ragging Regulation: - Approval is subject to strict compliance of provisions made in AICTE Regulation notified vide F. No. 37-3/Legal/AICTE/2009 dated July 1, 2009 for Prevention and Prohibition of Ragging in Technical Institutions. In case Institution fails to take adequate steps to Prevent Ragging or fails to act in accordance with AICTE Regulation or fails to punish perpetrators or incidents of Ragging, it will be liable to take any action as defined under clause 9(4) of the said Regulation.

It is mandatory to comply all the essential requirements as given in APH 2019-20(appendix 6)

NOTE: If the State Government / UT / DTE / DME has a reservation policy for admission in Technical Education Institutes and the same is applicable to Private & Self-financing Technical Institutions, then the State Government / UT/ DTE / DME shall ensure that 10 % of Reservation for EWS would be operational from the Academic year 2019-20 without affecting the percentage reservations of SC/ST/OBC/General . However, this would not be applicable in the case of Minority Institutions referred to the clause (1) of Article 30 of Constitution of India.

Prof. A.P Mittal
Member Secretary, AICTE

Copy to:

1. **The Director Of Technical Education**, Odisha**

2. **The Registrar**,**
   Directorate Of Technical Education , Odisha

3. **The Principal / Director,**
   Purna Chandra Institute Of Engineering & Technology
   At-Chhendipadapo-Chhendipadaps-Chhendipadadist-Angulpin-759124Orissa,
   Vill-Chhendipada,Angul,
   Odisha,759124

4. **The Secretary / Chairman,**
   Purna Chandra Institute Of Engineering & Technology
   At-Chhendipada
   Po-Chhendipada
   Ps-Chhendipada
   Dist-Angul
   Orissa
   Pin-759124.
   Chhendipada,Angul,
   Orissa,759124

5. **The Regional Officer,**
   All India Council for Technical Education
   College of Leather Technology Campus
   Block LB, Sector III, Salt Lake City
   Kolkata - 700 098, West Bengal

6. **Guard File(AICTE)**

Note: Validity of the Course details may be verified at http://www.aicte-india.org/

** Individual Approval letter copy will not be communicated through Post/Email. However, consolidated list of Approved Institutions(bulk) will be shared through official Email Address to the concerned Authorities mentioned above.

All India Council for Technical Education

(A Statutory body under Ministry of HRD, Govt. of India)

Nelson Mandela Marg,Vasant Kunj, New Delhi-110070 Website: www.aicte-india.org

APPROVAL PROCESS 2020-21

Extension of Approval (EoA)

F.No. Eastern/1-7011559054/2020/EOA Date: 30-Apr-2020

To,

Sub: Extension of Approval for the Academic Year 2020-21

Ref: Application of the Institution for Extension of Approval for the Academic Year 2020-21

Sir/Madam,

In terms of the provisions under the All India Council for Technical Education (Grant of Approvals for Technical Institutions) Regulations 2020 notified by the Council vide notification number F.No. AB/AICTE/REG/2020 dated 4th February 2020 and norms standards, procedures and conditions prescribed by the Council from time to time, I am directed to convey the approval to

Permanent Id	1-445778291	**Application Id**	1-7011559054
Name of the Institute	PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY	**Name of the Society/Trust**	PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
Institute Address	AT-CHHENDIPADAPO-CHHENDIPADAPS-CHHENDIPADADIST-ANGULPIN-759124ORISSA, VILL-CHHENDIPADA, ANGUL, Odisha, 759124	**Society/Trust Address**	AT-CHHENDIPADA PO-CHHENDIPADA PS-CHHENDIPADA DIST-ANGUL ORISSA PIN-759124,CHHENDIPADA,ANGUL,Orissa,759124
Institute Type	Private-Self Financing	**Region**	Eastern

To conduct following Courses with the Intake indicated below for the Academic Year 2020-21

Program	Level	Course	Affiliating Body (University /Body)	Intake Approved for 2019-20	Intake Approved for 2020-21	NRI Approval Status	PIO / FN / Gulf quota/ OCI/ Approval Status
ENGINEERING AND TECHNOLOGY	DIPLOMA	CIVIL ENGINEERING	Directorate of Technical Education , Odisha	60	60	NA	No
ENGINEERING AND TECHNOLOGY	DIPLOMA	ELECTRICAL ENGINEERING	Directorate of Technical Education , Odisha	120	120	NA	No
ENGINEERING AND TECHNOLOGY	DIPLOMA	MECHANICAL ENGINEERING	Directorate of Technical Education , Odisha	120	120	NA	No

ENGINEERING AND TECHNOLOGY	DIPLOMA	MINING ENGINEERING	Directorate of Technical Education , Odisha	120	120	NA	No

It is mandatory to comply with all the essential requirements as given in APH 2020-21 (Appendix 6)

Important Instructions

1. The State Government/ UT/ Directorate of Technical Education/ Directorate of Medical Education shall ensure that 10% of reservation for Economically Weaker Section (EWS) as per the reservation policy for admission, operational from the Academic year 2020-21 is implemented without affecting the reservation percentages of SC/ ST/ OBC/ General. However, this would not be applicable in the case of Minority Institutions referred to the Clause (1) of Article 30 of Constitution of India. Such Institution shall be permitted to increase in annual permitted strength over a maximum period of two years beginning with the Academic Year 2020-21

2. The Institution offering courses earlier in the Regular Shift, First Shift, Second Shift/Part Time now amalgamated as total intake shall have to fulfil all facilities such as Infrastructure, Faculty and other requirements as per the norms specified in the Approval Process Handbook 2020-21 for the Total Approved Intake. Further, the Institutions Deemed to be Universities/ Institutions having Accreditation/ Autonomy status shall have to maintain the Faculty: Student ratio as specified in the Approval Process Handbook. All such Institutions/ Universities shall have to create the necessary Faculty, Infrastructure and other facilities WITHIN 2 YEARS to fulfil the norms based on the Affidavit submitted to AICTE.

3. In case of any differences in content in this Computer generated Extension of Approval Letter, the content/information as approved by the Executive Council / General Council as available on the record of AICTE shall be final and binding.

4. Strict compliance of Anti-Ragging Regulation: - Approval is subject to strict compliance of provisions made in AICTE Regulation notified vide F. No. 373/Legal/AICTE/2009 dated July 1, 2009 for Prevention and Prohibition of Ragging in Technical Institutions. In case Institution fails to take adequate steps to Prevent Ragging or fails to act in accordance with AICTE Regulation or fails to punish perpetrators or incidents of Ragging, it will be liable to take any action as defined under clause 9(4) of the said Regulation.

Prof.Rajive Kumar
Member Secretary, AICTE

Copy to:

1. **The Director Of Technical Education**, Odisha**

2. **The Principal / Director,**
PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
At-Chhendipadapo-Chhendipadaps-Chhendipadadist-Angulpin-759124Orissa,
Vill-Chhendipada,Angul,
Odisha,759124

3. **The Secretary / Chairman,**
AT-CHHENDIPADA
PO-CHHENDIPADA
PS-CHHENDIPADA
DIST-ANGUL
ORISSA
PIN-759124
CHHENDIPADA,ANGUL
Orissa,759124

4. **The Regional Officer,**
   All India Council for Technical Education
   College of Leather Technology Campus
   Block LB, Sector III, Salt Lake City
   Kolkata - 700 098, West Bengal

5. **Guard File(AICTE)**

Note: Validity of the Course details may be verified at http://www.aicte-india.org/

** Individual Approval letter copy will not be communicated through Post/Email. However, consolidated list of Approved Institutions(bulk) will be shared through official Email Address to the concerned Authorities mentioned above.

All India Council for Technical Education

(A Statutory body under Ministry of Education, Govt. of India)

Nelson Mandela Marg,Vasant Kunj, New Delhi-110070 Website: www.aicte-india.org

APPROVAL PROCESS 2021-22

Extension of Approval (EoA)

F.No. Eastern/1-9317994728/2021/EOA Date: 25-Jun-2021

To,

The Commissioner cum Secretary,
Deptt. Of Higher & Technical Education,
Govt. of Orissa, Orisas Sectt.
Bhubaneshwar-751001

Sub: Extension of Approval for the Academic Year 2021-22

Ref: Application of the Institution for Extension of Approval for the Academic Year 2021-22

Sir/Madam,

In terms of the provisions under the All India Council for Technical Education (Grant of Approvals for Technical Institutions) Regulations, Notified on 4th February, 2020 and amended on 24th February 2021 and norms standards, procedures and conditions prescribed by the Council from time to time, I am directed to convey the approval to:

Permanent Id	1-445778291	**Application Id**	1-9317994728
Name of the Institution /University	PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY	**Name of the Society/Trust**	PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
Institution /University Address	AT-CHHENDIPADAPO-CHHENDIPADAPS-CHHENDIPADADIST-ANGULPIN-759124ORISSA, VILL-CHHENDIPADA, ANGUL, Odisha, 759124	**Society/Trust Address**	AT-CHHENDIPADA PO-CHHENDIPADA PS-CHHENDIPADA DIST-ANGUL ORISSA PIN-759124,CHHENDIPADA,ANGUL,Orissa,759124
Institution /University Type	Private-Self Financing	**Region**	Eastern

To conduct following Programs / Courses with the Intake indicated below for the Academic Year 2021-22

Program	Level	Course	Affiliating Body (University /Body)	Intake Approved for 2020-21	Intake Approved for 2021-22	NRI Approval Status	FN / Gulf quota/ OCI/ Approval Status
ENGINEERING AND TECHNOLOGY	DIPLOMA	CIVIL ENGINEERING	Directorate of Technical Education , Odisha	60	60	NA	NA
ENGINEERING AND TECHNOLOGY	DIPLOMA	ELECTRICAL ENGINEERING	Directorate of Technical Education , Odisha	120	120	NA	NA

ENGINEERING AND TECHNOLOGY	DIPLOMA	MECHANICAL ENGINEERING	Directorate of Technical Education , Odisha	120	120	NA	NA
ENGINEERING AND TECHNOLOGY	DIPLOMA	MINING ENGINEERING	Directorate of Technical Education , Odisha	120	120	NA	NA

It is mandatory to comply with all the essential requirements as given in APH 2021-22 (Appendix 6)

Important Instructions

1. The State Government/ UT/ Directorate of Technical Education/ Directorate of Medical Education shall ensure that 10% of reservation for Economically Weaker Section (EWS) as per the reservation policy for admission, operational from the Academic year 2019-20 is implemented without affecting the reservation percentages of SC/ ST/ OBC/ General. However, this would not be applicable in the case of Minority Institutions referred to the Clause (1) of Article 30 of Constitution of India. Such Institution shall be permitted to increase in annual permitted strength over a maximum period of two years.

2. The Institution offering courses earlier in the Regular Shift, First Shift, Second Shift/Part Time now amalgamated as total intake shall have to fulfil all facilities such as Infrastructure, Faculty and other requirements as per the norms specified in the Approval Process Handbook 2021-22 for the Total Approved Intake. Further, the Institutions Deemed to be Universities/ Institutions having Accreditation/ Autonomy status shall have to maintain the Faculty: Student ratio as specified in the Approval Process Handbook.

3. Strict compliance of Anti-Ragging Regulation, Establishment of Committee for SC/ ST, Establishment of Internal Complaint Committee (ICC), Establishment of Online Grievance Redressal Mechanism, Barrier Free Built Environment for disabled and elderly persons, Fire and Safety Certificate should be maintained as per the provisions made in Approval Process Handbook and AICTE Regulation notified from time to time.

4. In case of any differences in content in this Computer generated Extension of Approval Letter, the content/information as approved by the Executive Council / General Council as available on the record of AICTE shall be final and binding.

Prof.Rajive Kumar
Member Secretary, AICTE

Copy ** to:

1. **The Director of Technical Education**, Odisha**

2. **The Principal / Director,**
PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
At-Chhendipadapo-Chhendipadaps-Chhendipadadist-Angulpin-759124Orissa,
Vill-Chhendipada,Angul,
Odisha,759124

3. **The Secretary / Chairman,**
AT-CHHENDIPADA
PO-CHHENDIPADA
PS-CHHENDIPADA
DIST-ANGUL
ORISSA
PIN-759124

CHHENDIPADA,ANGUL
Orissa,759124

4. **The Regional Officer,**
All India Council for Technical Education
College of Leather Technology Campus
Block LB, Sector III, Salt Lake City
Kolkata - 700 098, West Bengal

5. **Guard File(AICTE)**

Note: Validity of the Course details may be verified at http://www.aicte-india.org/ .

** Individual Approval letter copy will not be communicated through Post/Email. However, consolidated list of Approved Institutions(bulk) will be shared through official Email Address to the concerned Authorities mentioned above.

This is a computer generated Statement. No signature Required

All India Council for Technical Education

(A Statutory body under Ministry of Education, Govt. of India)

Nelson Mandela Marg,Vasant Kunj, New Delhi-110070 Website: www.aicte-india.org

APPROVAL PROCESS 2022-23

Extension of Approval (EoA)

F.No. Eastern/1-10967939322/2022/EOA Date: 03-Jul-2022

To,

Sub: Extension of Approval for the Academic Year 2022-23

Ref: Application of the Institution for Extension of Approval for the Academic Year 2022-23

Sir/Madam,

In terms of the provisions under the All India Council for Technical Education (Grant of Approvals for Technical Institutions) Regulations, 2022 Notified on 4th February, 2022 and amended on 24th February 2022 and norms standards, procedures and conditions prescribed by the Council from time to time, I am directed to convey the approval to

Permanent Id	1-445778291	**Application Id**	1-10967939322
Name of the Institution	PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY	**Name of the Society/Trust**	PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
Institution Address	AT-CHHENDIPADAPO-CHHENDIPADAPS-CHHENDIPADADIST-ANGULPIN-759124ORISSA, VILL-CHHENDIPADA, ANGUL, Odisha, 759124	**Society/Trust Address**	AT-CHHENDIPADA PO-CHHENDIPADA PS-CHHENDIPADA DIST-ANGUL ORISSA PIN-759124,CHHENDIPADA,ANGUL,Orissa,759124
Institution Type	Private-Self Financing	**Region**	Eastern
Year of Establishment	2009		

To conduct following Courses with the Intake indicated below for the Academic Year 2022-23

Level	Program	Course	Affiliating Body (University /Body)	Intake Approved for 2021-22	Intake Approved for 2022-23	NRI Approval Status	FN / Gulf quota/ OCI/ Approval Status
DIPLOMA	ENGINEERING AND TECHNOLOGY	CIVIL ENGINEERING	Directorate of Technical Education , Odisha	60	60	NA	NA
DIPLOMA	ENGINEERING AND TECHNOLOGY	ELECTRICAL ENGINEERING	Directorate of Technical Education , Odisha	120	120	NA	NA
DIPLOMA	ENGINEERING AND TECHNOLOGY	MECHANICAL ENGINEERING	Directorate of Technical Education , Odisha	120	120	NA	NA

Level	Program	Course	Affiliating Body (University /Body)	Intake Approved for 2021-22	Intake Approved for 2022-23	NRI Approval Status	FN / Gulf quota/ OCI/ Approval Status
DIPLOMA	ENGINEERING AND TECHNOLOGY	MINING ENGINEERING	Directorate of Technical Education , Odisha	120	120	NA	NA

It is mandatory to comply with all the essential requirements as given in APH 2022-23 (Appendix 6)

Important Instructions

1. The State Government/ UT/ Directorate of Technical Education/ Directorate of Medical Education shall ensure that 10% of reservation for Economically Weaker Section (EWS) as per the reservation policy for admission, operational from the Academic year 2019-20 is implemented without affecting the reservation percentages of SC/ ST/ OBC (NCL)/ General. However, this would not be applicable in the case of Minority Institutions referred to the Clause (1) of Article 30 of Constitution of India. Such Institution shall be permitted to increase in annual permitted strength over a maximum period of two years.

2. The Institution offering courses earlier in the Regular Shift, First Shift, Second Shift/Part Time are now amalgamated as total intake and shall have to fulfil all facilities such as Infrastructure, Faculty and other requirements as per the norms specified in the Approval Process Handbook 2022-23 for the Total Approved Intake. Further, the Institutions Deemed to be Universities/ Institutions having Accreditation/ Autonomy status shall have to maintain the Faculty: Student ratio as specified in the Approval Process Handbook. All such Institutions/ Universities shall have to create the necessary Faculty, Infrastructure and other facilities WITHIN 2 YEARS to fulfil the norms based on the Affidavit submitted to AICTE beginning with the Academic Year 2022-23

3. Strict compliance of Anti-Ragging Regulation, Establishment of Committee for SC/ ST, Establishment of Internal Complaint Committee (ICC), Establishment of Online Grievance Redressal Mechanism, Barrier Free Built Environment for disabled and elderly persons, Fire and Safety Certificate should be maintained as Approval Process Handbook and provisions made in AICTE Regulation notified from time to time.

4. In case of any differences in content in this Computer generated Extension of Approval Letter, the content/information as approved by the Executive Council / General Council as available on the record of AICTE shall be final and binding.

Pharmacy Institute: In compliance with the order dated 05.03.2020 passed by the Hon'ble Supreme Court of India in Transferred Petitions (CIVIL) No 87-101 of 2014, for the existing institutions offering courses in Pharmacy Programme, approval of Pharmacy Council of India (PCI) is mandatory and AICTE approval is NOT required. The requirements for running the Programme (Diploma / UG / PG) such as Land & Build-up Area, Student-faculty ratio, Intake etc. will be as per the respective regulatory body (PCI).
In case of any inconsistency in the course name and intake for EoA issued by AICTE and the approval by PCI, the approval of PCI shall prevail.

Architecture Institute: In compliance with the order dated 08.11.2019 passed by the Hon'ble Supreme Court of Indian CA No.364/ 2005, for the existing Institutions offering Courses in Architecture Programme, approval by the Council of Architecture (CoA) is mandatory and AICTE approval is NOT required. The requirements for running the Programme (Diploma / UG / PG) such as Land & Build-up Area, Student-faculty ratio, Intake etc. will be as per respective regulatory body (CoA). In case of any inconsistency in the course name and intake for EoA issued by AICTE and the approval by CoA, the approval of CoA shall prevail.

Deemed to be University: Institutions Deemed to be Universities (Running Technical Education Programmes), it is mandatory to have AICTE approval from the Academic Year 2018-19 in compliance of the Hon'ble Supreme Court Order dated 03-11-2017 passed in CA No.17869- 17870 /2017.

Prof.Rajive Kumar
Member Secretary, AICTE

Copy to:

1. **The Director Of Technical Education**, Odisha**

2. **The Principal / Director,**
PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
At-Chhendipadapo-Chhendipadaps-Chhendipadadist-Angulpin-759124Orissa,
Vill-Chhendipada,Angul,
Odisha,759124

3. **The Secretary / Chairman,**
AT-CHHENDIPADA
PO-CHHENDIPADA
PS-CHHENDIPADA
DIST-ANGUL
ORISSA
PIN-759124
CHHENDIPADA,ANGUL
Orissa,759124

4. **The Regional Officer,**
All India Council for Technical Education
College of Leather Technology Campus
Block LB, Sector III, Salt Lake City
Kolkata - 700 098, West Bengal

5. **Guard File(AICTE)**

Note: Validity of the Course details may be verified at http://www.aicte-india.org/

****** Individual Approval letter copy will not be communicated through Post/Email. However, consolidated list of Approved Institutions(bulk) will be shared through official Email Address to the concerned Authorities mentioned above.

This is a computer generated Statement. No signature Required

All India Council for Technical Education

(A Statutory body under Ministry of Education, Govt. of India)

Nelson Mandela Marg,Vasant Kunj, New Delhi-110070 Website: www.aicte-india.org

APPROVAL PROCESS 2023-24

Extension of Approval (EoA)

F.No. Eastern/1-36206451311/2023/EOA Date: 15-May-2023

To,

Sub: Extension of Approval for the Academic Year 2023-24

Ref: Online application of the Institution submitted for Extension of Approval for the Academic Year 2023-24

Sir/Madam,

In terms of the provisions under the All India Council for Technical Education (Grant of Approvals for Technical Education) Regulations, 2020 notified on 4th February 2020 and amended on 24th February 2021 and norms standards, procedures and conditions prescribed by the Council from time to time, I am directed to convey the approval to:

Permanent Id	1-445778291	**Application Id**	1-36206451311
Name of the Institution	PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY	**Name of the Society/Trust**	PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
Institution Address	AT-CHHENDIPADAPO-CHHENDIPADAPS-CHHENDIPADADIST-ANGULPIN-759124ORISSA, VILL-CHHENDIPADA, ANGUL, Odisha, 759124	**Society/Trust Address**	AT-CHHENDIPADA PO-CHHENDIPADA PS-CHHENDIPADA DIST-ANGUL ORISSA PIN-759124,CHHENDIPADA,ANGUL,Orissa,759124
Institution Type	Private-Self Financing	**Region**	Eastern
Year of Establishment	2009		

To conduct following Courses with the Intake indicated below for the Academic Year 2023-24

Level	Program	Course	Affiliating Body (University /Body)	Intake Approved for 2022-23	Intake Approved for 2023-24	NRI Approval Status	FN / Gulf quota/ OCI/ Approval Status
DIPLOMA	ENGINEERING AND TECHNOLOGY	CIVIL ENGINEERING	Directorate of Technical Education , Odisha	60	60	No	No
DIPLOMA	ENGINEERING AND TECHNOLOGY	ELECTRICAL ENGINEERING	Directorate of Technical Education , Odisha	120	120	No	No
DIPLOMA	ENGINEERING AND TECHNOLOGY	MECHANICAL ENGINEERING	Directorate of Technical Education , Odisha	120	120	No	No

Level	Program	Course	Affiliating Body (University /Body)	Intake Approved for 2022-23	Intake Approved for 2023-24	NRI Approval Status	FN / Gulf quota/ OCI/ Approval Status
DIPLOMA	ENGINEERING AND TECHNOLOGY	MINING ENGINEERING	Directorate of Technical Education , Odisha	120	120	No	No

It is mandatory to comply with all the essential requirements as given in APH 2023-24 (Appendix 6)

Important Instructions

1. The State Government/ UT/ Directorate of Technical Education/ Directorate of Medical Education shall ensure that 10% of reservation for Economically Weaker Section (EWS) as per the reservation policy for admission, operational from the Academic year 2019-20 is implemented without affecting the reservation percentages of SC/ ST/ OBC(NCL) / General. However, this would not be applicable in the case of Minority Institutions referred to the Clause (1) of Article 30 of Constitution of India. Such Institution shall be permitted to increase in annual permitted strength over a maximum period of two years.

2. The Institution offering courses earlier in the Regular Shift, First Shift, Second Shift/Part Time are now amalgamated as total intake and shall have to fulfil all facilities such as Infrastructure, Faculty and other requirements as per the norms specified in the Approval Process Handbook 2023-24 for the Total Approved Intake. Further, the Institutions Deemed to be Universities/ Institutions having Accreditation/ Autonomy status shall have to maintain the Faculty: Student ratio as specified in the Approval Process Handbook.

3. Strict compliance of Anti-Ragging Regulation, Establishment of Committee for SC/ ST, Establishment of Internal Committee (IC), Establishment of Online Grievance Redressal Mechanism, Barrier Free Built Environment for disabled and elderly persons, Fire and Safety Certificate should be maintained as per the provisions made in Approval Process Handbook and AICTE Regulation notified from time to time.

4. In case of any differences in content in this Computer generated Extension of Approval Letter, the content/information as approved by the Executive Council / General Council as available on the record of AICTE shall be final and binding.

5. As per the AICTE Notification dated 29.01.2014 and amended thereto, it shall be mandatory for each Technical Education Institution, University Department and Institution Deemed to be University imparting Technical Education to get accreditation (NBA) for at least 60% of the eligible courses in the next ONE (1) Years' time, otherwise EoA for the subsequent Academic Year (A.Y. 2024-25) shall not be issued by the Council.

6. Deemed to be University**:** Institutions Deemed to be Universities (Running Technical Education Programmes), it is mandatory to have AICTE approval from the Academic Year 2018-19 in compliance of the Hon'ble Supreme Court Order dated 03-11-2017 passed in CA No.17869- 17870 /2017.

Prof.Rajive Kumar
Member Secretary, AICTE

Copy to:

1. **The Director Of Technical Education**, Odisha**

2. **The Principal / Director,**
PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
At-Chhendipadapo-Chhendipadaps-Chhendipadadist-Angulpin-759124Orissa,
Vill-Chhendipada,Angul,
Odisha,759124

3. **The Secretary / Chairman,**
AT-CHHENDIPADA
PO-CHHENDIPADA
PS-CHHENDIPADA
DIST-ANGUL
ORISSA
PIN-759124
CHHENDIPADA,ANGUL
Orissa,759124

4. **Guard File(AICTE)**

Note: Validity of the Course details may be verified at http://www.aicte-india.org/

** Individual Approval letter copy will not be communicated through Post/Email. However, a consolidated list of Approved Institutions(bulk) may be downloaded from the respective login id's.

This is a computer generated Statement. No signature Required

All India Council for Technical Education

(A Statutory body under Ministry of Education, Govt. of India)

Nelson Mandela Marg,Vasant Kunj, New Delhi-110070 Website: www.aicte-india.org

APPROVAL PROCESS 2024-25

Extension of Approval (EoA)

F.No. Eastern/1-43659009959/2024/EOA

Date of Approval: 23-Mar-2024

To,

Sub: Extension of Approval for the Academic Year 2024-25

Ref: Online application of the Institution submitted for Extension of Approval for the Academic Year 2024-25

Sir/Madam,

In terms of the provisions under the All India Council for Technical Education (Grant of Approvals for Technical Education), Powers delegated in AICTE ACT 1987, (No 52 of 1987) chapter II - u/s 2(g) to regulate Technical and subsequent Regulations of AICTE, I am directed to convey the approval to:

Permanent Id	1-445778291	**Application Id**	1-43659009959
Name of the Institution	PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY	**Name of the Society/Trust**	PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
Institution Address	AT-CHHENDIPADAPO-CHHENDIPADAPS-CHHENDIPADADIST-ANGULPIN-759124ORISSA, VILL-CHHENDIPADA, ANGUL, Odisha, 759124	**Society/Trust Address**	AT-CHHENDIPADA PO-CHHENDIPADA PS-CHHENDIPADA DIST-ANGUL ORISSA PIN-759124,CHHENDIPADA,ANGUL,Orissa,759124
Institution Type	Private-Self Financing	**Region**	Eastern
Year of Establishment	2009		

To conduct following Programs/Courses with the Intake indicated below for the Academic Year 2024-25

Level	Program	Course	Affiliating Body (University /Body)	Intake Approved for 2023-24	Intake Approved for 2024-25	NRI Approval Status	FN / Gulf quota/ OCI/ Approval Status
DIPLOMA	ENGINEERING AND TECHNOLOGY	CIVIL ENGINEERING	Directorate of Technical Education , Odisha	60	60	No	No
DIPLOMA	ENGINEERING AND TECHNOLOGY	ELECTRICAL ENGINEERING	Directorate of Technical Education , Odisha	120	120	No	No
DIPLOMA	ENGINEERING AND TECHNOLOGY	MECHANICAL ENGINEERING	Directorate of Technical Education , Odisha	120	120	No	No

Level	Program	Course	Affiliating Body (University /Body)	Intake Approved for 2023-24	Intake Approved for 2024-25	NRI Approval Status	FN / Gulf quota/ OCI/ Approval Status
DIPLOMA	ENGINEERING AND TECHNOLOGY	MINING ENGINEERING	Directorate of Technical Education , Odisha	120	120	No	No

All AICTE approved Institutions are empowered to nurture ecosystems for Skilling (through Vocational courses) via making effective use of existing infrastructure facilities and human resources.

It is mandatory to comply with all the essential requirements as given in APH 2024-25 to 2027 (Chapter-VI)

Important Instructions

1. As per mandatory Disclosure of APH 2024-27(Annexure-18, page180) Institutions must disclose the following information submitted to Council at the Prominent location on its website.
   i. Department wise availability of Infrastructure along with approved courses and intake approved by the Council.
   ii. Faculty details: Department wise: Name& Designation of the faculty members/teaching staff along with their qualification, tenure of service in your organization, total experience, Institution should also disclose Student Faculty Ratio, Cadre Ratio.
   iii. Additionally Audited Financial Statements for last 3 Financial years.
2. Reservation Policy of the Central Government (Including EWS) / Respective State Government/ UT as the case shall be applicable to all the Programmes. The concerned State Government/ UT Admission authority shall decide Modalities of Admission.
3. The Institution offering courses earlier in the Regular Shift, First Shift, Second Shift/Part Time are now amalgamated as total intake and shall have to fulfil all facilities such as Infrastructure, Faculty and other requirements as per the norms specified in the Approval Process Handbook 2024-25 to 2027 for the Total Approved Intake.
4. In case of any differences in content in this Computer generated Extension of Approval Letter, the content/information as approved by the **Executive Council / General Council as available on the record of AICTE shall be final and binding.**
5. All AICTE institutions are highly encouraged to get NBA/NAAC accreditation. All eligible AICTE institutions are thoroughly encouraged to participate in NIRF ranking process.
6. Deemed to be University: Institutions Deemed to be Universities (Running Technical Education Programmes), it is mandatory to have AICTE approval from the Academic Year 2018-19 in compliance of the Hon'ble Supreme Court Order dated 03-11-2017 passed in CA No.17869- 17870 /2017.
7. AICTE Approved Institutes are encouraged to utilize SWAYAM PLUS Courses up-to 40%
8. Internship is mandatory for all admitted students.
9. AICTE Approved Institutes are encouraged to make efficient use of the flagship schemes like:
   a. Parakh: Student Gap analysis portal bases services.
   b. Students Scholarship schemes like Pragati, Saksham, Swanath, ADF, etc.
   c. Course in Indian Languages.
   d. ATAL FDPs: Faculty training for Emerging areas and cutting edge Technologies.
   e. Augmenting Utilization of Research Assets (AURA).
   f. Smart India Hackathon: World's largest Open Innovation Platform.

Prof.Rajive Kumar
Member Secretary, AICTE

Copy to:

1. **The Director Of Technical Education**, Odisha**
2. **The Principal / Director,**
   PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
   At-Chhendipadapo-Chhendipadaps-Chhendipadadist-Angulpin-759124Orissa,
   Vill-Chhendipada,Angul,
   Odisha,759124

3. **The Secretary / Chairman,**
AT-CHHENDIPADA
PO-CHHENDIPADA
PS-CHHENDIPADA
DIST-ANGUL
ORISSA
PIN-759124
CHHENDIPADA,ANGUL
Orissa,759124

4. **Guard File(AICTE)**

Note: Validity of the Course details may be verified at http://www.aicte-india.org/

** Individual Approval letter copy will not be communicated through Post/Email. However, a consolidated list of Approved Institutions(bulk) may be downloaded from the respective login id's.

This is a computer generated Statement. No signature Required

STATE COUNCIL FOR TECHNICAL EDUCATION & VOCATIONAL TRAINING, ODISHA

ରାଜ୍ୟ ବୈଷୟିକ ଶିକ୍ଷା ଓ ପ୍ରଶିକ୍ଷଣ ପରିଷଦ, ଓଡ଼ିଶା

No 2002 /Dt 04.11.2024
SCTE(D) -95/2010

To

The Principals of all Polytechnics
& PDIS Institutions.

Sub: **Revised Academic Calendar for 2024-25.**

Madam/Sir,

With reference to the above subject, I am to enclose herewith the Revised Academic Calendar for 2024-25 session duly approved by the DTE&T-cum-V.C for further action at your end. The Revised Academic Calendar is subject to last minutes change upon instructions from AICTE/Government.

Encl: As above

Yours Faithfully,

4/11/24
Secretary

Memo No 2003 /Dt 04.11.2024

Copy submitted to the DTE&T ,Odisha ,Cuttack for kind information.

4/11/24
Secretary

Memo No 2004 /Dt 04.11.2024

Copy submitted to Additional Secretary to Govt., SD&TE Department,Odisha, Bhubaneswar for kind information.

4/11/24
Secretary

REVISED ACADEMIC CALENDAR OF DIPLOMA AND PDIS COURSES FOR THE SESSION 2024-25

Sl.No	ACTIVITY	1st SEMESTER	3rd /5th /7th (PT) SEMESTER
1	Induction Programme for 1st semester Diploma Courses & Coverage of Bridge Course	01.08.2024 to 14.08.2024	--------
2	Last date for uploading of Lesson Plan subject wise by Individual Faculty in the Institution Website	14.08.2024	29.06.2024
3	Commencement of Semester Classes	16.08.2024	01.07.2024
4	Readmission at Institute Level	--------	02.07.2024 to 13.07.2024
5	Reporting Readmission Data to SCTEVT online	--------	15.07.2024 to 20.07.2024
6	Internal Assessment	1st Week of Oct-2024	2nd Week of Sept-2024
7	Puja Holidays	07.10.2024 to 12.10.2024	07.10.2024 to 12.10.2024
8	Issue of SCTE&VT Registration Numbers	**20.11.2024**	**20.11.2024 (3rd Sem LE Student)**
9	Semester Exams Registration(Regular students)	**4th Week of Nov-2024**	**4th Week of Nov-2024**
10	2nd Internal Assessment	**3rd Week of Dec-2024**	----
11	Closing of Attendance	**24.12.2024**	**16.12.2024**
12	X' Mas Holidays	**25.12.2024 to 31.12.2024**	**25.12.2024 to 31.12.2024**
13	Tentative Date of Semester Examination	**02.01.2025**	**02.01.2025**
14	Tentative Date of Publication of Results	**31.03.2025**	**31.03.2025**
Sl.No	**ACTIVITY**	**2ND SEMESTER**	**4th/6th/8th(PT) SEMESTER**
1	Last date for uploading of Lesson Plan subject wise by Individual Faculty in the Institution Website	**01.02.2025**	**01.02.2025**
2	Commencement of Classes	**04.02.2025**	**04.02.2025**
3	Readmission at Institute Level	**05.02.2025 to 12.02.2025**	**05.02.2025 to 12.02.2025**
4	Reporting Readmission Data to SCTEVT online	**13.02.2025 to 20.02.2025**	**13.02.2025 to 20.02.2025**
5	Semester Exams Registration (Regular students)	**3rd Week of March-2025**	**3rd Week of March-2025**
6	1st Internal Assessment	**4th Week of March-2025**	**4th Week of March-2025**
7	Branch Change of 2nd sem. Students by Principals at Institute Level	**Upto 31.03.2025**	--------
8	Reporting Branch Change cases to SCTE&VT online	**02.04.2025 to 09.04.2025**	--------
9	2nd Internal Assessment	**1st Week of May-2025**	----
10	Closing of Attendance	**17.05.2025**	**17.05.2025**
11	Tentative Date of Semester Examination	**26.05.2025**	**26.05.2025**
12	Internship and Summer Break for Students	**17.06.2025 to 30.06.2025**	**17.06.2025 to 30.06.2025**
13	Tentative Date of Publication of Results	**31.07.2025**	**30.06.2025**
14	Tentative date for starting of next Session	**01.07.2025**	**01.07.2025**

1. **There shall be 39 periods of class per week and each of minimum 55 minutes duration for all semesters for 2nd & 3rd Year.**
2. **However, there shall 33 periods of class per week for 1st Year students. Each period is of 1 hour duration.**
3. **Principals are to arrange extra classes during Holidays and Off hours, wherever necessary, to complete the syllabus in time.**
4. **Annual Athletic Meet, Annual Cultural Meet may be conducted during even Semester.**
5. **The Internship Policy of AICTE is to be scrupulously followed and to be arranged at Institution level. Induction Programme for 1st semester students is to be implemented as per AICTE Guidelines.**
6. **Attendance Registers must be maintained in the prescribed cumulative manner by faculties in every class.**
7. **Monthly tests to be conducted every month apart from Internal Assessment.**

DTE&T cum Vice-Chairman.

PURNA CHANDRA INSTITUTE OF ENGINEERING &TECHNOLOGY ,CHHENDIPADA,ANGUL

NO:- PCIET/ACAD/2623/24 **DATE:-12/08/2024**

TIME TABLE FOR 1ST SEM. FOR THE SESSION -2024-25 W.E.F/DT. 16/08/2024

BRANCH:- CIVIL ENGG. (SECTION-C)

DAYS	SECTION	9.15 Am-10.15 Am (1st)	10.15 Am-11.15 Am (2nd)	11.15 Am-12.15 Pm (3rd)	12.15 Pm – 1.15 Pm (4th)	1.15 Pm-02.10 Pm	2.10Pm-3.10 Pm (5th)	3.10 Pm-4.10 Pm (6th)
MONDAY	C	APPLIED PHYSICS -1 (Lalatendu Sahu)	ENGG.MATH-1 (Kshira Mohan Behera)	FUND. OF ELECT. & ETC. ENGG (Rashmita Gadanayak)	ENVIRONMENTAL SCIENCE (Tapan Kumar Sahoo)	R	ENGG. GRAPHICS (C1 & C2) Sumanta Sahoo/Pritam Sagar Sahoo/ Bishnu Behera)	
TUESDAY	C	ENVIRONMENTAL SCIENCE (Tapan Kumar Sahoo)	ENGG.MATH-1 (Kshira Mohan Behera)	INTRODUCTION TO IT SYSTEM LAB (C1) (Jyotirmayee Pradhan/ Kusuma Manjari Biswal)		E	SPORTS & YOGA PRACTICAL (C1)	
				FUND. OF ELECT. & ETC. ENGG. LAB.(C2) (Rashmita Gadanayak)			APPLIED PHYSICS-1 LAB. (C2) (Lalatendu Sahu/ Sandhyarani Dehury)	
WEDNESDAY	C	APPLIED PHYSICS -1 (Lalatendu Sahu)	ENGG.MATH-1 (Saroj Ku Sahoo)	FUND. OF ELECT. & ETC. ENGG. (Rashmita Gadanayak)	INTRODUCTION TO IT SYSTEM (Diptimayee Pradhan)	C	ENGG. GRAPHICS (C1 & C2) (Swarna Prava Parida/ Ipsita Nayak)	
THURSDAY	C	APPLIED PHYSICS -1 (Lalatendu Sahu)	ENGG.MATH-1 (Saroj Ku Sahoo)	FUND. OF ELECT. & ETC. ENGG (Sushil Majhi)	INTRODUCTION TO IT SYSTEM (Diptimayee Pradhan)	E S	INTRODUCTION TO IT SYSTEM LAB (C1) (Aswini Pradhan/ Kusuma Manjari Biswal)	
FRIDAY	C	ENVIRONMENTAL SCIENCE (Nirupama Behera)	SPORTS & YOGA PRACTICAL (C2)		INTRODUCTION TO IT SYSTEM (Diptimayee Pradhan)		FUND. OF ELECT. & ETC. ENGG LAB. (C1) (Sushil Majhi / Ramesh Ch. Pradhan)	
			APPLIED PHYSICS-1 LAB. (C1) (Dolagobinda Sahu/ S.R. Dehury)			S	INTRODUCTION TO IT SYSTEM LAB. (C2) (Jyotirmayee Pradhan/ Kusuma Manjari Biswal)	
SATURDAY	C	ENVIRONMENTAL SCIENCE (Nirupama Behera)	FUND. OF ELECT. & ETC. ENGG. (Rashmita Gadanayak)	APPLIED PHYSICS -1 (Lalatendu Sahu)	xxxx		XXXXX	

Section:- Civil (C1) Regd. No.- F24060001001 TO F24060001032
Civil (C2) Regd. No. F2406000 TO F24060001064

Copy to:-Office N.B./ Hostel N.B/ All Dept's/ Academic Section/W/S/Time table file for information &necessary action.

PRINCIPAL
P.C.I.E.T., Chhendipada

PRINCIPAL
Purna Chandra Institute of Engineering & Technology
CHHENDIPADA, ANGUL

PURNA CHANDRA INSTITUTE OF ENGINEERING &TECHNOLOGY ,CHHENDIPADA,ANGUL

NO:- PCIET/ACAD/ 2623 /24 DATE:- 12 /08/2024

TIME TABLE FOR 1ST SEM. FOR THE SESSION -2024-25 W.E.F/DT. 16/08/2024

BRANCH:- MECHANICAL ENGG. (SECTION –MA & MB)

DAYS	SECTION	9.15 Am-10.15 Am (1st)	10.15 Am-11.15 Am (2nd)	11.15 Am-12.15 Pm (3rd)	12.15 Pm – 1.15 Pm (4th)	1.15 Pm-02.10 Pm	2.10Pm-3.10 Pm (5th)	3.10 Pm-4.10 Pm (6th)
MONDAY	MA	ENVIRONMENTAL SCIENCE (Nirupama Behera)	FUND. OF ELECT. ETC. ENGG. (Sushil Majhi)	INTRODUCTION TO IT SYSTEM (Diptimayee Pradhan)	ENGG. MATH-1 (Kshira Mohan Behera)	R	INTRODUCTION TO IT SYSTEM LAB (MA) (Jyotirmayee Pradhan/ Kusuma Manjari Biswal)	
	MB	ENGG. MATH-1 (Saroj Ku Sahoo)	ENVIRONMENTAL SCIENCE (Tapan Ku Sahu)	APPLIED PHYSICS -1 (Dolagobinda Sahu)	FUND. OF ELECT. & ETC. ENGG (Subhashree Pradhan)		SPORTS & YOGA PRACTICAL (MB1)	
							APPLIED PHYSICS-1 LAB. (MB2) (Lalatendu Sahu/ S. Dehury)	
TUESDAY	MA	ENVIRONMENTAL SCIENCE (Nirupama Behera)	FUND. OF ELECT. & ETC. ENGG (Subhashree Pradhan)	INTRODUCTION TO IT SYSTEM (Aswini Ku Pradhan)	ENGG. MATH-1 (Kshira Mohan Behera)	E	ENGG. GRAPHICS (MA) (Swarna Prava Parida/ Pritam Sagar Sahoo / Bishnu Charan Behera	
	MB	ENGG. MATH-1 (Saroj Ku Sahoo)	APPLIED PHYSICS -1 (Dolagobinda Sahu)	SPORTS & YOGA PRACTICAL (MB2)			INTRODUCTION TO IT SYSTEM LAB (MB) (Aswini Ku Pradhan/ Kusuma Manjari Biswal)	
				APPLIED PHYSICS-1 LAB. (MB1) (Lalatendu Sahu/ S. Dehury)				
WEDNESDAY	MA	ENVIRONMENTAL SCIENCE (Tapan Ku Sahu)	FUND. OF ELECT. & ETC. ENGG (Bibhuti Sahu)	APPLIED PHYSICS -1 (Lalatendu Sahu)	ENGG. MATH-1 (Saroj Ku Sahoo)	C	SPORTS & YOGA PRACTICAL. (MA1)	
							APPLIED PHYSICS-1 LAB. (MA2) (Lalatendu Sahu/ S. Dehury)	
	MB	ENGG. MATH-1 (Kshira Mohan Behera)	ENVIRONMENTAL SCIENCE (Nirupama Behera)	ENGG. GRAPHICS (MB) (Pritam Sagar Sahoo/ Bishnu Charan Behera)			INTRODUCTION TO IT SYSTEM LAB. (MB1) (Jyotirmayee Pradhan/ Kusuma Manjari Biswal)	
							FUND. OF ELECT. & ETC. ENGG. LAB. (MB2) (Subhashree Pradhan/ Krutibasa Behera)	

DAYS	SECTION	9.15 Am-10.15 Am (1st)	10.15 Am-11.15 Am (2nd)	11.15 Am-12.15 Pm (3rd)	12.15 Pm – 1.15 Pm (4th)	1.15 Pm-02.10 Pm	2.10Pm-3.10 Pm (5th)	3.10 Pm-4.10 Pm (6th)
THURSDAY	MA	ENVIRONMENTAL SCIENCE (Tapan Ku Sahu)	FUND. OF ELECT. & ETC. ENGG (Subhashree Pradhan)	APPLIED PHYSICS -1 (Lalatendu Sahu)	ENGG. MATH-1 (Saroj Ku Sahoo)	E	ENGG. GRAPHICS (MA) (Sumanta Pradhan/Pitam Sagar Sahoo)	
	MB	ENGG. MATH-1 (Kshira Mohan Behera)	INTRODUCTION TO IT SYSTEM (Aswini Ku Pradhan)	INTRODUCTION TO IT SYSTEM LAB. (MB2) (Jyotirmayee Pradhan/ Kusuma Manjari Biswal) / FUND. OF ELECT. & ETC. ENGG. LAB. (MB1) (Bibhuti Sahu/ Krutibasa Behera)			ENVIRONMENTAL SCIENCE (Nirupama Behera)	FUND. OF ELECT. & ETC. ENGG (Bibhuti Sahu)
FRIDAY	MA	APPLIED PHYSICS -1 (Dolagobinda Sahu)	INTRODUCTION TO IT SYSTEM (Jyotirmayee Pradhan)	FUND. OF ELECT. & ETC. ENGG. LAB. (MA1) (Bibhuti Sahu/ Lili Nayak) / INTRODUCTION TO IT SYSTEM LAB. (MA2) (Aswini Ku Pradhan/ Kusuma Manjari Biswal)		S	SPORTS & YOGA PRACTICAL (MA2) / APPLIED PHYSICS-1 LAB. (MA1) (Lalatendu Sahu/ S. Dehury)	
	MB	INTRODUCTION TO IT SYSTEM (Aswini Ku Pradhan)	APPLIED PHYSICS -1 (Lalatendu Sahu)	ENVIRONMENTAL SCIENCE (Nirupama Behera)	FUND. OF ELECT. & ETC. ENGG (Subhashree Pradhan)	S	ENGG. GRAPHICS (MB) (Pitam Sagar Sahoo/ Ipsita Nayak)	
SATURDAY	MA	APPLIED PHYSICS -1 (Dolagobinda Sahu)	INTRODUCTION TO IT SYSTEM LAB. (MA1) (Diptimayee Pradhan/ Kusuma Manjari Biswal) / FUND. OF ELECT. & ETC. ENGG. LAB. (MA2) (Subhashree Pradhan/ Krutibasa Behera)		xxxx / xxxx		xxxxxx	
	MB	INTRODUCTION TO IT SYSTEM (Jyotirmayee Pradhan)	APPLIED PHYSICS -1 (Lalatendu Sahu)	FUND. OF ELECT. & ETC. ENGG (Bibhuti Sahu)	xxxx			

Section:- Mech.(MA_1) Regd. No. F24060004001 TO F24060004032
Mech. (MA_2) Regd. No. F24060004033 TO F24060004064
Mech. (MB_1) Regd. No. F24060004065 TO F24060004096
Mech (MB_2) Regd. No. F24060004097 TO F24060004126

PRINCIPAL
P.C.I.E.T., Chhendipada.

PRINCIPAL
Purna Chandra Institute of
Engineering & Technology

Copy to:-Office N.B./ Hostel N.B/ All Dept's/ Academic Section/W/S/Time table file for information &necessary action.

PURNA CHANDRA INSTITUTE OF ENGINEERING &TECHNOLOGY ,CHHENDIPADA,ANGUL

NO:- PCIET/ACAD/ 2623 /24 DATE:- 12 /08/2024

TIME TABLE FOR 1ST SEM. FOR THE SESSION -2024-25 W.E.F/DT. 16/08/2024

BRANCH:- ELECTRICAL ENGG. (SECTION-EA & EB)

DAYS	SECTION	9.15 Am-10.15 Am (1st)	10.15 Am-11.15 Am (2nd)	11.15 Am-12.15 Pm (3rd)	12.15 Pm – 1.15 Pm (4th)	1.15 Pm-02.10 Pm	2.10Pm-3.10 Pm (5th)	3.10 Pm-4.10 Pm (6th)
MONDAY	EA	ENGG. MATH-1 (Kshira Mohan Behera)	COMM. SKILLS IN ENGLISH (Subhendu Pani)	APPLIED PHYSICS -1 (Lalatendu Sahu)	ENVIRONMENTAL SCIENCE (Nirupama Behera)	R	COMM. SKILLS IN ENGLISH LAB. (EA1) (Sidheswar Dash)	
							APPLIED PHYSICS-1 LAB. (EA2) (Dolagobinda Sahu/ S. Dehury)	
	EB	COMM. SKILLS IN ENGLISH (Sidheswar Dash)	ENGG. MECHANICS (Manas Ranjan Behera)	ENGG. MATH-1 (Saroj Ku Sahoo)	ENVIRONMENTAL SCIENCE (Tapan Ku Sahu)		ENGG. MECHANICS LAB.(EB1) (Manas Ranjan Behera)	
							COMM. SKILLS IN ENGLISH LAB. (EB2) (Subhendu Pani)	
TUESDAY	EA	ENGG. MATH-1 (Saroj Ku Sahoo)	ENGG. MECHANICS (Manas Ranjan Behera)	ENGG. MECHANICS LAB.(EA1) (Dewan Ku Sahu/ Manas Ranjan Behera)		E	ENGG. WORKSHOP PRACTICE (EA) (G.S. Pradhan/ K.C. Sahu/ Bhimsen Rout/ D. B. Mohanty)	
				COMM. SKILLS IN ENGLISH LAB. (EA2) (Sidheswar Dash)				
	EB	APPLIED PHYSICS-1 LAB. (EB2) (Lalatendu Sahu)		APPLIED PHYSICS -1 (Lalatendu Sahu)	ENGG. MECHANICS (Dewan Ku Sahu)		ENGG. MECHANICS LAB.(EB1) (Dewan Ku Sahu/ Manas Ranjan Behera)	
		COMM.SKILLS IN ENGLISH LAB. (EB1) (Subhendu Pani)					COMM. SKILLS IN ENGLISH LAB. (EB2) (Subhendu Pani / Sidheswar Dash)	
WEDNESDAY	EA	ENGG. MATH-1 (Saroj Ku Sahoo)	ENGG. MECHANICS (Dewan Ku Sahu)	COMM.SKILLS IN ENGLISH LAB. (EA2) (Sidheswar Dash)		C	APPLIED PHYSICS -1 (Dolagobinda Sahu)	ENVIRONMENTAL SCIENCE (Nirupama Behera)
				APPLIED PHYSICS -1 (EA1) (Lalatendu Sahu / S. Dehury)				
	EB	COMM. SKILLS IN ENGLISH (Subhendu Pani)	APPLIED PHYSICS -1 (Dolagobinda Sahu)	ENVIRONMENTAL SCIENCE (Tapan Ku sahu)	ENGG. MATH-1 (Kshira Mohan Behera)		ENGG. WORKSHOP PRACTICE (EB) (G.S. Pradhan/ K.C. Sahu/ Bhimsen Rout/ D. B. Mohanty)	

DAYS	SECTION	9.15 Am-10.15 Am (1st)	10.15 Am-11.15 Am (2nd)	11.15 Am-12.15 Pm (3rd)	12.15 Pm – 1.15 Pm (4th)	1.15 Pm-02.10 Pm	2.10Pm-3.10 Pm (5th)	3.10 Pm-4.10 Pm (6th)
THURSDAY	EA	APPLIED PHYSICS -1 (Lalatendu Sahu)	ENVIRONMENTAL SCIENCE (Tapan Ku sahu)	ENGG. MECHANICS LAB.(EA2) (Manas Ranjan Behera/ Pradeep Ku. Sahu)		E	ENGG. MECHANICS (Bikash Sahu)	COMM. SKILLS IN ENGLISH (Subhendu Pani)
				COMM. SKILLS IN ENGLISH LAB. (EA1) (Subhendu Pani)				
	EB	APPLIED PHYSICS -1 (Dolagobinda Sahu)	ENVIRONMENTAL SCIENCE (Nirupama Behera)	ENGG. MECHANICS (Manas Ranjan Behera)	ENGG. MATH-1 (Kshira Mohan Behera)	S	APPLIED PHYSICS-1 LAB. (EB2) (Dolagobinda Sahu/ S. Dehury)	
							COMM. SKILLS IN ENGLISH LAB. (EB1) (Sidheswar Dash)	
FRIDAY	EA	COMM. SKILLS IN ENGLISH (Subhendu Pani)	ENGG. MATH-1 (Kshira Mohan Behera)	APPLIED PHYSICS -1 (Dolagobinda Sahu)	ENVIRONMENTAL SCIENCE (Tapan Ku sahu)	S	ENGG. WORKSHOP PRACTICE (EA) (G.S. Pradhan/ K.C. Sahu/ Bhimsen Rout/ D. B. Mohanty)	
	EB	ENGG. MECHANICS (Bikash Sahu	ENVIRONMENTAL SCIENCE (Nirupama Behera)	ENGG. MATH-1 (Saroj Ku Sahoo)	APPLIED PHYSICS -1 (Lalatendu Sahu)		SPORTS & YOGA PRACTICAL LAB. (EB)	
SATURDAY	EA	ENGG. MECHANICS (Dewan Ku Sahu	SPORTS & YOGA PRACTICAL LAB. (EA)		xxxx		xxxxxx	
	EB	COMM. SKILLS IN ENGLISH (Subhendu Pani)	ENGG. WORKSHOP PRACTICE (EB) (G.S. Pradhan/ K.C. Sahu/ Bhimsen Rout/ D. B. Mohanty)		xxxx			

Section:- (EA_1): Elect. Regd. No. F24060002001 TO F24060002032
Section:- (EA_2):Elect.Regd. No. F240600020333 TO F24060002063
Section:- (EB_1) :Elect. Regd. No. F24060002064 TO F24060002095
Section:- (EB_2): Elect.Regd. No.F24060002096 TO F24060002127

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PURNA CHANDRA INSTITUTE OF ENGINEERING &TECHNOLOGY ,CHHENDIPADA,ANGUL

NO:- PCIET/ACAD/ 2623 /24 DATE:- 12 /08/2024

TIME TABLE FOR 1ST SEM. FOR THE SESSION -2024-25 W.E.F/DT. 16/08/2024

BRANCH:- MINING ENGG. (SECTION –MNA & MNB)

DAYS	SECTION	9.15 Am-10.15 Am (1st)	10.15 Am-11.15 Am (2nd)	11.15 Am-12.15 Pm (3rd)	12.15 Pm – 1.15 Pm (4th)	1.15 Pm-02.10 Pm	2.10Pm-3.10 Pm (5th)	3.10 Pm-4.10 Pm (6th)
MONDAY	MNA	ENGG. MECHANICS (Satyabrata Majhi)	ENGG. MATH-1 (Saroj Ku Sahoo)	ENGG. MECHANICS LAB.(MNA1) (Satyabrata Majhi) / COMM. SKILLS IN ENGLISH LAB. (MNA2) (Subhendu Pani/ Sidheswar Dash)		R	ENGG. WORKSHOP PRACTICE (MNA) (G.S. Pradhan/ K.C. Sahu/ Bhimsen Rout/ D. B. Mohanty)	
	MNB	APPLIED PHYSICS-1 LAB- (MNB1) (Dolagobinda Sahu / S.Dehury) / COMM. SKILLS IN ENGLISH LAB. (MNB2) (Subhendu Pani)		ENGG. MECHANICS (Bikash Sahu)	ENGG. MATH-1 (Saroj Ku Sahoo)		SPORTS & YOGA PRACTICAL (MNB)	
TUESDAY	MNA	ENGG. MECHANICS LAB. (MNA2) (Bikash Sahu/ Pradip Ku. Sahu) / COMM. SKILLS IN ENGLISH LAB. (MNA1) (Subhendu Pani)		APPLIED PHYSICS -1 (Dolagobinda Sahu)	COMM. SKILLS IN ENGLISH (Subhendu Pani)	E	ENGG. MATH-1 (Saroj Ku Sahoo)	ENVIRONMENTAL SCIENCE (Tapan Ku Sahu)
	MNB	ENGG. MECHANICS (Bikash Sahu)	COMM. SKILLS IN ENGLISH (Sidheswar Dash)	ENGG. WORKSHOP PRACTICE (MNB) (G.S. Pradhan/ K.C. Sahu/ Bhimsen Rout/ D. B. Mohanty)			ENVIRONMENTAL SCIENCE (Nirupama Behera)	APPLIED PHYSICS -1 (Dolagobinda Sahu)
WEDNESDAY	MNA	ENGG. MECHANICS (Satyabrata Majhi)	ENVIRONMENTAL SCIENCE (Nirupama Behera)	ENGG. MATH-1 (Saroj Ku Sahoo)	COMM. SKILLS IN ENGLISH (Sidheswar Dash)	C	SPORTS & YOGA PRACTICAL (MNA)	
	MNB	APPLIED PHYSICS-1 LAB- (MNB2) (Lalatendu Sahu / S. Dehury) / COMM. SKILLS IN ENGLISH LAB. (MNB1) (Sidheswar Dadsh)		COMM. SKILLS IN ENGLISH (Subhendu Pani)	ENVIRONMENTA SCIENCE (Tapan Ku Sahu)		ENGG. MATH-1 (Kshira Mohan Behera)	APPLIED PHYSICS -1 (Lalatendu Sahu)

DAYS	SECTION	9.15 Am-10.15 Am (1st)	10.15 Am-11.15 Am (2nd)	11.15 Am-12.	12.15 Pm – 1.15 Pm (4th)	1.15 Pm-02.10 Pm	2.10Pm-3.10 Pm (5th)	3.10 Pm-4.10 Pm (6th)
THURSDAY	MNA	ENGG. MATH-1 (Kshira Mohan Behera)	APPLIED PHYSICS -1 (Lalatendu Sahu)	APPLIED PHYSICS-1 LAB-(MNA1) (Dolagobinda Sahu / S.Dehury)		E	ENVIRONMENTAL SCIENCE (Nirupama Behera)	COMM. SKILLS IN ENGLISH (Sidheswar Dash)
				COMM. SKILLS IN ENGLISH LAB. (MNA2) (Subhendu Pani)				
	MNB	ENGG. MECHANICS (Bikash Sahu)	ENGG. MATH-1 (Saroj Ku Sahoo)	ENGG. WORKSHOP PRACTICE (MNB) (G.S. Pradhan/ K.C. Sahu/ Bhimsen Rout/ D. B. Mohanty)			ENGG. MECHANICS LAB.(MNB2) (Bikash Sahu/ Pradip Ku. Sahu)	
							COMM. SKILLS IN ENGLISH LAB. (MNB1) (Subhendu Pani)	
FRIDAY	MNA	ENGG. MECHANICS (Satyabrata Majhi)	ENGG. MATH-1 (Saroj Ku Sahoo)	ENGG. WORKSHOP PRACTICE (MNA) (G.S. Pradhan/ K.C. Sahu/ Bhimsen Rout/ D. B. Mohanty)		S	ENVIRONMENTAL SCIENCE (Nirupama Behera)	APPLIED PHYSICS -1 (Dolagobinda Sahu)
	MNB	ENVIRONMENTA SCIENCE (Tapan Ku Sahu)	ENGG. MECHANICS (Bikash Sahu)	APPLIED PHYSICS -1 (Lalatendu Sahu)	ENGG. MATH-1 (Kshira Mohan Behera)		ENGG. MECHANICS LAB.(MNB1) (Satyabrata Majhi/ Pradip Ku Sahu)	
							COMM. SKILLS IN ENGLISH LAB. (MNB2) (Subhendu Pani)	
SATURDAY	MNA	APPLIED PHYSICS -1 (Lalatendu Sahu)	APPLIED PHYSICS-1 LAB-(MNA2) (Dolagobinda Sahu / S.Dehury)		xxx	S	XXXXX	
			COMM. SKILLS IN ENGLISH LAB. (MNA1) (Sidheswar Dash)		xxx			
	MNB	ENGG. MECHANICS (Satyabrata Majhi)	ENVIRONMENTAL SCIENCE (Tapan Ku Sahu)	APPLIED PHYSICS -1 (Lalatendu Sahu)	xxx			

Section:- (MNA_1): Mining Regd. No. F24060010001 TO F24060010032
Section:- (MNA_2): Mining Regd. No. F24060010033 TO F24060010063
Section:- (MNB_1) : MiningRegd. No. F24060010064 TO F24060010095
Section:- (MNB_2): Mining Regd. No. F24060010096 TO F24060010126

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NO. PCIET / ESTT./2590/24 **DATE.25/06/2024**

TIME TABLE FOR 3rd SEM. (CIVIL ENGINEERING) FOR THE SESSION -2024-25 W.E.F/DT.01.07.2024

DAYS	9.15 Am-10.10 Am (1st)	10.10 Am-11.05 Am (2nd)	11.05 Am-12 Noon (3rd)	12--12.55 Pm (4th)	12.55 Pm-01.25Pm	1.25 Pm-02.20 Pm (5th)	2.20Pm-3.15 Pm (6th)	3.15 Pm-4.10 Pm (7th)
MONDAY	STRUCTURAL MECHANICS (Sunil Ku sahu)	GEOTECHNICAL ENGG. (Swarnaprava Parida)	BUILDING MATERIALS & CONSTRUCTION TECHNOLOGY (Sunil Ku sahu)	ESTIMATION & COST EVALUATION-1 (Sidhant Sekhar Mahar)	R	CIVIL ENGG DRAWING-1 (C1) (Sunil Ku Sahu/ Ipsita Nayak)		
						CIVIL ENGG. LAB.-1 (C2) (Sumanta Pradhan/ Babita Sahu)		
TUESDAY	BUILDING MATERIALS & CONSTRUCTION TECHNOLOGY (Babita Sahu)	ESTIMATION & COST EVALUATION-1 (Sidhant Sekhar Mahar / Sumanta Ku Sahoo)			E	ENVIRONMENTAL STUDIES (Sumanta Ku Sahoo)	GEOTECHNICAL ENGG. (Nandini Pradhan)	ESTIMATION & COST EVALUATION-1 (Sidhant Sekhar Mahar)
WEDNESDAY	ENVIRONMENTAL STUDIES (Sumanta Ku Sahoo)	CIVIL ENGG. LAB.-1 (C1) (Swarnaprava Parida/ Babita Sahu)			C	STRUCTURAL MECHANICS (Sunil Ku sahu)	ESTIMATION & COST EVALUATION-1 (Sidhant Sekhar Mahar)	BUILDING MATERIALS & CONSTRUCTION TECHNOLOGY (Sunil Ku sahu)
		CIVIL ENGG DRAWING-1 (C1) (Sunil Ku Sahu/ Ipsita Nayak)						
THURSDAY	GEOTECHNICAL ENGG. (Swarnaprava Parida)	STRUCTURAL MECHANICS (Pritam Sagar Sahoo)	ESTIMATION & COST EVALUATION-1 (Sidhant Sekhar Mahar)	ENVIRONMENTAL STUDIES (Sumanta Ku Sahoo)	E	CIVIL ENGG DRAWING-1 (C2) (Sunil Ku Sahu/ Ipsita Nayak)		
						CIVIL ENGG. LAB.-1 (C1) ((Swarnaprava Parida / Babita Sahu)		
FRIDAY	BUILDING MATERIALS & CONSTRUCTION TECHNOLOGY (Babita Sahu)	CIVIL ENGG. LAB.-1 (C2) (Sumanta Pradhan/ Babita Sahu/ Ipsita Nayak)			S	STRUCTURAL MECHANICS (Sumanta Pradhan)	GEOTECHNICAL ENGG. (Nandini Pradhan)	ENVIRONMENTAL STUDIES (Sumanta Ku Sahoo)
		CIVIL ENGG DRAWING-1 (C1) (Sunil Ku Sahu/ Sumanta Ku. Sahoo)						
SATURDAY	STRUCTURAL MECHANICS (Pritam Sagar Sahoo)	BUILDING MATERIALS & CONSTRUCTION ECHNOLOGY (Babita Sahu)	STUDENT CENTERED ACTIVITIES (SCA) (Pritam Sagar Sahoo)		S			

Group C1- (Civil) Regd. No.- F23060001001 TO F23060001030

C2- (Civil) Regd. No.- F23060001030 TO F23060001048 & (L.E)-L24060001001 TO on wards.

25/06/2024

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NO. PCIET / ESTT./2590/24 **DATE.25/06/2024**

TIME TABLE FOR 3RD SEM. (ELECTRICAL ENGINEERING) FOR THE SESSION -2024-25 W.E.F/DT.01.07.2024

DAYS	SECTION	9.15 Am-10.10 Am (1st)	10.10 Am-11.05 Am (2nd)	11.05 Am-12 Noon (3rd)	12--12.55 Pm (4th)	12.55 Pm-01.25Pm	1.25 Pm-02.20 Pm (5th)	2.20Pm-3.15 Pm (6th)	3.15 Pm-4.10 Pm (7th)
MONDAY	EA	ENVIRONMENTAL STUDIES (Pradyumna Garnaik)	CIRCUIT & NETWORK THEORY (Snehalata Behera)	ENGG. MATH – III (Kshira Mohan Behera	ELEMENT OF MECH.ENGG. (Dewan Ku. Sahu)	R	MECHANICAL ENGG. LAB. (EA1) (Subham pradhan/Bishnu Charan Behera)		
							MECHANICAL WORKSHOP (EA2) (Samir Prasad Sahu/K. C. Sahu /Bhimsen Rout)		
	EB	CIRCUIT & NETWORK THEORY (Saktidata Pradhan)	MECHANICAL ENGG. LAB. (EB1) (Subham Pradhan/ Bishnu Charan Behera)				ENVIRONMENTAL STUDIES (sushil Sahoo)	ELECT. ENGG. MATERIALS (Rashmita Gadanayak	ELEMENT OF MECH.ENGG. (Dewan Ku. Sahu)
			MECHANICAL WORKSHOP (EB2) (G.S Pradhan/K. C. Sahu /Bhimsen Rout)						
TUESDAY	EA	ELECT. ENGG. MATERIALS (Rashmita Gadanayak	MECHANICAL WORKSHOP (EA1) (G.S Pradhan/K. C. Sahu /Bhimsen Rout)			E	ENGG. MATH –III (Saroj ku. Sahoo)	CIRCUIT & NETWORK THEORY (Bishnupriya Sahoo)	ENVIRONMENTAL STUDIES (Pradyumna Garnaik)
			CIRCUIT & SIMULATION LAB. (EA2) (Debabrata Dibya Ranjan / Saktidata Pradhan)						
	EB	ENGG. MATH –III (K.M. Behera	CIRCUIT & NETWORK THEORY (Snehalata Behera)	ELEMENT OF MECH. .ENGG. (Subham Pradhan)	ELECT. ENGG. MATERIALS (Sushil ku. Majhi)		MECHANICAL WORKSHOP (EB1) (G.S Pradhan/K. C. Sahu /Bhimsen Rout)		
							CIRCUIT & SIMULATION LAB. (EB2) (Debabrata Dibya Ranjan / Saktidata Pradhan)		
WEDNESDAY	EA	ENGG. MATH –III (Kshira Mohan Behera	CIRCUIT & SIMULATION LAB. (EA2) (Debabrata/dibya Ranjan / Saktidata Pradhan)			C	CIRCUIT & NETWORK THEORY (Saktidata Pradhan)	ELEMENTS OF MECH. .ENGG. (Subham Pradhan)	ELECT. ENGG. MATERIALS (Sushil ku. Majhi)
			MECHANICAL WORKSHOP (EA1) (G.S Pradhan/Samirprasad sahu/K. C. Sahu /Bhimsen Rout)						
	EB	ELECT. ENGG. MATERIALS (Rashmita Gadanayak	ELEMENTS OF MECH. .ENGG. (Subham Pradhan)	CIRCUIT & NETWORK THEORY (Bishnupriya Sahoo)	ENGG. MATH –III (Saroj ku. Sahoo)		CIRCUIT & SIMULATION LAB. (EB1) (Debabrata/Dibya Ranjan / Saktidata Pradhan)		
							MECHANICAL WORKSHOP (EB2) (G.S Pradhan/K. C. Sahu /Bhimsen Rout)		

THURSDAY	EA	CIRCUIT & NETWORK THEORY **(Saktidata Pradhan)**	ENGG. MATH –III **(Kshira Mohan Behera**	ELECT. ENGG. MATERIALS **(Rashmita Gadanayak**	ENVIRONMEN TAL STUDIES **(Sushil Sahoo)**	E	CIRCUIT & SIMULATION LAB. (EA1) **(Debabrata Dibya Ranjan / Saktidata Pradhan)**		
							MECHANICAL ENGG. LAB. (EA2) **(Subham Pradhan/Bishnu Charan Behera)**		
	EB	ELECT. ENGG. MATERIALS **(Sushil Ku. Majhi)**	MECHANICAL WORKSHOP (EB1) **(Samirprasad Sahu/K. C. Sahu /Bhimsen Rout)**				CIRCUIT & NETWORK THEORY **(Bibhuti Sahoo)**	ENGG. MATH –III **(Kshira Mohan Behera**	ENVIRONMEN TAL STUDIES **(Pradyumna Garnaik)**
			CIRCUIT & SIMULATION LAB. (EB2) **(Debabrata Dibya Ranjan)**						
FRIDAY	EA	ELEMENTS OF MECH. .ENGG. **(Subham Pradhan)**	ENVIRONMEN TAL STUDIES **(Sushil Sahoo)**	ELECT. ENGG. MATERIALS **(Sushil Ku. Majhi)**	CIRCUIT & NETWORK THEORY **(Bishnupriya Sahoo)**	S	CIRCUIT & SIMULATION LAB. (EA1) **(Saktidata Pradhan/ Bibhuti Sahu)**		
							MECHANICAL WORKSHOP (EA2) **(G.S Pradhan/Samirprasad Sahu/Bhimsen Rout)**		
	EB	ENVIRONMEN TAL STUDIES **(Pradyumna Garnaik)**	MECHANICAL ENGG. LAB. (EB2) **(Subham Pradhan/Bishnu Charan Behera)**				ENGG. MATH –III **(Saroj ku. Sahoo)**	ELEMENTS OF MECH. .ENGG. **(Subham Pradhan)**	CIRCUIT & NETWORK THEORY **(Saktidata Pradhan**
			CIRCUIT & SIMULATION LAB. (EB1) **(Debabrata Dibya Ranjan/ Ramesh Chandra Pradhan)**			S			
SATURDAY	EA	ELEMENTS OF MECH. .ENGG. **(Subham Pradhan)**	STUDENT CENTRED ACTIVITIES **(SCA)(EA1 & EA2) (Debabrata Dibya Ranjan/ Lili Nayak)**				XXXX		
	EB	ENVIRONMEN TAL STUDIES **(sushil Sahoo)**	STUDENT CENTRED ACTIVITIES **(SCA) (EB1 & EB2) (Swagat Sahoo/ Bibhuti Sahu)**						

SECTION GROUPINGS

(EA1)	**Elect. Regd. No.**	:	**F23060002001 TO 2032**
(EA2)	**Elect. Regd. No.**	:	**F23060002033 TO 2063**
(EB1)	**Elect. Regd. No.**	:	**F23060002064 TO 2094**
(EB2)	**Elect. Regd. No.**	:	**F23060002095 TO F23060002125, & L24060002001 TO on wards**

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NO. PCIET / ESTT./2590/24 **DATE.25/06/2024**

TIME TABLE FOR 3rd SEM. MECHANICAL ENGINEERING FOR THE SESSION -2024-25 W.E.F/DT.01.07.2024

DAYS	SECTION	9.15 Am-10.10 Am (1st)	10.10 Am-11.05 Am (2nd)	11.05 Am-12 Noon (3rd)	12--12.55 Pm (4th)	12.55 Pm-01.25Pm	1.25 Pm-02.20 Pm (5th)	2.20Pm-3.15 Pm (6th)	3.15 Pm-4.10 Pm (7th)
MONDAY	MA	ENGG. MATERIAL (Dewan Ku Sahu)	MECHANICAL ENGG. DRAWING(MA1 & MA2) (Taranisen Mohanty/Bishnu Ch. Behera/ Bikash Ranjan Sahu)			R	THERMAL ENGG.-1 (Satya Narayan Majhi)	PRODUCTION TECHNOLOGY (Subhasmita Jena)	STRENGTH OF MATERIAL (Taranisen Mohanty)
	MB	THERMAL ENGG.-1 (Himansu Sekhar Samal)	ENVIRONMENTAL STUDIES (Bikash Ranjan Sahu/ Nirupama Behera	PRODUCTION TECHNOLOGY (Samir Prasad Sahu)	STRENGTH OF MATERIAL (Subham Pradhan)		MECHANICAL ENGG. DRAWING(MB1 & MB2) (Dewan ku. Sahu/Bikash Ranjan Sahu/Bishnu Ch. Behera)		
TUESDAY	MA	ENGG. MATERIAL (Dewan Ku Sahu)	ENVIRONMENTAL STUDIES (Manash Ranjan Behera)	PRODUCTION TECHNOLOGY (Subhasmita Jena)	STRENGTH OF MATERIAL (Taranisen Mohanty)	E	MECHANICAL ENGG. DRAWING(MA1 & MA2) (Taranisen Mohanty/ Bikash Ranjan Sahu/Bishnu Ch. Behera)		
	MB	ENGG. MATERIAL (Lakin Ku. Sahoo)	WORKSHOP -II (MB1 & MB2) (Bikash Ranjan Sahu/ Bhimsen Rout/ K.C. Sahu)				PRODUCTION TECHNOLOGY (Samir Prasad Sahu)	ENVIRONMENTAL STUDIES (Manash Ranjan Behera)	THERMAL ENGG.-1 (Satya Narayan Majhi)
WEDNESDAY	MA	MECHANICAL ENGG.LAB. (MA1 & MA2) (Dewan Ku. Sahu/Pradeep Ku.Sahoo)				C	THERMAL ENGG.-1 (Satya Narayan Majhi)	ENVIRONMENTAL STUDIES (Manash Ranjan Behera)	ENGG. MATERIAL (Lakin Ku. Sahoo)
	MB	STRENGTH OF MATERIAL (Taranisen Mohanty)	ENVIRONMENTAL STUDIES (Bikash Ranjan Sahu/ Nirupama Behera	ENGG. MATERIAL (Abinash Sahoo)	THERMAL ENGG.-1 (Himansu Sekhar Samal)		WORKSHOP -II (MB1 & MB2) (G.S Pradhan/K.C Sahu/ B.S Rout)		

THURSDAY	MA	THERMAL ENGG.-1 **(Himansu Sekhar Samal)**	WORKSHOP -II (MA1 & MA2) **(G.S Pradhan/Bikash Ranjan sahu/ Bhimsen Rout/ Lakin Ku.Sahu)**			**E**	PRODUCTION TECHNOLOGY **(Samir Prasad Sahu)**	STRENGTH OF MATERIAL **(Subham Pradhan)**	ENGG. MATERIAL **(Lakin Ku. Sahoo)**
	MB	MECHANICAL ENGG.LAB. (MB1 & MB2) **(Dewan Ku. Sahu/ Pradeep Ku.Sahoo))**					STRENGTH OF MATERIAL **(Taranisen Mohanty)**	ENVIRONMENTAL STUDIES **(Manash Ranjan Behera)**	ENGG. MATERIAL **(Lakin Ku. Sahoo)**
FRIDAY	MA	THERMAL ENGG.-1 **(Himansu Sekhar Samal)**	ENVIRONMENTAL STUDIES **(Manash Ranjan Behera)**	STRENGTH OF MATERIAL **(Subham Pradhan)**	PRODUCTION TECHNOLOGY **(Samir Prasad Sahu)**	**S**	WORKSHOP -II (MA1 & MA2) **(G.S Pradhan/K.C Sahu/B.S Rout)**		
	MB	ENGG. MATERIAL **(Abinash Sahoo)**	MECHANICAL ENGG. DRAWING(MB1 & MB2) **(Bikash Ranjan Sahu/Taranisen Mohanty/ Bishnu Ch. Behera)**				THERMAL ENGG.-1 **(Satya Narayan Majhi)**	PRODUCTION TECHNOLOGY **(Subhasmita Jena)**	STRENGTH OF MATERIAL **(Subham Pradhan)**
SATURDAY	MA	ENVIRONMENTAL STUDIES **(Bikash Ranjan Sahu)**	STUDENT CENTRED ACTIVITIES (SCA) **(Rasabihari Sahu/Satyanarayan Majhi)**				XXXX		
	MB	PRODUCTION TECHNOLOGY **(Subhasmita Jena)**	STUDENT CENTRED ACTIVITIES (SCA) (MB) **(Manas Ranjan Behera /Subhasmita Jena)**			**S**			

SECTION GROUPINGS:

(MA1) Mech. Regd. No	**:-**	**F22060004049 ,F23060004001 TO 4027,**
(MA2) Mech. Regd. No	**:-**	**F23060004028 TO 4054,**
(MB1) Mech. Regd. No	**:-**	**F23060004055 TO 4081,**
(MB2) Mech. Regd. No	**:-**	**F23060004082 TO 4108 ,& L24060004001 TO on wards**

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NO. PCIET / ESTT./2590/24 **DATE.25/06/2024**

TIME TABLE FOR 3rd SEM. MINING ENGINEERING FOR THE SESSION -2024-25 W.E.F/DT.01.07.2024

DAYS	SECTION	9.15 Am-10.10 Am (1st)	10.10 Am-11.05 Am (2nd)	11.05 Am-12 Noon (3rd)	12--12.55 Pm (4th)	12.55 Pm-01.25Pm	1.25 Pm-02.20 Pm (5th)	2.20Pm-3.15 Pm (6th)	3.15 Pm-4.10 Pm (7th)
MONDAY	MNA	SURFACE MINING TECHNOLOGY (Srikanta Samal)	MINE SURVEY-I LAB (MNA1) (Sunil Ku Sahu)			R	MECHANICAL OPERATION IN MINES (Dewan Ku. Sahu)	MINE GEOLOGY- 1 (Gobind Ch. Sethy)	ENVIRONMENTAL STUDIES (Uday Biswanath Pradhan)
			MINE GEOLOGY- 1 LAB (MNA2) (Uday Biswanath Pradhan)						
	MNB	MINE GEOLOGY- 1 (Pratyush Rout)	MECHANICAL OPERATION IN MINES (Rasabihari Sahu)	ENVIRONMENTAL STUDIES (Prabin Ku. Sahoo)	SURFACE MINING TECHNOLOGY (Dillip Ku Dehury)		MINE SURVEY-I LAB (MNB1) (Pranaya Ku. Behera)		
							MINE GEOLOGY- 1 LAB (MNB2) (Pratyush Ku. Rout)		
TUESDAY	MNA	MECHANICAL OPERATION IN MINES (Dewan Ku. Sahu)	ENVIRONMENTAL STUDIES (Uday Biswanath Pradhan)	MINE SURVEY -1 (Sunil Kumar Sahu)	SURFACE MINING TECHNOLOGY (Dillip Ku Dehury)	E	MINE SURVEY-1 LAB. (MNA 2) ((Sunil Ku Sahu)		
							MINE GEOLOGY- 1 LAB (MNA1) (Gobind Ch. Sethy/ Kanha Sahu)		
	MNB	MINE GEOLOGY- 1 (Gobind Ch. Sethy)	MINE SURVEY-I LAB (MNB2) (Sunil Ku Sahu)				SURFACE MINING TECHNOLOGY (Dillip Ku Dehury)	ENVIRONMENTAL STUDIES (Prabin Ku. Sahoo)	MINE SURVEY -1 (Pranay Ku. Behera)
			MINE GEOLOGY- 1 LAB (MNB1) (Pratyush Ku. Rout)						
WEDNESDAY	MNA	ENVIRONMENTAL STUDIES (Prabin Ku. Sahoo)	MINE SURVEY-I LAB (MNA1) (Pranay Ku. Behera)			C	MECHANICAL OPERATION IN MINES LAB. (MNB1 & MNB2) (Dewan Ku Sahu/ Pradip ku. Sahu)		
			MINE GEOLOGY- 1 LAB (MNA2) (Gobind Ch. Sethy)						
	MNB	SURFACE MINING TECHNOLOGY (Srikanta Samal)	MECHANICAL OPERATION IN MINES LAB. (MNB1 & MNB2) (Rasabihari Sahu/ Pradip ku. Sahu)				MINE SURVEY-I LAB (MNB1) (Sunil Ku Sahu)		
							MINE GEOLOGY- 1 LAB (MNB2) (Pratyush Ku. Rout)		

THURSDAY	MNA	MINE SURVEY -1 (Pranay Ku. Behera)	MECHANICAL OPERATION IN MINES LAB. (MNA1 & MNA2) (Dewan Ku Sahu/ Pradeep ku. Sahoo)			**E**	SURFACE MINING TECHNOLOGY (Dillip Ku Dehury	MINE GEOLOGY- 1 (Pratyush Rout)	ENVIRONMENTAL STUDIES (Prabin Ku. Sahoo)
	MNB	ENVIRONMENTAL STUDIES (Uday Biswanath Pradhan)	MINE SURVEY-I LAB (MNB2) (Pranay Ku Behera)				MINE SURVEY -1 (Sunil Kumar Sahu)	MINE GEOLOGY- 1 (Pritam Kumar Pradhan)	MECHANICAL OPERATION IN MINES (Rasabihari Sahu)
			MINE GEOLOGY- 1 LAB (MNB1) (Pritam Kumar Pradhan)						
FRIDAY	MNA	MINE GEOLOGY- 1 (Pritam Kumar Pradhan)	SURFACE MINING TECHNOLOGY (Dillip Ku Dehury	MECHANICAL OPERATION IN MINES (Dewan Ku. Sahu)	MINE SURVEY -1 (Sunil Kumar Sahu)	**S**	MINE SURVEY-I LAB (MNA2) (Sunil Ku Sahu/ Dillip Ku Dehury)		
							MINE GEOLOGY- 1 LAB (MNB1) (Pratyush Ku Rout/ Pritam Ku Pradhan)		
	MNB	MINE SURVEY -1 (Pranay Ku. Behera)	MECHANICAL OPERATION IN MINES (Rasabihari Sahu)	SURFACE MINING TECHNOLOGY (Dillip Ku Dehury	ENVIRONMENTAL STUDIES (Uday Biswanath Pradhan)		MECHANICAL OPERATION IN MINES LAB. (MNB1 & MNB2) (Rasabihari Sahu/ Bishnu Charan Behera)		
SATURDAY	MNA	MINE SURVEY -1 (Pranay Ku. Behera)	MECHANICAL OPERATION IN MINES (Rasabihari Sahu)	MINE GEOLOGY- 1 (Pratyush Ku Rout)	STUDENT CENTRED ACTIVITIES (SCA) (Govind Ch. Sethi)	**S**			
	MNB	MINE GEOLOGY- 1 (Pratyush Rout)	MINE SURVEY -1 (Sunil Kumar Sahu)	MECHANICAL OPERATION IN MINES (Dewan Ku. Sahu)	STUDENT CENTRED ACTIVITIES (SCA) (Lipun Dehury)				

SECTION GROUPINGS: **(MNA1) Mining Regd. No:- F22060010110, F23060010001 TO 10031,**
(MNA2) Mining Regd. No:- F23060010032 TO 10063 ,
(MNB1) Mining Regd. No:- F23060010064 TO 10095 ,
(MNB2) Mining Regd.No:- F23060010096 TO 10126 , & L24060010001 TO onwards

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NO. PCIET / ESTT./2590/24 DATE.25/06/2024

TIME TABLE FOR 5TH SEM. (CIVIL ENGINEERING) FOR THE SESSION -2024-25 W.E.F/DT.01.07.2024

DAYS	9.15 Am-10.10 Am (1st)	10.10 Am-11.05 Am (2nd)	11.05 Am-12 Noon (3rd)	12--12.55 Pm (4th)	12.55 Pm-01.25Pm	1.25 Pm-02.20 Pm (5th)	2.20Pm-3.15 Pm (6th)	3.15 Pm-4.10 Pm (7th)
MONDAY	STRUCTURAL DESIGN-II (Sidhanta Sekhar Mahar)	CIVIL ENGG. LAB.-II (C1) (Satyajit Behera / Babita Sahu)			R	ENTREPRENEURHIP & MANAGEMENT & SMART TECHNOLOGY (Anupama Behera)	RAILWAY & BRIDGE ENGG. (Sidhanta Sekhar Mahar)	WATER SUPPLY & WASTE WATER ENGG. (Swarna Prava Parida)
		ESTIMATING PRACTICE- II (COMPUTER AIDED) C2 (Pritam Sagar Sahu/ Sunil Kumar Sahu)						
TUESDAY	WATER SUPPLY & WASTE WATER ENGG. (Swarna Prava Parida)	STRUCTURAL DESIGN-II (Nandini Pradhan)	RAILWAY & BRIDGE ENGG. (Sumanta Pradhan)	ENTREPRENEURHIP & MANAGEMENT & SMART TECHNOLOGY (Anupama Behera)	E	CIVIL ENGG. LAB.-II (C1 & C2) (Ipsita Nayak / Babita Sahu)		
WEDNESDAY	ENTREPRENEURHIP & MANAGEMENT & SMART TECHNOLOGY (Bhakta Batsal Naik)	RAILWAY & BRIDGE ENGG. (Babita Sahu)	WATER SUPPLY & WASTE WATER ENGG. (Sumanta Ku Sahoo)	ESTIMATING & COST EVALUATION-II (Sunil Ku Sahu)	C	PROJECT PHASE-1 (C1 & C2) (Sumanta Pradhan/ Sidhanta Sekhar Mahar)		
THURSDAY	ESTIMATING & COST EVALUATION-II (Sunil Ku Sahu)	CIVIL ENGG. LAB.-II (C2) (Ipsita Nayak / Babita Sahu)			E	RAILWAY & BRIDGE ENGG. (Sidhanta Sekhar Mahar)	WATER SUPPLY & WASTE WATER ENGG. (Sumanta Ku Sahoo)	STRUCTURAL DESIGN-II (Nandini Pradhan)
		ESTIMATING PRACTICE- II (COMPUTER AIDED) C1 (Pritam Sagar Sahoo/ Sunil Kumar Sahu)						
FRIDAY	STRUCTURAL DESIGN-II	ESTIMATING & COST EVALUATION-II (Pritam Sagar Sahoo)	WATER SUPPLY & WASTE WATER ENGG. (Sumanta Ku Sahoo)	ENTREPRENEURHIP & MANAGEMENT & SMART TECHNOLOGY (Bhakta Batsal Naik)	S	PROJECT PHASE-1 (C1 & C2) (Sumanta Pradhan/ Sumanta Ku Sahoo)		
SATURDAY	ESTIMATING & COST EVALUATION-II (Pritam Sagar Sahoo)	STUDENT CENTRED ACTIVITIES (SCA) (C1 & C2) (Pritam Sagar Sahoo/ Babita Sahu))			S	XXXX		

Group C1- (Civil) Regd. No.- F22060001001 to F22060001037 ,
C2- (Civil) Regd. No.- F22060001038 to F22060001063 & L23060001001 to L23060001007

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NO. PCIET / ESTT./2590/24 **DATE.25/06/2024**

TIME TABLE FOR 5TH SEM. (ELECTRICAL ENGINEERING) FOR THE SESSION -2024-25 W.E.F/DT.01.07.2024

DAYS	SECTION	9.15 Am-10.10 Am (1st)	10.10 Am-11.05 Am (2nd)	11.05 Am-12 Noon (3rd)	12--12.55 Pm (4th)	12.55 Pm-01.25Pm	1.25 Pm-02.20 Pm (5th)	2.20Pm-3.15 Pm (6th)	3.15 Pm-4.10 Pm (7th)
MONDAY	EA	POWER ELECTRONIC & PLC (Subhashree Pradhan)	ELECTRICAL MACHINE LAB-II (EA1) (Krutibas Behera/ Ramesh Ch. Pradhan)			R	ENERGY CONVERSION -II (Bishnupriya Sahoo)	DIGITAL ELECTRONICS & MICROPROCESSOR (Rashmita Gadanayak)	ENTREPRENEURHIP & MANAGEMENT & SMART TECHNOLOGY (Anupama Behera)
			POWER ELECTRONICS & PLC LAB (EA2) (Subhashree Pradhan/ Sugyani Sahu)						
	EB	ENERGY CONVERSION-II (Bijaya Ku Behera)	DIGITAL ELECTRONICS & MICROPROCESSOR (Biswaranjan Jena)	POWER ELECTRONIC & PLC (Sugyani Sahoo)	ENTREPRENEURHIP & MANAGEMENT & SMART TECHNOLOGY (Bhakta Batsal Naik)		ELECTRICAL MACHINE LAB-II (EB1) (Sushil Ku Sahoo/ Ramesh Ch. Pradhan)		
							POWER ELECTRONICS & PLC LAB (EB2) (Subhashree Pradhan/ Sugyani Sahu)		
TUESDAY	EA	ENTREPRENEURHIP & MANAGEMENT & SMART TECHNOLOGY (Bhakta Batsal Naik)	UTILIZATION OF ELECTRICAL ENERGY & TRACTION (Swagat Sahoo)	DIGITAL ELECTRONICS & MICROPROCESSOR (Biswaranjan Jena)	ENERGY CONVERSION-II (Bishnupriya Sahoo)	E	ELECTRICAL MACHINE LAB-II (EA2) (Krutibas Behera/ Ramesh Ch. Pradhan)		
							POWER ELECTRONICS & PLC LAB (EA1) (Subhashree Pradhan/ Sugyani Sahu)		
	EB	UTILIZATION OF ELECTRICAL ENERGY & TRACTION (Subhendu Sekhar Behera)	ELECTRICAL MACHINE LAB-II (EB2) (Ramesh Ch. Pradhan/ Sushil Ku Sahoo)				ENERGY CONVERSION -II (Ramesh Ch. Pradhan)	POWER ELECTRONIC & PLC (Subhashree Pradhan)	DIGITAL ELECTRONICS & MICROPROCESSOR (Rashmita Gadanayak)
			POWER ELECTRONICS & PLC LAB (EB1) (Bibhuti Bhusan Sahu/ Krutibas Behera)						
WEDNESDAY	EA	UTILIZATION OF ELECTRICAL ENERGY & TRACTION (Swagat Sahoo)	POWER ELECTRONIC & PLC (Subhashree Pradhan)	ENERGY CONVERSION-II (Ramesh Ch. Pradhan)	DIGITAL ELECTRONICS & MICROPROCESSOR (Biswaranjan Jena)	C	PROJECT PHASE-1 (Subhashree Pradhan/ Swagat Sahoo/ Krutibas Behera)		
	EB	ENERGY CONVERSION-II (Birendra Ku Bai)	DIGITAL ELECTRONICS & MICROPROCESSOR (Biswaranjan Jena)	POWER ELECTRONIC & PLC (Sugyani Sahoo)	ENTREPRENEURHIP & MANAGEMENT & SMART TECHNOLOGY (Anupama Behera)		ELECTRICAL MACHINE LAB-II (EB1) (Ramesh Ch. Pradhan/ Sushil Ku Sahoo)		
							DIGITAL ETC. & MICRPROCESSOR LAB. (EB2) (Rashmita gadanayak/ Biswaranjan Jena)		

THURSDAY	EA	ENTREPRENEURHIP & MANAGEMENT & SMART TECHNOLOGY (Anupama Behera)	ELECTRICAL MACHINE LAB-II (EA2) (Ramesh Ch. Pradhan/ Sushil Ku Sahoo)			E	POWER ELECTRONIC & PLC (Sugyani Sahoo)	DIGITAL ELECTRONICS & MICROPROCESSOR (Biswaranjan Jena)	UTILIZATION OF ELECTRICAL ENERGY & TRACTION (Subhendu Sekhar Behera)
			DIGITAL ETC. & MICRPROCESSOR LAB. (EA1) (Rashmita Gadanayak / Sugyani Sahoo)						
	EB	POWER ELECTRONIC & PLC (Subhashree Pradhan)	UTILIZATION OF ELECTRICAL ENERGY & TRACTION (Swagat Sahoo)	DIGITAL ELECTRONICS & MICROPROCESSOR (Biswaranjan Jena)	ENTREPRENEURHIP & MANAGEMENT & SMART TECHNOLOGY (Subhendu Pani)		ELECTRICAL MACHINE LAB-II (EB2) (Ramesh Ch. Pradhan/ Sushil Ku Sahoo)		
FRIDAY	EA	ENTREPRENEURHIP & MANAGEMENT & SMART TECHNOLOGY (Bhakta Batsal Naik)	DIGITAL ELECTRONICS & MICROPROCESSOR (Rashmita Gadanayak)	UTILIZATION OF ELECTRICAL ENERGY & TRACTION (Subhendu Sekhar Behera)	ENERGY CONVERSION-II (Bijaya Ku Behera)	S	DIGITAL ETC. & MICRPROCESSOR LAB. (EB1) (Subhashree Pradhan/ Krutibas Behera)		
							ELECTRICAL MACHINE LAB-II (EA1) (Ramesh Ch. Pradhan/ Sushil Ku Sahoo)		
	EB	UTILIZATION OF ELECTRICAL ENERGY & TRACTION (Ramesh Ch. Pradhan)	ENERGY CONVERSION-II (Bishnupriya Sahoo)	ENTREPRENEURHIP & MANAGEMENT & SMART TECHNOLOGY (Anupama Behera)	DIGITAL ELECTRONICS & MICROPROCESSOR (Biswaranjan Jena)		DIGITAL ETC. & MICRPROCESSOR LAB. (EA2) (Subhashree Pradhan/ Sugyani Sahoo)		
SATURDAY	EA	POWER ELECTRONIC & PLC (Sugyani Sahoo)	STUDENT CENTRED ACTIVITIES (SCA) (EA) (Pradyumna GArnaik Bishnupriya Sahoo)			S	PROJECT PHASE-1 (Rashmita Gadanayak/ Swagat Sahoo/ Lili Nayak)		
	EB	UTILIZATION OF ELECTRICAL ENERGY & TRACTION (Subhendu Sekhar Behera)	STUDENT CENTRED ACTIVITIES (SCA) (EB) (Sushil Ku Majhi/ Swagat Sahoo)				XXXX		

SECTION GROUPINGS

(EA1) Elect. Regd. No. : F19060002038, F20060002080, F22060002001 TO 2039
(EA2) Elect. Regd. No. : F22060002040 TO 2075
(EB1) Elect. Regd. No. : F22060002076 TO 2110
(EB2) Elect. Regd. No. : F2060002111 TO 2124, L23060002001 TO L23060002021.

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NO. PCIET / ESTT./2590/24 **DATE.25/06/2024**

TIME TABLE FOR 5TH SEM. MECHANICAL ENGINEERING FOR THE SESSION -2024-25 W.E.F/DT.01.07.2024

DAYS	SECTION	9.15 Am-10.10 Am (1st)	10.10 Am-11.05 Am (2nd)	11.05 Am-12 Noon (3rd)	12--12.55 Pm (4th)	12.55 Pm-01.25Pm	1.25 Pm-02.20 Pm (5th)	2.20Pm-3.15 Pm (6th)	3.15 Pm-4.10 Pm (7th)
MONDAY	MA	REFRIGERATION & AIR CONDITIONING **(Satya Narayan Majhi)**	ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY **(Anupama Behera)**	MECHATRONICS **(Dewan Ku Sahu)**	DESIGN OF MACHINE ELEMENTS **(Taranisen Mohanty)**	R	HYDRAULIC MACHINES & INDUSTRIAL FLUID POWER **(Manas Ranjan Behera)**	REFRIGERATION & AIR CONDITIONING LAB. **(MA1) (Satya Narayan Majhi/ Abinash Sahoo)**	
	MB	HYDRAULIC MACHINES & INDUSTRIAL FLUID POWER **(Subhasmita Jena)**	DESIGN OF MACHINE ELEMENTS **(Lakin Ku Sahu)**	REFRIGERATION & AIR CONDITIONING LAB. **(MB1) (Satya Narayan Majhi/ Abinash Sahoo)**				**CAAD/ CAM LAB. (MA2) (Subhasmita Jena/Rasabihari Sahu)**	
				CAAD/ CAM LAB. (MB2) (Subhasmita Jena/Rasabihari Sahu)			MECHATRONICS **(Rasabihari Sahu)**	REFRIGERATION & AIR CONDITIONING **(Abinash Sahoo)**	ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY **(Bhakta Batsala Naik)**
TUESDAY	MA	PROJECT WORK PHASE- 1 (MA) (Dewan Ku Sahu / G.S. Pradhan / Abinash Sahoo)				E	REFRIGERATION & AIR CONDITIONING **(Satya Narayan Majhi)**	MECHATRONICS **(Dewan Ku Sahu)**	ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY **(Anupama Behera)**
	MB	HUDRAULICS MACHINE & INDUSTRIAL FLUID POWER LAB. (M1 & M2) **(Subhasmita Jena/ Manas Ranjan Behera/Pradeep Ku. Sahu)**					ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY **(Bhakta Batsala Naik)**	REFRIGERATION & AIR CONDITIONING LAB. **(MB1) (Satya Narayan Majhi/ Abinash Sahoo)**	
								CAAD/ CAM LAB. (MB2) (Subhasmita Jena/Rasabihari Sahu)	
WEDNESDAY	MA	DESIGN OF MACHINE ELEMENTS **(Taranisen Mohanty)**	MECHATRONICS **(Rasabihari Sahu)**	HYDRAULIC MACHINES & INDUSTRIAL FLUID POWER **(Subhasmita Jena)**	REFRIGERATION & AIR CONDITIONING **(Abinash Sahoo)**	C	ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY **(Anupama Behera)**	REFRIGERATION & AIR CONDITIONING LAB. **(MA2) (Satya Narayan Majhi/ Abinash Sahoo)**	
	MB	HYDRAULIC MACHINES & INDUSTRIAL FLUID POWER **(Manas Ranjan Behera)**	REFRIGERATION & AIR CONDITIONING **(Satya Narayan Majhi)**	MECHATRONICS **(Dewan Ku Sahu)**	DESIGN OF MACHINE ELEMENTS **(Lakin Ku Sahu)**			**CAAD/ CAM LAB. (MA1) (Subhasmita Jena/Rasabihari Sahu)**	
							STUDENT CENTRED ACTIVITIES (SCA) (MB) (Subham Pradhan/ Manas Ranjan Behera)		

THURSDAY	MA	DESIGN OF MACHINE ELEMENTS **(Lakin Ku Sahu)**	HYDRAULIC MACHINES & INDUSTRIAL FLUID POWER **(Subhasmita Jena)**	REFRIGERATION & AIR CONDITIONING LAB. **(MA2) (Satya Narayan Majhi/ Abinash Sahoo)**		**E**	STUDENT CENTRED ACTIVITIES (SCA) (MB) (Samir Prasad Sahu/ Rasabihari Sahu)		
				CAAD/ CAM LAB. (MA1) (Subhasmita Jena/Rasabihari Sahu)					
	MB	HYDRAULIC MACHINES & INDUSTRIAL FLUID POWER **(Manas Ranjan Behera)**	REFRIGERATION & AIR CONDITIONING **(Satya Narayan Majhi)**	MECHATRONICS **(Rasabihari Sahu)**	DESIGN OF MACHINE ELEMENTS **(Lakin Ku Sahu)**		ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY **(Anupama Behera)**	REFRIGERATION & AIR CONDITIONING LAB. **(MA2) (Satya Narayan Majhi/ Abinash Sahoo)**	
								CAAD/ CAM LAB. (MA1) (Subhasmita Jena/Rasabihari Sahu)	
FRIDAY	MA	HYDRAULIC MACHINES & INDUSTRIAL FLUID POWER **(Manas Ranjan Behera)**	REFRIGERATION & AIR CONDITIONING **(Abinash Sahoo)**	MECHATRONICS **(Rasabihari Sahu)**	DESIGN OF MACHINE ELEMENTS **(Lakin Ku Sahu)**	**S**	ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY **(Anupama Behera)**	REFRIGERATION & AIR CONDITIONING LAB. **(MA2) (Satya Narayan Majhi/ Abinash Sahoo)**	
								CAAD/ CAM LAB. (MA1) (Subhasmita Jena/Rasabihari Sahu)	
	MB	MECHATRONICS **(Dewan Ku Sahu)**	HYDRAULIC MACHINES & INDUSTRIAL FLUID POWER **(Subhasmita Jena)**	REFRIGERATION & AIR CONDITIONING LAB. **(MB2) (Satya Narayan Majhi/ Pradip Ku Sahu)**			REFRIGERATION & AIR CONDITIONING **(Satya Narayan Majhi)**	DESIGN OF MACHINE ELEMENTS **(Taranisen Mohanty)**	ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY **(Subhendu Pani)**
				CAAD/ CAM LAB. (MA1) (Subhasmita Jena/Rasabihari Sahu)					
SATURDAY	MA	HUDRAULICS MACHINE & INDUSTRIAL FLUID POWER LAB. (M1 & M2) **(Subhasmita Jena/ Bishnu Charan Behera/Pradeep Ku. Sahu)**				**S**	XXXXX		
	MB	PROJECT WORK PHASE- 1 (MB) (Satyanarayan Majhi/ Taranisen Mohanty)							

SECTION GROUPINGS:

(MA1) Mech. Regd. No :- F19060004025 , F22060004001 TO 4037 ,
(MA2) Mech. Regd. No :- F22060004039 TO 4074,
(MB1) Mech. Regd. No :- F22060004075 TO 4108
(MB2) Mech. Regd. No :- F22060004109 TO 4125 ,& L23060004001 TO L23060004017.

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TIME TABLE FOR 5TH SEM. MINING ENGINEERING FOR THE SESSION -2024-25 W.E.F/DT.01.07.2024

DAYS	SECTION	9.15 Am-10.10 Am (1st)	10.10 Am-11.05 Am (2nd)	11.05 Am-12 Noon (3rd)	12--12.55 Pm (4th)	12.55 Pm-01.25Pm	1.25 Pm-02.20 Pm (5th)	2.20Pm-3.15 Pm (6th)	3.15 Pm-4.10 Pm (7th)
MONDAY	MNA	MINE LEGISLATION & GENERAL SAFETY-1 **(Dillip Ku Dehury)**	MINE MACHINERY-1 LAB. (MNA1) **(Pratyush Pravanjan Behera)**			R	UNDER GROUND METAL MINING **(Chandan Sahoo)**	ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY **(Bhakta Batsala Naik)**	MINE MACHINERY-1 **(Dillip Ku Dehury)**
			MINE HAZARD & SAFETY LAB. (MNA2) **(Gobind Ch. Sethy/ Sibasundar Maikap)**						
	MNB	MINE MACHINERY- 1 (Pratyush Pravanjan Behera)	MINE HAZARD & SAFETY **(Sibasundar Maikap)**	ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY **(Anupama Behera)**	UNDER GROUND METAL MINING **(Ajay Kumar)**		MINE MACHINERY-1 LAB. (MNB1) **(Dillip Ku Dehury/ Srikanta Samal)**		
							MINE HAZARD & SAFETY LAB. (MNB2) **(Gobind Ch. Sethy/ Sibasundar Maikap)**		
TUESDAY	MNA	ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY **(Anupama Behera)**	MINE MACHINERY- 1 **(Dillip Ku Dehury)**	MINE HAZARD & SAFETY **(Sibasundar Maikap)**	MINE LEGISLATION & GENERAL SAFETY-1 **(Dillip Ku Dehury)**	E	STUDENT CENTRED ACTIVITIES (SCA) (MB) (Srikanta Samal)		
	MNB	ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY **(Anupama Behera)**	MINE HAZARD & SAFETY (Lipun Dehury)	MINE LEGISLATION & GENERAL SAFETY-1 **(Jagandip Mahato)**	MINE MACHINERY- 1 (Pratyush Pravanjan Behera)		UNDER GROUND METAL MINING **(Ajay Kumar)**	MINE HAZARD & SAFETY **(Sibasundar Maikap)**	MINE LEGISLATION & GENERAL SAFETY-1 **(Dillip Ku Dehury)**
WEDNESDAY	MNA	MINE MACHINERY- 1 (Srikanta Samal)	UNDER GROUND METAL MINING **(Chandan Sahoo)**	MINE LEGISLATION & GENERAL SAFETY-1 **(Jagandip Mahato)**	MINE HAZARD & SAFETY **(Sibasundar Maikap)**	C	MINE MACHINERY-1 LAB. (MNB2) **(Pratyush Pravanjan Behera / Srikanta Samal)**		
							MINE HAZARD & SAFETY LAB. (MNB1) **(Gobind ch. Sethy/ Dillip Ku Dehury**		
	MNB	ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY **(Bhakta Batsala Naik)**	MINE MACHINERY-1 LAB. (MNB2) **(Dillip Ku Dehury/ Ajay Kumar)**				MINE HAZARD & SAFETY **(Lipun Dehury)**	MINE MACHINERY-1 **(Srikanta Samal)**	UNDER GROUND METAL MINING **(Ajay Kumar)**
			MINE HAZARD & SAFETY LAB. (MNB1) **(Gobind ch. Sethy/ Prabin Sahoo)**						

THURSDAY	MNA	MINE HAZARD & SAFETY (Gobind Ch. Sethy)	MINE MACHINERY-1 LAB. (MNA1) (Dillip Ku Dehury/ Srikanta Samal)			E	MINE LEGISLATION & GENERAL SAFETY-1 (Jagandip Mahato)	ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY (Anupama Behera)	UNDER GROUND METAL MINING (Srikanta Samal)
			MINE HAZARD & SAFETY LAB. (MNA2) (Gobind Ch. Sethy/ Sibasundar Maikap)						
	MNB	UNDER GROUND METAL MINING (Srikanta Samal)	ENTREPRENEUR SHIP & MANAGEMENT & SMART TECHNOLOGY (Bhakta Batsala Naik)	MINE MACHINERY- 1 (Pravanjan Behera)	MINE LEGISLATION & GENERAL SAFETY-1 (Dillip Ku Dehury)		MINE MACHINERY-1 LAB. (MNB1) (Dillip Ku Dehury/ Srikanta Samal)		
FRIDAY	MNA	UNDER GROUND METAL MINING (Ajay Kumar)	MINE HAZARD & SAFETY (Gobind Ch. Sethy)	MINE MACHINERY- 1 (Pratyush Pravanjan Behera)	ENTREPRENEUR SHIP & MANAGEMENT & SMART TECHNOLOGY (Bhakta Batsala Naik)	S	MINE HAZARD & SAFETY LAB. (MNA2) (Gobind Ch. Sethy/ Sibasundar Maikap)		
							MINE MACHINERY-1 LAB. (MNA2) (Dillip Ku Dehury/ Ajay kumar)		
	MNB	MINE MACHINERY- 1 (Dillip Kumar Dehury)	MINE MACHINERY- 1 LAB (MNB2) (Srikanta Samal/ Jagandip Mahato)				MINE HAZARD & SAFETY LAB. (MNA1) (Sibasundar Maikap /Lipun Ku Dehury)		
			MINE HAZARD & SAFETY LAB. (MNB1) (Sibasundar Maikap /Lipun Ku Dehury)				STUDENT CENTRED ACTIVITIES (SCA) (MNB) (Ajay Kumar/Prabin Sahoo)		
SATURDAY	MNA	PROJECT PHASE – 1 (MNA) (Dillip Ku Dehury / Srikanta Samal)				S			
	MNB	PROJECT PHASE – 1 (MNB) (Dillip Ku Dehury / Gobinda Ch Sethy/ Ajay Kumar)							

SECTION GROUPINGS:

(MNA1) Mining Regd. No:- F20060010092, F22060010001 TO 10033 ,
(MNA2) Mining Regd. No:- F22060010034 TO 10071 ,
(MNB1) Mining Regd. No:- F22060010072 TO 10106 ,
(MNB2) Mining Regd.No:- F22060010107 TO 10124 , & L23060010001 TO L23060010018.

25/06/2024

PRINCIPAL
P.C.I.E.T.,CHHENDIPADA.

PRINCIPAL
Purna Chandra Institute of
Engineering & Technology
CHHENDIPADA, ANGUL

Copy to:-Office N.B./ Hostel N.B/ All Dept's/ Academic Section/W/S/Time table file for information &necessary action.

MURARILAL AGARWALLA & CO.
CHARTERED ACCOUNTANTS

GANESH KUNJ
DURGA VIHAR, TURANG
ANGUL -759122 (ODISHA)
CELL: 9437056900

AUDITOR'S REPORT

WE HAVE AUDITED THE ANNEXED BALANCE SHEET OF PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY, AT/PO : CHHENDIPADA, DIST: ANGUL (ORISSA), AS AT 31ST MARCH.2022 AND THE ANNEXED INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED ON THAT DATE AND REPORT AS FOLLOWS:-

WE HAVE OBTAINED ALL THE INFORMATION AND EXPLANATIONS WHICH TO THE BEST OF OUR KNOWLEDGE AND BELIEF WERE NECESSARY FOR THE PURPOSE OF OUR AUDIT.

THE STATEMENTS OF ACCOUNTS DEALT WITH BY THIS REPORT ARE IN AGREEMENT WITH THE BOOKS OF ACCOUNT MAINTAINED BY THE INSTITUTE.

IN OUR OPINION AND TO THE BEST OF OUR INFORMATION AND ACCORDING TO THE EXPLANATIONS GIVEN TO US THE ACCOUNTS DEALT WITH BY THIS REPORT GIVES A TRUE AND FAIR VIEW:-

i) IN THE CASE OF BALANCE SHEET OF THE STATE OF AFFAIRS OF THE INSTITUTE AS AT 31ST MARCH, 2022

AND

ii) IN THE CASE OF INCOME AND EXPENDITURE ACCOUNT OF THE EXCESS OF INCOME OVER EXPENDITURE FOR THE YEAR ENDED ON 31ST MARCH.2022.

PLACE: ANGUL
DATE : 12/09/2022.
UDIN: 22059905ARXBWR1622

For Murarilal Agarwalla & Co.
Chartered Accountants

Proprietor
M. L. Agarwalla
M. No.:059905

MURARILAL AGARWALLA & CO.
CHARTERED ACCOUNTANTS

GANESH KUNJ
DURGA VIHAR, TUBANG
ANGUL -759122 (ODISHA)
CELL: 9437058500

PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
AT/PO: CHHENDIPADA, DIST: ANGUL - 759124 (ORISSA)

BALANCE SHEET AS AT 31ST MARCH, 2022

LIABILITIES	AMOUNT	ASSETS	AMOUNT
CAPITAL FUND		FIXED ASSETS	88969918.16
Opening Balance	9235022.98	As per Schedule "I"	
Add: Excess of Income over Expenditure	894071.31		
	10129094.29		
Less: Income Tax & TDS	118136.00	CASH & BANK BALANCE	
	10010958.29		
		S.B. A/c. with Canara Bank, Chhendipada	12049.60
LOANS & BORROWINGS			
		C. A/c. with Canara Bank, Chhendipada	137214.29
Term Loan from S.B.I., Chhendipada	768482.32		
		S.B. A/c. with S.B.I., Chhendipada	15150.00
Term Loan from Canara Bank, Chhendipada	1250229.00		
		Current A/c. with S.B.I., Chhendipada	299538.86
Term Loan from Canara Bank, Chhendipada	253083.00		
		C. A/c. with ICICI Bank, Chhendipada	99657.39
Term Loan from Canara Bank, Chhendipada	2732311.00		
		Fixed Deposit with S.B.I., Chhendipada (Including Accrued Interest)	3281138.00
Unsecured Loans	76642109.00		
		Fixed Deposit with S.B.I., Chhendipada (Including Accrued Interest)	942271.00
CURRENT LIABILITIES			
		Cash in Hand	70880.31
Salary Payable	1822664.00		
EPF Payable	132961.00		
Audit Fees	15000.00		
	93827817.61		93827817.61

In terms of our report of even date annexed

PLACE: ANGUL
DATE: 12/09/2022
UDIN: 22059905ARXBWR1622

For Murarilal Agarwalla & Co.
Chartered Accountants

MURARILAL AGARWALLA & CO. ANGUL Chartered Accountants

Proprietor
M. L. Agarwalla
M. No.:059905

MURARILAL AGARWALLA & CO.
CHARTERED ACCOUNTANTS

GANESH KUNJ
DURGA VIHAR, TURANG
ANGUL -759125 (ODISHA)
CELL: 9437038900

PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
AT/PO: CHHENDIPADA, DIST: ANGUL - 759124 (ORISSA)

INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED ON 31ST MARCH 2022
ACCOUNTING YEAR : 2021-2022

EXPENDITURE	AMOUNT	INCOME	AMOUNT
To Annual Function	84650.00	By Fees Received	37389448.00
To Advertisement	290350.00		
To AICTE Exp.	70000.00	By Interest on SD	6046.00
To SCTE & VT	30000.00		
To Bank Charges	28982.37		
To Consumables	489524.00	BY Interest on SB A/c	2277.00
To Donation	54000.00		
To Electricity	591901.00	BY Interest on FD	61865.00
To E.P.F.	435124.00		
To Examination Exp.	1511820.00		
To Fuel Exp.	1091737.00		
To Hire Charges	252856.00		
To Insurance	293802.00		
To Interest	373618.32		
To Medical Exp.	51824.00		
To Membership & Subscription	20000.00		
To Electrical Exp.	87333.00		
To Misc. Exp.	34175.00		
To Gardening Exp.	120264.00		
To Newspaper & Periodicals	7982.00		
To Office Exp.	129050.00		
To Postage	12166.00		
To Printing & Stationery	150754.00		
To Puja Exp.	91026.00		
To Canteen Exp.	3422621.00		
To Refreshment	380205.00		
To Refund to Students	12500.00		
To Rent	32461.00		
To Repair & Maintenance	989947.00		
To Road Tax & Fitness	19413.00		
To Remuneration to visiting /Guest	51000.00		
To Salary			
Teaching Staff	14847250.00		
Non Teaching Staff	3069456.00		
To Student Registration Fees	79650.00		
To Student Welfare Fees	15800.00		
To Seminar Exp.	6861.00		
To Telephone & Internet Exp.	187180.00		
To Travelling Exp.	194544.00		
To Trainning Exp.	8500.00		
To Computer Exp.	173625.00		
To Audit Fees	15000.00		
To Depreciation	6754614.00		
To Excess of Income over Expenditure Transferred to Capital Fund	894071.31		
	37459636.00		37459636.00

In terms of our report of even date annexed

PLACE: ANGUL
DATE: 12/09/2022
UDIN: 22059905ARXBWR1822

For Murarilal Agarwalla & Co.
Chartered Accountants

Proprietor
M. L. Agarwalla
M. No.:059905

PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
AT/PO: CHHENDIPADA, DIST: ANGUL - 759124 (ORISSA)

Schedule - 1
DETAILS OF FIXED ASSETS AS ON 31ST MARCH, 2022

Sl.No.	Particulars	Rate of Depreciation	W.D.V. as on 01.04.2021	Addition		Deduction during the Year	Total	Depreciation Amount	W.D.V. as on 31.03.2022
				More than Six months	Less than Six months				
1	BUILDING	5.00%	73011377.00	0.00	3188975.00	0.00	76200352.00	3730293.00	72470059.00
2	FURNITURE & FIXTURES	10.00%	3523561.00	130800.00	103250.00	0.00	3757611.00	370599.00	3387012.00
3	COMPUTERS	40.00%	1507839.00	11000.00	77462.00	0.00	1596301.00	623028.00	973273.00
4	ELECTRICAL FITTINGS	15.00%	2449576.00	541108.16	427778.00	0.00	3418462.16	480686.00	2937776.16
5	LIBRARY BOOKS	15.00%	1938910.00	0.00	26250.00	0.00	1965160.00	292805.00	1672355.00
6	TOOLS & EQUIPMENTS	15.00%	6450632.00	46800.00	810596.00	0.00	7308028.00	1035410.00	6272618.00
7	VEHICLE	15.00%	1284151.00	0.00	0.00	0.00	1284151.00	192623.00	1091528.00
8	CCTV	15.00%	126168.00	0.00	0.00	0.00	126168.00	18925.00	107243.00
9	XEROX MACHINE	15.00%	68299.00	0.00	0.00	0.00	68299.00	10245.00	58054.00
	Grand Total		90360513.00	729708.16	4634311.00	0.00	95724532.16	6754614.00	88969918.16

MURARILAL AGARWALLA & CO. ANGUL Chartered Accountants

MURARILAL AGARWALLA & CO.
CHARTERED ACCOUNTANTS

GANESH KUNJ
DURGA VIHAR, TURANG
ANGUL-759122 (ODISHA)
CELL: 9437058900

AUDITOR'S REPORT

WE HAVE AUDITED THE ANNEXED BALANCE SHEET OF PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY, AT/PO : CHHENDIPADA, DIST: ANGUL (ORISSA), AS AT 31ST MARCH,2023 AND THE ANNEXED INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED ON THAT DATE AND REPORT AS FOLLOWS:-

WE HAVE OBTAINED ALL THE INFORMATION AND EXPLANATIONS WHICH TO THE BEST OF OUR KNOWLEDGE AND BELIEF WERE NECESSARY FOR THE PURPOSE OF OUR AUDIT.

THE STATEMENTS OF ACCOUNTS DEALT WITH BY THIS REPORT ARE IN AGREEMENT WITH THE BOOKS OF ACCOUNT MAINTAINED BY THE INSTITUTE.

IN OUR OPINION AND TO THE BEST OF OUR INFORMATION AND ACCORDING TO THE EXPLANATIONS GIVEN TO US THE ACCOUNTS DEALT WITH BY THIS REPORT GIVES A TRUE AND FAIR VIEW:-

i) IN THE CASE OF BALANCE SHEET OF THE STATE OF AFFAIRS OF THE INSTITUTE AS AT 31ST MARCH, 2023

AND

ii) IN THE CASE OF INCOME AND EXPENDITURE ACCOUNT OF THE EXCESS OF INCOME OVER EXPENDITURE FOR THE YEAR ENDED ON 31ST MARCH,2023.

PLACE: ANGUL
DATE : 31/05/2023.
UDIN: 23059905BGTOYS7833

For Murarilal Agarwalla & Co.
Chartered Accountants

Proprietor
M. L. Agarwalla
M. No.:059905

MURARILAL AGARWALLA & CO. ANGUL Chartered Accountants

MURARILAL AGARWALLA & CO.
CHARTERED ACCOUNTANTS

GANESH KUNJ
DURGA VIHAR, TURANGI
ANGUL -759122 (ODISHA)
CELL: 9437039961

PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
AT/PO: CHHENDIPADA, DIST: ANGUL - 759124 (ORISSA)

BALANCE SHEET AS AT 31ST MARCH, 2023

LIABILITIES	AMOUNT	ASSETS	AMOUNT
CAPITAL FUND		FIXED ASSETS	95010714.16
Opening Balance	10010958.29	As per Schedule "I"	
Add: Excess of Income over Expenditure	6501633.24		
	16512591.53		
Less: Income Tax & TDS	25096.00	CASH & BANK BALANCE	
	16487495.53		
		S.B. A/c. with Canara Bank, Chhendipada	13447.60
LOANS & BORROWINGS			
		C. A/c. with Canara Bank, Chhendipada	1176223.42
Term Loan from S.B.I., Chhendipada	773548.32		
		S.B. A/c. with S.B.I., Chhendipada	15150.00
Term Loan from Canara Bank, Chhendipada	979468.00		
		Current A/c. with S.B.I., Chhendipada	188427.66
Term Loan from Canara Bank, Chhendipada	151833.00		
		C. A/c. with ICICI Bank, Chhendipada	99657.39
Term Loan from SBI, Chhendipada	3308700.19		
		Fixed Deposit with S.B.I., Chhendipada (Including Accrued Interest)	5000000.00
Unsecured Loans	76842109.00		
		Fixed Deposit with S.B.I., Chhendipada (Including Accrued Interest)	1021592.00
CURRENT LIABILITIES			
		Cash in Hand	83519.81
Salary Payable	3221170.00		
EPF Payable	793924.00		
Audit Fees	15000.00		
Esic Payable	35484.00		
	102606732.04		102606732.04

In terms of our report of even date annexed

PLACE: ANGUL
DATE: 31/08/2023
UDIN: 23059905BGTOYS7833

For Murarilal Agarwalla & Co.
Chartered Accountants

MURARILAL AGARWALLA & CO. ANGUL Chartered Accountants

Proprietor
M. L. Agarwalla
M. No.:059905

MURARILAL AGARWALLA & CO.
CHARTERED ACCOUNTANTS

PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
AT/PO: CHHENDIPADA, DIST: ANGUL - 759126 (ORISSA)

GANESH KUNJ
DURGA VIHAR, TURANG
ANGUL-759122 (ODISHA)
CELL: 9437038900

INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED ON 31ST MARCH,2023.

ACCOUNTING YEAR : 2022-2023

EXPENDITURE	AMOUNT	INCOME	AMOUNT
To Annual Function	77500.00	By Fees Received	58646059.00
To Advertisement	769265.00		
To AICTE Exp.	119000.00		
To SCTE & VT	30000.00		
To Bank Charges	29575.32		
To Consumables	1570244.00	BY Interest on SB A/c.	840.00
To Workshop Raw Material	941642.00		
To Donation	155500.00		
To Electricity	901431.00	BY Interest on FD	250942.00
To E.P.F.	911378.00		
To E.S.I.	144645.00		
To Examination Exp.	1800857.00		
To Fuel Exp.	3454790.52		
To Fire safety	77875.00		
To Food safety fees	10000.00		
To QCI Fees	1000.00		
To Hire Charges	573665.00		
To Insurance	332790.00		
To Interest	687452.12		
To Medical Exp.	452941.00		
To Membership & Subscription	20000.00		
To Electrical Exp.	617684.00		
To Misc. Exp.	49747.00		
To Gardening Exp.	84172.00		
To Newspaper & Periodicals	9885.00		
To Office Exp.	310213.00		
To Postage	12846.80		
To Printing & Stationery	1110518.00		
To Puja Exp.	453354.00		
To Canteen Exp.	6338616.00		
To Refreshment	337316.00		
To Rent	57207.00		
To Repair & Maintenance	2223062.00		
To Road Tax & Fitness	71912.00		
To Remuneration to visiting /Guest	347967.00		
To Salary			
Teaching Staff	15046746.00		
Non Teaching Staff	3498818.00		
To Student Registration Fees	76650.00		
To Student Welfare Fees	7000.00		
To Seminar Exp.	45876.00		
To Telephone & Internet Exp.	527280.00		
To Travelling Exp.	871761.00		
To Trainning Exp.	9600.00		
To Computer Exp.	379915.00		
To Audit Fees	15000.00		
To Depreciation	6831511.00		
To Excess of Income over Expenditure Transferred to Capital Fund	6501633.24		
	58897841.00		58897841.00

In terms of our report of even date annexed

PLACE: ANGUL
DATE: 31/08/2023
UDIN: 23059909GTOYS7833

For Murarilal Agarwalla & Co.
Chartered Accountants

MURARILAL AGARWALLA & CO. ANGUL Chartered Accountants

Proprietor
M. L. Agarwalla
M. No.:059905

PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
AT/PO: CHHENDIPADA, DIST: ANGUL - 759124 (ORISSA)

Schedule - 1
DETAILS OF FIXED ASSETS AS ON 31ST MARCH, 2023

Sl.No.	Particulars	Rate of Depreciation	W.D.V. as on 01.04.2022	Addition		Deduction during the Year	Total	Depreciation Amount	W.D.V. as on 31.03.2023
				More than Six months	Less than Six months				
1	BUILDING	5.00%	72470059.00	6810315.00	4383651.00	0.00	83664025.00	4073610.00	79590415.00
2	FURNITURE & FIXTURES	10.00%	3387012.00	123300.00	55859.00	0.00	3566171.00	353824.00	3212347.00
3	COMPUTERS	40.00%	973273.00	403240.00	30000.00	0.00	1406513.00	556605.00	849908.00
4	ELECTRICAL FITTINGS	15.00%	2937776.16	0.00	22300.00	0.00	2960076.16	442339.00	2517737.16
5	LIBRARY BOOKS	15.00%	1672355.00	0.00	26250.00	0.00	1698605.00	252822.00	1445783.00
6	TOOLS & EQUIPMENTS	15.00%	6272618.00	37877.00	151395.00	0.00	6461890.00	957929.00	5503961.00
7	VEHICLE	15.00%	1091528.00	0.00	0.00	0.00	1091528.00	163729.00	927799.00
8	CCTV	15.00%	107243.00	0.00	0.00	0.00	107243.00	16086.00	91157.00
9	XEROX MACHINE	15.00%	58054.00	0.00	78120.00	0.00	136174.00	14567.00	121607.00
10	LAND	0.00%	0	0	750000.00	0	750000.00	0.00	750000.00
	Grand Total		88969918.16	7374732.00	5497575.00	0.00	101842225.16	6831511.00	95010714.16

MURARILAL AGARWALLA & CO. ANGUL Chartered Accountants

MURARILAL AGARWALLA & CO.
CHARTERED ACCOUNTANTS

GANESH KUNJ
DURGA VIHAR, TURANG
ANGUL -759122 (ODISHA)
CELL: 9437038900

AUDITOR'S REPORT

WE HAVE AUDITED THE ANNEXED BALANCE SHEET OF PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY, AT/PO : CHHENDIPADA, DIST: ANGUL (ORISSA), AS AT 31ST MARCH,2024 AND THE ANNEXED INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED ON THAT DATE AND REPORT AS FOLLOWS:-

WE HAVE OBTAINED ALL THE INFORMATION AND EXPLANATIONS WHICH TO THE BEST OF OUR KNOWLEDGE AND BELIEF WERE NECESSARY FOR THE PURPOSE OF OUR AUDIT.

THE STATEMENTS OF ACCOUNTS DEALT WITH BY THIS REPORT ARE IN AGREEMENT WITH THE BOOKS OF ACCOUNT MAINTAINED BY THE INSTITUTE.

IN OUR OPINION AND TO THE BEST OF OUR INFORMATION AND ACCORDING TO THE EXPLANATIONS GIVEN TO US THE ACCOUNTS DEALT WITH BY THIS REPORT GIVES A TRUE AND FAIR VIEW:-

i) IN THE CASE OF BALANCE SHEET OF THE STATE OF AFFAIRS OF THE INSTITUTE AS AT 31ST MARCH, 2024

AND

ii) IN THE CASE OF INCOME AND EXPENDITURE ACCOUNT OF THE EXCESS OF INCOME OVER EXPENDITURE FOR THE YEAR ENDED ON 31ST MARCH,2024.

PLACE: ANGUL
DATE : 27/09/2024.
UDIN: 24059905BKAQZQ1795

For Murarilal Agrawalla & Co.
Chartered Accountants

MURARILAL AGARWALLA & CO. ANGUL Chartered Accountants

Proprietor
M L Agarwal
M. No.-059905

MURARILAL AGARWALLA & CO.
CHARTERED ACCOUNTANTS

GANESH KUNJ
DURGA VIHAR, TURANG
ANGUL -759122 (ODISHA)
CELL: 9437038900

PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
AT/PO: CHHENDIPADA, DIST: ANGUL - 759124 (ORISSA)

BALANCE SHEET AS AT 31ST MARCH, 2024

LIABILITIES	AMOUNT	ASSETS	AMOUNT
CAPITAL FUND		FIXED ASSETS	100936006.16
Opening Balance	16487495.53	As per Schedule "I"	
Add: Excess of Income over Expenditure	1917794.81		
	18405290.34		
Less: Income Tax & TDS	452977.00	CASH & BANK BALANCE	
	17952313.34		
		S.B. A/c. with Canara Bank, Chhendipada	5810.60
LOANS & BORROWINGS			
		C. A/c. with Canara Bank, Chhendipada	539381.19
Term Loan from S.B.I., Chhendipada	9585618.00		
		S.B. A/c. with S.B.I., Chhendipada	15150.00
Term Loan from Canara Bank, Chhendipada	622016.00		
		Current A/c. with S.B.I., Chhendipada	38942.42
Term Loan from Canara Bank, Chhendipada	31757.00		
		C. A/c. with ICICI Bank, Chhendipada	99657.39
Term Loan from SBI, Chhendipada	8104073.28		
		Fixed Deposit with S.B.I., Chhendipada	9419617.00
Term Loan from Canara Bank, Chhendipada	3638298.00	(Including Accrued Interest)	
Unsecured Loans	64742109.00		
		SBI C. A/C. 186	68909.41
		(Including Accrued Interest)	
CURRENT LIABILITIES			
		Cash in Hand	8326.45
Salary Payable	5193393.00		
EPF Payable	1139555.00		
Audit Fees	15000.00		
Esic Payable	107668.00		
Fuel Payble	682320.00		
	111131800.62		111131800.62

In terms of our report of even date annexed

PLACE: ANGUL
DATE: 27/09/2024
UDIN: 24059905BKAQZQ1795

For Murarilal Agrawalla & Co.
Chartered Accountants

MURARILAL AGARWALLA & CO. ANGUL Chartered Accountants

Proprietor
M L Agarwal
M. No.-059905

MURARILAL AGARWALLA & CO.
CHARTERED ACCOUNTANTS

GANESH KUNJ
DURGA VIHAR, TUBANG
ANGUL -759122 (ODISHA)
CELL: 9437038900

PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
AT/PO: CHHENDIPADA, DIST: ANGUL - 759124 (ORISSA)

INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED ON 31ST MARCH 2024.
ACCOUNTING YEAR : 2023-2024

	EXPENDITURE	AMOUNT		INCOME	AMOUNT
To	Annual Function	16000.00	By	Fees Received	55808046.00
To	Advertisement	778525.00			
To	AICTE Exp.	140200.00	By	Interest on Refund of IT	1730.00
To	SCTE & VT	30000.00			
To	Bank Charges	234340.50			
To	Consumables	2082898.00	BY	Interest on SB A/c.	399.00
To	Workshop Raw Material	385580.00			
To	Donation	41500.00			
To	Electricity	949073.00	BY	Interest on FD	466244.00
To	E.P.F.	1647327.00			
To	E.S.I.	315872.00			
To	Examination Exp.	1855910.80			
To	Fuel Exp.	2597660.87			
To	Fire safety	82220.00			
To	Food safety fees	10000.00			
To	QCI Fees	1000.00			
To	Hire Charges	389348.00			
To	Insurance	99164.00			
To	Interest	1493955.52			
To	Medical Exp.	82878.00			
To	Membership & Subscription	20000.00			
To	Electrical Exp.	1713732.00			
To	Misc. Exp.	75127.00			
To	Gardening Exp.	95500.00			
To	Newspaper & Periodicals	8214.00			
To	Office Exp.	281349.00			
To	Postage	17045.70			
To	Printing & Stationery	1024268.00			
To	Puja Exp.	352260.00			
To	Canteen Exp.	5621464.00			
To	Refreshment	235694.00			
To	Rent	50400.00			
To	Repair & Maintenance	1600721.00			
To	Road Tax & Fitness	34012.00			
To	Remuneration to Visiting /Guest	435796.00			
To	Salary				
	Teaching Staff	17097443.00			
	Non Teaching Staff	3818354.00			
To	Student Registration Fees	70500.00			
To	Student Welfare Fees	64100.00			
To	Seminar Exp.	54922.00			
To	Telephone & Internet Exp.	413557.74			
To	Travelling Exp.	380405.06			
To	Trainning Exp.	10800.00			
To	Refund to Student	72950.00			
To	Audit Fees	15000.00			
To	Depreciation	7561557.00			
To	Excess of Income over Expenditure Transferred to Capital Fund	1917794.81			
		56276419.00			56276419.00

In terms of our report of even date annexed

PLACE: ANGUL.
DATE: 27/09/2024
UDIN: 24059058AQZQ1785

For Murarilal Agrawalla & Co.
Chartered Accountants

MURARILAL AGARWALLA & CO. ANGUL Chartered Accountants

Proprietor
M L Agarwal
M. No.-059905

PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
AT/PO: CHHENDIPADA, DIST: ANGUL - 759124 (ORISSA)

Schedule - I
DETAILS OF FIXED ASSETS AS ON 31ST MARCH, 2024

SLNo.	Particulars	Rate of Depreciation	W.D.V. as on 01.04.2023	Addition		Deduction during the Year	Total	Depreciation Amount	W.D.V. as on 31.03.2024
				More than Six months	Less than Six months				
1	BUILDING	5.00%	79590415.00	6043926.00	1530014.00	0.00	87164355.00	4319967.00	82844388.00
2	FURNITURE & FIXTURES	10.00%	3212347.00	300091.00	583931.00	0.00	4096369.00	380440.00	3715929.00
3	COMPUTERS	40.00%	849908.00	726419.00	284371.00	0.00	1860698.00	687405.00	1173293.00
4	ELECTRICAL FITTINGS	15.00%	2517737.16	495540.00	97794.00	0.00	3111071.16	459326.00	2651745.16
5	LIBRARY BOOKS	15.00%	1445783.00	4400.00	131633.00	0.00	1581816.00	227400.00	1354416.00
6	TOOLS & EQUIPMENTS	15.00%	5503961.00	3249130.00	39600.00	0.00	8792691.00	1315934.00	7476757.00
7	VEHICLE	15.00%	927799.00	0.00	0.00	0.00	927799.00	139170.00	788629.00
8	CCTV	15.00%	91157.00	0.00	0.00	0.00	91157.00	13674.00	77483.00
9	XEROX MACHINE	15.00%	121607.00	0.00	0.00	0.00	121607.00	18241.00	103366.00
10	LAND	0.00%	750000	0	0.00	0	750000.00	0.00	750000.00
	Grand Total		95010714.16	10819506.00	2667343.00	0.00	108497563.16	7561557.00	100936006.16

MURARILAL AGARWALLA & CO. ANGUL Chartered Accountants