

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

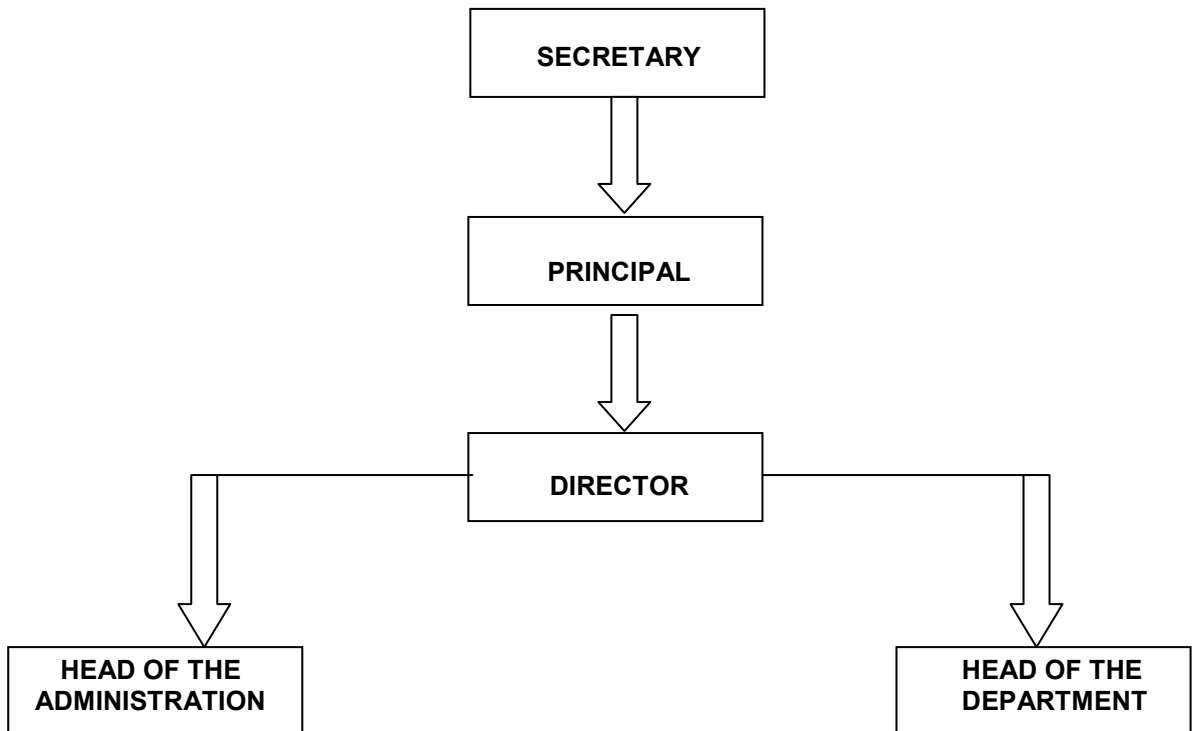
4. **NAME OF THE AFFILIATING UNIVERSITY** : STATE COUNCIL FOR TECHNICAL EDUCATION & VOCATIONAL TRAINING (SCTE&VT), ODISHA, BHUBANESWAR.

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 steps for its improvements of quality of teaching related activities.
- 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 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 2021-22 by vide Order No. PCIET/Estt/1703/2021 dated 07.04.2021.
- 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 2021-22 by vide Order No. PCIET/Estt/ 1808/2021 dated 11.10.2021.

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. Prakash Chandra Moharana	Lecturer, Elect. Engg.	Member	
10.	Er. Sibani Sahu	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. Sujata Dalei	Lecturer in Civil Engg.	Member	
16.	Er. Ramesh Chandra Pradhan	Lecturer in Elect. Engg.	Member	
17.	Er. Dillip Kumar Dehury	H.O.D., Mining Engg.	Member	
18.	Mr. Dolagobind Sahoo	Lecturer in Physics	Member	
19.	Er. Sunil Kumar Sahu	Lecturer in Civil Engg.	Member	
20.	Mr. Basudeba Behera	Office Asst.	Member	
21.	Mr. Prasanta Kumar Behera	Office Asst.	Member	
22.	Mr. Santha Pradhan	Office Asst.	Member	
23.	Mr. Susanta Kumar Sethy	Office Asst.	Member	
24.	Representative of Tahasildar, Chhendipada		Member	

25	Representative of Chhendipada Police Station		Member	
26.	Representative of Local Media		Member	
27.	Representative of Guardians/ Parents		Member	
28.	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. Prakash Chandra Moharana	Lecturer, Elect. 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. Sibani Sahu	Lecturer in Civil Engg.	Member	
13.	Er. Sujata Dalei	Lecturer in Civil Engg.	Member	
14.	Er. Dillip Kumar Dehury	H.O.D., Mining Engg.	Member	
15.	Er. Ramesh Chandra Pradhan	Lecturer in Elect. Engg.	Member	
16.	Er. Sunil Kumar Pradhan	Lecturer in Civil Engg.	Member	
17.	Mr. Tapan Kumar Sahu	Lecturer in Chemistry	Member	
18.	Mr. Basudeba Behera	Office Asst.	Member	
19.	Mr. Prasanta Kumar Behera	Office Asst.	Member	
20.	Mr. Santha Pradhan	Office Asst.	Member	
21.	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 : pciет.edugrievance.com for the session 2018-19 & has been renewed in subsequent years. The E-grievance redressal committee of PCIET for the session 2021-22 reconstituted by vide Order No. PCIET/Estt/1816/21 dated 12.10.2021. 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 Grievance : Redressal Committee in the Institution and Appointment of OMBUDSMAN by the University

The above committee has been constituted in our institute as per A.I.C.T.E. regulation since inception of our institution from the session 2009-10 & has been reconstituted for the session 2021-22 by vide Order No. PCIET/Estt/1816/2021 dated 12.10.2021.

- 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 2021-22 by vide Order No. PCIET/Estt/1872/2021 dated 15.02.2022. The objective of the above committee is 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 2021-22 by vide Order No. PCIET/Estt/1818/2021 dated 12.10.2021. 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, Chhenipada, Dist.-Angul has been constituted vide Order No. PCIET/Estt./777/2019 dated 07.01.2019 & has been Reconstituted for the session 2021-22 by vide Order No. PCIET/Estt/1812/2021 dated 11.10.2021.

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.

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 ACCREDITED
- Status of Accrediation of the Courses : NOT ACCREDITED
- 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 :

2019	-	258
2020	-	276
2021	-	312
- Fee : Tuition Fee Per Year - Rs. 30,000/-
 Hostel Cost – Rs.22,000/- per year per student
 Transportation Cost – Rs.8,800/- upto 20 Kms.
 Rs. 13,200/- 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
2019	1	59	08	1.2 Lakh	2 Lakh
2020	1	55	12	1.2 Lakh	2 Lakh
2021	1	58	05	1.2 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 :

2019	-	264
2020	-	270
2021	-	318
- Fee : Tuition Fee Per Year - Rs. 30,000/-
 Hostel Cost – Rs.22,000/- per year per student
 Transportation Cost – Rs.8,800/- upto 20 Kms.
 Rs. 13,200/- 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
2019	2	53	08	1.2 Lakh	2 Lakh
2020	2	100	22	1.2 Lakh	1.8 Lakh
2021	1	115	05	1.2 Lakh	1.8 Lakh

- Name : DIPLOMA IN MECHANICAL ENGINEERING
- Number of Seats : 120
- Duration : 3 Years
- Cut off marks/rank of admission during the last three years :

2019	-	270
2020	-	324
2021	-	330
- Fee : Tuition Fee Per Year - Rs. 30,000/-
 Hostel Cost – Rs.22,000/- per year per student
 Transportation Cost – Rs.8,800/- upto 20 Kms.
 Rs. 13,200/- 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
2019	2	99	40	1.5 Lakh	2 Lakh
2020	2	102	17	1.2 Lakh	1.8 Lakh
2021	1	116	06	1.2 Lakh	1.8 Lakh

- Name : MINING ENGINEERING
- Number of Seats : 120
- Duration : 3 Years
- Cut off marks/rank of admission during the last three years :

2019	-	354
2020	-	360
2021	-	366
- Fee : Tuition Fee Per Year - Rs. 30,000/-
 Hostel Cost – Rs.22,000/- per year per student
 Transportation Cost – Rs.8,800/- upto 20 Kms.
 Rs. 13,200/- 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
2019	1	101	14	1.5 Lakh	2 Lakh
2020	1	134	12	1.5 Lakh	2 Lakh
2021	1	142	06	1.5 Lakh	2 Lakh

- Name and duration of programme(s) having: NOT APPLICABLE
 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 :

7. FACULTY :

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

- 1) ER. SUNIL KUMAR SAHU
- 2) ER. PRITAM SAGAR SAHOO
- 3) ER. NANDINI PRADHAN
- 4) ER. SIBANI SAHU
- 5) ER. BABITA SAHU
- 6) ER. SATYA NARAYAN MOHANTY
- 7) ER. SUJATA DALEI
- 8) ER. SWARNAPRAVA PARIDA

- Permanent Faculty : 8 Nos.
- Adjunct Faculty : Nil
- Permanent Faculty : Student Ratio : 1 : 25

- Number of Faculty employed and left during :
last three years

YEAR	EMPLOYED	LEFT
2019-20	01	01
2020-21	01	01
2021-22	01	-

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

- 1) ER. BIBHUTI BHUSAN SAHU
- 2) ER. JYOTIPRAKASH SWAIN
- 3) ER. BIJAYA KUMAR BEHERA
- 4) ER. SATYANARAYAN SAHU
- 5) ER. SUVENDU SEKHAR BEHERA
- 6) ER. BISWARANJAN JENA
- 7) ER. SUSHIL SAHOO
- 8) ER. SAKTIDATTA PRADHAN
- 9) ER. SUGYANI SAHOO
- 10) ER. RAMESH CHANDRA PRADHAN
- 11) ER. SUBHRAMANYA PRADHAN
- 12) ER. SWADHIN KUMAR SAHOO
- 13) ER. SUBHASHREE PRADHAN
- 14) ER. PRAKASH CHANDRA MOHARANA
- 15) ER. SASWATI SANGHAMITRA PRADHAN

- Permanent Faculty : 15 Nos.
- Adjunct Faculty : Nil
- Permanent Faculty : Student Ratio : 1 : 25

- Number of Faculty employed and left during :
last three years

YEAR	EMPLOYED	LEFT
2019-20	02	02
2020-21	02	02
2021-22	02	-

- Branch wise list Faculty Members : **BRANCH – MECHANICAL ENGINEERING**
 - 1) ER. HEMANTA KUMAR PRADHAN
 - 2) ER. MANAS RANJAN BEHERA
 - 3) ER. GOURI SANKAR PRADHAN
 - 4) ER. BIKASH RANJAN SAHU
 - 5) ER. HIMANSU SEKHAR SAMAL
 - 6) ER. MADHUMITA SAHOO
 - 7) ER. TARANISEN MOHANTY
 - 8) ER. LAKIN KUMAR SAHOO
 - 9) ER. RASABIHARI SAHU
 - 10) ER. SUBODHAKANTA GARNAIK
 - 11) ER. BABULAL MOHAPATRA
 - 12) ER. SHAKTI PRASAD ACHARYA
 - 13) ER. DEJILINE SAHOO
 - 14) ER. JAYANANDA DEHURY
 - 15) ER. DEWAN KUMAR SAHU
- Permanent Faculty : 15 Nos.
- Adjunct Faculty : Nil
- Permanent Faculty : Student Ratio : 1 : 25
- Number of Faculty employed and left during :

last three years

YEAR	EMPLOYED	LEFT
2019-20	02	02
2020-21	01	01
2021-22	03	03

- Branch wise list Faculty Members : **BRANCH – MINING ENGINEERING**
 - 1) ER. ANANDA KUMAR PADHAN
 - 2) ER. DURGA PRASAD SAHU
 - 3) ER. ALOK KUMAR MAHAPATRA
 - 4) ER. SATYABRATA SAHOO
 - 5) ER. PRABIN KUMAR SAHOO
 - 6) ER. UDAYA BISWANATH PRADHAN
 - 7) ER. PRANAYA KUMAR BEHERA
 - 8) ER. SRINATH KUMAR SWAIN
 - 9) ER. ATISH KUMAR SAHOO
 - 10) ER. AMARENDRA SAHOO
 - 11) ER. PRATYUSH ROUT
 - 12) ER. GOBINDA CHANDRA SETHY
 - 13) ER. LIPUN DEHURY
 - 14) ER. DILLIP KUMAR DEHURY
 - 15) ER. RADHAKRUSHNA BHUTIA
 - 16) ER. SRIKANTA SAMAL
- Permanent Faculty : 16 Nos.
- Adjunct Faculty : Nil
- Permanent Faculty : Student Ratio : 1 : 25
- Number of Faculty employed and left during :

last three years

YEAR	EMPLOYED	LEFT
2019-20	03	03
2020-21	05	05
2021-22	03	03

- **FIRST YEAR/OTHER FACULTIES :**

- 1) ER. BASANTA KUMAR SAHOO, DIRECTOR
- 2) TAPAN KUMAR SAHU, LECT. IN CHEM.
- 3) ABHIPSA PRIYADARSINI, LECT. IN CHEM.
- 4) BISWAJIT SAHOO, LECT. IN PHYSICS
- 5) DOLAGOBIND SAHOO, LECT. IN PHYSICS
- 6) KSHIRA MOHAN BEHERA, LECT. IN MATH.
- 7) BISMITA PANI, LECT. IN ENGLISH
- 8) SUBHENDU KUMAR PANI, LECT. IN ENGLISH
- 9) SUPRAVA PRADHAN, LECT. IN COMP.
- 10) JYOTIRMAYEE PRADHAN, LECT. IN COMP.
- 11) ASWINI KUMAR PRADHAN, LECT. IN COMP.
- 12) ANUPAMA BEHERA, LECT. IN MGMT.

- Permanent Faculty : 12 Nos.

- Adjunct Faculty : Nil

- Permanent Faculty : Student Ratio : 1 : 25

- Number of Faculty employed and left during:
last three years

YEAR	EMPLOYED	LEFT
2019-20	01	01
2020-21	01	01
2021-22	01	01

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 : 28 Years
 - Research : 5 Years
 - Industry : -
 - Others : Administrative – 25 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	:	13 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	Administrative – 5 Years
vi)	Area of Specialization	:	MANUFACTURING SCIENCE & TECHNOLOGY
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Diploma Level	:	PRODUCTION 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. 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	:	6 Years
	• Research	:	-
	• Industry	:	2 Years
	• Others	:	-
vi)	Area of Specialization	:	STRUCTURAL DESIGN
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	STRUCTURAL MECHANICS ESTIMATION & COST EVALUATION-I & II LAND SURVEYING - II 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 : 6 Years
 - Research : -
 - Industry : -
 - Others : -
- vi) Area of Specialization : IRRIGATION ENGINEERING
- vii) Courses taught at Diploma/
Post Diploma/Under Graduate/
Post Graduate / Post Graduate
Diploma Level : STRUCTURAL MECHANICS
STRUCTURAL DESIGN-II
CIVIL ENGG. DRAWING
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 : 6 Years
 - Research : -
 - Industry : -
 - Others : -
- vi) Area of Specialization : GEOTECH ENGINEERING.
- vii) Courses taught at Diploma/
Post Diploma/Under Graduate/
Post Graduate / Post Graduate
Diploma Level : ENVIRONMENTAL STUDIES.
STRUCTURAL MECHANICS
ESTIMATING & COST EVALUATION-II
HYDRAULICS & IRRIGATION ENGG.
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. BABITA SAHU
LECT. IN CIVIL ENGG.**
- ii) Date of Birth : 05/01/1985
- iii) Unique Id : 1-3612596034
- iv) Educational Qualifications : B.TECH.
- v) Work Experience :
- Teaching : 4 YearS
 - Research : -
 - Industry : -
 - Others : -
- vi) Area of Specialization : IRRIGATION ENGG.
- vii) Courses taught at Diploma/
Post Diploma/Under Graduate/
Post Graduate / Post Graduate
Diploma Level : BUILDING MATERIALS & CONSTN. TECHNOLOGY
WATER SUPPLY & WASTE WATER ENGG
STRUCTURAL DESIGN - I
CONSTRUCTION MANAGEMENT
CONSTRUCTION WORKSHOP-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. SIBANI SAHU
LECT. IN CIVIL ENGG.**
- ii) Date of Birth : 15/06/1996
- iii) Unique Id : 1-3612888513
- iv) Educational Qualifications : B.TECH.
- v) Work Experience :
- Teaching : 4 Yeas
 - Research : -
 - Industry : -
 - Others : -
- vi) Area of Specialization : ARCHITECTURAL PRACTICES
- vii) Courses taught at Diploma/
Post Diploma/Under Graduate/
Post Graduate / Post Graduate
Diploma Level : GEOTECHNICAL ENGG.
CIVIL ENGG. DRAWING - I
RAILWAY & BRIDGE ENGG
CONCRETE TECHNOLOGY
CAD LAB
LAND SURVEYING - I
- 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. SUJATA DALEI LECT. IN CIVIL ENGG.	
ii)	Date of Birth	:	22/05/1995	
iii)	Unique Id	:	1-7444782386	
iv)	Educational Qualifications	:	B.TECH.	
v)	Work Experience	:		
	• Teaching	:	2 Yeas	
	• Research	:	-	
	• Industry	:	-	
	• Others	:	-	
vi)	Area of Specialization	:	ARCHITECTURAL PRACTICES	
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	BUILDING MATERIALS & CONSTN. TECHNOLOGY STRUCTURAL DESIGN - II CIVIL ENGG. DRAWING - I STRUCTURAL DESIGN - I 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. SATYA NARAYAN MOHANTY
LECT. IN CIVIL ENGG.**
- ii) Date of Birth : 12/03/1997
- iii) Unique Id : 1-7444782393
- iv) Educational Qualifications : B.TECH.
- v) Work Experience :
- Teaching : 2 Yeas
 - Research : -
 - Industry : -
 - Others : -
- vi) Area of Specialization : ADVANCE CONSTRUCTION TECHNOLOGY
- vii) Courses taught at Diploma/
Post Diploma/Under Graduate/
Post Graduate / Post Graduate
Diploma Level : ENVIRONMENTAL STUDIES
WATER SUPPLY & WASTER WATER ENGG.
RAILWAY & BRIDGE ENGG.
LAND SURVEYING - 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. 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	:	2 Yeas
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	IRRIGATION ENGINEERING
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	ESTIMATING & COST EVALUATION - I WATER SUPPLY & WASTE WATER ENGG. HYDRAULIC & IRRIGATION ENGG. ADVANCE CONSTRUCTION TECHNIQUE & EQUIPMENTS
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 : 5 Years
 - Research : -
 - Industry : -
 - Others : -
- vi) Area of Specialization : CONTROL SYSTEM ENGG.
- vii) Courses taught at Diploma/
Post Diploma/Under Graduate/
Post Graduate / Post Graduate
Diploma Level : BASIC ELECTRICAL & ELECTRONICS ENGG
CIRCUIT & NETWORK THEORY
ELECTRICAL DRAWING
RENEWABLE ENERGY
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. JYOTIPRAKASH SWAIN
LECT. IN ELECTRICAL ENGG.**
- ii) Date of Birth : 26/01/1990
- iii) Unique Id : 1-4361047719
- iv) Educational Qualifications : M.TECH.
- v) Work Experience :
- Teaching : 3 Yeas
 - Research : -
 - Industry : 1 Year
 - Others : -
- vi) Area of Specialization : CONTROL SYSTEM ENGG.
- vii) Courses taught at Diploma/
Post Diploma/Under Graduate/
Post Graduate / Post Graduate
Diploma Level : ANALOG ELECTRONICS & OPAMP
CONTROL SYSTEM ENGG.
CIRCUIT & NETWORK THEORY
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. 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 : 6 Years
 - Research : -
 - Industry : -
 - Others : -
- vi) Area of Specialization : TESTING & MAINTENANCE OF ELECTRICAL MACHINE.
- vii) Courses taught at Diploma/
Post Diploma/Under Graduate/
Post Graduate / Post Graduate
Diploma Level : BASIC ELECTRICAL & ELECTRONICS ENGG.
POWER ELECTRONICS & PLC
ANALOG ELECTRONICS & OPAMP
SWITCHGEAR & 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. SATYANARAYAN SAHU LECT. IN ELECTRICAL ENGG.	
ii)	Date of Birth	:	18/07/1993	
iii)	Unique Id	:	1-2901091646	
iv)	Educational Qualifications	:	B.TECH.	
v)	Work Experience	:		
	• Teaching	:	6 Years	
	• Research	:	-	
	• Industry	:	-	
	• Others	:	-	
vi)	Area of Specialization	:	CONTROL SYSTEM ENGG.	
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	BASIC ELECTRICAL & ELECTRONICS ENGG. ENERGY CONVERSION - II UTILIZATION OF ELECTRICAL ENERGY & TRACTION ELECTRICAL MEASUREMENT & INSTRUMENT 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. 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 : 6 Years
 - Research : -
 - Industry : -
 - Others : -
- vi) Area of Specialization : ELECTRICAL MAINTENANCE
- vii) Courses taught at Diploma/
Post Diploma/Under Graduate/
Post Graduate / Post Graduate
Diploma Level : CIRCUIT & NETWORK THEORY
MECHATRONICS
DIGITAL ELECTRONICS & MICROPROCESSOR
- 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 : 6 Years
 - Research : -
 - Industry : -
 - Others : -
- vi) Area of Specialization : ELECTRICAL INSTALLATION
- vii) Courses taught at Diploma/
Post Diploma/Under Graduate/
Post Graduate / Post Graduate
Diploma Level : ENVIRONMENTAL STUDIES
ENERGY CONVERSION - II
MECHATRONICS
ENERGY CONVERSION – I
GENERATION, TRANSMISSION & DISTRIBUTION
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. 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	:	6 Years	
	• Research	:	-	
	• Industry	:	-	
	• Others	:	-	
vi)	Area of Specialization	:	UTILIZATION OF ELECTRICAL ENERGY & TRACTION	
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	POWER ELECTRONICS & PLC ENERGY CONVERSION - I GENERATION, TRANSMISSION & DISTRIBUTION 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. 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	:	6 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	EMBEDED SYSTEM
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	CIRCUIT & NETWORK THEORY DIGITAL ELECTRONICS & MICROPROCESSOR ANALOG ELECTRONICS & OPAMP 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. 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 : 6 Years
 - Research : -
 - Industry : -
 - Others : -
- vi) Area of Specialization : CONTROL SYSTEM ENGG.
- vii) Courses taught at Diploma/
Post Diploma/Under Graduate/
Post Graduate / Post Graduate
Diploma Level : ELECTRICAL ENGG. MATERIALS
UTILIZATION OF ELECTRICAL ENERGY & TRACTION
CONTROL SYSTEM ENGG.
ENERGY CONVERSION - I
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. 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	:	3 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	TESTING & MAINTENANCE OF ELECTRICALMACHINE
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	CIRCUIT & NETWORK THEORY UTILIZATION OF ELECTRICAL ENERGY & TRACTION ELECTRICAL INSTALLATION & ESTIMATING ELECTRICAL MEASUREMENT & INSTRUMENT
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. SUBHRAMANYA PRADHAN LECT. IN ELECTRICAL ENGG.
ii)	Date of Birth	:	25/05/1994
iii)	Unique Id	:	1-4797143234
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	3 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	CONTROL SYSTEM ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	CIRCUIT & NETWORK THEORY ENERGY CONVERSION - II ELECTRICAL DRAWING CONTROL SYSTEM ENGG. SWITCHGEAR & 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. SWADHIN KUMAR SAHOO LECT. IN ELECTRICAL ENGG.
ii)	Date of Birth	:	08/06/1990
iii)	Unique Id	:	1-3588292517
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	4 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	POWER SYSTEM OPERATION
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	ENERGY CONVERSION - II ANALOG ELECTRONICS & OP AMP ELECTRICAL DRAWING 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. SUBHASHREE PRADHAN LECT. IN ELECTRICAL ENGG.	
ii)	Date of Birth	:	18/06/1997	
iii)	Unique Id	:	1-7444782685	
iv)	Educational Qualifications	:	B.TECH.	
v)	Work Experience	:		
	• Teaching	:	3 Years	
	• Research	:	-	
	• Industry	:	-	
	• Others	:	-	
vi)	Area of Specialization	:	ANALOG ELECTRONICS	
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	ELECTRICAL ENGG. MATERIAL BASIC ELECTRICAL & ELECTRONICS ENGG. POWER ELECTRONICS & PLC ANALOG ELECTRONICS & OP AMP 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. PRAKASH CHANDRA MOHARANA LECT. IN ELECTRICAL ENGG.
ii)	Date of Birth	:	21/05/1996
iii)	Unique Id	:	1-7364688595
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	1 Year
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	RENEWABLE ENERGY
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	BASIC ELECTRICAL & ELECTRONICS ENGG. CIRCUIT & NETWORK THEORY ENERGY CONVERSION - II 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. SASWATI SANGHAMITRA PRADHAN LECT. IN ELECTRICAL ENGG.
ii)	Date of Birth	:	05/06/1991
iii)	Unique Id	:	1-9321369531
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	1 Year
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	CONTROL SYSTEM ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	CIRCUIT & NETWORK THEORY DIGITAL ELECTRONICS & MICROPROCESSOR MECHATRONICS ELECTRICAL MEASUREMENT & INSTRUMENT GENERATION, TRANSMISSION & DISTRIBUTION
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	:	8 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	POWER PLANT ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	STRENGTH OF MATERIALS ENGG. MATERIALS THERMAL ENGG. - II MANUFACTURING TECHNOLOGY AUTOMOBILE 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. 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	:	6 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	POWER PLANT ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	HYDRAULIC MACHINE & INDUSTRIAL FLUID POWER THEORY OF MACHINES & MEASUREMENT AUTOMOBILE 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. 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 : 6 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 : ENVIRONMENTAL STUDIES
THERMAL ENGG. - I
AUTOMOBILE ENGG.
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. 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	:	6 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	FLUID MECHANICS
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	THEORY OF MACHINES INDUSTRIAL ENGG. MECHANICAL ENGG. DRAWING HYDRAULIC MACHINES & INDUSTRIAL FLUID POWER
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. MADHUMITA SAHOO**
LECT. IN MECHANICAL ENGG.
- ii) Date of Birth : 30/06/1993
- iii) Unique Id : 1-2901869883
- iv) Educational Qualifications : B.TECH.
- v) Work Experience :
- Teaching : 6 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 : PRODUCTION TECHNOLOGY
ENVIRONMENTAL STUDIES
DESIGN OF MACHINE ELEMENTS
THEORY OF MACHINES
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. TARANISEN MOHANTY
LECT. IN MECHANICAL ENGG.**
- ii) Date of Birth : 12/07/1991
- iii) Unique Id : 1-2906640916
- iv) Educational Qualifications : B.TECH.
- v) Work Experience :
- Teaching : 6 Years
 - Research : -
 - Industry : -
 - Others : -
- vi) Area of Specialization : MANUFACTURING TECHNOLOGY
- vii) Courses taught at Diploma/
Post Diploma/Under Graduate/
Post Graduate / Post Graduate
Diploma Level : THERMAL ENGG. - I
PRODUCTION TECHNOLOGY
DESIGN OF MACHINE ELEMENTS
ADVANCE MANUFACTURING PROCESS
AUTOMOBILE ENGG.
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. 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 : 5 Years
 - Research : -
 - Industry : -
 - Others : -
- vi) Area of Specialization : POWER PLANT ENGG.
- vii) Courses taught at Diploma/
Post Diploma/Under Graduate/
Post Graduate / Post Graduate
Diploma Level : MANUFACTURING TECHNOLOGY
ADVANCE MANUFACTURING PROCESS
POWER STATION ENGG
ELEMENTS OF MECHANICAL ENGG.
REFRIGERATION & AIRCONDITIONING
- 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 : 4 YeaS
 - Research : -
 - Industry : -
 - Others : -
- vi) Area of Specialization : FLUID MECHANICS
- vii) Courses taught at Diploma/
Post Diploma/Under Graduate/
Post Graduate / Post Graduate
Diploma Level : STRENGTH OF MATERIALS
ENGG. MATERIALS
FLUID MECHANICS
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. SUBODHAKANTA GARNAIK 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	:	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	:	STRENGTH OF MATERIALS HYDRAULIC MACHINES & INDUSTRIAL FLUID ELEMENTS OF MECHANICAL ENGG. THEORY OF MACHINES MANUFACTURING TECHNOLOGY AUTOMOBILE 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. BABULAL MOHAPATRA
LECT. IN MECHANICAL ENGG.**
- ii) Date of Birth : 10/04/1994
- iii) Unique Id : 1-3588292501
- iv) Educational Qualifications : B.TECH.
- v) Work Experience :
- Teaching : 4 Years
 - Research : -
 - Industry : -
 - Others : -
- vi) Area of Specialization : POWER PLANT ENGG.
- vii) Courses taught at Diploma/
Post Diploma/Under Graduate/
Post Graduate / Post Graduate
Diploma Level : THERMAL ENGG. – I & II
MECHANICAL OPERATION IN MINES
HYDRAULIC MACHINES & INDUSTRIAL FLUID
POWER
FLUID MECHANICS
AUTOMOBILE 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. SHAKTI PRASAD ACHARYA LECT. IN MECHANICAL ENGG.
ii)	Date of Birth	:	16/04/1991
iii)	Unique Id	:	1-3588292509
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	4 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	AUTOMOBILE ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Undergraduate/ Post Graduate/Post Graduate Diploma Level	:	PRODUCTION TECHNOLOGY MANUFACTURING TECHNOLOGY AUTOMOBILE ENGG. 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. DEJILINE SAHOO
LECT. IN MECHANICAL ENGG.**
- ii) Date of Birth : 07/11/1991
- iii) Unique Id : 1-4798577480
- iv) Educational Qualifications : B.TECH.
- v) Work Experience :
- Teaching : 3 Years
 - Research : -
 - Industry : -
 - Others : -
- vi) Area of Specialization : POWER PLANT ENGG.
- vii) Courses taught at Diploma/
Post Diploma/Undergraduate/
Post Graduate/Post Graduate
Diploma Level : PRODUCTION TECHNOLOGY
ENVIRONMENTAL STUDIES
DESIGN OF MACHINE ELEMENTS
FLUID MECHANICS
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. JAYANANDA DEHURY LECT. IN MECHANICAL ENGG.
ii)	Date of Birth	:	14/05/1995
iii)	Unique Id	:	1-7397108072
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	2 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	POWER PLANT ENGG.
vii)	Courses taught at Diploma/ Post Diploma/Undergraduate/ Post Graduate/Post Graduate Diploma Level	:	THERMAL ENGG. –I & II POWER STATION ENGG. ADVANCE MANUFACTURING PROCESS REFRIGERATION & AIRCONDITIONING
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 : 01/05/1998
- iii) Unique Id : 1-9570960384
- iv) Educational Qualifications : B.TECH.
- v) Work Experience :
- Teaching : 2 Years
 - Research : -
 - Industry : -
 - Others : -
- vi) Area of Specialization : REFRIGERATION & AIRCONDITIONING
- vii) Courses taught at Diploma/
Post Diploma/Undergraduate/
Post Graduate/Post Graduate
Diploma Level : FLUID MECHANICS
THERMAL ENGG. - II
AUTOMOBILE ENGG.
STRENGTH OF MATERIALS
REFRIGERATION & AIRCONDITIONING
- 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. ANANDA KUMAR PADHAN LECT. IN MINING ENGG.	
ii)	Date of Birth	:	19/07/1994	
iii)	Unique Id	:	1-3205530819	
iv)	Educational Qualifications	:	B.TECH.	
v)	Work Experience	:		
	• Teaching	:	5 Years	
	• Research	:	-	
	• Industry	:	-	
	• Others	:	-	
vi)	Area of Specialization	:	MINE VENTILATION	
vii)	Courses taught at Diploma/ Post Diploma/Undergraduate/ Post Graduate/Post Graduate Diploma Level	:	SURFACE MINE TECHNOLOGY MINE GEOLOGY - I UNDERGROUND METAL MINING MINE MACHINERY – I & II MINE VENTILATION UNDERGROUND COAL MINING	
viii)	Research guidance	:		
	• No. of papers published in National/International Journals/Conferences	:	-	
	• Master	:	-	
	• Ph.D.	:	-	
ix)	Projects Carried out	:	OPTIMIZATION IN DRILLING & BLASTING PATTERN	
x)	Patents	:	-	
xi)	Technology Transfer	:	-	
xii)	Research Publications	:	-	
xiii)	No. of Books published with details	:	-	

i)	Name	:	ER. DURGA PRASAD SAHU LECT. IN MINING ENGG.
ii)	Date of Birth	:	10/02/1995
iii)	Unique Id	:	1-3588146462
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	4 Yeas
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	ENTREPRENEURSHIP & MINE MANAGEMENT
vii)	Courses taught at Diploma/ Post Diploma/Undergraduate/ Post Graduate/Post Graduate Diploma Level	:	SURFACE MINING TECHNOLOGY MINES LEGISLATION & GENERAL SAFETY - II UNDERGROUND COAL MINING MINE GEOLOGY - 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. ALOK KUMAR MAHAPATRA LECT. IN MINING ENGG.
ii)	Date of Birth	:	10/06/1995
iii)	Unique Id	:	1-3588146422
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	4 Yeas
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	MINE MACHINERY
vii)	Courses taught at Diploma/ Post Diploma/Undergraduate Post Graduate/Post Graduate Diploma Level	:	MINE SURVEY - I MINE MACHINERY - I SURFACE MINING TECHNOLOGY MINE MACHINERY - II MINES LEGISLATION & GENERAL SAFETY - II
viii)	Research guidance	:	
	• No. of papers published in National/International Journals/Conferences	:	-
	• Master	:	-
	• Ph.D.	:	-
ix)	Projects Carried out	:	ROCK MECHANICS
x)	Patents	:	-
xi)	Technology Transfer	:	-
xii)	Research Publications	:	-
xiii)	No. of Books published with details	:	-



i)	Name	:	ER. SATYABRATA SAHOO LECT. IN MINING ENGG.
ii)	Date of Birth	:	16/05/1994
iii)	Unique Id	:	1-4796261966
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	3 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	MINE METHOD
vii)	Courses taught at Diploma/ Post Diploma/Undergraduate Post Graduate/Post Graduate Diploma Level	:	MINE GEOLOGY - I ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY UNDERGROUND COAL MINES 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. 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 : 3 Years
 - Research : -
 - Industry : -
 - Others : -
- vi) Area of Specialization : MINE METHOD
- vii) Courses taught at Diploma/
Post Diploma/Undergraduate
Post Graduate/Post Graduate
Diploma Level : ENVIRONMENTAL STUDIES
MINE MACHINERY – I & II
MINE LEGISLATION & GENERAL SAFETY
MINE 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. 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 : 3 Years
 - Research : -
 - Industry : -
 - Others : -
- vi) Area of Specialization : MINE VENTILATION
- vii) Courses taught at Diploma/
Post Diploma/Undergraduate
Post Graduate/Post Graduate
Diploma Level : MINE GEOLOGY - I
MINE HAZARD & SAFETY
MINE VENTILATION
MINE LEGISLATION & GENERAL SAFETY - 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. 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	:	2 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	MINERAL DRESSING
vii)	Courses taught at Diploma/ Post Diploma/Undergraduate Post Graduate/Post Graduate Diploma Level	:	MINE SURVEY - I ENTREPRENERUSHIP & MANAGEMENT & SMART TECHNOLOGY ELECTRICAL EQUIPMENTS IN MINES 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. SRINATH KUMAR SWAIN LECT. IN MINING ENGG.
ii)	Date of Birth	:	19/03/1993
iii)	Unique Id	:	1-7492920108
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	2 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	UNDERGROUND METAL MINES
vii)	Courses taught at Diploma/ Post Diploma/Undergraduate Post Graduate/Post Graduate Diploma Level	:	ENVIRONMENTAL STUDIES UNDERGROUND METAL MINING ELECTRICAL EQUIPMENTS IN MINES 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. ATISH KUMAR SAHOO LECT. IN MINING ENGG.
ii)	Date of Birth	:	25/05/1998
iii)	Unique Id	:	1-7492920144
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	2 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	MINE GEOLOGY
vii)	Courses taught at Diploma/ Post Diploma/Undergraduate Post Graduate/Post Graduate Diploma Level	:	SURFACE MINE TECHNOLOGY UNDERGROUND METAL MINES MINE SURVEY - II MINE GEOLOGY - 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. AMARENDRA SAHOO LECT. IN MINING ENGG.
ii)	Date of Birth	:	05/06/1997
iii)	Unique Id	:	1-7492920150
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	2 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	MINE MACHINERY
vii)	Courses taught at Diploma/ Post Diploma/Undergraduate Post Graduate/Post Graduate Diploma Level	:	MINE VENTILATION MINE MACHINERY - II MINE SURVEY - II UNDERGROUND METAL 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	:	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	:	2 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	MINE HAZARD & SAFETY
vii)	Courses taught at Diploma/ Post Diploma/Undergraduate Post Graduate/Post Graduate Diploma Level	:	ELECTRICAL EQUIPMENTS IN MINES MINE GEOLOGY –I & II MINE METHOD MINE HAZARD & SAFETY
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	:	2 Years	
	• Research	:	-	
	• Industry	:	-	
	• Others	:	-	
vi)	Area of Specialization	:	MINE LEGISLATION & GENERAL SAFETY	
vii)	Courses taught at Diploma/ Post Diploma/Undergraduate Post Graduate/Post Graduate Diploma Level	:	MINE SURVEY – I & II MINE LEGISLATION & GENERAL SAFETY-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. 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	:	2 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	MINE HAZARD
vii)	Courses taught at Diploma/ Post Diploma/Undergraduate Post Graduate/Post Graduate Diploma Level	:	ENVIRONMENTAL STUDIES MINE SURVEY – I & II MINE HAZARD & GENERAL SAFETY- 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. DILLIP KUMAR DEHURY
LECT. IN MINING ENGG.**
- ii) Date of Birth : 05/05/1991
- iii) Unique Id : 1-7447128222
- iv) Educational Qualifications : B.TECH.
- v) Work Experience :
- Teaching : 3 Years
 - Research : -
 - Industry : -
 - Others : -
- vi) Area of Specialization : MINE HAZARD & SAFETY
- vii) Courses taught at Diploma/
Post Diploma/Undergraduate
Post Graduate/Post Graduate
Diploma Level : MINE SURVEY - I
MINE HAZARD & SAFETY
MINE LEGISLATION & GENERAL SAFETY - I
MINE VENTILATION
MINE MACHINERY – II
MINE GEOLOGY - 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. RADHAKRUSHNA BHUTIA
LECT. IN MINING ENGG.**
- ii) Date of Birth : 22/10/1998
- iii) Unique Id : 1-9480496500
- iv) Educational Qualifications : B.TECH.
- v) Work Experience :
- Teaching : 1 Year
 - Research : -
 - Industry : -
 - Others : -
- vi) Area of Specialization : MINE MACHINERY
- vii) Courses taught at Diploma/
Post Diploma/Undergraduate
Post Graduate/Post Graduate
Diploma Level : ENVIRONMENTAL STUDIES
MINE GEOLOGY - I
UNDERGROUND METAL MINING
MINE MACHINERY – I
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 : 1 Year
 - Research : -
 - Industry : -
 - Others : -
- vi) Area of Specialization : UNDERGROUND COAL MINING
- vii) Courses taught at Diploma/
Post Diploma/Undergraduate
Post Graduate/Post Graduate
Diploma Level : SURFACE MINING TECHNOLOGY
MINE MACHINERY - I
UNDERGROUND COAL MINING
MINE VENTILATION
MINE LEGISLATION & GENERAL SAFETY - 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 : **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 : 4 Yeas
 - 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. ABHIPSA PRIYADARSINI
LECT. IN CHEMISTRY**
- ii) Date of Birth : 05/07/1993
- iii) Unique Id : 1-3614178942
- iv) Educational Qualifications : M.SC.
- v) Work Experience :
- Teaching : 4 Years
 - Research : -
 - Industry : -
 - Others : -
- vi) Area of Specialization : 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. BISWAJIT SAHOO
LECT. IN PHYSICS**
- ii) Date of Birth : 26/09/1995
- iii) Unique Id : 1-4363274507
- iv) Educational Qualifications : M.SC.
- v) Work Experience :
- Teaching : 3 Yeas
 - 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. 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 : 4 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 : 10 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 : **MRS. BISMITA PANI
LECT. IN ENGLISH**
- ii) Date of Birth : 12/06/1987
- iii) Unique Id : 1-9480677876
- iv) Educational Qualifications : M.A.
- v) Work Experience :
- Teaching : 1 Year
 - Research : -
 - Industry : -
 - Others : -
- vi) Area of Specialization : -
- 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 : **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 : 5 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. SUPRAVA PRADHAN LECT. IN COMP. SC. & ENGG.
ii)	Date of Birth	:	03/03/1991
iii)	Unique Id	:	1-2913388777
iv)	Educational Qualifications	:	B.TECH.
v)	Work Experience	:	
	• Teaching	:	6 Years
	• Research	:	-
	• Industry	:	-
	• Others	:	-
vi)	Area of Specialization	:	COMPUTER NETWORKING
vii)	Courses taught at Diploma/ Post Diploma/Under Graduate/ Post Graduate / Post Graduate Diploma Level	:	COMPUTER APPLICATION OBJECT ORIENTED COMP. PROGRAMMING 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 : **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 : 6 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 : 7 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 : -



9. FEE :

- Details of fee, as approved by State Fee Committee, for the Institution. : Tuition Fee Per Year - Rs. 30,000/-
Hostel Cost – Rs.22,000/- per year per student
Transportation Cost – Rs.8,800/- upto 20 Kms.
Rs. 13,200/- for more than 20 Kms.
Caution Money – Rs.500/- (one time refundable)
- Time schedule for payment of fee : From the beginning of each session.
For entire programme.
- No. of Fee waivers granted with Amount and name of students. : 61 Nos. (Last 3 years)
Rs, 6,500/- each students per annum

SL. NO.	NAME OF THE STUDENTS	BRANCH	YEAR OF ADMISSION
1.	BIJALIN PRADHAN	CIVIL ENGG.-1 ST SEM	2019
2.	PRIYANKA PRIYADARSINI SAHU	CIVIL ENGG.-1 ST SEM	2019
3.	TUKU SAHU	CIVIL ENGG.-1 ST SEM	2019
4.	BISWARANJAN NAYAK	ELECT. ENGG.-1 ST SEM	2019
5.	NIRMALYA KUMAR PRADHAN	ELECT. ENGG.-1 ST SEM	2019
6.	PARTHA SAHU	ELECT. ENGG.-1 ST SEM	2019
7.	RAJ KUMAR BEHERA	ELECT. ENGG.-1 ST SEM	2019
8.	SAGARIKA SAHOO	ELECT. ENGG.-1 ST SEM	2019
9.	SAMIYA KUMAR SAHU	ELECT. ENGG.-1 ST SEM	2019
10.	BAILOCHAN PRADHAN	MECH. ENGG.-1 ST SEM	2019
11.	BASANTA BHOI	MECH. ENGG.-1 ST SEM	2019
12.	MUNA BEHERA	MECH. ENGG.-1 ST SEM	2019
13.	PANCHANAN DEHURY	MECH. ENGG.-1 ST SEM	2019
14.	SAROJ SAHU	MECH. ENGG.-1 ST SEM	2019
15.	SOUBHAGYA CHARAN SAHU	MECH. ENGG.-1 ST SEM	2019
16.	ABINASH SAHOO	MINING ENGG.-1 ST SEM	2019
17.	GOBINDA CHANDRA PRADHAN	MINING ENGG.-1 ST SEM	2019
18.	SANGRAM KUMAR SAMANTA	MINING ENGG.-1 ST SEM	2019
19.	SOUMYA RANJAN DEHURY	MINING ENGG.-1 ST SEM	2019
20.	LITU SAHOO	MINING ENGG.-1 ST SEM	2019
21.	JAGABANDHU BEHRA	CIVIL ENGG.-3 RD SEM	2019
22.	LOPAMUDRA PRADHAN	CIVIL ENGG.-1 ST SEM	2020
23.	MONALISHA BEHERA	CIVIL ENGG.-1 ST SEM	2020
24.	PADMINI SAHU	CIVIL ENGG.-1 ST SEM	2020
25.	INDRAMANI BEHERA	ELECT. ENGG. – 1 ST SEM	2020
26.	JILU PANDA	ELECT. ENGG. – 1 ST SEM	2020
27.	RIKU GARNAIK	ELECT. ENGG. – 1 ST SEM	2020
28.	SAGAR SAHU	ELECT. ENGG. – 1 ST SEM	2020
29.	SUBODHA KUMAR SAHOO	ELECT. ENGG. – 1 ST SEM	2020
30.	TRINATH SAHU	ELECT. ENGG. – 1 ST SEM	2020
31.	DAYANIDHI MATIARY	MECH. ENGG. – 1 ST SEM	2020
32.	HARISHANKAR SAHU	MECH. ENGG. – 1 ST SEM	2020
33.	MANOJ DEHURY	MECH. ENGG. – 1 ST SEM	2020
34.	SAROJ SAHU	MECH. ENGG. – 1 ST SEM	2020
35.	SHISHIRA KUMAR SAHU	MECH. ENGG. – 1 ST SEM	2020
36.	MAHADEV SAHOO	MINING ENGG. – 1 ST SEM	2020
37.	RAJESH KUMAR SAHOO	MINING ENGG. – 1 ST SEM	2020
38.	SANJIB KUMAR MAJHI	MINING ENGG. – 1 ST SEM	2020
39.	SOUMYARANJAN SAHOO	MINING ENGG. – 1 ST SEM	2020
40.	SWAYAM SAHU	MINING ENGG. – 1 ST SEM	2020
41.	TAPAS PRADHAN	MINING ENGG. – 1 ST SEM	2020
42.	TAPAS KUMAR BEHERA	MECH. ENGG. – 3 RD SEM.	2020

SL. NO.	NAME OF THE STUDENTS	BRANCH	YEAR OF ADMISSION
43.	IPSITA MAJHI	CIVIL ENGG.-1 ST SEM	2021
44.	NAMITA SAHU	CIVIL ENGG.-1 ST SEM	2021
45.	SONALI BEHERA	CIVIL ENGG.-1 ST SEM	2021
46.	CHINMAYA BEHERA	ELECT. ENGG.-1 ST SEM	2021
47.	HIMANSU SAHU	ELECT. ENGG.-1 ST SEM	2021
48.	LITAN SAHU	ELECT. ENGG.-1 ST SEM	2021
49.	PRADYUMNA BHOI	ELECT. ENGG.-1 ST SEM	2021
50.	PRATYUSH MAJHI	ELECT. ENGG.-1 ST SEM	2021
51.	PUJA DEHURY	ELECT. ENGG.-1 ST SEM	2021
52.	ASHUTOSH SAHU	MECH. ENGG.-1 ST SEM	2021
53.	BIMAL PRADHAN	MECH. ENGG.-1 ST SEM	2021
54.	CHINMAYA SAHU	MECH. ENGG.-1 ST SEM	2021
55.	PARADHIN GARNAIK	MECH. ENGG.-1 ST SEM	2021
56.	SIDHANT KUMAR MAJHI	MECH. ENGG.-1 ST SEM	2021
57.	SOUMYA RANJAN BEHERA	MECH. ENGG.-1 ST SEM	2021
58.	CHANDAN KUMAR SAHU	MINING ENGG.-1 ST SEM	2021
59.	HAKESH CHANDRA SAHU	MINING ENGG.-1 ST SEM	2021
60.	RAHUL SAHU	MINING ENGG.-1 ST SEM	2021
61.	SUMANTA MAHAKUD	MINING ENGG.-1 ST SEM	2021

- Number of scholarship offered by : -
the Institution, duration and amount
- Criteria for fee waiver/scholarship : Poor & meritorious students
- Estimated cost of Boarding and : Rs. 22,000/- per year.
Lodging in Hostels
- 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	120
13	2021 – 22	60	120	120	120	120

- 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 (1 ST 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	
2019 (1 ST SEM)	CIVIL ENGG.	60	63	03	20	43	04	36	09	03	04	04	
	ELECT. ENGG.	120	126	06	107	13	73	02	17	06	11	05	
	MECH. ENGG.	120	126	06	116	04	78	02	21	02	17	-	
	MINING ENGG.	120	126	06	126	-	80	-	23	-	17	-	

YEAR	BRANCH	10% OF APPROVED INTAKE + 1 ST SEM CARRY FORWARD VACANT SEATS	ADMISSION TAKEN IN 3RD SEM	ADMISSION UNDER TFW CATEGORY (1 ST 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	
2019 (3 RD SEM)	CIVIL ENGG.	06	06	-	04	02	04	02	-	-	-	-	
	ELECT. ENGG.	12	12	-	12	-	08	-	02	-	02	-	
	MECH. ENGG.	13	13	-	13	-	12	-	-	-	01	-	
	MINING ENGG.	14	14	-	14	-	12	-	01	-	01	-	

YEAR	BRANCH	APPROVED INTAKE	ADMISSION TAKEN IN 1ST SEM	ADMISSION UNDER TFW CATEGORY (1 ST 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	
2020 (1 ST SEM)	CIVIL ENGG.	60	63	03	26	37	18	18	03	07	05	09	
	ELECT. ENGG.	120	102	06	94	04	47	01	17	01	30	01	
	MECH. ENGG.	120	101	05	101	-	52	-	16	-	28	-	
	MINING ENGG.	120	96	06	90	-	77	-	02	-	11	-	

YEAR	BRANCH	10% OF APPROVED INTAKE + 1 ST SEM CARRY FORWARD VACANT SEATS	ADMISSION TAKEN IN 3RD SEM	ADMISSION UNDER TFW CATEGORY (1 ST 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	
2020 (3RD SEM)	CIVIL ENGG.	06	06	-	04	02	04	02	-	-	-	-	
	ELECT. ENGG.	12	12	-	12	-	08	-	02	-	02	-	
	MECH. ENGG.	13	13	-	12	-	12	-	-	-	01	-	
	MINING ENGG.	14	14	-	14	-	12	-	01	-	01	-	

YEAR	BRANCH	APPROVED INTAKE	ADMISSION TAKEN IN 1ST SEM	ADMISSION UNDER TFW CATEGORY (1 ST 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	
2021 (1ST SEM)	CIVIL ENGG.	60	63	03	26	37	14	13	07	07	05	14	
	ELECT. ENGG.	120	122	06	119	03	46	01	20	-	48	01	
	MECH. ENGG.	120	122	06	122	-	55	-	25	-	36	-	
	MINING ENGG.	120	103	04	103	-	87	-	05	-	07	-	

YEAR	BRANCH	10% OF APPROVED INTAKE + 1 ST SEM CARRY FORWARD VACANT SEATS	ADMISSION TAKEN IN 3RD SEM	ADMISSION UNDER TFW CATEGORY (1 ST 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	
2021 (3RD SEM)	CIVIL ENGG.	06	05	-	05	-	05	-	-	-	-	-	
	ELECT. ENGG.	36	36	-	36	-	31	-	02	-	03	-	
	MECH. ENGG.	37	37	01	37	-	32	-	-	-	04	-	
	MINING ENGG.	43	43	-	43	-	41	-	02	-	-	-	

- 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.dterorissa.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 : 05.07.2021
 - Last of date of submission of applications: 05.09.2021
 - Dates for announcing final results :
 - Release of admission list : (main list and waiting list shall be announced on the same day)
 - Date for acceptance by the candidate : (time given shall in no case shall be less than 15 days)
 - Last date for closing of admission : 20.10.2021
 - Starting of the Academic session : 01.10.2021
 - 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 criterion with its respective weightages i.e. Admission Test, marks in qualifying examination etc.
Eligibility :-
 - Admission to 1st Semester of Engineering & Technology :-**
Pass in H.S.C. Examination/10th standard examination conducted/declared equivalent by B.S.E., Odisha and obtained at least 35% marks in aggregate, securing 30% marks in each subject at the qualifying exam. With Mathematics, Science & English subject.
 - 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 except Mining and minimum 16 years for Mining 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.
2019-20	258	264	270	354
2020-21	276	270	324	360
2021-22	312	318	330	366

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

13. LIST OF APPLICANTS : Not Applicable

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

15. INFORMATION OF INFRASTRUCTURE AND OTHER RESOURCES AVAILABLE :

- Number of Class Rooms and size of each : 16 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
44	CLASS ROOM - 16	C-16	66	A	SECOND

- 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	117.41	B	GROUND
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	EWSP-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	MACHINES SHOP	M SHOP	135.62	B	GROUND
21	CARPENTRY SHOP	CYSHOP	127.75	C	GROUND
22	FITTING SHOP	FGSHOP	128.62	C	GROUND
23	SHEET METAL SHOP	SMSHOP	128.62	C	GROUND
24	BLACKSMITH & FOUNDRY SHOP	BS&FS	107.36	C	GROUND
25	WELDING SHOP	WGSHOP	128.2	C	GROUND
26	TURNING SHOP	TGSHOP	67.02	C	GROUND
27	MOULDING SHOP	MGSHOP	77.51	C	GROUND
28	ADDITIONAL WORKSHOP (WELDING SHOP)	WGS-1	80	C	GROUND
29	ADDITIONAL WORKSHOP (FITTING SHOP)	FGS-1	77.91	C	GROUND
30	ADDITIONAL WORKSHOP (MACHINE SHOP)	MSHOP-1	75	C	GROUND
31	ADDL. CARPENTRY SHOP	CYS-1	78.07	C	FIRST
32	ADDL. SHEET METAL SHOP	SMS-1	145	C	FIRST
33	ADDL. BLACKSMITH & FOUNDRY SHOP	BS&FS-1	83.02	C	FIRST
34	ADDITIONAL WORKSHOP (TURNING SHOP)	TGS-1	67.02	C	GROUND

35	ADDITIONAL WORKSHOP (MOULDING SHOP)	MGS-1	77.28	C	GROUND
36	MINE MACHINERY LAB	MML	136.01	B	FIRST
37	MINE ENVIRONMENT & HAZARD LAB.	ME&HL	110.84	B	FIRST
38	GEOLOGY LAB	GEOLAB	94.02	B	SECOND
39	MINE VENTILATION LAB	MVENTL	94.02	B	SECOND
40	MINING SURVEY LAB	MSL	69.2	B	SECOND
41	ELECTRICAL EQUIPMENTS LAB	EEL	66	B	SECOND

- No. of Drawing Halls with capacity each : 02 Nos. Drawing Halls

SL NO	ROOM TYPE	ROOM ID	AREA IN SQM	BLOCK	FLOOR
1	DRAWING HALL - 1	D-1	139.65	B	THIRD
2	DRAWING HALL - 2	D-2	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 and capacity of each : Available & no. of rooms. – 23 Nos. (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 : 11075 Nos.
Total Titles : 1812 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 Equipment/Facilities in each Laboratory/Workshop

**CIVIL ENGINEERING
SURVEY LABORATORY**

SL NO	Name of machines /Equipments/ Tools	Supplier	Specification	Quantity
1	Tape		Fiber glass tape(50m)	3
			Steel tape(30m)	5
			Fiber tape(30m)	2
		Premier instruments Co.	Fiber tape(30m)	10
			Metal wired tape(30m)	1
			Steel tape(15m)	3
			Fiber tape(15m)	3
		Premier instruments Co.	Fiber tape(15m)	10
2	Compass		Prismatic Compass	4
		Premier instruments Co.	Prismatic Compass (4inch)	1
		Premier instruments Co.	Prismatic Compass (5inch)	1
			Surveyor's Compass	2
		Premier instruments Co.	Surveyor's Compass	1
3	chain		100ft	
		Premier instruments Co.	100ft	5
			33ft	2
			66ft	
			30mt	
		Premier instruments Co.	30mt	5
4	Tripod Stand		compass	6
		Premier instruments Co.	compass	3
			Auto Level & Dumpy Level	7
		Premier instruments Co.	Auto Level & Dumpy Level	6
			Plane table	3
			Theodolite	2
		Premier instruments Co.	Transite Theodolite	2
		Premier instruments Co.	Digital Theodolite	2
			Tacheometer	2
			Abney Level	2
			Extra	2
		Premier instruments Co.	Wye level	1
			Tilting level	1
5	Proposnal Compass			10
6	Auot Level			5
7	Auot Level	Premier instruments Co.	Auto Level(Sokkia)	1
		Premier instruments Co.	Auot Level(Topcon)	1
		Premier instruments Co.	Auot Level(Nikon)	1
		Premier instruments Co.	Auot Level(Bosch)(26D)	1
		Premier instruments Co.	Auot Level(Bosch)(32D)	1
8	Dumpy Level			2

9	Dumpy Level(12 Inches)	Premier instruments Co.		1
10	Abney Level			2
11	Wye Level			2
12	Wye Level	Premier instruments Co.		1
13	Tilting Level			2
14	Tilting Level			1
15	Hand Level			2
16	Hand Level	Premier instruments Co.		1
17	Abney Level	Premier instruments Co.		1
18	Theodolite			2
19	Transit Theodolite	Premier instruments Co.	Vishal Brand 20Sec Accuracy	1
20	Transit Theodolite	Premier instruments Co.	Eastman Brand 20Sec Accuracy	1
21	Digital Theodolite	Premier instruments Co.	Laser Optical system	1
22	Digital Theodolite	Premier instruments Co.	Non Laser Optical system	1
23	Tacheometer			2
24	Telescopic Alidade			2
25	Telescopic Alidade	Premier instruments Co.		1
26	Levelling Staff		4mt	5
		Premier instruments Co.	4mt	1
			5mt	1
			6mt	6
27	Ranging Rod		3mt	5
			2mt	19
		Premier instruments Co.	3mt	5
		Premier instruments Co.	2mt	5
28	Arrow			41
			GI	5
29	Peg			6
30	Wooden Peg			5
31	Line Ranger			5
		Premier instruments Co.	Sokkia Model	1
			Bosch (50mt)	1
			Bosch (100mt)	1
32	Open cross staff			5
		Premier instruments Co.	Brass Pole	1
33	French Cross Staff			5
34	French Curve			
		Premier instruments Co.		1
35	Optical Square			5
		Premier instruments Co.	6inch	1

			12inch	1
36	Planimeter			2
		Premier instruments Co.	Manual	1
			Digital	1
37	Beam Compass			2
38	Pentagraph			3
		Premier instruments Co.	24 inch	1
			30 inch	1
39	Pentagraph		Ghat-tour	2
40	Box Sextanat			2
41	Cyclone Ghat Tracer			3
42	Clinometer	Premier instruments Co.		1
43	Total Station Prism		Chinise	1
44	Total Station Prism		Topcon	1

CONCRETE & SOIL LAB

SL NO	Name of machines /Equipments/Tools	Specification	Quantity
1	IS Sieve (coarse Grained)	125mm	1
		100mm	2
		90mm	1
		80mm	1
		75mm	1
		63mm	2
		53mm	1
		50mm	1
		45mm	1
		40mm	2
		37.5mm	1
		31.5mm	1
		26.5mm	1
		25mm	1
		22.4mm	1
		20mm	2
		19mm	1
		16mm	2
		13.2mm	1
		12.5mm	2
		11.2mm	1
10mm	2		
9.5mm	1		
6.3mm	1		
5.6mm	1		
4.75mm	1		
2.36mm	4		

2	Lid		2
3	Pan		3
4	IS Sieve (Fine Grained)	1.18mm	2
		180mics	2
		710mics	2
		600mics	4
		425mics	2
		300mics	4
		150mics	2
		90mics	4
		75mics	4
	4.75mics	4	
5	Lid		4
6	Pan		5
7	Pycnometer		3
8	Spatchula/Palette Knife		16
9	Trowel		8
10	Straight Edge		3
11	CoreCutter with Dolly		3
12	Shrinkage limit set		3
13	Liquid Limit Set		3
14	Measuring Cylinder		7
15	Iron Mould		10
16	Le-chetelier Apparatus		18
17	Le-chetelier Flask		5
18	Vicat Apparatus		3
		Mould	3
		Glass Plate	2
		Niddle Box	2
19	Measuring Cyclinder	200ml	1
20	Container		14
21	Proctor Mould	Big	6
		Small	17
22	Abrassive charges		24
23	Tray	600mmx600mm	3
		450mmx450mm	4
		300mmx250mm	5
24	Cube Mould	150mmx150mm	5
		100mmx100mm	5
25	Slump Mould Set		2
26	steel Rammer		3
27	Weighing Balance	1500gram	3
28	Rapid moisture Meter		1
29	Compacting Factor Apparatus		2
30	Water Bath		3
31	Loss Angels Abrassion Test Machine		1
32	Table Vibrator		1

33	Impact test Machines		1
34	compressive Strength Machines		1
35	Vee-Bee Consistometer		1
36	Mechanical Sieve Shaker		2
37	Thermostatic Oven		
38	proctor Mould	150mm	13
		180mm	2
		120mm	2
39	Proctor rammer	72cm	3
		48cm	3
40	stop watch		8
41	Weigh balance		1
42	Handy Spring Balance		8
43	Steel Rule		12
44	Cone Penetrometer Set		1
45	Control Switch		2
46	Star Delta Mortar Starter		1
47	Penetration Apparatus	Penetrometer	1

PUBLIC HEALTH ENGINEERING LAB

SL NO	Name of machines /Equipments/Tools	Specification	Quantity
1	Wash Bottle		15
2	Magnetic Stirrier		2
3	Filter		1
4	Six Jar Apparatus		1
5	Evaporating Dish		6
6	Spirit Lamp		9
7	Thermometer		4
8	Desicator		4
9	Wire Brush		24
10	Test Tube Holder		11
11	Buret Stand		22
12	Ring Clamp		2
13	Funnel Clamp		2
14	Buret Clamp		19
15	Buret		13
16	Funnel Clamp		2
17	Flask	500ml	10
		250ml	12
18	Beaker	1000ml	7
		600ml	1
		250ml	2
		150ml	10
19	Test Tube Stand		21
20	Pipet Stand		6

21	Pipet Stand		20
22	Graduated Cylinder		7
23	Test Tube	50ml	15
			85
24	Filter Paper	11cm dia	1
		12.5cm dia	1
		4.5cm dia	1
25	Electric Hot Plate		4

ELECTRICAL ENGINEERING :

Electrical Machine & Workshop Lab.

SL.NO.	Name of the Item's	Specification	Qunantity
1	Ammeter	D.C (0-1A)	5
		D.C (0-5A)	3
		D.C (0-150mA)	1
		D.C (0-200mA)	1
		A.C (0-5A)	3
		A.C (0-10-30A)	2
		A.C (10-20A)	1
		A.C (0-500mA)	1
		A.C (0-10A)	3
		A.C (0-5-10A)	2
		A.C (0-50A)	1
2	Voltmeter	D.C (0-10mV)	1
		A.C (0-300V)	3
		A.C (0-500V)	6
		A.C(0-150-300-600V)	3
3	Rheostart	0-5ohm,1A	2
		0-5ohm,5A	1
		0-5ohm,1A	3
		0-25ohm,1A	2
		0-120ohm,1A	1
		0-300ohm,1A	7
		0-800ohm,1A	3
0-45ohm,5A	3		
4	Wattmeter	0-750-1500-3000 watt	3
		0-350 watt	1
		96*96,1250watt	1
5	Frequency meter	0-55Hz	1
		0-456-50-55	1
		60Hz	3
		MC portable type 50Hz	1
6	Power Factor mater	250V,5A	4
7	Energy meter	3-phase(A.C)	1
		1-Phase(A.C)	2
8	Multimeter	Analog	8
9	Ohm meter	300ohm	2

		2000ohmm	2
10	Clampon meter	Digital	4
11	Tachometer	Digital	6
12	Varriac	220V,5A,10A	4
13	Gate end box		2
14	Fuse	HRC	2
		Rewirrrable	2
15	Mercury Vapour Lamp		2
16	Sodium vapour lamp		2
17	Induction coil	800-10000V,100mm spark	2
18	T.P.I.C		2
19	D.P.I.C		2
20	C.T		1
21	P.T		1
22	S.W.G	1-36	5
23	Starter	Automatic delta-star	3
		D.O.L	2
		Stepper motor control starter	1
24	Neon Tester		1
25	Choke coil	240v,50Hz	2
26	Earth Tester		5
27	Circuit Breaker		1
28	Screw driver	200mm	15
		150mm	8
		100mm	7
29	Hand drill		2
30	Ball pin Hammer		10
31	Wire stipper		4
32	Nose Plier		6
33	Spanner		6
34	Multi purpose Knife		15
35	Side cutting Plier		15
36	Poker		15
37	Pincer		28
38	Dot Pinch		19
39	Ginlet		3
40	Centre punch		12
41	Flat File		4
42	Round File		4
43	Growler		3
44	MOTOR-Sewing motor	230V,7.5A,6500R.P.M	1
45	D.C Compound motor with break	220V,3.5A,1H.P,1450R.P.M	1
46	D.C Compound motor	220V,11A,3-H.P,1500R.P.M	1
47	D.C Series motor with break	220V,3.5A,1H.P,1450R.P.M	1
48	D.C Series motor with break	220V,7A,2H.P,1500R.P.M	1
49	D.C Motor drive with break	220V,3.4A,1H.P,1500RPM	1
50	Synchronous motor	220V(D.C),400V(A.C),1.2-2A	
		3H.P,1500R.P.M	1

51	Induction motor with break	3-phase,3A,400V	
		2H.P,1450R.P.M	1
52	Induction motor capacitor & break	220V,1-PHASE,7A,1425R.P.M	1
		Motor-400v,10A,7H.P,1450rpm	
53	D.C gen set	Gen-250V,10A,2.5KW,2500rpm	1
54	D.C Gen set Compound	Motor-220V,10A,3H.P,2500RPM	
		Gen-250V,10A,2.5KW,2500rpm	1
55	D.C Gen set Shunt	Motor-220V,10A,3H.P,1500RPM	1
56	Alternator	Motor-220V,17A,5h.p,1500rpm	
		Gen-400V,3A,3.5kva,1500rpm	1
57	Alternator	Motor-220V,8A,2H.P,1500rpm	
		Gen-400V,4.1A,3kva,1500rpm	1
58	Transformer	1-phase 230V/115V,4.4A,1kva	2
		1-phase 220/110,4.4A,1kva	1
		3-phase 415/230V,1.5A,1kva	2
		3-phase 415/220,1.5A,1kva	1
59	Inductor coil	230V,5A,1-PHASE	1
60	Thyristor	A.C Motro drive	1
		D.C motor drive	1
61	A.C.B	440V,10A,5kva	1
62	Transformer oil kit tester	30V	1
63	Rheostat	1ohm,5A	5
		10ohm,5A	2
		25ohm,1A	2
64	Half &full control	1-phase bridge rectifier	1
65	Function Generator	1MHz	2
66	I.C Trainer Kit		2
67	Circuit Breaker	Oil	2
		Air	2
		SF6	2
68	Megger Chake continuity of wind.		2
69	Relay's	Over Current	1
		Earth Fault	1
		Buchholz Relay	1
70	Relay Test Bnch		1
<u>Circuit & Network Theory Lab</u>			
1	Ammeter	D.C (0-1A)	5
		D.C (0-5A)	3
		D.C (0-150mA)	1
		D.C (0-200mA)	1
		A.C (0-5A)	3
		A.C (0-10-30A)	2
		A.C (10-20A)	1

		A.C (0-500mA)	1
		A.C (0-10A)	3
		A.C (0-5-10A)	2
		A.C (0-50A)	1
2	Voltmeter	D.C (0-10mV)	1
		A.C (0-300V)	3
		A.C (0-500V)	6
		A.C(0-150-300-600V)	3
3	Two port Network Kit		1
4	Resonance	Parallel	2
		Series	2
5	Andersons Bidge	Inductance	1
6	Desauty's Bridge	Cpacitance	1
7	Active Low pass Fielter		2
		High pass fielter	2
		Band Pass Fielter	2
		Notch Fielter	2
8	Theorem Kits	Supperposition	1
		Norton's	1
		Maximum power transform	2
		Milliman's	1
9	Verification of KCL,KVL Kit		2
10	D.C Power Supply	12V	2

Instrumentation & Measurement Lab

SL.NO.	Name of the Item's	Specification	Quantity
1	Energy Meter		2
2	Straingauge		1
3	Thermocouple		1
4	Thermister		1
5	Bridge Kit	Wheat.,Desauty,Wein,Maxwell,Ander.	1
6	Andersons Bidge	Inductance	1
7	Desauty's Bridge	Cpacitance	1
8	Temperature Transducer kit		1
9	LVDT		1
10	Thermometer		8
11	C.T		1
12	P.T		1
13	S.W.G	1-36	5
14	Hydrometer		4
15	Micrometer	0-25*0.01mm	4
16	Variac	0-270,1-phase	1
		0-270,3-phase	1
17	Megger	1000V	1

		500V	3
16	Digital Gauge Meter		2
Microprocessor & Interfacing Lab			
SL.NO.	Name of the Item's	Specification	Quantity
1	8085 micro-processor kit		2
2	Power Supply Kit	12V(D.C)	2
3	8085 micro-processor kit		2
4	Stepper Motor Interfacing Kit		1
5	Traffic Light Control System		1
6	7-Segment Display Kit	Using 8279 (I.C)	1
Power Electronics Lab.			
SL.NO.	Name of the Item's	Specification	Quantity
1	Rectifier Kit	HWR,FWR Using S.C.R	1
2	Filter Circuit	Inductor,Capacito,Pi	1
3	Powewr MOSFET Kit		1
4	FET Kit		1
5	IGBT Kit		1
6	Chopper Kit		1
7	Dual Power Supply With Automatic	2A,0-30V(D.C)	4
8	Oscilloscope	30MHz	2
9	Function Generator	1MHz	2
10	Diode Characteristics Kit		1
Digital Electronics Lab			
SL.NO.	Name of the Item's	Specification	Quantity
1	Logic Trainer KIT		1
2	NAND,NOR Logic Gate Kit		2
3	Binary-Gray Converter Kit		1
4	Half/Full Adder Kit		4
5	Half/Full Subtractor Kit		4
6	Add/Sub Kit		1
7	Mux/Demux		3
8	Comparater		1
9	Flipflop	J-K,S-R,M-S,D,T	7
10	Up/Down Counter	4-Bit,ASYN,SYN	2
11	Mod-10 counter		1
12	A/D & D/A		4
13	Shift Resisters	SISO,PIPO,PISO,SIPO	2
14	7-Segment Display		1
15	Power Supply Unit	24V (D.C)	2
16	Function Generator	1MHz	2
Basic Electronics & Analog Electronics Lab			
SL.NO.	Name of the Item's	Specification	Quantity
1	Screw driver	200mm	15

		150mm	8
		100mm	7
2	Combination Plier		6
3	Hand drill		2
4	Ball pin Hammer		10
5	Wire stripper		4
6	Nose Plier		6
7	Spanner		6
8	Multi purpose Knife		15
9	Side cutting Plier		15
10	Poker		15
11	Pincer		28
12	Dot Pinch		19
13	Ginlet		3
14	Centre punch		12
15	Flat File		4
16	Round File		4
17	CRO	30MHz	3
18	Digital Storage CRO	25MHz`	1
19	CRO	50MHz	3
20	Half & full control	1-phase bridge rectifier	1
21	Function Generator	1MHz	2
22	I.C Trainer Kit		2
23	Digital Gauge Meter		2
24	Power Supply Unit	12V(D.C)	2
25	Basic Electronics & power electronic	Trainer Kit	2
26	Soldering Iron	35w Wooden	15
27	Power Supply Unit	12V(D.C)	2
28	Basic Electronics & power electronic	Trainer Kit	2
29	P-A System	250	1
30	Transister characteristics kit	CB,CE,CC	3
31	Common emmitter Amplifier kit		2
32	R-C Coupled amplifier kit		2
33	Push-Pull Amp.Kit		2
34	Power Amp. Kit	Class-A,B,C,AB	4
35	Multivibrator Kit	Astable,Bistable,Monostable	4
36	Oscillator	Hartly,Colpits,Phase Shift,Wein Bridge	5
37	MOSFET Kit		1
38	JFET kit		1
39	Transuster Biasing Kit		4
40	Rectifier Kit	HWR.FWR	2
41	Zener Diode Voltage Regulator Kit		1
42	Diode Characteristics Kit		1
43	Multimeter	Digital	10
		Analog	5
44	Function Generator	1MHz	1
45	OPAMP.Kit		1
46	Solder		50

47	Flux		30
48	Diode		500
49	Transformer	500mA	30
		1A	15
Basic Electrical Lab			
SL.NO.	Name of the Item's	Specification	Quantity
1	Ammeter	D.C (0-1A)	1
		D.C (0-5A)	1
		A.C (0-5A)	1
		A.C (0-10-30A)	1
		A.C (10-20A)	1
2	Voltmeter	D.C (0-10mV)	1
		A.C (0-300V)	1
3	Rheostat	0-5ohm,1A	1
		0-5ohm,5A	1
		0-5ohm,1A	1
4	Wattmeter	0-750-1500-3000 watt	1
5	Multimeter	Analog	4
		Digital	4
6	Capacitor	5A,230V	4
7	Two Wattmeter	power measurementb board	1
8	Electric Drill	10mm	1
9	Induction coil	800-10000V,100mm spark	2
10	Choke Coil	230V,40W,50Hz	4
11	Flourescent Lamp	40W	4
12	Screw driver	200mm	15
		150mm	8
		100mm	7
13	Combination Plier		6
14	Hand drill		2
15	Ball pin Hammer		10
16	Wire stipper		4
17	Nose Plier		6
18	Spanner		6
19	Multi purpose Knife		15
20	Side cutting Plier		15
21	Poker		15
22	Pincer		28
23	Dot Pinch		19
24	Ginlet		3
25	Centre punch		12
26	Flat File		4
27	Round File		4
28	Heater	1500w	4

MECHANICAL ENGINEERING**STRENGTH OF MATERIALS LAB.**

SI NO.	Name of Machine/Equipments/Tools	Specification	Quantity
1	UNIVERSAL TESTING MACHINE SET		1
2	TORSION TESTING MACHINE SET		1
3	IMPACT TESTING MACHINE		1
4	BRINELL HARDNESS TESTING MACHINE		1
5	OIL CANE		2
6	VERNIER CALIPER	200X0.02 MM	2
7	VERNIER CALIPER	150X0.02 MM	3
8	MICROMETER	25-50X0.01 MM	4
9	MICROMETER	50-75X0.01 MM	1
10	MICROMETER	0-25X0.01 MM	5
11	DEPTH MICROMETER	RANGE -0-100 MM, ACCURACY- 0.01 MM	1
12	MICRO METER SPARE PARTS		1
13	INTENDER	DIAMOND	1
14	INTENDER	STEEL	2
15	ALLEN KEY SET		2
16	HARDNESS TESTING MACHINE(SPECIMEN)	HRB	1
17	HARDNESS TESTING MACHINE(SPECIMEN)	HRC	1
18	HARDNESS TESTING MACHINE(SPECIMEN)	SAMPLE	2
19	BRINELL MICROSCOPE		1
20	TORSION TESTING MACHINE (SPECIMEN)		2
21	UNIVERSAL TESTING MACHINE GRAPH PAPER		2

HYDRAULICS & HYDRAULIC MACHINE LAB

1	HYDRAULICS TEST BENCH		1
2	KAPLAN TURBINE		1
3	FRANCIS TURBINE		1
4	PELTON WHEEL TURBINE		1
5	CENTRIFUGAL PUMP		1
6	RECIPROCATING PUMP		1

7	ANALYTICAL FRACTIONAL WEIGHT BOX	2
8	TACHOMETER	1
9	STOP WATCH	2

HEAT POWER LAB

1	SINGLE CYLINDER PETROL ENGINE	1
2	MULTI CYLINDER PETROL ENGINE	1
3	TWO STAGE AIR COMPRESSOR	1
4	WINDOW TYPE AC TUTOR	1
5	GENERAL TYPE REFRIGERATION SYSTEM	1
6	VERTICAL WATER TUBE BOILER	1
7	COCHRAN BOILER	1
8	STEAM ENGINE FACTORY MODEL WITH ELECTRIC HEATER	1
9	CLOSE TYPE FLASH POINT AND FIRE POINT	1
10	OPEN TYPE FLASH POINT AND FIRE POINT	1
11	TWO- STROKE PETROL ENGINE MODEL	1
12	TWO- STROKE DIESEL ENGINE MODEL	1
13	FOUR- STROKE PETROL ENGINE MODEL	1
14	FOUR- STROKE DIESEL ENGINE MODEL	1
15	ANEMOMETER	1

MACHINE SHOP

1	CENTRE LATHE	9
2	GRINDING MACHINE	3
3	SENSITIVE DRILLING MACHINE (BENCH TYPE)	9
4	HORIZONTAL MILLING MACHINE	1
5	SHAPER MACHINE	1
6	SLOTTER MACHINE	1
7	KNURLING TOOL	1
8	CHUCK KEY	4
9	SURFACE GAUGE	5

10	DRILL BIT	3/6 = 1 NO, 23.5 MM = 1 NO, 16 MM = 1 NO, 18MM = 3 NOS	6
11	THREADING TAP	1/2' = 3 NOS, 6MM = 3 NOS, 10X1.5 MM = 3 NOS	9
12	WIRE BRUSH		5
13	LETTER PUNCH SET		5
14	FILER GAUGE SET		2
15	ADJUSTABLE TAP HOLDER		1
16	STEEL RULE	150MM = 58 NOS, 300MM = 1 NO, 30MM = 1NO, 150MM = 19 NOS, 600MM = 3 NOS	82
17	C CLAMP	4" = 2NOS, 8" = 8NOS	10
18	SCREW DRIVER		7
19	PIPE WRENCH		1
20	HARD NEEDLE FILE ASSORTED SHAPE	16 CM	1
21	STRAIGHT SCRIBER		28
22	OCTAGONAL CHISEL		3
23	TOOL HOLDER KEY		8
24	TRY SQUARE		17
25	TOOL HOLDER	14MM L = 1, 12MM L = 1, 14 MM S = 3, 12 MM S = 3, 12 MM R = 2	11
26	DRILL KEY		3
27	DOT PUNCH		20
28	HALF ROUND FILE	150MM = 22NOS, 200 MM = 15NOS, 3/4" = 29 NOS, 1/2" = 5 NOS	72
29	SMOTH FILE	150 MM	3
30	SMOTH FILE	300 MM	4
31	TRIANGULAR FILE	200 MM	37
32	BALL PANE HAMMER		40
33	SLOTTING TOOL		5
34	SINGLE POINT CUTTING TOOLS	3/8"X3" = 2 NOS, 5/16"X4" = 2 NOS, 5/16"X3 = 4NOS, 3/8"X4" = 3NOS	11
35	DRILL SUCKET		4
36	THREE JAW CHUCK		1
37	JAW		9
38	TALLEN KEY	4MM	1

39	DIVIDER		53
40	OUT SIDE CALLIPER		82
41	INSIDE CALLIPER		77
42	DOUBLE ENDED SPANER	16-17= 7NOS, 21-23= 1 NO, 19-22= 1 NO, 20-22= 2 NOS, 25-28= 2 NOS, 30-32= 2 NOS, 18-19= 4 NOS, 16-17= 2 NOS, 14-15= 6 NOS, 10-11= 2 NOS, 8-10= 1 NO, 7-8= 1 NO, 6-7= 2 NOS, 4-5= 1 NO	34
43	RING SPANER	12-13= 9NOS, 14-15= 2NOS, 20-22= 1 NO, 10-11= 1NO, 30-32= 2 NOS, 8-9= 1 NO, 16-17= 1NO, 6-7= 2 NOS, 18-19= 2 NOS	21
44	TORQUE WRENCH SET		1

FITTING SHOP

1	C CLAMP		
2	HAND DRILL		2
3	BENCH VICE		80
4	BENCH VICE TABLE		20
5	HACKSAW FRAME		92
6	VERNIER HEIGHT GAUGE	300X0.02/12X.001 MM	1
7	HAND VICE		1
8	FLAT FILE		78
9	SQUARE FILE		39
10	ROUND FILE		22
11	FLAT CHISEL	1" = 8 NOS, 3/4 = 2 NOS, 1/2" = 14 NOS	24
12	BENT SNIP		3
13	STRAIGHT SNIP		8

CARPENTRY SHOP

1	RIP SAW		15
2	TENNON SAW		42
3	MALLET		16
4	KNIFE FILE		16
5	KNIFE TRIANGULAR FILE		4
6	T SPANNER		3
7	ANGLE PLATE		2
8	SURFACE PLATE		1

9	JACK PLANE		11
10	NUMBER PUNCH SET		3
11	LETTER PUNCH SET		5

BLACK SMITH

1	ANVIL		7
2	SWAGE BLOCK		2
3	OPEN HEARTH FURNACE		8
4	CLOSE HEARTH FURNACE		1
5	BOLT TONG		30
6	FLAT TONG		19
7	TOP FULLER		4
8	FLATTER		7
9	BOTTOM FULLER		3
10	POKER		7
11	PIN BAR		6
12	LAMP		7
13	HOOK PIN STRIGHT		4
14	HOOK PIN BEND TYPE		4
15	BENT TONG		1
16	ROSPCUT HALF ROUND FILE		1
17	GAS NOZZLE		4
18	GOOGLES		28
19	COPE DRAG		1
20	BRONZE CHISEL		3
21	U FLATTER		4
22	ROUND FLATTER		
23	HOLDING CHISEL	25 MM	4
24	BLOWER SET		1
25	SURFACE CHISEL		10
26	LEG VICE		1
27	HAND VICE		4

28	POWER SAW	1
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WELDING SHOP

1	WELDING CABLE	20 M	1
2	WELDING SET OIL COOL		2
3	HOLDER		4
4	WELDING SCREEN		2
5	VICE BENCH		2
6	ROUND FILE SMOTH CUT		15
7	ROUND FILE BASTARD CUT		14
8	SINGLE CUT ROUGH FILE		36
9	TRIANGULAR KNIFE FILE		9
10	WELDING MACHINE		2

MINING ENGINEERING

MINE MACHINERY LAB.

SL NO.	MODEL SUPPLIER NAME	MODEL /EQUIPMENT NAME	QUANTITY
1	REPLICA	BACKSTAY	2
2	REPLICA	RUNAWAY SWITCH	2
3	REPLICA	INTERCOUPLED STOP- BLOCK & RUNWAY SWITCH	2
4	REPLICA	GATE BELT CONVEYOR WITH LOOP TAKE- UP	1
5	REPLICA	CONE CUT	1
6	REPLICA	WEDGE CUT	1
7	REPLICA	FAN CUT	1
8	REPLICA	BURN CUT	1
9	REPLICA	DRAG CUT	1
10	REPLICA	TYPES OF ROOF SUPPORT BY TIMBER	1
11	REPLICA	CHOCK RELEASE DEVICE	1
12	REPLICA	SIDE & ROOF SUPPORT IN A ROAD WAY	1
13	REPLICA	FORE POLING	2
14	REPLICA	SAFARI SUPPORTS	1
15	REPLICA	ROOF & SIDE STITCHING	2
16	REPLICA	ROOF BOLTING	1
17	REPLICA	COLLIERY LAMP ROOM	1
18	REPLICA	STONE-DUST BARRIER	1
19	REPLICA	APPROACHAING OLD WATER- LOGGED WORKINGS	1

20	REPLICA	MINING WIRE ROPES(DISLAYED IN A SHOW CASE)	1
21	REPLICA	CYLINDRICAL DRUM	1
22	REPLICA	CONICAL DRUM	1
23	REPLICA	CYLINDRO- CONICAL DRUM	1
24	REPLICA	BI-CYLINDRO-CONICAL DRUM	1
25	REPLICA	ANCHORED POST BRAKES	1
26	REPLICA	CENTRE-SUSPENDED CALIPER BRAKES	1
27	REPLICA	KING DETACHING HOOK	1
28	REPLICA	ROPE GUIDES	1
29	REPLICA	STOPE BLOCK	1
30	REPLICA	BACK CATCH	1
31	REPLICA	SPRING CATCH	1
32	REPLICA	AGECROFT DEVICE	1
33	REPLICA	JAZZ RAIL	2
34	REPLICA	INTERCOUPLED STOP- BLOCK & RUNWAY SWITCH AND JAZZ RAIL COMBINED	1
35	REPLICA	TUB RETARDER	1
36	REPLICA	TUB RE-RAILER	1
37	REPLICA	MAN-RIDING CAR	2
38	REPLICA	SHAKER CONVEYOR	2
39	REPLICA	BELT CONVEYOR	1
40	REPLICA	SINGLE DECK CAGE	2
41	REPLICA	DOUBLE DECK CAGE	1
42	REPLICA	RELIANCE CAPEL	1
43	REPLICA	WHITE METAL CAPEL	1
44	REPLICA	RIGID GUIDE	1
45	REPLICA	ROPE GUIDE SHOE	1
46	REPLICA	PROP KEPS	1
47	REPLICA	STAUSS KEPS	1
48	REPLICA	MINE CAR	1
49	REPLICA	MAIN AND TAIL ROPE HAULAGE LAYOUT	1
50	REPLICA	SHAFT SINKING	1
51	REPLICA	DIRECT ROPE HAULAGE LAYOUT	1
52	REPLICA	LONG WALL RETREATING FACE WITH CAVING	1
53	REPLICA	CHOCK RELEASE DEVICE	1
54	REPLICA	DEPILLERING IN A BORD AND PILLER PANNEL	1
55	REPLICA	LONG WALL ADVANCE FACE WITH SAND STONE	1

MINE VENTILATION LAB

SL NO.	MODEL SUPPLIER NAME	MODEL /EQUIPMENT NAME	QUANTITY
1	REPLICA	AXIAL FLOW FAN	1
2	REPLICA	SIROCCO FAN	1
3	REPLICA	VENTILATION SYSTEM IN A BORD AND PILLER DEVELOPMENT PANEL	1

4	REPLICA	VENTILATION STOPPING	4
5	REPLICA	PREPARATORY STOPPING	4
6	REPLICA	ISOLATION STOPPING	4
7	REPLICA	FIRE STOPPING	4
8	REPLICA	EXPLOSION PROOF STOPPING	4
9	REPLICA	VENTILATION DOOR WITH REGULATOR	4
10	MICON ENGINEERS	BAROMETER	1

MINE HAZARDS & ENVIRONMENT LAB.

SL NO	MODEL SUPPLIER NAME	MODEL/ EQUIPMENT NAME	QUANTITY
1	MICON ENGINEERS	TOXIMETER	1
2	MICON ENGINEERS	MULTI GAS DETECTOR	2
3	MICON ENGINEERS	WHIRLING HYGROMETER	1
4	MICON ENGINEERS	MECHANICAL ANEMOMETER	1
5	MICON ENGINEERS	VELOMETER	1
6	MICON ENGINEERS	KATA THERMOMETER	1
7	MICON ENGINEERS	HELMET	2
8	MICON ENGINEERS	GUM BOOTS	1
9	MICON ENGINEERS	HAND GLOVES	1
10	MICON ENGINEERS	EAR MUFF/ PLUG	1
11	MICON ENGINEERS	FLUORESCENT JACKETS (COTTON)	1
12	MICON ENGINEERS	NOSE MASK/ DUST MASK	1
13	MICON ENGINEERS	SHIN GUARD/ KNEE CAP	1
14	MICON ENGINEERS	FIRST AID BOX	1
15	MICON ENGINEERS	MINING SAFETY BELT	1
16	MICON ENGINEERS	GOGGLES	1
17	MICON ENGINEERS	SAMPLING BLADDER	1

GAS TESTING EQUIPMENTS			
SL NO.	MODEL SUPPLIER NAME	MODEL /EQUIPMENT NAME	QUANTITY
1	J.K. DEY & SONS	VELOX GL7 (MODIFIED) GAS TESTING FLAME SAFETY LAMP(SL NO. 170080& 170081)	2
2	J.K. DEY & SONS	VELOX GL50 GAS TESTING FLAME SAFETY LAMP(SL NO. 180018)	2
3	J.K. DEY & SONS	GASKET	1
4	J.K. DEY & SONS	WICK	1 BUNDLE
5	J.K. DEY & SONS	INNER GAUGE	2
6	J.K. DEY & SONS	OUTER GAUGE	2
7	J.K. DEY & SONS	FIXED FILAMENT UNIT (MODIFIED)	1
8	J.K. DEY & SONS	FUEL VESSEL (OIL POT) FOR GL50 LAMP	1
9	J.K. DEY & SONS	BATTERY FOR GL7 LAMP	2

10	J.K. DEY & SONS	GAS CYLINDER	1
11	J.K. DEY & SONS	FIXED FILAMENT UNIT (MODIFIED)	1
12	J.K. DEY & SONS	A COMPLETE GAS CAP INDICATOR BOX (WOODEN) HS CODE 98010014 :	1
13	J.K. DEY & SONS	MITHANE GAS TESTING CHAMBER	1
14	J.K. DEY & SONS	FIXED FILAMENT UNIT (MODIFIED)	1
15	J.K. DEY & SONS	LID WITH POSITIVE CONNECTOR OF BATTERY BOX	1
16	REPLICA	COLLIERY LAMPROOM	1

GEOLOGY LAB.

SL NO.	MODEL SUPPLIER NAME	MODEL /EQUIPMENT NAME	QUANTITY
1	GEOLOGISTS SYNDICATE PVT. LTD.	HAND SPECIMEN OF ROCKS	48
2	GEOLOGISTS SYNDICATE PVT. LTD.	HAND SPECIMEN OF MINERALS	43
3	GEOLOGISTS SYNDICATE PVT. LTD.	ORE HAND SPECIMEN	18
4	GEOLOGISTS SYNDICATE PVT. LTD.	MOH'S SCALE OF HARDNESS (SPL.)	1
5	GEOLOGISTS SYNDICATE PVT. LTD.	PETROLOGICAL MICROSCOPE	2
6	GEOLOGISTS SYNDICATE PVT. LTD.	HAMMER 1000 GMS	1
7	GEOLOGISTS SYNDICATE PVT. LTD.	POCKET MAGNET	1
8	GEOLOGISTS SYNDICATE PVT. LTD.	MEASURING TAPE 3 MTRS STEEL	1
9	GEOLOGISTS SYNDICATE PVT. LTD.	MEASURING TAPE STEEL 15 MTRS	1
10	GEOLOGISTS SYNDICATE PVT. LTD.	MEASURING TAPE 30 MTRS STEEL	1
11	GEOLOGISTS SYNDICATE PVT. LTD.	MESURING TAPE 50 MTRS STEEL	1
12	GEOLOGISTS SYNDICATE PVT. LTD.	GEOLOGISTS FIELD NOTEBOOK	1
13	GEOLOGISTS SYNDICATE PVT. LTD.	MUNSHELL ROCK COLOUR CHART	14
14	GEOLOGISTS SYNDICATE PVT. LTD.	THERMOMETER / HYGROMETER	1
15	GEOLOGISTS SYNDICATE PVT. LTD.	GEOLOGICAL MAP OF INDIA X174	183 1
16	GEOLOGISTS SYNDICATE PVT. LTD.	MINERAL MAP OF INDIA	1
17	GEOLOGISTS SYNDICATE PVT. LTD.	TECTONIC MAP OF INDIA & ADJ. COUNTY	1
18	GEOLOGISTS SYNDICATE PVT. LTD.	3D GEOGOLICAL MODEL FIBRE GLASS 100 CMX 75 CM	1
19	GEOLOGISTS SYNDICATE PVT. LTD.	3D GEOGOLICAL MODEL 25 CMX 35 CM. APRX. GM	1

MINE SURVEY LAB

SL NO	Name of machines / Equipments/ Tools	Supplier	Specification	Quantity
1	Tape		Fiber glass tape(50m)	3
			Steel tape(30m)	5
			Fiber tape(30m)	2

		Premier instruments Co.	Fiber tape(30m)	10
			Metal wired tape(30m)	1
			Steel tape(15m)	3
			Fiber tape(15m)	3
		Premier instruments Co.	Fiber tape(15m)	10
			Metal wired tape(15m)	3
2	Compass		Prismatic Compass	4
		Premier instruments Co.	Prismatic Compass (4inch)	1
		Premier instruments Co.	Prismatic Compass (5inch)	1
			Surveyor's Compass	2
		Premier instruments Co.	Surveyor's Compass	1
3	chain		100ft	
		Premier instruments Co.	100ft	5
			33ft	2
			66ft	
			30mt	
		Premier instruments Co.	30mt	5
			20mt	
4	Tripod Stand		compass	6
		Premier instruments Co.	compass	3
			Auto Level & Dumpy Level	7
		Premier instruments Co.	Auto Level & Dumpy Level	6
			Plane table	3
			Theodolite	2
		Premier instruments Co.	Transite Theodolite	2
		Premier instruments Co.	Digital Theodolite	2
			Tacheometer	2
			Abney Level	2
			Extra	2
		Premier instruments Co.	Wye level	1
			Tilting level	1
5	Proposnal Compass			10
6	Auot Level			5
7	Auot Level	Premier instruments Co.	Auto Level(Sokkia)	1
		Premier instruments Co.	Auot Level(Topcon)	1

		Premier instruments Co.	Auot Level(Nikon)	1
		Premier instruments Co.	Auot Level(Bosch)(26D)	1
		Premier instruments Co.	Auot Level(Bosch)(32D)	1
8	Dumpy Level			2
9	Dumpy Level(12 Inches)	Premier instruments Co.		1
10	Theodolite			2
11	Transit Theodolite	Premier instruments Co.	Vishal Brand 20Sec Accuracy	1
12	Transit Theodolite	Premier instruments Co.	Eastman Brand 20Sec Accuracy	1
13	Digital Theodolite	Premier instruments Co.	Laser Optical system	1
14	Digital Theodolite	Premier instruments Co.	Non Laser Optical system	1
15	Tacheometer			2
16	Telescopic Alidade			2
17	Telescopic Alidade	Premier instruments Co.		1
18	Levelling Staff		4mt	5
		Premier instruments Co.	4mt	1
			5mt	1
			6mt	6
19	Ranging Rod		3mt	5
			2mt	19
		Premier instruments Co.	3mt	5
		Premier instruments Co.	2mt	5
20	Arrow			41
			GI	5
21	Peg			6
22	Wooden Peg			5
23	Line Ranger			5
		Premier instruments Co.	Sokkia Model	1
			Bosch (50mt)	1
	Bosch (100mt)	1		
24	Open cross staff			5
		Premier instruments Co.	Brass Pole	1
25	Optical Square			5
		Premier instruments Co.	6inch	1
			12inch	1
26	Planimeter			2
		Premier instruments Co.	Manual	1
			Digital	1

27	Beam Compass			2
27 28	Clinometer			
		Premier instruments Co.		1
29	Total Station Prism		Chinise	1
30	Total Station Prism		Topcon	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.
- **COMPUTING FACILITIES :**
 - Internet Bandwidth : 48 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	2019 – 20	60	120	120	120	420
2	2020 – 21	60	120	120	120	420
3	2021 – 22	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
2019	Civil Engg.	01	59	08	1.2 Lakh	2 Lakh
2020	Civil Engg.	01	55	12	1.2 Lakh	2 Lakh
2021	Civil Engg.	01	58	05	1.2 Lakh	1.8 Lakh
2019	Elect. Engg.	02	53	08	1.2 Lakh	2 Lakh
2020	Elect. Engg.	02	100	22	1.2 Lakh	1.8 Lakh
2021	Elect. Engg.	01	115	05	1.2 Lakh	1.8 Lakh
2019	Mech. Engg.	02	99	40	1.5 Lakh	2 Lakh
2020	Mech. Engg.	02	102	17	1.2 Lakh	1.8 Lakh
2021	Mech. Engg.	01	116	06	1.2 Lakh	1.8 Lakh
2019	Mining Engg.	01	101	14	1.5 Lakh	2 Lakh
2020	Mining Engg.	01	134	12	1.5 Lakh	2 Lakh
2021	Mining Engg.	01	142	06	1.5 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 : -



No. 3939 Date 6/9/18

To
Principals of All Polytechnics

Sub: Final Revised syllabus of 1st & 2nd semester w.e.f 2018-19 session

Sir,

In continuation to this office letter No. 3584 dt. 16.8.2018, I am to say that after discussion in the Polytechnic Principals' meeting held on 25/8/2018, and subsequent deliberations in the council, the final revised Syllabus for 1st & 2nd semester Diploma Engineering courses effective from 2018-19 session is hereby circulated with the following changes in the norms and contents. This syllabus shall be applicable for all diploma courses approved by AICTE, New Delhi under Engineering and Technology Programme and affiliated to this council w.e.f. 2018-19.

1. The conditions on selection of subjects specified in the above letter is hereby relaxed. Individual institution can select the subjects, where alternatives are available depending on the students strength and varieties of branches available with them, subject to condition that all students of a particular branch shall be offered only one of the alternative subjects and no part of students in a branch can be offered different alternative subject. The Institutions are to upload the subjects offered for different branches in SCTE&VT web portal to be notified in due course of time, so that the same can be followed from coming 1st semester onwards.
2. Engg. Mechanics and Basic Electrical Engg. & Electronics Engg. shall be offered as alternate to each other in both 1st & 2nd semester to be selected by the institute.
3. Subject contents of Communicative English, Basic Electrical & Electronics Engineering have been partially modified.
4. The Total Marks in a semester have been made as 750

Lateral Entry students admitted during 2018-19 shall appear the subjects of 1st and 2nd semester like previous year.

The students should be encouraged to undergo Internship Training during Summer Vacation to enhance their Skill and Employability.

End: As above

Yours faithfully


Controller of Examinations 6/9/18

STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA

TEACHING AND EVALUATION SCHEME FOR 1st Semester (COMMON TO ALL ENGINEERING COURSES)(wef 2018-19)

Subject Code	Subject	Periods/week			Evaluation Scheme			
		L	T	P	Mid Sem Internal Assessment/ Sessional	End Sem Exams	Exams (Hours)	Total
Theory								
Th.1a Th.1b	Communicative English OR Computer Application	4	-	-	20	80	3	100
Th.2a Th.2b	Engineering Physics OR Engineering Chemistry	4	-	-	20	80	3	100
Th.3	Engineering Mathematics-I	5	1	-	20	80	3	100
Th.4 Th.4a&b	Engg. Mechanics OR Basic Electrical & Electronics Engg.	4			20	80	3	100
	<i>Total</i>	17	-		80	320	-	400
Practical								
Pr.1a Pr.1b	Comm. English Lab OR Computer application Lab	-	-	4	50	-	-	50
Pr.2a Pr.2b	Engg. Physics Lab OR Engg. Chemistry Lab	-	-	4	50	50	3	100
Pr.3a Pr.3b	Engineering Drawing OR Workshop Practice	-	-	6	50	100	3 4	150
Pr.4	Seminar			4	50			50
	Student Centred Activities(SCA)		-	3	-	-	-	-
	<i>Total</i>	-	-	21	200	150	-	350
	Grand Total	17	1	21	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 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

In Th.4a&b Basic Electrical & Electronics Engg. paper there shall be examination in separate Answer books for Th.4a Basic Electrical Engg. and Th.4b Basic Electronics Engg. in the same sitting

STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA

TEACHING AND EVALUATION SCHEME FOR 2nd Semester (COMMON TO ALL ENGINEERING COURSES)(wef 2018-19)

Subject Code	Subject	Periods/week			Evaluation Scheme			
		L	T	P	Internal Assessment/ Sessional	End Sem Exams	Exams (Hours)	Total
Theory								
Th.1a Th.1b	Communicative English OR Computer Application	4	-	-	20	80	3	100
Th.2a Th.2b	Engineering Physics OR Engineering Chemistry	4	-	-	20	80	3	100
Th.3	Engineering Mathematics-II	5	1	-	20	80	3	100
Th.4 Th.4a&b	Engg. Mechanics OR Basic Electrical & Electronics Engg.	4			20	80	3	100
	<i>Total</i>	<i>17</i>	<i>1</i>		<i>80</i>	<i>320</i>	<i>-</i>	<i>400</i>
Practical								
Pr.1a Pr.1b	Comm. English Lab OR Computer application Lab	-	-	4	50	-	-	50
Pr.2a Pr.2b	Engg. Physics Lab OR Engg. Chemistry Lab	-	-	4	50	50	3	100
Pr.3a Pr.3b	Engineering Drawing OR Workshop Practice	-	-	6	50	100	3 4	150
Pr.4	Seminar			4	50			50
	Student Centred Activities(SCA)		-	3	-	-	-	-
	<i>Total</i>	<i>-</i>	<i>-</i>	<i>21</i>	<i>200</i>	<i>150</i>	<i>-</i>	<i>350</i>
	Grand Total	17	1	21	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 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

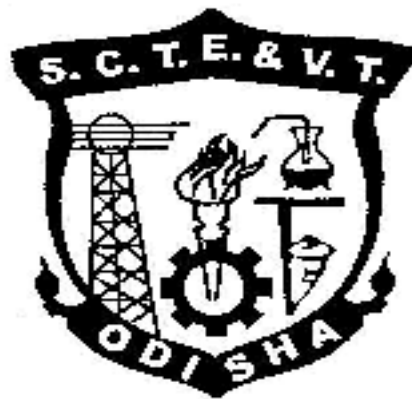
In Th.4a&b Basic Electrical & Electronics Engg. paper there shall be examination in separate Answer books for Th.4a Basic Electrical Engg. and Th.4b Basic Electronics Engg. in the same sitting

CURRICULLUM OF 1ST & 2ND SEMESTER

For

DIPLOMA IN ENGINEERING

(Effective FROM 2018-19 Session)



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

Th.1a. COMMUNICATIVE ENGLISH

(1st & 2nd sem Common)

Theory: 4 Periods per Week
 Total Periods: 60 Periods
 Examination: 3 Hours

I.A : 20 Marks
 Term End Exam : 80 Marks
 TOTAL MARKS : 100 Marks

Topic- wise distribution of periods with marks

S.L. No.	Topics	Periods
I	Literature Appreciation	20
II	Vocabulary	05
III	Application of Grammar	08
IV	Formal writing skills	15
V	Elements of communication	12
	• Introduction to communication	
	• Professional communication	
	• Nonverbal communication	
	Total	60

OBJECTIVE

- To comprehend the given passage
- To answer correctly the questions on seen and unseen passages
- To increase the vocabulary
- To apply rules of grammar for flawless writing
- To understand and use the basic concepts of communication in an organized set up and social context
- To give a positive feedback in various situation, to use appropriate body language and to avoid barrier for effective communication
- To improve writing skill

Unit-I

LITERATURE APPRECIATION

1. Reading comprehension

Sub-skills of reading comprehension are to be worked out and tested through an unseen passage in about 200-500 words.

A student should get acquainted with sub-skills of reading for the purpose of:

- Skimming the gist
- Scanning for necessary information
- Close reading for inference and evaluation
- Main idea and supporting points
- Guessing the meaning of un-familiar words
- Note- making
- Summarizing
- Supplying a suitable title

2. Text

The following chapter from “**Invitation to English**”, **Book-1** for +2 students of CHSE, Odisha.**2016 reprint** to be covered in class room:

- **Standing Up For Yourself** By Yevgeny Yevtushenko

- **The Magic Of Teamwork** By Sam Pitroda
- **Inchcape Rock** By Robert Southey
- **To My True Friend** By Elizabeth Pinard

The student is to answer comprehension questions from these chapters in the end examination.

UNIT- II

VOCABULARY

Use of synonyms, antonyms

- Same word used in different situations in different meaning
- Single word substitute

Unit-III

APPLICATION OF ENGLISH GRAMMAR

- Countable and Uncountable Noun
- Articles and Determiners
- Modal Verbs
- Tenses
- Voice-change
- Subject-verb Agreement

UNIT-IV

FORMAL WRITING SKILLS

1. Paragraph writing
 - Meaning
 - Features of Paragraph Writing (Topic Statement, Supporting Points and Plot Compatibility)
 - Developing Ideas into Paragraphs (Describing Place/ Person/ Object /Situation and any general topic of interest)
2. Notice
3. Agenda
4. Report writing (Format of a Report, Reporting an event / news)
5. Writing personal letter
6. Letter to the Principal, Librarian, Head of the Deptt, and Hostel Superintendent
7. Writing Business letters
 - Layout of a Business Letter
 - Letter of Enquiry, Placing an Order, Execution of an Order, Complaint, Cancellation of an order(Features, Format and example)
8. Job application and C.V.(Features, Format and example)

UNIT-V

ELEMENTS OF COMMUNICATION

A. Introduction to Communication

1. Meaning, Definition and concept of communication
2. Good Communication and Bad Communication
3. Communication model
 - One-way Communication Model and Two-way Communication Model with examples
4. Process of communication and factors responsible for it
 - Sender, Message, Channel, Receiver / Audience, Feedback, Noise, Context

B. Professional Communication

1. Meaning of professional communication
2. Types of professional communication
 - 2.1. Formal or Systematic Communication
 - Upward communication (How it takes place, symbol, merits and demerits)
 - Down-ward communication (How it takes place, symbol, merits and demerits)

- Parallel communication (How it takes place, symbol, merits and demerits)
- 2.2. Informal communication
- Grape vine communication (How it takes place, symbol, merits and demerits)

D. Non- Verbal Communication

1. Meaning of nonverbal Communication

2. Different areas of Non-verbal Communication

- Kinesics or Body Language (Postures and Gestures, Facial Expression and Eye Contact)
- Proxemics or Spatial Language (Private Space, Personal Space, Social Space, Public Space)
- Language of Signs and Symbols(Audio Sign and Visual Sign in everyday life with merits and demerits)

Syllabus Coverage up to I.A

1. Reading Comprehension
2. Standing Up by Yourself
3. Use of Synonyms and Antonyms
4. Notice
5. Agenda

Books Recommended:

Invitation to English, Book-1, (for +2 students), CSHE (2016 reprint), Odisha

Invitation to English, Book-2, (for +2 students), CSHE (2016 reprint), Odisha

Invitation to English, Book-3, (for +2 students), CSHE (2016 reprint), Odisha

Invitation to English, Book-4, (for +2 students), CSHE (2016 reprint), Odisha

Wren and Martin High School English Grammar, Dr. NDV Prasad Rao, S. Chand Publication

Communication Skills, Sanjay Kumar and Puspalata, Oxford University Press

Th.1b. COMPUTER APPLICATION

(1st / 2nd sem Common)

Theory: 4 Periods per Week
Total Periods: 60 Periods
Examination: 3 Hours

I.A : 20 Marks
End Sem Exam : 80 Marks
TOTAL MARKS : 100 Marks

Objective:

The students will get to know about the fundamentals of computer. They will get acquainted with various components of computer hardware, software etc. Idea on Role of operating system and its usability will also be known. Knowledge on word processing, electronic spreadsheet, presentation software and Internet will also be acquired. The students will be given brief knowledge about Programming methodology and C programming.

Topic wise distribution of periods

Sl. No.	Topics	Periods
1	Computer Organisation	05
2	Computer Software	07
3	Computer Network and Internet	08
4	File Management and Data Processing	05
5	Problem Solving Methodology	05
6	Overview of C Programming language	15
7	Advanced features of C	15
	TOTAL	60

1. COMPUTER ORGANISATION

Introduction to Computer Evolution of Computers Generation of Computers Classification of Computers
Basic Organisation of Computer (Functional Block diagram) Input Devices, CPU & Output Devices.
Computer Memory and Classification of Memory

2. COMPUTER SOFTWARE

Software concept, System software, Application software
Overview of Operating System Objectives and Functions of O.S ,
Types of Operating System: Batch Processing, Multiprogramming, Time Sharing OS
Features of DOS, Windows and UNIX
Programming Languages Compiler, interpreter Computer Virus
Different Types of computer virus
Detection and prevention of Virus
Application of computers in different Domain

3. COMPUTER NETWORK AND INTERNET

Networking concept, Protocol, Connecting Media, Data Transmission mode
Network Topologies, Types of Network
Networking Devices like Hub, Repeater, Switch, Bridge, Router, Gateway & NIC
Internet Services like E-Mail, WWW, FTP, Chatting, Internet Conferencing,
Electronic Newspaper & Online Shopping
Different types of Internet connectivity and ISP

4. FILE MANAGEMENT AND DATA PROCESSING

Concept of File and Folder
File Access and Storage methods. Sequential, Direct, ISAM
Data Capture, Data storage
Data Processing and Retrieval

5. PROBLEM SOLVING METHODOLOGY

Algorithm, Pseudo code and Flowchart Generation of Programming Languages
Structured Programming Language
Examples of Problem solving through Flowchart

6. OVERVIEW OF C PROGRAMMING LANGUAGE

Constants, Variables and Data types in C Managing Input and Output operations.
Operators, Expressions, Type conversion & Typecasting
Decision Control and Looping Statements (If, If-else, If-else-if, Switch, While, Do-while, For, Break, Continue & Goto)
Programming Assignments using the above features.

7. ADVANCED FEATURES OF C

Functions and Passing Parameters to the Function (Call by Value and Call by Reference) Scope of Variables and Storage Classes
Recursion Function and Types of Recursion
One Dimensional Array and Multidimensional Array
String Operations and Pointers
Pointer Expression and Pointer Arithmetic Programming Assignments using the above features. Structure and Union (Only concepts, No Programming)

Syllabus coverage upto I.A

Chapter- 1,2 3,4

Books Recommended

1. Computer Fundamentals and Programming in C by Reema Thareja, Oxford University Press
2. Programming in ANSI C by A.N Kamthane, Pearson Education
3. Computer Application by Kalyani Publisher
4. Let us C by Y. Kanetkar, BPB
5. Computer Fundamentals, by E. Balaguruswamy, TMH

Th.2a. Engineering Physics

(1st / 2nd sem Common)

Theory: 4 Periods per Week
Total Periods: 60 Periods
Examination: 3 Hours

I.A: 20 Marks
End Sem Exam : 80 Marks
TOTAL MARKS : 100 Marks

Unit	Topic	No. of periods
1	UNITS & DIMENSIONS	03
2	SCALARS & VECTORS	03
3	KINEMATICS	06
4	WORK & FRICTION	05
5	GRAVITATION	05
6	OSCILLATIONS & WAVES	06
7	HEAT & THERMODYNAMICS	07
8	OPTICS	04
9	ELECTROSTATICS & MAGNETOSTATICS	07
10	CURRENT ELECTRICITY	06
11	ELECTROMAGNETISM & ELECTROMAGNETIC INDUCTION	05
12	MODERN PHYSICS	03
TOTAL :		60 Periods

UNIT 1 - UNITS AND DIMENSIONS

- 1.1 Physical quantities - (Definition).
- 1.2 Definition of fundamental and derived units, systems of units (FPS, CGS, MKS and SI units).
- 1.3 Definition of dimension and Dimensional formulae of physical quantities.
- 1.4 Dimensional equations and Principle of homogeneity.
- 1.5 Checking the dimensional correctness of Physical relations.

UNIT 2 - SCALARS AND VECTORS

- 2.1 Scalar and Vector quantities (definition and concept), Representation of a Vector – examples, types of vectors.
- 2.2 Triangle and Parallelogram law of vector Addition (Statement only). Simple Numerical.
- 2.3 Resolution of Vectors – Simple Numericals on Horizontal and Vertical components.
- 2.4 Vector multiplication (scalar product and vector product of vectors).

UNIT 3 - KINEMATICS

- 3.1 Concept of Rest and Motion.
- 3.2 Displacement, Speed, Velocity, Acceleration & FORCE (Definition, formula, dimension & SI units).
- 3.3 Equations of Motion under Gravity (upward and downward motion) - no derivation.
- 3.4 Circular motion: Angular displacement, Angular velocity and Angular acceleration (definition, formula & SI units).
- 3.5 Relation between –(i) Linear & Angular velocity, (ii) Linear & Angular acceleration).
- 3.6 Define Projectile, Examples of Projectile.
- 3.7 Expression for Equation of Trajectory, Time of Flight, Maximum Height and Horizontal Range for a projectile fired at an angle, Condition for maximum Horizontal Range.

UNIT 4 – WORK AND FRICTION

- 4.1 Work – Definition, Formula & SI units.
- 4.2 Friction – Definition & Concept.
- 4.3 Types of friction (static, dynamic), Limiting Friction (Definition with Concept).
- 4.4 Laws of Limiting Friction (Only statement, No Experimental Verification).
- 4.5 Coefficient of Friction – Definition & Formula, Simple Numericals.
- 4.6 Methods to reduce friction.

UNIT 5 - GRAVITATION

- 5.1 Newton's Laws of Gravitation – Statement and Explanation.
- 5.2 Universal Gravitational Constant (G)- Definition, Unit and Dimension.
- 5.3 Acceleration due to gravity (g)- Definition and Concept.

- 5.4 Definition of mass and weight.
- 5.5 Relation between g and G.
- 5.6 Variation of g with altitude and depth (No derivation – Only Explanation).
- 5.7 Kepler's Laws of Planetary Motion (Statement only).

UNIT 6 - OSCILLATIONS AND WAVES

- 6.1 Simple Harmonic Motion (SHM) - Definition & Examples.
- 6.2 Expression (Formula/Equation) for displacement, velocity, acceleration of a body/ particle in SHM.
- 6.3. Wave motion – Definition & Concept.
- 6.4 Transverse and Longitudinal wave motion – Definition, Examples & Comparison.
- 6.5 Definition of different wave parameters (Amplitude, Wavelength, Frequency, Time Period.
- 6.6 Derivation of Relation between Velocity, Frequency and Wavelength of a wave
- 6.7 Ultrasonics – Definition, Properties & Applications.

UNIT 7 - HEAT AND THERMODYNAMICS

- 7.1 Heat and Temperature – Definition & Difference
- 7.2 Units of Heat (FPS, CGS, MKS & SI).
- 7.3 Specific Heat (concept, definition, unit, dimension and simple numerical)
- 7.4 Change of state (concept), Latent Heat (concept, definition, unit, dimension and simple numerical)
- 7.5 Thermal Expansion – Definition & Concept
- 7.6 Expansion of Solids (Concept)
- 7.7 Coefficient of linear, superficial and cubical expansions of Solids – Definition & Units.
- 7.8 Relation between α , β & γ
- 7.9 Work and Heat - Concept & Relation.
- 7.10 Joule's Mechanical Equivalent of Heat (Definition, Unit)
- 7.11 First Law of Thermodynamics (Statement and concept only)

UNIT 8 – OPTICS

- 8.1 Reflection & Refraction – Definition.
- 8.2 Laws of reflection and refraction (Statement only)
- 8.3 Refractive index – Definition, Formula & Simple numerical.
- 8.4 Critical Angle and Total internal reflection – Concept, Definition & Explanation
- 8.5 Refraction through Prism (Ray Diagram & Formula only – NO derivation)..
- 8.6 Fiber Optics – Definition, Properties & Applications.

UNIT 9 – ELECTROSTATICS & MAGNETOSTATICS

- 9.1 Electrostatics – Definition & Concept.
- 9.2 Statement & Explanation of Coulombs laws, Definition of Unit charge.
- 9.3 Absolute & Relative Permittivity (ϵ) – Definition, Relation & Unit.

- 9.4 Electric potential and Electric Potential difference (Definition, Formula & SI Units).
- 9.5 Electric field, Electric field intensity (E) – Definition, Formula & Unit.
- 9.6 Capacitance - Definition, Formula & Unit.
- 9.7 Series and Parallel combination of Capacitors (No derivation, Formula for effective/Combined/total capacitance & Simple numericals).
- 9.8 Magnet, Properties of a magnet.
- 9.9 Coulomb's Laws in Magnetism – Statement & Explanation, Unit Pole (Definition).
- 9.10 Magnetic field, Magnetic Field intensity (H) - (Definition, Formula & SI Unit).
- 9.11 Magnetic lines of force (Definition and Properties)
- 9.12 Magnetic Flux (Φ) & Magnetic Flux Density (B) – Definition, Formula & Unit.

UNIT 10 – CURRENT ELECTRICITY

- 10.1 Electric Current – Definition, Formula & SI Units.
- 10.2 Ohm's law and its applications.
- 10.3 Series and Parallel combination of resistors (No derivation, Formula for effective/ Combined/ total resistance & Simple numericals).
- 10.4 Kirchhoff's laws (Statement & Explanation with diagram).
- 10.5 Application of Kirchhoff's laws to Wheatstone bridge - Balanced condition of Wheatstone's Bridge – Condition of Balance (Equation).

UNIT 11 – ELECTROMAGNETISM & ELECTROMAGNETIC INDUCTION

- 11.1 Electromagnetism – Definition & Concept.
- 11.2 Force acting on a current carrying conductor placed in a uniform magnetic field, Fleming's Left Hand Rule
- 11.3 Faraday's Laws of Electromagnetic Induction (Statement only)
- 11.4 Lenz's Law (Statement)
- 11.5 Fleming's Right Hand Rule
- 11.6 Comparison between Fleming's Right Hand Rule and Fleming's Left Hand Rule.

UNIT 12 - MODERN PHYSICS

- 12.1 LASER & laser beam (Concept and Definition)
- 12.2 Principle of LASER (Population Inversion & Optical Pumping)
- 12.3 Properties & Applications of LASER
- 12.4 Wireless Transmission – Ground Waves, Sky Waves, Space Waves (Concept & Definition)

RECOMMENDED BOOKS

1. Text Book of Physics for Class XI (Part-I, Part-II) N.C.E.R.T
2. Text Book of Physics for Class XII (Part-I, Part-II) N.C.E.R.T
3. Text Book of Engineering Physics by Barik, Das, Sharma, Kalyani Publisher
4. Concepts in Physics by H. C. Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi

Syllabus coverage upto I.A

Units 1,2,3,4,5,6

Th.2b. Engineering Chemistry (1st / 2nd sem Common)

Theory: 4 Periods per Week
Total Periods: 60 Periods
Examination: 3 Hours

I.A : 20 Marks
Term End Exam : 80 Marks
TOTAL MARKS : 100 Marks

Objective:

Engineering Chemistry is concerned with the changes of matters with its environment and an ever growing subject. So, the aim of teaching Engineering Chemistry in Diploma Courses is to acquaint the students with the basic Chemistry of different materials used in industry and to equip the students with the basic principles of chemical changes taking place in different aspects connected to engineering fields. They also develop the right attitude to cope up with the continuous flow of new technology.

Topic wise distribution of periods

Sl. No	Topics/ Units	Periods
A	Physical Chemistry	22
B	Inorganic Chemistry	08
C	Organic Chemistry	10
D	Industrial Chemistry	20
	TOTAL	60

A. PHYSICAL CHEMISTRY

Chapter 1: Atomic structure : Fundamental particles (electron, proton & neutron Definition, mass and charge).Rutherford's Atomic model (postulates and failure), Atomic mass and mass number, Definition, examples and properties of Isotopes, isobars and isotones. Bohr's Atomic model (Postulates only), Bohr-Bury scheme, Aufbau's principle, Hund's rule, Electronic configuration (up to atomic no 30).

Chapter 2 : Chemical Bonding : Definition , types (Electrovalent, Covalent and Coordinate bond with examples (formation of NaCl, MgCl₂, H₂,Cl₂, O₂, N₂, H₂O, CH₄, NH₃, NH₄⁺, SO₂).

Chapter 3 : Acid base theory : Concept of Arrhenius, Lowry Bronsted and Lewis theory for acid and base with examples (Postulates and limitations only). Neutralization of acid & base. Definition of Salt, Types of salts (Normal, acidic, basic, double, complex and mixed salts, definitions with 2 examples from each).

Chapter 4: Solutions : Definitions of atomic weight, molecular weight, Equivalent weight. Determination of equivalent weight of Acid, Base and Salt.

Modes of expression of the concentrations (Molarity , Normality & Molality) with Simple Problems. pH of solution (definition with simple numericals)
Importance of pH in industry (sugar, textile, paper industries only)

Chapter 5 : Electrochemistry : Definition and types (Strong & weak) of Electrolytes with example. Electrolysis (Principle & process) with example of NaCl (fused and aqueous solution).

Faraday's 1st and 2nd law of Electrolysis (Statement, mathematical expression and Simple numerical) Industrial application of Electrolysis- Electroplating (Zinc only).

Chapter 6 : Corrosion: Definition of Corrosion, Types of Corrosion- Atmospheric Corrosion, Waterline corrosion. Mechanism of rusting of Iron only. Protection from Corrosion by (i) Alloying and (ii) Galvanization.

B. INORGANIC CHEMISTRY

Chapter 7 : Metallurgy: Definition of Mineral, ores , gangue with example. Distinction between Ores And Minerals. General methods of extraction of metals,

- i) Ore Dressing
- ii) Concentration (Gravity separation, magnetic separation, Froth floatation & leaching)
- iii) Oxidation (Calcinations, Roasting)
- iv) Reduction (Smelting, Definition & examples of flux, slag)
- v) Refining of the metal (Electro refining, & Distillation only)

Chapter 8 : Alloys: Definition of alloy. Types of alloys (Ferro, Non Ferro & Amalgam) with example. Composition and uses of Brass, Bronze, Alnico, Duralumin

C. ORGANIC CHEMISTRY

Chapter 9 : Hydrocarbons : Saturated and Unsaturated Hydrocarbons (Definition with example)

Aliphatic and Aromatic Hydrocarbons (Huckle's rule only). Difference between Aliphatic and aromatic hydrocarbons

IUPAC system of nomenclature of Alkane, Alkene, Alkyne, alkyl halide and alcohol (up to 6 carbons) with bond line notation.

Uses of some common aromatic compounds (Benzene, Toluene, BHC, Phenol, Naphthalene, Anthracene and Benzoic acid) in daily life.

D. INDUSTRIAL CHEMISTRY

Chapter 10 : Water Treatment : Sources of water, Soft water, Hard water, hardness, types of Hardness (temporary or carbonate and permanent or non-carbonate), Removal of hardness by lime soda method (hot lime & cold lime—Principle, process & advantages) , Advantages of Hot lime over cold lime process.

Organic Ion exchange method (principle, process, and regeneration of exhausted resins)

Chapter 11 : Lubricants: Definition of lubricant, Types (solid, liquid and semisolid with examples only) and specific uses of lubricants (Graphite, Oils, Grease), Purpose of lubrication

Chapter 12 : Fuel: Definition and classification of fuel, Definition of calorific value of fuel, Choice of good fuel.

Liquid: Diesel, Petrol, and Kerosene --- Composition and uses.

Gaseous: Producer gas and Water gas (Composition and uses). Elementary idea about LPG, CNG and coal gas (Composition and uses only).

Chapter 13 : Polymer: Definition of Monomer, Polymer, Homo-polymer, Co-polymer and Degree of polymerization. Difference between Thermosetting and Thermoplastic, Composition and uses of Polythene, & Poly-Vinyl Chloride and Bakelite.

Definition of Elastomer (Rubber). Natural Rubber (it's draw backs). Vulcanisation of Rubber. Advantages of Vulcanised rubber over raw rubber.

Chapter 14: Chemicals in Agriculture: Pesticides: Insecticides, herbicides, fungicides- Examples and uses.

Bio Fertilizers: Definition, examples and uses.

Syllabus Coverage upto I.A

Chapter 1,2,3,4,5,6

Books Recommended

1. Text Book of Intermediate Chemistry Part-1 and Part-2 by Nanda, Das, Sharma, Kalyani Publishers
2. Engg. Chemistry by B.K. Sharma, Krishna Prakashan Media Pvt. Ltd
3. Engineering Chemistry by Y.R. Sharma and P. Mitra, Kalyani Publishers
4. Engineering Chemistry for Diploma – Dr. R K Mohapatra, PHI Publication, New Delhi.
5. Engineering Chemistry- Jain & Jain, Dhanpat Roy and Sons.

Th.3. ENGINEERING MATHEMATICS-I (1ST Sem Common)

Theory: 5 Periods per Week
Total Periods: 75 Periods
Examination: 3 Hours

I.A : 20 Marks
End Sem Exam : 80 Marks
TOTAL MARKS : 100 Marks

OBJECTIVE:

1. This subject helps the students to develop logical thinking which is useful in comprehending the principles of all to the subjects.
2. Analytical and systematic approach towards any problem is developed through learning of this subject.
3. Mathematics being a versatile subject can be used at every stage of human life.

Topic wise distribution of periods and marks

Sl. No.	Subject	Unit	Topic	Periods
A	Algebra	1	Matrices and Determinant	18
B	Trigonometry	2	Trigonometry	15
C	Two Dimensional Geometry	3	Co-ordinate Geometry in Two Dimensions (Straight Line)	13
		4	Circle	07
D	Three Dimensional Geometry	5	Co-ordinate Geometry in Three Dimensions	15
		6	Sphere	07
			TOTAL	75

1) MATRICES AND DETERMINANTS

- a) Types of matrices
- b) Algebra of matrices
- c) Determinant
- d) Properties of determinant
- e) Inverse of a matrix (second and third order)
(Question should be on second order matrix)
- f) Cramer's Rule (Question should be on two variables)
- g) Solution of simultaneous equations by matrix inverse method
(Question should be on two variables)

2) TRIGONOMETRY

- a) Trigonometrical ratios
- b) Compound angles, multiple and sub-multiple angles (only formulae)
- c) Define inverse circular functions and its properties (no derivation)

3) CO-ORDINATE GEOMETRY IN TWO DIMENSIONS (Straight line)

- a) Introduction of geometry in two dimension
- b) Distance formulae, division formulae, area of a triangle (only formulae no derivation)
- c) Define slope of a line, angle between two lines (only F), condition of perpendicularity and parallelism.
- d) Different forms of straight lines (only formulae)
 - i) One point form (ii) two point form (iii) slope form (iv) intercept form (v) Perpendicular form
- e) Equation of a line passing through a point and (i) parallel to a line (ii) Perpendicular to a line
- f) Equation of a line passing through the intersection of two lines
- g) Distance of a point from a line

4) CIRCLE

- a) Equation of a circle
 - (i) center radius form
 - (ii) general equation of a circle
 - (iii) end point of diameter form

5) CO-ORDINATE GEOMETRY IN THREE DIMENSIONS

- a) Distance formulae, section formulae, direction ratio, direction cosine, angle between two lines (condition of parallelism and perpendicularity)
- b) Equation of a plane
 - i) General form, angle between two planes, perpendicular distance of a point from a plane, equation of a plane passing through a point and
 - i) parallel to a plane (ii) perpendicular to a plane

6) SPHERE

- a) Equation of a sphere
 - i) center radius form
 - ii) general form
 - iii) two end points of a diameter form (only formulae and problems)

Books Recommended:

1. Elements of Mathematics _ Vol. _ 1 & 2 (Odisha State Bureau of Text Book preparation & Production)

Reference Books:

1. Mathematics Part- I & Part- II- Textbook for Class XII, NCERT Publication

Syllabus to be covered up to IA

Ch.1, Ch,2, and Ch,3,(a,b,c)

Th. 4. ENGINEERING MECHANICS (2nd sem Common)

Theory: 4 Periods per Week
Total Periods: 60 Periods
Examination: 3 Hours

I.A : 20 Marks
End Sem Exam : 80 Marks
TOTAL MARKS : 100 Marks

Objective:

On completion of the subject, the student will be able to do:

1. Compute the force, moment & their application through solving of simple problems on coplanar forces.
2. Understand the concept of equilibrium of rigid bodies.
3. Know the existence of friction & its applications through solution of problems on above.
4. Locate the C.G. & find M.I. of different geometrical figures.
5. Know the application of simple lifting machines.
6. Understand the principles of dynamics.

Topic wise distribution of periods

Sl. No.	Topics	Periods
1	Fundamentals of Engineering Mechanics	14
2	Equilibrium	08
3	Friction	10
4	Centroid & moment of Inertia	14
5	Simple Machines	08
6	Dynamics	06
	TOTAL	60

1. FUNDAMENTALS OF ENGINEERING MECHANICS

1.1 Fundamentals.

Definitions of Mechanics, Statics, Dynamics, Rigid Bodies,

1.2 Force

Force System.

Definition, Classification of force system according to plane & line of action.

Characteristics of Force & effect of Force. Principles of Transmissibility & Principles of Superposition. Action & Reaction Forces & concept of Free Body Diagram.

1.3 Resolution of a Force.

Definition, Method of Resolution, Types of Component forces, Perpendicular components & non-perpendicular components.

1.4 Composition of Forces.

Definition, Resultant Force, Method of composition of forces, such as

1.4.1 Analytical Method such as Law of Parallelogram of forces & method of resolution.

1.4.2. Graphical Method.

Introduction, Space diagram, Vector diagram, Polygon law of forces.

1.4.3 Resultant of concurrent, non-concurrent & parallel force system by Analytical & Graphical Method.

1.5 Moment of Force.

Definition, Geometrical meaning of moment of a force, measurement of moment of a force & its S.I units. Classification of moments according to

direction of rotation, sign convention, Law of moments, Varignon's Theorem, Couple – Definition, S.I. units, measurement of couple, properties of couple.

2. EQUILIBRIUM

2.1 Definition, condition of equilibrium, Analytical & Graphical conditions of equilibrium for concurrent, non-concurrent & Free Body Diagram.

2.2 Lamia's Theorem – Statement, Application for solving various engineering problems.

3. FRICTION

3.1 Definition of friction, Frictional forces, Limiting frictional force, Coefficient of Friction.

Angle of Friction & Repose, Laws of Friction, Advantages & Disadvantages of Friction.

3.2 Equilibrium of bodies on level plane – Force applied on horizontal & inclined plane (up & down).

3.3 Ladder, Wedge Friction.

4. CENTROID & MOMENT OF INERTIA

4.1 Centroid – Definition, Moment of an area about an axis, centroid of geometrical figures such as squares, rectangles, triangles, circles, semicircles & quarter circles, centroid of composite figures.

4.2 Moment of Inertia – Definition, Parallel axis & Perpendicular axis Theorems. M.I. of plane lamina & different engineering sections.

5. SIMPLE MACHINES

5.1 Definition of simple machine, velocity ratio of simple and compound gear train, explain simple & compound lifting machine, define M.A, V.R. & Efficiency & State the relation between them, State Law of Machine, Reversibility of Machine, Self Locking Machine.

5.2 Study of simple machines – simple axle & wheel, single purchase crab winch & double purchase crab winch, Worm & Worm Wheel, Screw Jack.

5.3 Types of hoisting machine like derricks etc, Their use and working principle. No problems.

6. DYNAMICS

6.1 Kinematics & Kinetics, Principles of Dynamics, Newton's Laws of Motion, Motion of Particle acted upon by a constant force, Equations of motion, D'Alembert's Principle.

6.2 Work, Power, Energy & its Engineering Applications, Kinetic & Potential energy & its application.

6.3 Momentum & impulse, conservation of energy & linear momentum, collision of elastic bodies, and Coefficient of Restitution.

Syllabus coverage upto I.A

Chapter 1, 2 and 3.1

Books Recommended

1. Engineering Mechanics – by A.R. Basu (TMH Publication Delhi)
2. Engineering Machines – Basudev Bhattacharya (Oxford University Press).
3. Text Book of Engineering Mechanics – R.S Khurmi (S. Chand).
4. Applied Mechanics & Strength of Material – By I.B. Prasad.
5. Engineering Mechanics – By Timosheenko, Young & Rao.
6. Engineering Mechanics – Beer & Johnson (TMH Publication).

Th.4(a). BASIC ELECTRICAL ENGINEERING (1st sem Common)

Theory: 2 Periods per Week
Total Periods: 30 Periods
Examination: 1.5 Hours

I.A : 10 Marks
End Sem Exam : 40 Marks
TOTAL MARKS : 50 Marks

Topic wise Distribution of Periods and Marks

Sl.No.	Topics	Periods
1	Fundamentals	05
2	A C Theory	08
3	Generation of Elect. Power	03
4	Conversion of Electrical Energy	07
5	Wiring and Power Billing	04
6	Measuring Instrument	03
	Total	30

Objective

1. To be familiar with A.C Fundamental and circuits
2. To be familiar with basic principle and application of energy conversion devices
3. To be familiar with generation of Electrical power
4. To be familiar with wiring and protective device
5. To be familiar with calculation and commercial Billing of electrical power & energy
6. To have basic knowledge of various electrical measuring instruments & conservation of electrical energy

1. FUNDAMENTALS

- 1.1 Concept of current flow.
- 1.2 Concept of source and load.
- 1.3 State Ohm's law and concept of resistance.
- 1.4 Relation of V, I & R in series circuit.
- 1.5 Relation of V, I & R in parallel circuit.
- 1.6 Division of current in parallel circuit.
- 1.7 Effect of power in series & parallel circuit.
- 1.8 Kirchhoff's Law.
- 1.9 Simple problems on Kirchhoff's law.

2. A.C. THEORY

- 2.1 Generation of alternating emf.
- 2.2 Difference between D.C. & A.C.
- 2.3 Define Amplitude, instantaneous value, cycle, Time period, frequency, phase angle, phase difference.
- 2.4 State & Explain RMS value, Average value, Amplitude factor & Form factor with Simple problems.
- 2.5 Represent AC values in phasor diagrams.
- 2.6 AC through pure resistance, inductance & capacitance
- 2.7 AC through RL, RC, RLC series circuits.
- 2.8 Simple problems on RL, RC & RLC series circuits.
- 2.9 Concept of Power and Power factor
- 2.10 Impedance triangle and power triangle.

3. GENERATION OF ELECTRICAL POWER

- 3.1 Give elementary idea on generation of electricity from thermal , hydro & nuclear power station with block diagram

4. CONVERSION OF ELECTRICAL ENERGY

(No operation, Derivation, numerical problems)

- 4.1 Introduction of DC machines.
4.2 Main parts of DC machines.
4.3 Classification of DC generator
4.4 Classification of DC motor.
4.5 Uses of different types of DC generators & motors.
4.6 Types and uses of single phase induction motors.
4.7 Concept of Lumen
4.8 Different types of Lamps (Filament, Fluorescent, LED bulb) its Construction and Principle.
4.9 Star rating of home appliances (Terminology, Energy efficiency, Star rating Concept)

5. WIRING AND POWER BILLING

- 5.1 Types of wiring for domestic installations.
5.2 Layout of household electrical wiring (single line diagram showing all the important component in the system).
5.3 List out the basic protective devices used in house hold wiring.
5.4 Calculate energy consumed in a small electrical installation

6. MEASURING INSTRUMENTS

- 6.1 Introduction to measuring instruments.
6.2 Torques in instruments.
6.3 Different uses of PMMC type of instruments (Ammeter & Voltmeter).
6.4 Different uses of MI type of instruments (Ammeter & Voltmeter).
6.5 Draw the connection diagram of A.C/ D.C Ammeter, voltmeter, energy meter and wattmeter. (Single phase only).

Syllabus Coverage upto I.A

Chapter 1,2,3

BOOKS RECOMENDED:

1. ABC of Electrical Enginnering by Jain & Jain (Dhanpat Rai Publication)
2. Fundamentals of Electrical Engg and Electronics by B.L Thereja
3. Concept of Basic Electrical Enginnering ,P.K Das and A.K. Mallick by B.M Publications
4. Fundamentals of Electrical Engg by Asfaq Hussain
5. Fundamentals of Electrical Engg by JB Gupta
6. Basic Electrical Engg. By Chakraborti (Mcgraw Hill)

Th.4(b). BASIC ELECTRONIC ENGINEERING (1st sem Common)

Theory: 2 Periods per Week
Total Periods: 30 Periods
Examination: 1.5 Hours

I.A : 10 Marks
End Sem Exam : 40 Marks
TOTAL MARKS : 50 Marks

Topic wise Distribution of Periods and Marks

Sl.No.	Topics	Periods
1	Electronic Devices	8
2	Electronic circuits	9
3	Communication System	3
4	Transducers & Measuring instruments	10
	Total	30

Objective

1. To be familiar with Electronic devices
2. To be familiar with Electronic circuits
3. To be familiar with communication system
4. To be familiar with Electronic measuring instruments

1. ELECTRONIC DEVICES

- 1.1 Basic Concept of Electronics and its application.
- 1.2 Basic Concept of Electron Emission & its types.
- 1.3 Classification of material according to electrical conductivity (Conductor, Semiconductor & Insulator) with respect to energy band diagram only.
- 1.4 Difference between Intrinsic & Extrinsic Semiconductor.
- 1.5 Difference between vacuum tube & semiconductor.
- 1.6 Principle of working and use of PN junction diode, Zener diode and Light Emitting Diode (LED)
- 1.7 Integrated circuits (I.C) & its advantages.

2. ELECTRONIC CIRCUITS

- 2.1 Rectifier & its uses.
- 2.2 Principles of working of different types of Rectifiers with their merits and demerits
- 2.3 Functions of filters and classification of simple Filter circuit (Capacitor, choke input and π)
- 2.4 Working of D.C power supply system (unregulated) with help of block diagrams only
- 2.5 Transistor, Different types of Transistor Configuration and state output and input current gain relationship in CE, CB and CC configuration(No mathematical derivation)
- 2.6 Need of biasing and explain different types of biasing with circuit diagram.(only CE configuration)
- 2.7 Amplifiers(concept) , working principles of single phase CE amplifier
- 2.8 Electronic Oscillator and its classification
- 2.9 Working of Basic Oscillator with different elements through simple Block Diagram

3. COMMUNICATION SYSTEM

- 3.1 Basic communication system (concept & explanation with help of Block diagram)
- 3.2 Concept of Modulation and Demodulation, Difference between them
- 3.3 Different types of Modulation (AM, FM & PM) based on signal, carrier wave and modulated wave (only concept, No mathematical Derivation)

4. TRANSDUCERS AND MEASURING INSTRUMENTS

- 4.1 Concept of Transducer and sensor with their differences.
- 4.2 Different type of Transducers & concept of active and passive transducer.
- 4.3 Working principle of photo emissive, photoconductive, photovoltaic transducer and its application
- 4.4 Multimeter and its applications
- 4.5 Analog and Digital Multimeter and their differences
- 4.6 Working principle of Multimeter with Basic Block diagram
- 4.7 CRO, working principle of CRO with simple Block diagram

Syllabus Coverage upto I.A

Chapter 1,2(upto 2.6)

BOOKS RECOMENDED:

- 1. Principles of Electronics by V.K Mehta and Rohit Mehta,S Chand Publication
- 2. Principles of Electronics by S.K. SAHADEV (Dhanpatrai Publication)

Th.3. ENGINEERING MATHEMATICS – II (2nd Sem Common)

Theory: 5 Periods per Week
Total Periods: 75 Periods
Examination: 3 Hours

I.A : 20 Marks
End Sem Exam : 80 Marks
TOTAL MARKS : 100 Marks

Objective:

Principles and application in Engineering are firmly ground on abstract mathematical structures. Students passing from secondary level need familiarization with such structure with a view to develop their knowledge, skill and perceptions about the applied science. Calculus is the most important mathematical tool in forming engineering application into mathematical models. Wide application of calculus makes it imperative to develop methods of solving differential equations. The knowledge of limit, derivative and derivative needs to be exhaustively practiced. To help a systematic growth of skill in solving equation by calculus method will be the endeavor of this course content. Understanding the concept of co-ordinate system in 3D in case of lines, planes and sphere and it's use to solve Engineering problems. After completion of the course the student will be equipped with basic knowledge to form equations and solve them competently.

Topic wise distribution of periods

Sl. No.	Topics	Periods	Marks
1	Vector Algebra	15	12
2	Limits and Continuity	12	12
3	Derivatives	21	20
4	Integration	15	24
5	Differential Equation	12	12
TOTAL		75	80

1) VECTOR ALGEBRA

- a) Introduction
- b) Types of vectors (null vector, parallel vector , collinear vectors)
(in component form)
- c) Representation of vector
- d) Magnitude and direction of vectors
- e) Addition and subtraction of vectors
- f) Position vector
- g) Scalar product of two vectors
- h) Geometrical meaning of dot product
- i) Angle between two vectors
- j) Scalar and vector projection of two vectors
- k) Vector product and geometrical meaning
(Area of triangle and parallelogram)

2) LIMITS AND CONTINUITY

- a) Definition of function, based on set theory
- b) Types of functions
 - i) Constant function
 - ii) Identity function
 - iii) Absolute value function
 - iv)The Greatest integer function
 - v) Trigonometric function
 - vi) Exponential function
 - vii) Logarithmic function
- c) Introduction of limit
- d) Existence of limit
- e) Methods of evaluation of limit

- i) $\lim_{x \rightarrow 0} \frac{x^n - a^n}{x - a} = na^{n-1}$
- ii) $\lim_{x \rightarrow 0} \frac{a^x - 1}{x} = \log_e a$
- iii) $\lim_{x \rightarrow 0} \frac{e^x - 1}{x} = 1$
- iv) $\lim_{x \rightarrow 0} (1 + x)^{1/x} = e$
- v) $\lim_{x \rightarrow \infty} \left(1 + \frac{1}{x}\right)^x = e$
- vi) $\lim_{x \rightarrow 0} \frac{\log(1+x)}{x} = 1$
- vii) $\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$
- viii) $\lim_{x \rightarrow 0} \frac{\tan x}{x} = 1$

e) Definition of continuity of a function at a point and problems based on it

3) DERIVATIVES

- a) Derivative of a function at a point
- b) Algebra of derivative
- c) Derivative of standard functions
 $x^n, a^x, \log_a x, e^x, \sin x, \cos x, \tan x, \cot x, \sec x, \csc x, \sin^{-1} x, \cos^{-1} x,$
 $\tan^{-1} x, \cot^{-1} x, \sec^{-1} x, \csc^{-1} x$
- d) Derivative of composite function (Chain Rule)
- e) Methods of differentiation of
 - i) Parametric function
 - ii) Implicit function
 - iii) Logarithmic function
 - iv) a function with respect to another function
- f) Applications of Derivative
 - i) Successive Differentiation (up to second order)
 - ii) Partial Differentiation (function of two variables up to second order)
- g) Problems based on above

4) INTEGRATION

- a) Definition of integration as inverse of differentiation
- b) Integrals of standard functions
- c) Methods of integration
 - i) Integration by substitution
 - ii) Integration by parts
- d) Integration of the following forms
 - i) $\int \frac{dx}{x^2 + a^2}$ ii) $\int \frac{dx}{x^2 - a^2}$ iii) $\int \frac{dx}{a^2 - x^2}$ iv) $\int \frac{dx}{\sqrt{x^2 + a^2}}$ v) $\int \frac{dx}{\sqrt{x^2 - a^2}}$ vi) $\int \frac{dx}{\sqrt{a^2 - x^2}}$
 - vii) $\int \frac{dx}{x\sqrt{x^2 - a^2}}$ viii) $\int \sqrt{a^2 - x^2} dx$ ix) $\int \sqrt{a^2 + x^2} dx$ x) $\int \sqrt{x^2 - a^2} dx$
- e) Definite integral, properties of definite integrals
 - i) $\int_0^a f(x) dx = \int_0^a f(a - x) dx$
 - ii) $\int_a^b f(x) dx = - \int_b^a f(x) dx$
 - iii) $\int_a^c f(x) dx = \int_a^b f(x) dx + \int_b^c f(x) dx, a < b < c$
 - iv) $\int_{-a}^a f(x) dx = 0, \text{ if } f(x) = \text{odd}$
 $= 2 \int_0^a f(x) dx, \text{ if } f(x) = \text{even}$
- f) Application of integration
 - i) Area enclosed by a curve and X – axis
 - ii) Area of a circle with centre at origin

5) DIFFERENTIAL EQUATION

- a) Order and degree of a differential equation
- b) Solution of differential equation
 - i) 1st order and 1st degree equation by the method of separation of variables
 - ii) Linear equation $\frac{dy}{dx} + Py = Q$, where P,Q are functions of x

Syllabus to be covered up to IA

Ch. 2 and Ch. 3

Books Recommended:

1. Elements of Mathematics _ Vol. _ 1 & 2 (Odisha State Bureau of Text Book preparation & Production)

Reference Books:

Mathematics Part- I & Part- II- Textbook for Class XII, NCERT Publication

Pr.1a. Communicative English Lab

(1st & 2nd sem Common)

Theory: 4 Periods per Week
Total Periods: 60 Periods

Sessional : 50 Marks
TOTAL MARKS : 50 Marks

SI No.	Topic	Periods
1	Listening Skill	10
2	Speaking Skill	20
3	Personality Development	10
4	Interpersonal Skills	10
5	Presenting in G D , Seminar and Conferences	10
	Total	60

PRACTICAL

1. LISTENING SKILLS

- The student should be able to listen to a text read aloud in normal speed with focus on intonation
- After listening the student can fill-in-blanks, choose a suitable title, make a summary, supply required information and be able to answer comprehension questions from the passage read aloud.

2. SPEAKING SKILL

- Reading aloud of dialogues, texts, poems, speeches focusing on intonation.
- Self-introduction
- Role-plays on any two- situations
- Telephonic conversation

3. PERSONALITY DEVELOPMENT

- Initiation
- Physical appearance
- Audience purpose

4. INTERPERSONAL SKILLS

Appropriate use of non-verbal skills in face-to-face communication
[i.e. viva- voice, group-interviews, GDs and seminars]

5. PRESENTING IN GD, SEMINARS AND CONFERENCES

- Leadership quality
- Time management
- Achieving the target

Pr.1b. COMPUTER APPLICATION LAB
(1st / 2nd sem Common)

Theory: 4 Periods per Week
Total Periods: 60 Periods

Sessional : 50 Marks
TOTAL MARKS : 50 Marks

1. BASIC COMPUTER OPERATION

[04]

Identification of different components of Computer Switch on and Booting Process Shut down, Restart of computer

2. PERSONAL COMPUTER SYSTEM

[12]

Study of device and power supply form factor of Personal Computer System

Identification of various Mother Board components

Identification of different ports, type of connectors, and their purpose, Cooling System of Processor and Case

Identification and Study of ROM, RAM, Adapter Cards, Expansion Slots, SATA connectors

Study of Adapters and Converters

3. COMPUTER LAB SAFETY AND STUDY OF LAB TOOLS

[06]

Study of various types of LAB Safety measures (General Safety, Electrical Safety, Fire safety), Analysis of various Power Fluctuation Types (Blackout, Brownout, Noise, Spike, Power surge), Power Protection Devices (Surge suppressor, UPS, Standby power supply)

Procedures for proper disposal or recycling of hazardous computer components (Batteries, Monitors, Toner Kits, Cartridges, Chemical Solvents and Aerosol Cans)

Study of General Lab Tools (ESD tools, Hand tools, cable tools, Cleaning tools, Diagnostic tools), Disk Management Tools

4. OPERATING SYSTEM

[08]

Basic DOS commands (CLS, DIR, DATE, TIME, VERSION, MD, CD, RD, DEL, COPY, REN, USE OF WILD CARDS, PATH), Basic Windows OS operations, MOUSE OPERATIONS, Utilities and Accessories, Installation and configuration of OS

5. WORKING WITH MS-OFFICE

[12]

Basic operations of Word Processing Package. (MS-Word), Basic operations of Electronic Spread Sheet Package. (MS-Excel), Basic operations of Presentation Package (MS- Power point) (*Create, Edit, Format, Save, Print/View in the above three packages*)

6. WORKING WITH INTERNET

[06]

Getting acquainted with Internet connection, Browser, website

URL, webpage, http, WWW, net browsing

Creating E-Mail Id, sending and receiving E-mail Chatting

7. C PROGRAMMING

[12]

1. Write a Program in C to find the greatest number among three numbers.
2. Write a Program in C to find the average of n numbers by using for loop.
3. Write a program in C to determine whether a number is prime or not?
4. Write a program in C to check whether a given number is palindrome or not?
5. Write a program in C to compute the sine series.
6. Write a program in C to accept row wise and column wise element in a two dimensional array and print them.
7. Write a program in C to find the vowels in a given string.
8. Write a program in C to find the factorial of a number, by using recursion.
9. Write a program in C to find the sum of Fibonacci series, by using function.
10. Write a program in C to accept a number from keyboard and print it in reverse order of entry, by using function.

Pr.2a. Engineering Physics Lab

(1st / 2nd sem Common)

Theory: 4 Periods per Week

Total Periods: 60 Periods

Examination: 3 Hours

Sessional : 50 Marks

End Sem Exams : 50 Marks

TOTAL MARKS : 100 Marks

(Any 10 Experiments)

SL.NO	NAME OF THE EXPERIMENTS
1	To find the cross sectional area of a wire using a screw gauge.
2	To find the thickness and volume of a glass piece using a screw gauge.
3	To find volume of a solid cylinder using a Vernier Calipers.
4	To find volume of a hollow cylinder using a Vernier Calipers.
5	To determine the radius of curvature of convex surface using a Spherometer.
6	To determine the radius of curvature of concave surface using a Spherometer.
7	To find the time period of a simple pendulum and determine acceleration due to gravity.
8	To determine the angle of Prism.
9	To determine the angle of Minimum Deviation by I ~ D curve method.
10	To trace lines of force due to a bar magnet with North pole pointing North and locate the neutral points.
11	To trace lines of force due to a bar magnet with North pole pointing South and locate the neutral points.
12	To verify Ohm's Law by Ammeter – Voltmeter method.

Pr.2b. Engineering Chemistry Lab

(1st / 2nd sem Common)

Theory: 4 Periods per Week

Total Periods: 60 Periods

Examination: 3 Hours

Sessional : 50 Marks

End Sem Exams : 50 Marks

TOTAL MARKS : 100 Marks

Sl No.	Experiment
1	Preparation and study of physical and chemical properties CO ₂ gas.
2	Preparation and study of physical and chemical properties NH ₃ gas.
3	Crystallization of Copper sulphate from copper carbonate.
4	Simple acid-base titrations (i) Acidimetry (ii) Alkalimetry
5	Tests for acid radicals (Known): (i) Carbonate, (ii) Sulphide, (iii) Chloride, (iv) Nitrate and (v) Sulphate.
6	Test for Basic radicals (Known): (i) Ammonium, (ii) Zinc, (iii) Magnesium, (iv) Aluminium, (v) Calcium, (vi) Sodium and (vii) potassium.
7	Test for unknown Acid radicals
8	Test for unknown basic radicals
9	Test for unknown salt (composed of one basic radical and one acid radical)

Recommended Books:

- (i) Practical Intermediate Chemistry By Dr. Bichitrananda Nanda
- (ii) Elemental Experimental chemistry by Dr. Y R Sharma, A K Das, Kalyani Publisher

Pr.3a. Engineering Drawing (1st / 2nd sem Common)

Theory: 6 Periods per Week
Total Periods: 90 Periods
Examination: 3 Hours

Sessional : 50 Marks
End Sem Exams : 100 Marks
TOTAL MARKS : 150 Marks

Objective

After completion of the study of Engg. Drawing the student should be able to

1. Understand the importance of Engineering Drawing.
2. Demonstrate the use of different drawing instrument.
3. Make free hand lettering and numbering.
4. Practice of dimensioning of drawing.
5. Undertake different geometric constructions, projections of straight line, planes and solids.
6. Take up different orthographic projections.
7. Draw sectional views, development of surface of different solids.
8. Develop the concept of building drawing.
9. Prepare 2D engineering drawing using Auto CAD software.

Topic wise distribution of periods.

Sl. No.	Topics	Periods
1	Introduction and Demonstration	03
2	Types of Lines, Lettering & Dimensioning	03
3	Scales	03
4	Curves	06
5	Orthographic Projections	21
6	Section and Developments	21
7	Isometric Projections	06
8	Building Drawing	12
9	Practices on Auto CAD	15
	TOTAL	90

(All drawings are to be made in First Angle Projection)

1. INTRODUCTION & DEMONSTRATION

- 1.1 Identify various sizes of drawing boards, drawing sheets as per BIS.
- 1.2 List the types of pencils, instruments, and scales (RF).
- 1.3 Demonstrate lying of drawing sheet, margin, standard layout and title block as per BIS, folding principle of drawings (blue prints, print outs etc).

2. TYPES OF LINES, LETTERING & DIMENSIONING

- 2.1 Demonstrate and explain the use of various types of lines.
- 2.2 Demonstrate the principle of single stroke, gothic lettering & numerals as per BIS.

3. SCALES

- 3.1 Significance of scales in drawing; different scales.
- 3.2 Define and draw plain sale and diagonal sale.

4. CURVES

- 4.1 Explain Conic sections with illustration, Explain terms like focus, vertex, directrix and eccentricity.
- 4.2 Draw conics sections by eccentricity method – Ellipse, Parabola and Hyperbola.
- 4.3 Draw Ellipse by concentric circle method and arc of circle method.
- 4.4 Draw parabola by Rectangle Method and Tangent Method.

5. ORTHOGRAPHIC PROJECTIONS

- 5.1 Demonstrate the principles of 1st angle and 3rd angle projections with the help of models and draw symbols.
- 5.2 Draw projection of points.
- 5.3 Draw projection of straight line (parallel to both planes, parallel to one and perpendicular to other, parallel to one and inclined to other and inclined to both reference planes).
- 5.4 Draw plane figure such as squares, rectangles, triangles, circle, Pentagon and hexagon (perpendicular to one plane and inclined to other).
- 5.5 Draw projections of solids such as prism, cylinder, cone, tetrahedron and pyramid in simple position (with axis parallel to one reference plane and perpendicular to other reference plane).

6. SECTION & DEVELOPMENTS

- 6.1 Draw the sectional projection & development of prism, cylinder, cone and pyramid in simple position by a cutting plane perpendicular to one reference plane and inclined to other reference plane.
- 6.2 Draw true shape of the cutting sections.

7. ISOMETRIC PROJECTIONS

Draw isometric view & Isometric projection of prism, pyramid, cone & cylinder with axis horizontal and vertical with construction of isometric scales.

8. BUILDING DRAWING

- 8.1 Explain terms related to building drawing.
- 8.2 Draw plan, elevation of single room building with verandah (Flat roof according to given line plan and specification).

9. PRACTICES ON AUTO CAD

- 9.1 Introduction-Settings, Limits etc.
- 9.2 Auto CAD commands-
Draw commands (Line, circle, arc, polygon, ellipse, rectangle).
Edit command, Dimension commands and Modify Commands for two dimensional drafting only.
- 9.3 Exercise for practice using Auto CAD.
 - 9.3.1 Orthographic projections of lines, planes and solids as per chapter 5.0.
 - 9.3.2 Isometric projection as per Chapter 7.0.

Note: Focus should be on Hands on Practice of student using AutoCAD software

Books Recommended

1. Machine Drawing by Basudeb Bhattacharya, Oxford University Press.
2. A Text Book of Engineering Drawing by Dr. R.K. Dhawan.
3. A Text Book of Engineering Graphics & Auto CAD by K Venugopal.
4. A Text book of Engineering Drawing by N.D. Bhatt.
5. Engineering Drawing by P.S. Gill.
6. A Introduction to Auto CAD – 2012 by George Omura, Willey India Publishers.

Pr.3b. Workshop Practice

(1st / 2nd sem Common)

Theory: 6 Periods per Week
 Total Periods: 90 Periods
 Examination: 4 Hours

Sessional : 50 Marks
 End Sem Exams : 100 Marks
 TOTAL MARKS : 150 Marks

Objective:

1. To demonstrate safely practice in various shops of the workshop.
2. To select suitable tools & equipment in the following shops. (a) Fitting.
 (b) Sheet Metal.
 (c) Welding (Gas & Electrical). (d) Turning.
3. To select suitable materials for different process in the above shops.
4. To demonstrate the different processes adopted in the above shops.
5. To finish the jobs within stipulated time and with accuracy as per specifications.

Topic Wise distribution of periods

Sl. No.	Topics	Periods
1	Fitting Shop	24
2	Sheet Metal	18
3	Welding Shop	24
4	Turning Shop	21
5	Exposure to CNC Milling / Lathe Machine	03
	TOTAL	90

1. FITTING SHOP

- 1.1 Demonstrate safety practices in the fitting shop.
- 1.2 Select suitable holding & clamping devices for fitting jobs.
- 1.3 Select suitable tools like- files, vice, chisels, punch, scriber, hammers, surface plate, V-block, try square, caliper etc.
- 1.4 Demonstrate the following operations:
 Sawing, Chipping, Fitting, Craping, Grinding, Marking, Reaming, Tapping, Drilling & Angular cutting.
- 1.5 Introduction of chipping, demonstration on chipping and its applications.
- 1.6 Description, demonstration and practice of simple operation of hack saw straight and angular cutting.
- 1.7 Introduction and use of measuring tools used in fitting shop like steel rule, measuring tape, outside micrometer, vernier caliper and vernier height gauge.
- 1.8 Description and Demonstration and practice of thread cutting using taps and dies.
 Job: Cutting & fitting practice on a square of 50mm X 50mm X 8mm MS Flat. Job: Angular cutting practice of 45 degree (on the above job).
 Job: Preparation of stud (to cut external threads) with the help of dies (mm or BSW). Job: H-fitting in the mild steel (ms) square.
 Job: Prepare one job on male female fitting.

2. SHEET METAL

- 2.1 Demonstrate safety practices in sheet metal shop.
- 2.2 Prepare surface development for the jobs according to the drawing.
- 2.3 Cut M.S and G.P. sheets according to the surface development / drawing using standard sheet metal cutting tools.
- 2.4 Select hand tools for sheet metal work.
- 2.5 Demonstrate the process of metal clamp joining and reveted joining of sheet metals.

Job: Making of sheet metal joints.

Job: Prepare a sheet metal tray or a funnel.

Job: Prepare a sheet metal job involving rolling, shearing, creasing, bending & cornering. Job: Prepare a lap riveting joint.

3. WELDING SHOP

- 3.1 Introduction.
- 3.2 Safety precautions in welding, safety equipments & its application in welding shop.
- 3.3 Introduction to welding, type of welding, common materials that can be welded, introduction to gas welding equipment, types of flame, adjustment of flame, applications of gas welding, Welding tools & safety precautions.
- 3.4 Introduction to electric arc welding (AC & DC), practice in setting current & voltage for striking proper arc, precautions while using electric arc welding. Applications of arc welding. Introduction to polarity & their use.
- 3.5 Demonstrate & use of the different tools used in the welding shop with sketches, Hand shield, helmet, clipping hammer, gloves, welding lead, connectors, aprons, goggles, etc.
- 3.6 Demonstrate of welding defects & various types of joints & end preparation.
Job: Preparation of lap joint by arc welding rod. Job: Preparation of Tee joint by arc welding.
Job: Preparation of single V or double V butt joint by electric arc welding. Job: Brazing practice. Use of Spelt or (on MS sheet pieces).
Job: Gas welding practice on worn-out & broken parts.

4. TURNING SHOP

- 4.1 Introduction.
- 4.2 Safety precaution & safety equipments.
- 4.3 Various marking, measuring, cutting & holding tools.
- 4.4 Demonstration of different parts of a lathe, demonstration on centering & turning operation in a group of 06 students.
Job: plain turning, taper turning & grooving practices on round bar.

5. EXPOSURE TO C.N.C MILLING / LATHE MACHINE

Reference Books

1. Workshop Technology by S.K.Hajara Choudhary, Media Promoters Publishers, New Delhi.
2. Workshop Technology by B.S. Raghubanshi, Dhanpat Rai and Sons, New Delhi.
3. Workshop Technology by H.S. Bawa – TMH.
4. Workshop Familiarization by E Wilkinson.
5. Sheet metal shop practice by Bruce & Meyer.
6. Workshop Technology by R.S. Khurmi & J.K. Gupta, S.Chand.

Notes

1. *Work, Progress book should be maintained continuously.*
2. *The roll numbers of the students must be punched on each job.*
3. *The turning shop job should be done by students' maximum 06 students in a group*

Pr.4 Seminar

(1st / 2nd sem Common)

Theory: 4 Periods per Week
Total Periods: 60 Periods

Sessional : 50 Marks
TOTAL MARKS : 50 Marks

The students shall present seminar on different topics on latest science and Technology in the entire class. There shall not be any grouping of students. The students shall present the seminar topic to the whole class/section. All other students should be allowed and encouraged to put questions to the presenter student, who shall answer the questions. A student has to present seminar on at least 2 topics in a semester. He/she has to submit seminar report for each topic separately, to the teacher concerned, which shall be preserved for verification by the authorities. The students should be encouraged to refer to the magazines, journals, e-materials etc. for preparing for seminar topic. Attendance of all students other than the presenters should be ensured, so that seminar shall be more participative and knowledge of students shall improve by listening to many topics presented.

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
		<i>Total</i>	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	-	-	-	-
		<i>Total</i>	-	-	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.

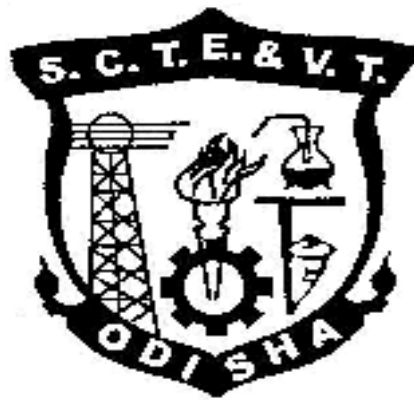
There shall be 1 Internal Assessment done for each of the Theory Subject. Sessional Marks shall be total of the performance of individual different jobs/ experiments in a subject throughout the semester

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	3 rd
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 OBJECTIVES

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	3 rd
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 identify 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
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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	3 rd
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 OBJECTIVES

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-constructural 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 1 and 1-1/2 Brick thick walls. T, X and right angled corner junctions. Thickness for 1 and 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	4 th
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 OBJECTIVES

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 mummy 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 Engineering			
Course code:		Semester	3 rd
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 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 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, and desertification.

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 optin 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

- 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 human health.
- Human rights.
- Value education
- Role of information technology in environment and human health.

Syllabus coverage upto I.A

Units 1, 2, 3

Learning Resources:			
SI.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	3 rd
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 OBJECTIVES

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	3 rd
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 OBJECTIVES

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. (gabled / 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	4 th
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 OBJECTIVES

After completion of the course, students will be able to

CO1- Prepare estimates for 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 MS 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
		<i>Total</i>	<i>20</i>			<i>80</i>	<i>320</i>	<i>-</i>	<i>400</i>
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				
		<i>Total</i>	<i>-</i>	<i>-</i>	<i>19</i>	<i>150</i>	<i>200</i>	<i>-</i>	<i>350</i>
		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.

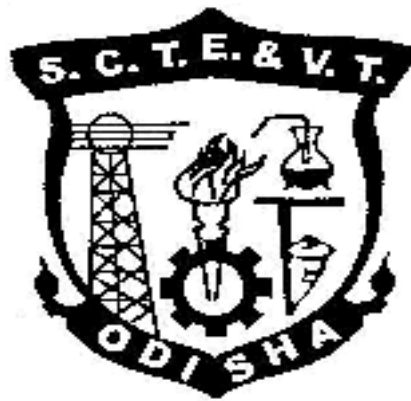
There shall be 1 Internal Assessment done for each of the Theory Subject. Sessional Marks shall be total of the performance of individual different jobs/ experiments in a subject throughout the semester

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	4 th
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 90° bend and 45° 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	4 th
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
<i>PART: A (Hydraulics And Machines)</i>		
1	Hydrostatics	12
2	Kinematics Of Fluid Flow	18
3	Pumps	05
<i>Part: B (Irrigation Engineering)</i>		
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	4 th
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 prismatic formula and trapezoidal formula,
Prismatic 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	4 th
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 of 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 Engineering.	S. Chand

Pr1. LAND SURVEY PRACTICE-I

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	4 th
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 Measurements, 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 from 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	4 th
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 latest Educational version for minimum 15 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: Aperture 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 /0.01m	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
		<i>Total</i>	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				
				-		-	-	-	-
		<i>Total</i>	-	-	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

		<p>2) SP-20 Hand book on masonry design and construction- BIS Publication.</p> <p>3) IS 806: 1968 Code of practice for use of steel tubes in general building construction.</p> <p>4) IS 1161: 1998 Steel Tubes for Structural Purposes – Specification</p>	
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Th3. RAILWAY & BRIDGE ENGINEERING

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	5 th
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, caisson foundation

3.3 Cofferdams

4 Bridge substructure and approaches

4.1 Types of piers

4.2 Types of abutments

4.3 Types of wing walls

4.4 Approaches

Culvert & Cause ways

5 5.1 Types of culverts – 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	5 th
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 OBJECTIVES

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- methods 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-siphonage 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.

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/Nephelometer/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	5 th
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 from 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(5th and 6th sem). The Grouping of students, selection of Project, assignment of Project Guide to the Group shall be done in the beginning of 5th 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 5th 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 pipette method for clay and silt.	Pipete	4 NOS
		Cylinder/jars	5 NOS
		Mechanical stirrer	6 NOS
		Glass weighing bottles	7 NOS
		Digital Balance-	NIL
		Thermometer	1
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 collar ,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	
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 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	One set consist of all the above items
12	Determination of CBR value using Laboratory CBR Testing device	C.B.R mould 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.	One set consist of all the above items
Hydraulics Laboratory			
1	Verification of Bernoulli's Theorem	F1-10 hydraulics bench F1-15 Bernoulli's apparatus test equipment A stopwatch for timing the flow measurement.	One set consist of all the above items
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. Orificemeter fitted in a horizontal pipeline with means of varying flow rate, U tube differential manometer.	Each One set consist of all the above items

4	Determination of head Loss due to friction and coefficient of friction for flow through pipe	F1-10 hydraulics bench	One set consist of all the above items
		F1-18 pipe friction apparatus	
		Stopwatch for timing the flow measurement	
		Measuring cylinder for measuring very low flow rates	
		Spirit level	
		Thermometer	
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.	One set consist of all the above items
		Water bath: A bath maintained within $27.0^{\circ} \pm 0.1^{\circ} \text{C}$ 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 $0-44^{\circ}\text{C}$ and readable up to 0.2°C	
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/Nephelometer/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 $77\pm 18^{\circ}\text{C}$ 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 Chloride 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	Determination 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
		<i>Total</i>	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	-	-	-	-
		<i>Total</i>	-	-	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.

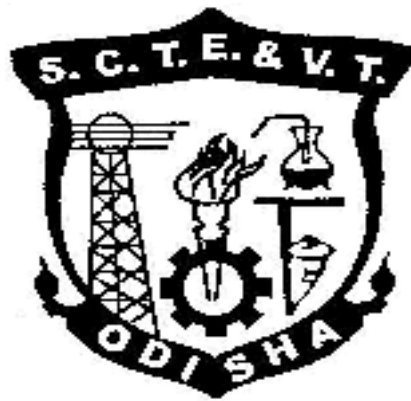
There shall be 1 Internal Assessment done for each of the Theory Subject. Sessional Marks shall be total of the performance of individual different jobs/ experiments in a subject throughout the semester

CURRICULLUM OF 6TH SEMESTER

For

DIPLOMA IN CIVIL ENGINEERING

(Effective FROM 2020-21 Sessions)



**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](http://gps.alaska.edu/jeff/Spatial%20Reference/Freymueller_DOT_GPS.pdf)
4. [https://drive.google.com/file/d/0B7srsI9Fr4QdUzAzSIRwZnNRZ3M/view :-](https://drive.google.com/file/d/0B7srsI9Fr4QdUzAzSIRwZnNRZ3M/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](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](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 & William 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 gunniting (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 Warning.
- 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 Centre
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	6 th
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	6 th
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 and 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](http://gps.alaska.edu/jeff/Spatial%20Reference/Freymueller_DOT_GPS.pdf)
4. [https://drive.google.com/file/d/0B7srsI9Fr4QdUzAzSIRwZnNRZ3M/view :-](https://drive.google.com/file/d/0B7srsI9Fr4QdUzAzSIRwZnNRZ3M/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](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](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](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&og=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/](http://www.gisresources.com/basic-of-photogrammetry_2/)
17. [http://giswin.geo.tsukuba.ac.jp/sis/tutorial/Fundamentals of GIS Estoque.pdf](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	6 th
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:-

SI.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	Substance 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-Junction, Y-Junction, 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
		<i>Total</i>	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	-	-	-	-
		<i>Total</i>	-	-	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	3 rd
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 Rouché's theorem for consistency of a system of linear equations in n 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 $\frac{1}{f(D)} x^n$.
- 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 $\Gamma(n + 1) = n!$ and find $\Gamma\left(\frac{1}{2}\right) = \sqrt{\pi}$.
- 4.2. Define Laplace Transform of a function $f(t)$ 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 t^n and division by t .
- 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 $f(x)$ 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 $(0 \leq x \leq 2\pi \text{ and } -\pi \leq x \leq \pi)$.
- 5.6. Obtain F.S of continuous functions and functions having points of discontinuity in $(0 \leq x \leq 2\pi \text{ and } -\pi \leq x \leq \pi)$
- 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 (E) and establish relation between E & difference operator (Δ).
- 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	3 rd
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 AND NETWORK	Gargi Basu	Platinum

3rd Semester Electrical

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	3 rd
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

SI 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 resistors or thermistors
 - 2.14.3 Photoconductive cells
 - 2.14.4 Photovoltaic cells
 - 2.14.5 Varistors
 - 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	3 rd
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.

<u>Learning Resources:</u>			
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	3 rd
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	3 rd
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	3 rd
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, taper 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
		<i>Total</i>	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				
		<i>Total</i>	-	-	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.

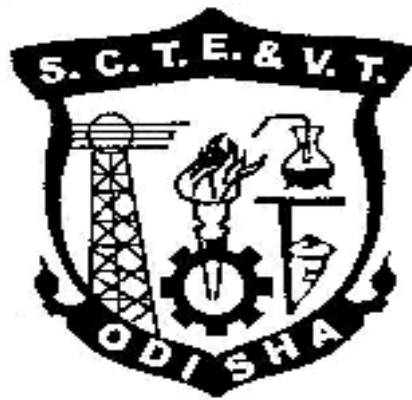
There shall be 1 Internal Assessment done for each of the Theory Subject. Sessional Marks shall be total of the performance of individual different jobs/ experiments in a subject throughout the semester

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	4 th
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	<i>Electrical Technology – II</i>	<i>B. L. Thareja and A. K. Thareja</i>	<i>S.Chand</i>
2	<i>A Textbook of Electrical Machines</i>	<i>K R Siddhapura, D B Raval</i>	<i>Vikas</i>
3.	<i>Electrical Technology</i>	<i>J. B. Gupta</i>	<i>S.K.Kataria and Sons</i>
4.	<i>Electric Machine</i>	<i>Ashfaq Husain</i>	<i>Dhanpat Rai and Sons</i>
5.	<i>Electrical Machine</i>	<i>S. K. Bhattacharya</i>	<i>TMH</i>
6.	<i>Electrical Machines</i>	<i>D P Kothari, I J Nagrath</i>	<i>Mc Graw Hill</i>
7	<i>Electrical Machines</i>	<i>Prithwiraj purakait and Indrayudh Bandyopadhyay</i>	<i>OXFORD</i>

Th2. Analog Electronics and OP-AMP

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	4 th
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	4 th
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. ENERGY METERS 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 Maxwell'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	4 th
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 laying.
- 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	4 th
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	4 th
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 & observe 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	4 th
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:	4 th
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	<i>Electrical Design and Drawing</i>	<i>Surjit Singh</i>	<i>Dhanpat Rai & Sons</i>
2	<i>Electrical Engineering Drawing</i>	<i>C.R. Dargan</i>	<i>Asian Publication</i>

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

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
		<i>Total</i>	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	-	-	-	-
		<i>Total</i>	-	-	18	100	150	-	250
		Grand Total	21	-	18	200	550	-	750

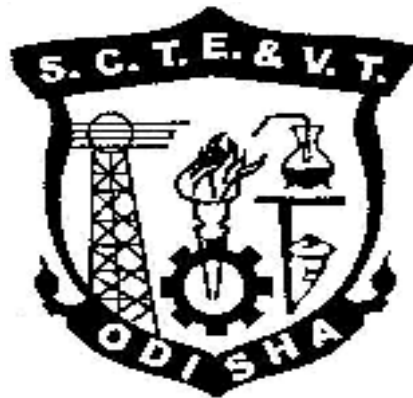
Abbreviations: L-Lecturer, T-Tutorial, P-Practical. Each class is of minimum 55 minutes duration

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:	5 th
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 reluctance 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. Bhattacharya	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	5 th
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:	5 th
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 features 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.	<i>Utilization of Electrical Energy by Traction</i>	<i>G. C. Garg</i>	<i>Khanna Publisher</i>
2.	<i>Utilization of Electrical Energy</i>	<i>E. I. Taylor</i>	<i>TMH</i>
3.	<i>A Text book on Power system Engineering</i>	<i>Soni, Gupta and Bhatnagar</i>	<i>Dhanpat Rai & Sons</i>

TH.5 POWER ELECTRONICS AND PLC

Name of the Course: Diploma in Electrical Engineering			
Course code:	Th.5	Semester:	5 th
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 indispensable 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

	<i>and AC Drives</i>		
3.	<i>Power Electronics</i>	<i>M. D. Singh and K.B Khanchandani</i>	<i>TMH</i>
4.	<i>Power Electronics</i>	<i>M H Rashid</i>	<i>PHI Publisher</i>
5.	<i>Power Electronics</i>	<i>P C Sen</i>	<i>TMH</i>
6.	<i>Power Electronics</i>	<i>N Mohan</i>	<i>Willey (India)</i>
7.	<i>Programmable logic Controllers</i>	<i>Frank D. Petruzela</i>	<i>TMH</i>
8.	<i>Programme logic controller</i>	<i>Dr.M.Mitra&Dr.S.Sengupta</i>	<i>Penram</i>

Pr.1 ELECTRICAL MACHINE LAB-II

Name of the Course: Diploma in Electrical Engineering			
Course code:	Pr.1	Semester	5 th
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	5 th
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	5 th
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	5 th
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:

SI. 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 (5th and 6th sem). The Grouping of students, selection of Project, assignment of Project Guide to the Group shall be done in the beginning of 5th 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 5th 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
		<i>Total</i>	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	-	-	-	-
		<i>Total</i>	-	-	19	150	200	-	350
		Grand Total	16	04	19	205	545	-	750

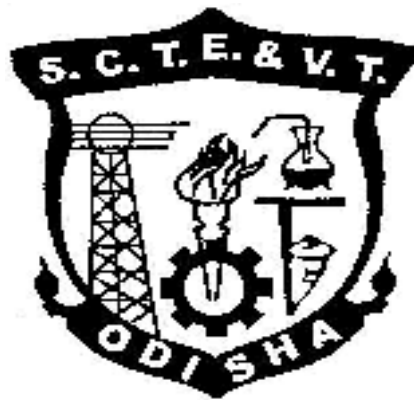
Abbreviations: L-Lecturer, T-Tutorial, P-Practical . Each class is of minimum 55 minutes duration

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	6 th
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 grading 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 m² 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 m² 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 80m² 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 30m² 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:			
SI.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	6 th
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) Lightning 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 Switcgear	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	6 th
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	6 th
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.
 - 3.6.1. 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	6 th
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.

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.	<i>Renewable Energy Sources and Emerging Technologies</i>	<i>D.P.Kothari, K.C Singal, Rakesh Ranjan</i>	<i>PHI Learning Pvt.Ltd, New Delhi</i>
2.	<i>Non-Conventional Energy Resources</i>	<i>B.H.Khan</i>	<i>Tata McGrawHill</i>
3	<i>Non-Conventional Energy Resources</i>	<i>J.P Navani & Sonal Sapra</i>	<i>S chand</i>
4.	<i>Non Conventional Energy sources and Utilisation</i>	<i>R K Rajput</i>	<i>S Chand</i>
5	<i>Wind Electrical Systems</i>	<i>S. N. Bhadra, D. Kastha, S. Banerjee</i>	<i>Oxford Univ. Press, New Delhi</i>
6.	<i>Non Conventional Energy Resources</i>	<i>N K Bansal</i>	<i>S Chand</i>

Th4. ELECTRIC VEHICLES

(Elective- C)

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester:	6 th
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. <i>Electric and Hybrid Electric Vehicles</i>	Husain	CRC Press
4.	<i>Modern Electric Vehicle Technology</i>	Chan C. C. and K. T. Chau	Oxford Science Publication,
5.	M. H. <i>Power Electronics: Circuits, Devices and Applications,</i>	Rashid	3rd edition, Pearson,

Pr1.ELECTRICAL WORKSHOP PRACTICE

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	6 th
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 2.5mm² to 6 mm² 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	6 th
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>"
- (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 the 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

SI 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
		<i>Total</i>	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	-	-	-	-
		<i>Total</i>	-	-	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 3RD SEMESTER
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	3 rd
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
- 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.

7

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	3 rd
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	3 rd
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, tempering, 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, γ - alloy.
- 6.2 Copper alloys: Composition, property and usage of Copper-Aluminum, Copper-Tin, Babbitt , Phosphorous 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	3 rd
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 (Clausius & 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, Charles's law, Avogadro's law, Dalton's law of partial pressure, Gay Lussac law, General gas equation, characteristic gas constant, Universal gas constant.
- 3.2 Explain specific heat of gas (C_p and C_v)
- 3.3 Relation between C_p & C_v .
- 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 polytropic 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
Total Periods: 60 Periods
Examination: 3 Hours

I.A: 20 Marks
End Exam : 80 Marks
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	3 rd
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	3 rd
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	3 rd
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 SQUIRE	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 SQUARE	10 Nos.
04	SCRIBER & SURFACE 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 PEEN 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)

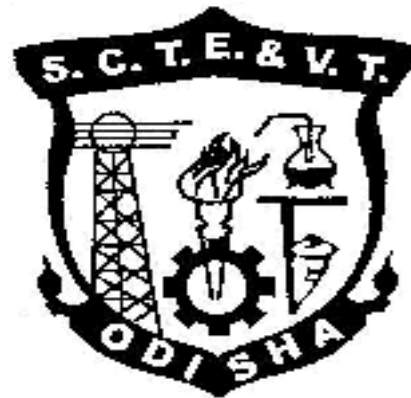
Subject Number	Subject Code	Subject	Periods/week			Evaluation Scheme			
			L	T	P	Internal Assessment/ Sessional	End Sem Exams	Exams (Hours)	Total
Theory									
Th.1		Theory of Machine	4		-	20	80	3	100
Th.2		Manufacturing Technology	4		-	20	80	3	100
Th.3		Fluid Mechanics	4		-	20	80	3	100
Th.4		Thermal Engg-II	4		-	20	80	3	100
		<i>Total</i>	<i>16</i>			<i>80</i>	<i>320</i>	<i>-</i>	<i>400</i>
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				
		<i>Total</i>	<i>-</i>	<i>-</i>	<i>23</i>	<i>150</i>	<i>200</i>	<i>-</i>	<i>350</i>
		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	4 th
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

<u>Sl. No.</u>	<u>Topic</u>	<u>Periods</u>
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	Pearson

TH-2 MANUFACTURING TECHNOLOGY

Name of the Course: Diploma in Mech/Auto/ & Other Mechanical Allied Branches			
Course code:		Semester	4 th
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
- Comprehending working principle and components in machining tools including lathe, milling, shaping, planing, slotting machines
- Comprehending requirement of surface finish and realize principles involved in grinding and superfinishing operations

C. TOPIC WISE DISTRIBUTION OF PERIODS

<u>Sl. No.</u>	<u>Topic</u>	<u>Periods</u>
01	Tool Materials	04
02	Cutting Tools	06
03	Lathe Machine	08
04	Shaper	06
05	Planing 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	4 th
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

<u>Sl. No.</u>	<u>Topic</u>	<u>Periods</u>
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. It

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

<u>Sl. No.</u>	<u>Topic</u>	<u>Periods</u>
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.

<u>Sl No.</u>	<u>Reference Book</u>	<u>Author Name</u>	<u>Publisher Name</u>
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	4 th
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
		<i>Total</i>	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				
		<i>Total</i>	-	-	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**

- Intellectual Property Rights(IPR), Patents, Trademarks, Copyrights
- Features of Factories Act 1948 with Amendment (only salient points)
- 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	5 th
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 PERIODS

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.KATARIYA
04	V.B.BHANDARI	DESIGN OF MACHINE ELEMENTS	TMH
05	S.MD.JALAUDEEN	DESIGN DATA BOOK	ANURADHA PUBLICATION

TH.3 HYDRAULIC MACHINES & INDUSTRIAL FLUID POWER

Name of the Course: Diploma in MECHANICAL ENGINEERING			
Course code:		Semester	5 TH
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 PERIODS.

SL.NO	TOPICS	PERIODS
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 for 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 PERIODS

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 Definition 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

6.2Types 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	5 th
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
- 5.1.3 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- Chapters 1.2&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	5 th
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(5th and 6th sem). The Grouping of students, selection of Project, assignment of Project Guide to the Group shall be done in the beginning of 5th 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 5th 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							
<i>Total</i>			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				
<i>Total</i>			-	-	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 PERIODS

SI 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,

2.3 Solution of L.P.P. by graphical method.

2.4 Evaluation of Project completion time by Critical Path Method and PERT (Simple problems)-

2.5 Explain 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:

4.1 Define Inspection and Quality control.

4.2 Describe 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

5.3.2 Scheduling

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:			
<i>Sl. No.</i>	<i>Name of Authors</i>	<i>Title of the Book</i>	<i>Name of the Publisher</i>
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

SI 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:			
<i>Sl. No.</i>	<i>Name of Authors</i>	<i>Title of the Book</i>	<i>Name of the Publisher</i>
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:			
<i>Sl. No.</i>	<i>Name of Authors</i>	<i>Title of the Book</i>	<i>Name of the Publisher</i>
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:			
<i>Sl. No.</i>	<i>Name of Authors</i>	<i>Title of the Book</i>	<i>Name of the Publisher</i>
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:			
<i>Sl. No.</i>	<i>Name of Authors</i>	<i>Title of the Book</i>	<i>Name of the Publisher</i>
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.

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 effector 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:			
<i>Sl. No.</i>	<i>Name of Authors</i>	<i>Title of the Book</i>	<i>Name of the Publisher</i>
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-level 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	6 th
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:-

SI.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

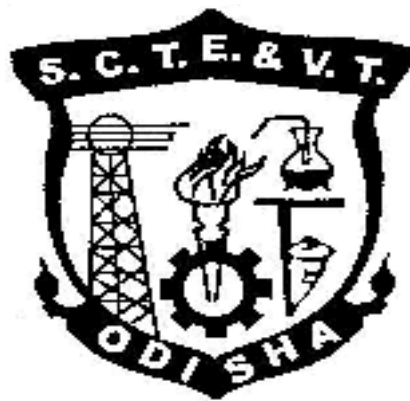
AUTOMOBILE ENGINEERING LAB

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	Maruty car type carburetor	01 no
06	Cut section of a fuel pump	01no
07	New car engine	01 no
08	Gear box	01no

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 Lavel 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

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.

SYLLABUS COVERAGE UP TO I.A

Chapter 1,2,3,4.

Learning Resources:		
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 Resources:		
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 Resources:		
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 Resources:		
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	3 rd
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:

SI. 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 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.
- 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 human health.

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.

<u>Learning Resources:</u>			
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 Bernoulli'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

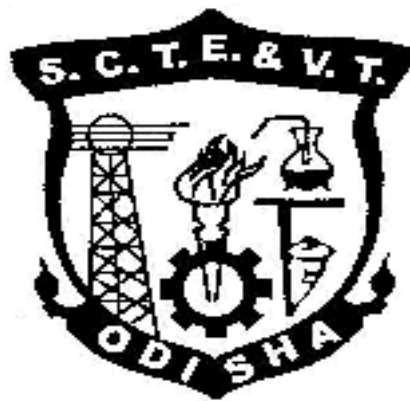
CHAPTER	TOPIC	PERIODS
1	Verify Bernoulli's Theorem	15
2	Determine rate of flow of air	15
3	Conduct Tensile test of a mild steel specimen	15
4	Determine volumetric efficiency of Air compressor	15
5	Study of 2-Stroke and 4-Stroke diesel engines	15
6	Conduct of I.C Engine Test	15
	Total	90

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-strain 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			Evaluation 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 Underground 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 curve 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 collieri 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.
 - Homotropical & Antitropical 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 SO₂ & H₂S.
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**

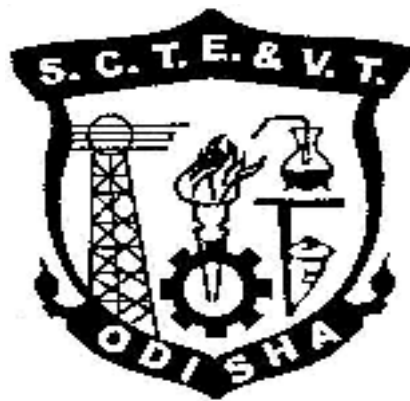
- Prepare an Electrical switch board to control two light points, one plug point, one fan point and put a required fuse.
- Study of circuit breakers (Air Circuit Breaker & Oil Circuit Breaker).
- Study of Gate End Box.
- Study of Relays (Buchholz Relay , Over Current Relay).
- Identify the different 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 and the total presentation will be approximately 10 minutes duration. There will be an interactive session between the presenter and the 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 damp, 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/O₂ ratio & CO₂/O₂ 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 Resources:		
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 Resources		
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 Resources		
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. Stopping methods.

- Classify stopping methods with application and factors affecting methods of stopping.
- Preparatory arrangement for stopping.
- Describe the following methods with layout including drilling, blasting, transportation and supports.
 - Open stopping.
 - Open stopping with pillar support.
 - Shrinkage stopping.
 - Cut & fill stopping.
 - Square set stopping.
 - 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 Resources		
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 (NO _x , H ₂ S, CO, CO ₂)	8
	Total	90

C. COURSE CONTENT.

- Estimation of CH₄ in air sample using flame safety lamp and detection by a methanometer.
 - Accumulation & percentage test of CH₄ by flame safety lamp.

- Study & use of different types of methonometer.
- Determination of CO by using CO-dectector.
- Determination of CO₂ in air sampling by CO₂ 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 (NO_x, H₂S, CO, CO₂)

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	5 th
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(5th and 6th sem). The Grouping of students, selection of Project, assignment of Project Guide to the Group shall be done in the beginning of 5th 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 5th 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.

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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
		<i>Total</i>	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				
		<i>Total</i>			23	150	200		350
		Grand Total	16		23	230	520		750

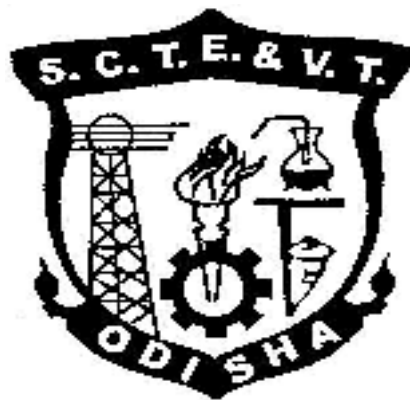
Abbreviations: L-Lecturer, T-Tutorial, P-Practical. Each class is of minimum 55 minutes duration

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. Flotation**
 - 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 Spherical 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 photogrammetry.
- Define vertical photograph, Tilted Photograph, Oblique photograph, Prospective projection, Exposure station, Flying height focal length, Principal Point, Nadir Point, Ground Nadir Point, Tilt, 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	Megascope identification of Igneous rocks	15
2	Megascope identification of Sedimentary rocks	15
3	Megascope 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

- Megascope identification of Igneous rocks in hand specimens.
- Megascope identification of Sedimentary rocks in hand specimens.
- Megascope 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:

SI. 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 the 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 tray 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 tray 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 tray 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

			<p>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 $w / (w - w')$.</p>	
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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 conveyer	1
8	Working model of scrapper loader.	1
9	Working model of Gathering arm loader.	1
10	Electric Coal Drill.	1



No. 1567 Date. 24/9/2021

To

The Principals of all Polytechnics & PDIS Institutions

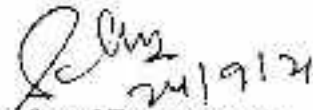
Sub: Academic Calendar for 2021-22

Sir,

With reference to the above subject, I am to enclose herewith the Academic Calendar for 2021-22 session with due approval from DTE&T, Odisha vide letter No. 10017 dt.23.9.2021 of Dy. Director(TT) for further action at your end. The Academic Calendar is subject to last minute change upon instructions from AICTE/Govt.

Yours faithfully

Encl: as above


24/9/21
Controller of Examinations

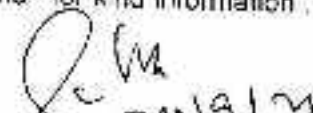
Memo No. 1568 Date 24/9/2021

Copy to DTE&T, Odisha, Cuttack for kind information.


24/9/21
Controller of Examinations

Memo No. 1569 Date 24/9/2021

Copy to Additional Secretary, SD&TE Department, Govt. of Odisha for kind information.


24/9/21
Controller of Examinations

ACADEMIC CALENDAR of Diploma and PDIS courses for the Session 2021-22

Sl.No	Activity	1 st Semester	3 rd /5 th /7 th (PT) Semester
1	Induction Programme for 1 st semester Diploma Courses & Coverage of Bridge Course	8.10.2021	-
2	Commencement of Semester Classes	25.10.2021 (PDIS course 16.11.2021)	1.10.2021
3	Readmission at Institute Level	-	1.10.2021 to 16.10.2021
4	Reporting Readmission Data to SCTEVT online	-	18.10.2021 to 25.10.2021
5	Puja Holidays	11.10.2021 to 18.10.2021	11.10.2021 to 18.10.2021
6	Issue of SCTE&VT Registration Numbers	15.12.2021	1.12.2021(3 rd sem LE students)
7	Semester Exams Registration(Regular students)	4th week of Dec. 2021	2nd week of Dec. 2021
8	Internal Assessment for 1 st , 3 rd & 5th Sem (Last date)	1st week of Jan. 2022	1st week of Dec. 2021
9	Closing of Attendance	31.1.2022	8.1.2022
10	X'Mas Holidays	-	-
11	Tentative Date of Semester Examination	8.2.2022	18.1.2022
Sl.No	Activity	2nd Semester	4 th /6 th /8 th (PT) Semester
12	Commencement of Classes	24.2.2022	3.2.2022
13	Readmission	24.2.2022 to 7.3.2022	3.2.22 to 17.2.2022
14	Reporting Readmission Data to SCTEVT online	8.3.22 to 15.3.2022	18.2.22 to 25.2.2022
15	Semester Exams Registration(Regular students)	2nd week of April 2022	4th week of March 2022
16	Internal Assessment	3rd week of April 2022	3rd week of March 2021
17	Closing of Attendance	24.5.2022	30.4.2021
18	Branch Change of 2 nd sem. Students by Principals	Up to 31.3.2022	-
19	Reporting Branch Change case to SCTE&VT online	2.4.2022 to 9.4.2022	-
20	Tentative Date of Semester Examination	5.6.2022	8.5.2022
21	Tentative Date of Publication of Results	31.8.2022	31.7.2022
22	Internship and Summer Break for Students	18.6.2022 to 30.6.2022	1.6.2022 to 30.6.22
23	Tentative date for starting of next Session	-	1/7/2022

- There shall be 39 periods of class per week and each of minimum 55 minutes duration for all semesters.
- Principals are to arrange extra classes during Holidays and Off hours, wherever necessary, to complete the syllabus in time.
- Annual Athletic Meet, Annual Cultural Meet may be conducted subject to Covid restriction.
- 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 subject to covid restriction.
- Activities of Academic Calendar are subject to last minute change due to Covid19 Pandemic restrictions of Govt and/or instructions from AICTE and other contingencies.
- Online Mode of Classes may be adopted during the period for which Physical mode of classes are restricted by Govt. due to Covid19 Pandemic.

[Signature]
24/19

PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY, CHHENDIPADA, ANGUL

NO. PCIET/Acad/1430/2020

DATE 22-08-2020


ONLINE CLASSES TIME TABLE FOR 1ST SEM (CIVIL/ MECHANICAL ENGINEERING) FOR THE SESSION 2020-21 W.E.F. DT. 09/11/2020

SECTION : A & B (COMBINED)

DAYS	09.15 A.M. – 10.10 A.M. (1ST)	10.10 A.M. – 11.05 A.M. (2ND)	11.05 A.M. – 12.00 NOON (3RD)	12.00 NOON – 12.55 P.M. (4TH)	12.55 P.M. – 01.25 P.M.	01.25 P.M. – 02.20 P.M. (5TH)	02.20 P.M. – 03.15 P.M. (6TH)	03.15 P.M. – 04.10 P.M. (7TH)
MONDAY	COMPUTER APPLICATION (ASWINI KUMAR PRADHAN)	ENGINEERING PHYSICS (DOLAGOBIND SAHOO)	ENGINEERING MATHEMATICS-I (KSHIRA MOHAN BEHERA)	BASIC ELECTRICAL & ELECTRONICS ENGG. (SASWATI SANGHAMITRA PRADHAN)	R E C E S S	COMPUTER APPLICATION LAB (SECTION : A & B) (ASWINI KUMAR PRADHAN / SUPRAVA PRADHAN / KUSUMA MANJARI BISWAL)		
TUESDAY	COMPUTER APPLICATION (ASWINI KUMAR PRADHAN)	ENGINEERING PHYSICS (DOLAGOBIND SAHOO)	ENGINEERING MATHEMATICS-I (KSHIRA MOHAN BEHERA)	BASIC ELECTRICAL & ELECTRONICS ENGG. (SASWATI SANGHAMITRA PRADHAN)		ENGINEERING PHYSICS PRACTICAL (SECTION : A & B) (DOLAGOBIND SAHOO / BISWAJIT SAHOO)		
WEDNESDAY	COMPUTER APPLICATION (ASWINI KUMAR PRADHAN)	ENGINEERING PHYSICS (DOLAGOBIND SAHOO)	ENGINEERING MATHEMATICS-I (KSHIRA MOHAN BEHERA)	BASIC ELECTRICAL & ELECTRONICS ENGG. (SASWATI SANGHAMITRA PRADHAN)		ENGINEERING DRAWING PRACTICAL (SECTION : A & B) (SUJATA DALEI / SWARNAPRAVA PARIDA / NANDINI PRADHAN)		
THURSDAY	ENGINEERING PHYSICS (BISWAJIT SAHOO)	ENGINEERING MATHEMATICS-I (DR. B.K. SAHOO)	COMPUTER APPLICATION (JYOTIRMAYEE PRADHAN)	BASIC ELECTRICAL & ELECTRONICS ENGG. (BIJAYA KUMAR BEHERA)		ENGINEERING PHYSICS PRACTICAL (CIVIL & MECH. – SECTION : A & B) (DOLAGOBIND SAHOO / BISWAJIT SAHOO)	STUDENTS-CENTRED ACTIVITIES (SCA) (BISWAJIT SAHOO / TAPAN KUMAR SAHOO)	
FRIDAY	ENGINEERING PHYSICS (BISWAJIT SAHOO)	ENGINEERING MATHEMATICS-I (DR. B.K. SAHOO)	COMPUTER APPLICATION (JYOTIRMAYEE PRADHAN)	BASIC ELECTRICAL & ELECTRONICS ENGG. (BIJAYA KUMAR BEHERA)		ENGINEERING DRAWING PRACTICAL (SECTION : A & B) (SUJATA DALEI / SWARNAPRAVA PARIDA / NANDINI PRADHAN)		
SATURDAY	COMPUTER APPLICATION LAB (SECTION : A & B) (ASWINI KUMAR PRADHAN / SUPRAVA PRADHAN)		SEMINAR (SUBHENDU KUMAR PARI / ANUPAMA BEHERA)					

GROUP : SECTION (A) CIVIL : REGD. NO. : F2000001001 TO F2000011003
SECTION (B) MECHANICAL : REGD. NO. : F20000054001 TO F20000054101

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PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY, CHHENDIPADA, ANGUL

NO. PC/ET/ Acad/ 1430/ 2020

DATE 22-08-2020

ONLINE CLASSES TIME TABLE FOR 1ST SEM (ELECTRICAL / MINING ENGINEERING) FOR THE SESSION 2020-21 W.E.F. DT. 09/11/2020

SECTION : C & D (COMBINED)

DAYS	09.15 A.M. – 10.10 A.M. (1ST)	10.10 A.M. – 11.05 A.M. (2ND)	11.05 A.M. – 12.00 NOON (3RD)	12.00 NOON – 12.55 P.M. (4TH)	12.55 P.M. – 01.25 P.M.	01.25 P.M. – 02.20 P.M. (5TH)	02.20 P.M. – 03.15 P.M. (6TH)	03.15 P.M. – 04.10 P.M. (7TH)
MONDAY	ENGINEERING CHEMISTRY (TAPAN KUMAR SAHU)	COMMUNICATIVE ENGLISH (SUBHENDU KUMAR PANI)	BASIC ELECTRICAL & ELECTRONICS ENGG. (SUBHASHREE PRADHAN)	ENGINEERING MATHEMATICS – I (KSHIRA MOHAN BEHRA)	R E C E S S	COMMUNICATIVE ENGLISH LAB. (SECTION : C & D) (SUBHENDU KUMAR PANI / SIDHESWAR DASH)		
TUESDAY	ENGINEERING CHEMISTRY (TAPAN KUMAR SAHU)	COMMUNICATIVE ENGLISH (SUBHENDU KUMAR PANI)	BASIC ELECTRICAL & ELECTRONICS ENGG. (SUBHASHREE PRADHAN)	ENGINEERING MATHEMATICS – I (KSHIRA MOHAN BEHRA)		ENGINEERING CHEMISTRY LAB. (SECTION : C & D) (TAPAN KUMAR SAHU / ABHIPSA PRIYADARSINI)		
WEDNESDAY	ENGINEERING CHEMISTRY (TAPAN KUMAR SAHU)	COMMUNICATIVE ENGLISH (SUBHENDU KUMAR PANI)	BASIC ELECTRICAL & ELECTRONICS ENGG. (SUBHASHREE PRADHAN)	ENGINEERING MATHEMATICS – I (KSHIRA MOHAN BEHRA)		WORKSHOP PRACTICE (SECTION : C & D) (GOURI SANKAR PRADHAN / LAKIN KUMAR SAHOO)		
THURSDAY	COMMUNICATIVE ENGLISH (SUBHENDU KUMAR PANI)	ENGINEERING CHEMISTRY (ABHIPSA PRIYADARSINI)	ENGINEERING MATHEMATICS – I (KSHIRA MOHAN BEHRA)	BASIC ELECTRICAL & ELECTRONICS ENGG. (RANDEEP PRADHAN)		ENGINEERING CHEMISTRY LAB. (SECTION : C & D) (TAPAN KUMAR SAHU / ABHIPSA PRIYADARSINI)	STUDENTS CENTRED ACTIVITIES (SCA) (ABHIPSA PRIYADARSINI/ BISWAJIT SAHOO)	
FRIDAY	COMMUNICATIVE ENGLISH (SUBHENDU KUMAR PANI)	ENGINEERING CHEMISTRY (ABHIPSA PRIYADARSINI)	ENGINEERING MATHEMATICS – I (KSHIRA MOHAN BEHRA)	BASIC ELECTRICAL & ELECTRONICS ENGG. (RANDEEP PRADHAN)		WORKSHOP PRACTICE (SECTION : C & D) (GOURI SANKAR PRADHAN / LAKIN KUMAR SAHOO)		
SATURDAY	SEMINAR (ASWINI KUMAR PRADHAN / BISWAJIT SAHOO)		COMMUNICATIVE ENGLISH LAB. (SECTION : C & D) (SUBHENDU KUMAR PANI / SIDHESWAR DASH)					

GROUP : SECTION (C) ELECTRICAL : REGD. NO. : F20060002001 TO F20060002102
SECTION (D) MINING : REGD. NO. : F20060010001 TO F20060010099

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NO. PCIEE/ESTT/1713/2021

DATE - 22-04-2021

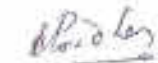
ONLINE CLASSES TIME TABLE FOR 2ND SEM (CIVIL / MECHANICAL ENGINEERING) FOR THE SESSION 2020-21 W.E.F. DT. 28/04/2021

SECTION : A & B (COMBINED)

DAYS	09.15 A.M. – 10.10 A.M. (1ST)	10.10 A.M. – 11.05 A.M. (2ND)	11.05 A.M. – 12.00 NOON (3RD)	12.00 NOON – 12.55 P.M. (4TH)	12.55 P.M. – 01.25 P.M.	01.25 P.M. – 02.20 P.M. (5TH)	02.20 P.M. – 03.15 P.M. (6TH)	03.15 P.M. – 04.10 P.M. (7TH)
MONDAY	ENGINEERING CHEMISTRY (TAPAN KUMAR SAHU)	ENGINEERING MECHANICS (DEWAN KUMAR SAHU)	ENGINEERING MATHEMATICS – II (KSHIRA MOHAN BEHERA)	COMMUNICATIVE ENGLISH (BISMITA PANI)	R E C E S S	COMMUNICATIVE ENGLISH LAB (SECTION : A & B) (SUBHENDU KUMAR PANI / SIDHESWAR DASH)		
TUESDAY	ENGINEERING CHEMISTRY (TAPAN KUMAR SAHU)	ENGINEERING MECHANICS (DEWAN KUMAR SAHU)	ENGINEERING MATHEMATICS – II (KSHIRA MOHAN BEHERA)	COMMUNICATIVE ENGLISH (BISMITA PANI)		ENGINEERING CHEMISTRY LAB (SECTION : A & B) (TAPAN KUMAR SAHU / ABHIPSA PRIYADARSINI)		
WEDNESDAY	ENGINEERING CHEMISTRY (TAPAN KUMAR SAHU)	ENGINEERING MECHANICS (DEWAN KUMAR SAHU)	ENGINEERING MATHEMATICS – II (KSHIRA MOHAN BEHERA)	COMMUNICATIVE ENGLISH (SUBHENDU KUMAR PANI)		WORKSHOP PRACTICE (SECTION : A & B) (GOURI SANKAR PRADHAN / LAKIN KUMAR SAHOO)		
THURSDAY	COMMUNICATIVE ENGLISH (SUBHENDU KUMAR PANI)	ENGINEERING MECHANICS (BIKASH RANJAN SAHU)	ENGINEERING MATHEMATICS – II (KSHIRA MOHAN BEHERA)	ENGINEERING CHEMISTRY (ABHIPSA PRIYADARSINI)		COMMUNICATIVE ENGLISH LAB (SECTION : A & B) (SUBHENDU KUMAR PANI / SIDHESWAR DASH)	STUDENTS CENTRED ACTIVITIES (SCA) TAPAN KUMAR SAHU / ABHIPSA PRIYADARSINI	
FRIDAY	COMMUNICATIVE ENGLISH (SUBHENDU KUMAR PANI)	ENGINEERING MECHANICS (BIKASH RANJAN SAHU)	ENGINEERING MATHEMATICS – II (KSHIRA MOHAN BEHERA)	ENGINEERING CHEMISTRY (ABHIPSA PRIYADARSINI)		WORKSHOP PRACTICE (SECTION : A & B) (GOURI SANKAR PRADHAN / LAKIN KUMAR SAHOO)		
SATURDAY	ENGINEERING CHEMISTRY LAB (CIVIL & MECHANICAL – SECTION : A & B) (TAPAN KUMAR SAHU / ABHIPSA PRIYADARSINI)		SEMINAR (SECTION : A & B) (SUBHENDU KUMAR PANI / SIDHESWAR DASH / ASWINI KUMAR PRADHAN)					

GROUP : SECTION (A) CIVIL - REGD. NO. - F20060001001 TO F20060001063
SECTION (B) MECHANICAL - REGD. NO. - F20060004001 TO F20060004101

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NO. PCIE7/E11+/1712/21B1

DATE 22-04-2021


ONLINE CLASSES TIME TABLE FOR 2ND SEM (ELECTRICAL / MINING ENGINEERING) FOR THE SESSION 2020-21 W.E.F. DT. 28/04/2021

SECTION : C & D (COMBINED)

DAYS	09.15 A.M. – 10.10 A.M. (1ST)	10.10 A.M. – 11.05 A.M. (2ND)	11.05 A.M. – 12.00 NOON (3RD)	12.00 NOON – 12.55 P.M. (4TH)	12.55 P.M. – 01.25 P.M.	01.25 P.M. – 02.20 P.M. (5TH)	02.20 P.M. – 03.15 P.M. (6TH)	03.15 P.M. – 04.10 P.M. (7TH)	
MONDAY	ENGINEERING MATHEMATICS – II (KSHIRA MOHAN BEHERA)	COMPUTER APPLICATION (ASWINI KUMAR PRADHAN)	ENGINEERING MECHANICS (TARANISEN MOHANTY)	ENGINEERING PHYSICS (DOLAGOBIND SAHOO)	R E C E S S	COMPUTER APPLICATION LAB (SECTION – C & D) (ASWINI KUMAR PRADHAN / SUPRAVA PRADHAN)			
TUESDAY	ENGINEERING MATHEMATICS – II (KSHIRA MOHAN BEHERA)	COMPUTER APPLICATION (ASWINI KUMAR PRADHAN)	ENGINEERING MECHANICS (TARANISEN MOHANTY)	ENGINEERING PHYSICS (DOLAGOBIND SAHOO)		ENGINEERING PHYSICS PRACTICE (SECTION – C & D) (DOLAGOBIND SAHOO / BISWAJIT SAHOO)			
WEDNESDAY	ENGINEERING MATHEMATICS – II (KSHIRA MOHAN BEHERA)	COMPUTER APPLICATION (ASWINI KUMAR PRADHAN)	ENGINEERING MECHANICS (TARANISEN MOHANTY)	ENGINEERING PHYSICS (DOLAGOBIND SAHOO)		ENGINEERING DRAWING PRACTICAL (SECTION – C & D) (SUJATA DALEI / NANDINI PRADHAN)			
THURSDAY	ENGINEERING MATHEMATICS – II (KSHIRA MOHAN BEHERA)	COMPUTER APPLICATION (JYOTIRMAYEE PRADHAN)	ENGINEERING PHYSICS (BISWAJIT SAHOO)	ENGINEERING MECHANICS (TARANISEN MOHANTY)		COMPUTER APPLICATION LAB (SECTION – C & D) (ASWINI KUMAR PRADHAN / SUPRAVA PRADHAN)	STUDENTS CENTRED ACTIVITIES (SCA) BISWAJIT SAHOO / TAPAN KUMAR SAHU		
FRIDAY	ENGINEERING MATHEMATICS – II (KSHIRA MOHAN BEHERA)	COMPUTER APPLICATION (JYOTIRMAYEE PRADHAN)	ENGINEERING PHYSICS (BISWAJIT SAHOO)	ENGINEERING MECHANICS (TARANISEN MOHANTY)		ENGINEERING DRAWING PRACTICAL (SECTION – C & D) (SWARNAPRAVA PARIDA / NANDINI PRADHAN)			
SATURDAY	ENGINEERING PHYSICS PRACTICAL (SECTION – C & D) (DOLAGOBIND SAHOO / BISWAJIT SAHOO)		SEMINAR (SUBHENDU KUMAR PANI / ASWINI KUMAR PRADHAN)						

GROUP : SECTION (C) ELECTRICAL : REGD. NO. : F2000002001 TO F20066662102
SECTION (D) MINING : REGD. NO. : F2000010001 TO F20066610096

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PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY, CHHENDIPADA, ANGUL

NO. PCIEE/Acad/1430/2020

DATE 22-08-2020

ONLINE CLASSES TIME TABLE FOR 3RD SEM (CIVIL ENGINEERING) FOR THE SESSION 2020-21 W.E.F. DT. 12/08/2020 / REVISED DT. 01.09.2020

DAYS	09.15 A.M. – 10.10 A.M. (1ST)	10.10 A.M. – 11.05 A.M. (2ND)	11.05 A.M. – 12.00 NOON (3RD)	12.00 NOON – 12.55 P.M. (4TH)	12.55 P.M. – 01.25 P.M.	01.25 P.M. – 02.20 P.M. (5TH)	02.20 P.M. – 03.15 P.M. (6TH)	03.15 P.M. – 04.10 P.M. (7TH)
MONDAY	STRUCTURAL MECHANICS (SUNIL KU. SAHU)	GEOTECHNICAL ENGINEERING (SIBANI SAHU)	BUILDING MATERIALS & CONSTRUCTION TECHNOLOGY (SUJATA DALEI)	ESTIMATION & COST EVALUATION-I (SATYA NARAYAN MOHANTY)	R E C E S S	CIVIL ENGG. DRAWING – I (C1 & C2) (SUJATA DALEIPRITAM SAGAR SAHOO)		
TUESDAY	BUILDING MATERIALS & CONSTRUCTION TECHNOLOGY (BABITA SAHU)	ENVIRONMENTAL STUDIES (NANDINI PRADHAN)	GEOTECHNICAL ENGINEERING (SIBANI SAHU)	ESTIMATION & COST EVALUATION-I (SUNIL KUMAR SAHU)		ESTIMATION PRACTICE – I (COMPUTER AIDED) (SWARNAPRAVA PARIDA / SATYA NARAYAN MOHANTY)		
WEDNESDAY	ENVIRONMENTAL STUDIES (NANDINI PRADHAN)	STRUCTURAL MECHANICS (PRITAM SAGAR SAHOO)	ESTIMATION & COST EVALUATION-I (SUNIL KUMAR SAHU)	BUILDING MATERIALS & CONSTRUCTION TECHNOLOGY (SUJATA DALEI)		CIVIL ENGINEERING LAB – I (C1 & C2) (BABITA SAHU / NANDINI PRADHAN)		
THURSDAY	GEOTECHNICAL ENGINEERING (SIBANI SAHU)	STRUCTURAL MECHANICS (SUNIL KUMAR SAHU)	ENVIRONMENTAL STUDIES (NANDINI PRADHAN)	ESTIMATION & COST EVALUATION-I (SATYA NARAYAN MOHANTY)		CIVIL ENGG. DRAWING – I (C1 & C2) (SIBANI SAHU / PRITAM SAGAR SAHOO)		
FRIDAY	BUILDING MATERIALS & CONSTRUCTION TECHNOLOGY (SUJATA DALEI)	STRUCTURAL MECHANICS (PRITAM SAGAR SAHOO)	GEOTECHNICAL ENGINEERING (SIBANI SAHU)	ENVIRONMENTAL STUDIES (SATYA NARAYAN MOHANTY)		CIVIL ENGINEERING LAB – I (C1 & C2) (SIBANI SAHU / NANDINI PRADHAN)		
SATURDAY	STRUCTURAL MECHANICS (SUNIL KUMAR SAHU)	BUILDING MATERIALS & CONSTRUCTION TECHNOLOGY (BABITA SAHU)	STUDENTS CENTRED ACTIVITIES(SCA) (SWARNAPRAVA PARIDA/SATYABRATA DEHURY/ SUMITRA DEHURY)					

GROUP C1-(Civil Regd. No.): F19060001001 TO F19060001035
C2-(Civil Regd. No.): F19060001036 TO F19060001063 & L20060001001 TO 1006

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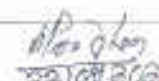
NO. PCIE7/Acad/1430/2020

DATE: 22-08-2020

ONLINE CLASSES TIME TABLE FOR 3RD SEM (ELECTRICAL ENGINEERING) FOR THE SESSION 2020-21 W.E.F. DT. 12/08/2020 / REVISED DT. 01.09.2020

DAYS	SECTION	09.15 A.M. – 10.10 A.M. (1ST)	10.15 A.M. – 11.05 A.M. (2ND)	11.55 A.M. – 12.00 NOON (3RD)	12.00 NOON – 12.55 P.M. (4TH)	12.55 P.M. – 01.25 P.M.	01.25 P.M. – 02.20 P.M. (5TH)	02.20 P.M. – 03.15 P.M. (6TH)	03.15 P.M. – 04.10 P.M. (7TH)
MONDAY	EA & EB	CIRCUIT & NETWORK THEORY (SASWATI SANGHAMITRA PRADHAN)	ENVIRONMENTAL STUDIES (BISWARANJAN JENA)	ENGG. MATH. – III (KSHIRA MOHAN BEHERA)	ELEMENT OF MECHANICAL ENGG. (SUBODHAKANTA GARNAIK)	R E C E S S	MECHANICAL ENGG. LAB (EA & EB) (SUBODHAKANTA GARNAIK / LAKIN SAHU / MADAN MOHAN DEHURY)		
TUESDAY	EA & EB	ELECTRICAL ENGG. MATERIAL (SUBHASHREE PRADHAN)	ENGG. MATH. – III (KSHIRA MOHAN BEHERA)	CIRCUIT & NETWORK THEORY (RANDEEP PRADHAN)	ENVIRONMENTAL STUDIES (ANUPAMA BEHERA)		CIRCUIT & SIMULATION LAB (EA1 & EB) (RANDEEP PRADHAN / RAMESH CHANDRA PRADHAN)		
WEDNESDAY	EA & EB	ENGG. MATH. – III (KSHIRA MOHAN BEHERA)	CIRCUIT & NETWORK THEORY (SASWATI SANGHAMITRA PRADHAN)	ELEMENT OF MECHANICAL ENGG. (MADAN MOHAN DEHURY)	ELECTRICAL ENGG. MATERIAL (SUGYANI SAHOO)		MECHANICAL WORKSHOP (EA & EB) (DEEPAK KUMAR BISWAL / GOURI SANKAR PRADHAN / KRUSHNA CH. SAHU)		
THURSDAY	EA & EB	CIRCUIT & NETWORK THEORY (SASWATI SANGHAMITRA PRADHAN)	ENGG. MATH. – III (KSHIRA MOHAN BEHERA)	ELECTRICAL ENGG. MATERIAL (SUBHASHREE PRADHAN)	ENVIRONMENTAL STUDIES (JAMIT KU. BEHERA)		MECHANICAL WORKSHOP (EA & EB) (GOURI SANKAR PRADHAN / DEEPAK KUMAR BISWAL / SANATAN SAHU)		
FRIDAY	EA & EB	ELEMENT OF MECHANICAL ENGG. (SUBODHAKANTA GARNAIK)	ENVIRONMENTAL STUDIES (BISWARANJAN JENA)	ELECTRICAL ENGG. MATERIAL (SUGYANI SAHOO)	CIRCUIT & NETWORK THEORY (RANDEEP PRADHAN)		CIRCUIT & SIMULATION LAB (EA & EB) (RAMESH CHANDRA PRADHAN / SAKTIDATTA PRADHAN)		
SATURDAY	EA & EB	ELEMENT OF MECHANICAL ENGG. (MADAN MOHAN DEHURY)	STUDENT CENTRED ACTIVITIES (SCA) (EA & EB) (SUBHASHREE PRADHAN / SUSHIL SAHU / SATYA NARAYAN SAHU / SASWATI SANGHAMITRA PRADHAN)						

*SECTION GROUPINGS: (EA1) Elect. Regd. No. F19050002991 TO 2029, 2031 TO 2033
 (EA2) Elect. Regd. No. F19050002034 TO 2064
 (EB1) Elect. Regd. No. F19050002065 TO 2100
 (EB2) Elect. Regd. No. F19050002101 TO 2125 & L20000002001 TO 2012


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NO. PCJET/AC09/1430/2020

DATE 22-08-2020

ONLINE CLASSES TIME TABLE FOR 3RD SEM (MECHANICAL ENGINEERING) FOR THE SESSION 2020-21 W.E.F. DT. 12/08/2020 / REVISED DT. 01.09.2020

DAYS	SECTION	09.15 A.M. – 10.10 A.M. (1ST)	10.10 A.M. – 11.05 A.M. (2ND)	11.05 A.M. – 12.00 NOON (3RD)	12.00 NOON – 12.55 P.M. (4TH)	12.55 P.M. – 01.25 P.M.	01.25 P.M. – 02.20 P.M. (5TH)	02.20 P.M. – 03.15 P.M. (6TH)	03.15 P.M. – 04.10 P.M. (7TH)
MONDAY	MA & MB	ENGINEERING MATERIAL (TARANISEN MOHANTY)	THERMAL ENGINEERING – I (JAYANANDA DEHURY)	PRODUCTION TECHNOLOGY (DIPAK BISWAL)	STRENGTH OF MATERIAL (SUBODHAKANTA GARNAIK)	R E C E S S	MECHANICAL ENGG. DRAWING (MA & MB) HIMANSU SEKHAR SAMAL / BISHNU CHARANA BEHERA		
TUESDAY	MA & MB	ENGINEERING MATERIAL (MANAS RANJAN BEHERA)	ENVIRONMENTAL STUDIES (BIKASH RANJAN SAHU)	PRODUCTION TECHNOLOGY (DEEPAK KUMAR BISWAL)	STRENGTH OF MATERIAL (RASABHARI SAHU)		WORKSHOP – II (MA & MB) (GOURI SANKAR PRADHAN / LAKIN KUMAR SAHU / SANATAN SAHU)		
WEDNESDAY	MA & MB	STRENGTH OF MATERIAL (SUBODHAKANTA GARNAIK)	THERMAL ENGINEERING – I (BIKASH RANJAN SAHU)	ENVIRONMENTAL STUDIES (DEJILINE SAHOO)	ENGINEERING MATERIAL (MANAS RANJAN BEHERA)		MECHANICAL ENGG. LAB (MA & MB) (SUBODHAKANTA GARNAIK / GOURI SANKAR PRADHAN / GOBINDA BARIK)		
THURSDAY	MA & MB	THERMAL ENGINEERING-I (JAYANANDA DEHURY)	PRODUCTION TECHNOLOGY (TARANISEN MOHANTY)	STRENGTH OF MATERIAL (SUBODHAKANTA GARNAIK)	ENGINEERING MATERIAL (TARANISEN MOHANTY)		STUDENT CENTRED ACTIVITIES (SCA) (MA & MB) (BIKASH RANJAN SAHU / MADAN MOHAN DEHURY / GOURI SANKAR PRADHAN)		
FRIDAY	MA & MB	THERMAL ENGINEERING-I (BIKASH RANJAN SAHU)	ENVIRONMENTAL STUDIES (DEJILINE SAHOO)	STRENGTH OF MATERIAL (RASABHARI SAHU)	PRODUCTION TECHNOLOGY (DEEPAK KUMAR BISWAL)		WORKSHOP – II (MA & MB) (GOURI SANKAR PRADHAN / LAKIN KUMAR SAHU / SANATAN SAHU)		
SATURDAY	MA & MB	ENVIRONMENTAL STUDIES (BIKASH RANJAN SAHU)	MECH. ENGG. DRAWING (MA & MB) (TARANISEN MOHANTY / HIMANSU SEKHAR SAMAL)						

SECTION GROUPINGS

(MA1) Mech. Regd. No.	...	F19050004001 TO 4031
(MA2) Mech. Regd. No.	...	F19050004032 TO 4081
(MB1) Mech. Regd. No.	...	F19050004082 TO 4087, 4089, 4090, 4092 TO 4100
(MB2) Mech. Regd. No.	...	F19050004101 TO 4113, 4115 TO 4123, 4125, 4126 & L20050004001 TO 4013

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NO. PCIEE/Acad/1430/2020

DATE 22-08-2020

ONLINE CLASSES TIME TABLE FOR 3RD SEM (MINING ENGINEERING) FOR THE SESSION 2020-21 W.E.F. DT. 12/08/2020 / REVISED DT. 01/09/2020

DAYS	SECTION	09.15 A.M. – 10.15 A.M. (1ST)	10.10 A.M. – 11.05 A.M. (2ND)	11.05 A.M. – 12.00 NOON (3RD)	12.00 NOON – 12.55 P.M. (4TH)	12.55 P.M. – 01.25 P.M.	01.25 P.M. – 02.20 P.M. (5TH)	02.20 P.M. – 03.15 P.M. (6TH)	03.15 P.M. – 04.10 P.M. (7TH)
MONDAY	MNA & MNB	SURFACE MINING TECHNOLOGY (ANANDA KU. PADHAN)	MECHANICAL OPERATION IN MINES (RASABIHARI SAHU)	MINE GEOLOGY – I (SATYABRATA SAHOO)	ENVIRONMENTAL STUDIES (DILLIP KUMAR DEHURY)	R E C E S S	MINE SURVEY – I LAB (MNA & MNB) (ALOK KU. MAHAPATRA/PRANAYA KU. BEHERA)		
TUESDAY	MNA & MNB	MECHANICAL OPERATION IN MINES (RASABIHARI SAHU)	ENVIRONMENTAL STUDIES (PRABINA KUMAR SAHOO)	MINE SURVEY – I (PRANAYA KUMAR BEHERA)	SURFACE MINING TECHNOLOGY (ALOK KUMAR MAHAPATRA)		MINE GEOLOGY – I LAB (MNA & MNB) (ANANDA KU. PADHAN/PRATYUSH ROUT)		
WEDNESDAY	MNA & MNB	ENVIRONMENTAL STUDIES (DILLIP KUMAR DEHURY)	MINE SURVEY – I (ALOK KUMAR MAHAPATRA)	MECHANICAL OPERATION IN MINES (JAYANANDA DEHURY)	MINE GEOLOGY – I (ANANDA KUMAR PADHAN)		MECHANICAL OPERATION IN MINES LAB (MNA & MNB) (DILLIP KUMAR DEHURY / GOBINDA CHANDRA SETHY)		
THURSDAY	MNA & MNB	MINE SURVEY – I (ALOK KUMAR MAHAPATRA)	SURFACE MINING TECHNOLOGY (ANANDA KUMAR PADHAN)	MINE GEOLOGY – I (SATYABRATA SAHU)	ENVIRONMENTAL STUDIES (PRABINA KUMAR SAHOO)		MECHANICAL OPERATION IN MINES LAB (MNA & MNB) (GOBINDA CHANDRA SETHY / DURGA PRASAD SAHU)		
FRIDAY	MNA & MNB	MINE GEOLOGY – I (ANANDA KUMAR PADHAN)	SURFACE MINING TECHNOLOGY (ALOK KUMAR MAHAPATRA)	MECHANICAL OPERATION IN MINES (JAYANANDA DEHURY)	MINE SURVEY – I (PRANAYA KUMAR BEHERA)		MINE SURVEY – I LAB (MNA & MNB) (ANANDA KUMAR PADHAN / ALOK KUMAR MAHAPATRA)		
SATURDAY	MNA & MNB	MINE GEOLOGY – I LAB. (MNA & MNB) (SATYABRATA SAHU / PRATYUSH ROUT)			STUDENT CENTRED ACTIVITIES (SCA) (LIPUN DEHURY / DURGA PRASAD SAHU / SRINATH SWAIN)				

SECTION GROUPINGS

(MNA) Mining Regd. No
(MNA2) Mining Regd. No
(MNB1) Mining Regd. No
(MNB2) Mining Regd. No

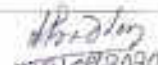
F19060010001 TO 10031

F19060010032 TO 10037, 10038 TO 10063

F19060010064 TO 10096, 10098 TO 10099, 10097, 10098

F19060010099 TO 10108, 10108 TO 10121, 10123 TO 10126 & L20060010001 TO 10074

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NO. PC1ET/EST/1712/2021

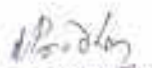
DATE 22-04-2021

ONLINE CLASSES TIME TABLE FOR 4TH SEM (CIVIL ENGINEERING) FOR THE SESSION 2020-21 W.E.F. DT. 15/04/2021

DAYS	09.15 A.M. – 10.10 A.M. (1ST)	10.10 A.M. – 11.05 A.M. (2ND)	11.05 A.M. – 12.00 NOON (3RD)	12.00 NOON – 12.55 P.M. (4TH)	12.55 P.M. – 01.25 P.M.	01.25 P.M. – 02.20 P.M. (5TH)	02.20 P.M. – 03.15 P.M. (6TH)	03.15 P.M. – 04.10 P.M. (7TH)
MONDAY	STRUCTURAL DESIGN-I (SUJATA DALEI)	SURVEY - I (SIBANI SAHU)	HYDRAULIC & IRRIGATION ENGG. (SWARNAPRAVA PARIDA)	HIGHWAY ENGINEERING (SUNIL KUMAR SAHU)	R E C E S S	LAND SURVEY PRACTICE - I (PR-1) (C1 & C2) SIBANI SAHU / PRITAM SAGAR SAHOO		
TUESDAY	SURVEY - I (SIBANI SAHU)	HYDRAULIC & IRRIGATION ENGG. (SWARNAPRAVA PARIDA)	HIGHWAY ENGINEERING (SUNIL KUMAR SAHU)	STRUCTURAL DESIGN-I (BABITA SAHU)		CIVIL ENGINEERING DRAWING - II (PR-2) (C1 & C2) (SUNIL KUMAR SAHU / SUJATA DALEI)		
WEDNESDAY	HYDRAULIC & IRRIGATION ENGG. (SWARNAPRAVA PARIDA)	HIGHWAY ENGINEERING (SUNIL KUMAR SAHU)	STRUCTURAL DESIGN-I (SUJATA DALEI)	SURVEY - I (PRITAM SAGAR SAHOO)		TECHNICAL SEMINAR (PR-3) (C1 & C2) (SIBANI SAHU / SUMITRA DEHURY)		
THURSDAY	STRUCTURAL DESIGN-I (BABITA SAHU)	SURVEY - I (PRITAM SAGAR SAHOO)	HYDRAULIC & IRRIGATION ENGG. (SWARNAPRAVA PARIDA)	HIGHWAY ENGINEERING (SUNIL KUMAR SAHU)		CIVIL ENGINEERING DRAWING - II (C1 & C2) (SUJATA DALEI / SWARNAPRAVA PARIDA)		
FRIDAY	SURVEY - I (SIBANI SAHU)	HYDRAULIC & IRRIGATION ENGG. (SWARNAPRAVA PARIDA)	HIGHWAY ENGINEERING (SUNIL KUMAR SAHU)	STRUCTURAL DESIGN-I (SUJATA DALEI)		LAND SURVEY PRACTICE - I (PR-1) (C1 & C2) SIBANI SAHU / SATYABRATA DEHURY		
SATURDAY	HYDRAULIC & IRRIGATION ENGG. (SWARNAPRAVA PARIDA)	HIGHWAY ENGINEERING (SUNIL KUMAR SAHU)	STRUCTURAL DESIGN-I (BABITA SAHU)	SURVEY - I (PRITAM SAGAR SAHOO)				

GROUP C1-(Civil Regd. No.) : F19950001001 TO F19950001035
 C2-(Civil Regd. No.) : F19950001036 TO F19950001063 & L20050001001 TO 1008

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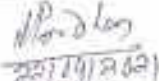
DATE: 29-04-2021

ONLINE CLASSES TIME TABLE FOR 4TH SEM (ELECTRICAL ENGINEERING) FOR THE SESSION 2020-21 W.E.F. DT. 15/04/2021

DAYS	SECTION	09.15 A.M. – 10.10 A.M. (1ST)	10.10 A.M. – 11.05 A.M. (2ND)	11.05 A.M. – 12.00 NOON (3RD)	12.00 NOON – 12.55 P.M. (4TH)	12.55 P.M. – 01.25 P.M.	01.25 P.M. – 02.20 P.M. (5TH)	02.20 P.M. – 03.15 P.M. (6TH)	03.15 P.M. – 04.10 P.M. (7TH)	
MONDAY	EA & EB	ENERGY CONVERSION-I (PRAKASH CHANDRA MOHARANA)	ELECTRICAL MEASUREMENT & MEASURING INSTRUMENTS (SASWATI SANGHAMITRA PRADHAN)	ANALOG ELECTRONICS & OP AMP (SUBHASHREE PRADHAN)	GENERATION, TRANSMISSION & DISTRIBUTION (SUSHIL SAHOO)	R E C E S S	ELECTRICAL MACHINE LAB – I (EA & EB) (PRAKASH CHANDRA MOHARANA / RAMESH CHANDRA PRADHAN)			
TUESDAY	EA & EB	ENERGY CONVERSION-I (PRAKASH CHANDRA MOHARANA)	ELECTRICAL MEASUREMENT & MEASURING INSTRUMENTS (SASWATI SANGHAMITRA PRADHAN)	ANALOG ELECTRONICS & OP AMP (SUBHASHREE PRADHAN)	GENERATION, TRANSMISSION & DISTRIBUTION (SUSHIL SAHOO)		ANALOG ELECTRONICS LAB. (EA & EB) (SAKTIDATTA PRADHAN / JYOTI PRAKASH SWAIN / SUBHASHREE PRADHAN)			
WEDNESDAY	EA & EB	ELECTRICAL MEASUREMENT & MEASURING INSTRUMENTS (SATYA NARAYAN SAHU)	ENERGY CONVERSION-I (SUGYANI SAHOO)	ANALOG ELECTRONICS & OP AMP (SUBHASHREE PRADHAN)	GENERATION, TRANSMISSION & DISTRIBUTION (SASWATI SANGHAMITRA PRADHAN)		ELECTRICAL DRAWING (EA & EB) (PRAKASH CHANDRA MOHARANA / SWADHIN KUMAR SAHOO)			
THURSDAY	EA & EB	ANALOG ELECTRONICS & OP AMP (JYOTI PRAKASH SWAIN)	ENERGY CONVERSION-I (SUGYANI SAHOO)	ELECTRICAL MEASUREMENT & MEASURING INSTRUMENTS (SATYA NARAYAN SAHU)	GENERATION, TRANSMISSION & DISTRIBUTION (SASWATI SANGHAMITRA PRADHAN)		ELECTRICAL MACHINE LAB – I (SUSHIL SAHOO / KRUTIBASA BEHERA)			
FRIDAY	EA & EB	ANALOG ELECTRONICS & OP AMP (JYOTI PRAKASH SWAIN)	ENERGY CONVERSION-I (PRAKASH CHANDRA MOHARANA)	ELECTRICAL MEASUREMENT & MEASURING INSTRUMENTS (SASWATI SANGHAMITRA PRADHAN)	GENERATION, TRANSMISSION & DISTRIBUTION (SUSHIL SAHOO)		ELECTRICAL DRAWING (EA & EB) (SWADHIN KUMAR SAHOO / KRUTIBASA BEHERA)			
SATURDAY	EA & EB	SIMULATION PRACTICE ON MAT LAB (EA & EB) (SASWATI SANGHAMITRA PRADHAN / BIJAYA KUMAR BEHERA / SUGYANI SAHOO)					STUDENTS CENTRED ACTIVITIES (SCA) (BISWARANJAN JENA / SUSHIL SAHOO)			

SECTION GROUPINGS	(EA1) Elect. Regd. No.	F19060002001 TO 2029, 2031 TO 2033
	(EA2) Elect. Regd. No.	F19060002004 TO 2004
	(EB1) Elect. Regd. No.	F19060002005 TO 2100
	(EB2) Elect. Regd. No.	F19060002101 TO 2126 & L20060002001 TO 2032

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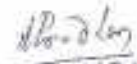
DATE - 22-04-2021

ONLINE CLASSES TIME TABLE FOR 4TH SEM (MECHANICAL ENGINEERING) FOR THE SESSION 2020-21 W.E.F. DT. 15/04/2021

DAYS	SECTION	09.15 A.M. – 10.10 A.M. (1ST)	10.10 A.M. – 11.05 A.M. (2ND)	11.05 A.M. – 12.00 NOON (3RD)	12.00 NOON – 12.55 P.M. (4TH)	12.55 P.M. – 01.25 P.M.	01.25 P.M. – 02.20 P.M. (5TH)	02.20 P.M. – 03.15 P.M. (6TH)	03.15 P.M. – 04.10 P.M. (7TH)	
MONDAY	MA & MB	THEORY OF MACHINES (TARANISEN MOHANTY)	MANUFACTURING TECHNOLOGY (SUBODHAKANTA GARNAIK)	THERMAL ENGG. – II (DEWAN KUMAR SAHU)	FLUID MECHANICS (DEJILINE SAHOO)	R E C E S S	THEORY OF MACHINES & MEASUREMENT LAB (PR-1) (MA & MB) (GOURI SANKAR PRADHAN / GOBINDA BARIK)			
TUESDAY	MA & MB	THEORY OF MACHINES (TARANISEN MOHANTY)	MANUFACTURING TECHNOLOGY (SUBODHAKANTA GARNAIK)	THERMAL ENGG. – II (DEWAN KUMAR SAHU)	FLUID MECHANICS (DEJILINE SAHOO)		MECHANICAL ENGINEERING LAB – II (PR-2) (MA & MB) (JAYANANDA DEHURY / SIPUN KUMAR SAHU)			
WEDNESDAY	MA & MB	THEORY OF MACHINES (TARANISEN MOHANTY)	MANUFACTURING TECHNOLOGY (SUBODHAKANTA GARNAIK)	THERMAL ENGG. – II (DEWAN KUMAR SAHU)	FLUID MECHANICS (DEJILINE SAHOO)		WORKSHOP – III (PR-3) (MA & MB) (GOURI SANKAR PRADHAN / DWAN KUMAR SAHU)			
THURSDAY	MA & MB	MANUFACTURING TECHNOLOGY (MADHUMITA SAHU)	FLUID MECHANICS (TARANISEN MOHANTY)	THERMAL ENGG. – II (JAYANANDA DEHURY)	THEORY OF MACHINES (SUBODHAKANTA GARNAIK)		THEORY OF MACHINES & MEASUREMENT LAB (PR-1) (MA & MB) (TARANISEN MOHANTY / GOBINDA BARIK)			
FRIDAY	MA & MB	MANUFACTURING TECHNOLOGY (MADHUMITA SAHU)	FLUID MECHANICS (TARANISEN MOHANTY)	THERMAL ENGG. – II (JAYANANDA DEHURY)	THEORY OF MACHINES (SUBODHAKANTA GARNAIK)		MECHANICAL ENGINEERING LAB – II (PR-2) (MA & MB) (SUBODHAKANTA GARNAIK / SIPUN KUMAR SAHU)			
SATURDAY	MA & MB	WORKSHOP – III (PR-3) (MA & MB) (GOURI SANKAR PRADHAN / SANATAM SAHU)			TECHNICAL SEMINAR (TARANISEN MOHANTY/ JAYANANDA DEHURY)					

SECTION GROUPINGS: (MA1) Mech. Regd. No. : F19060004001 TO 4031
 (MA2) Mech. Regd. No. : F19060004032 TO 4051
 (MB1) Mech. Regd. No. : F19060004052 TO 4081, 4083, 4090, 4092 TO 4100
 (MB2) Mech. Regd. No. : F19060004101 TO 4113, 4115 TO 4123, 4125, 4126 & L20060004001 TO 4013

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NO. PCIEET/ESTT/1712/8.21

DATE - 22-04-2021

ONLINE CLASSES TIME TABLE FOR 4TH SEM (MINING ENGINEERING) FOR THE SESSION 2020-21 W.E.F. DT. 15/04/2021

DAYS	SECTION	09.15 A.M. – 10.10 A.M. (1ST)	10.10 A.M. – 11.05 A.M. (2ND)	11.05 A.M. – 12.00 NOON (3RD)	12.00 NOON – 12.55 P.M. (4TH)	12.55 P.M. – 01.25 P.M.	01.25 P.M. – 02.20 P.M. (5TH)	02.20 P.M. – 03.15 P.M. (6TH)	03.15 P.M. – 04.10 P.M. (7TH)
MONDAY	MNA & MNB	UNDERGROUND COAL MINING (ANANDA KUMAR PADHAN)	MINE SURVEY – II (SUNIL KUMAR SAHU)	ELECTRICAL EQUIPMENTS IN MINES (RADHAKRUSHNA BHUTIA)	MINE VENTILATION (DILLIP KUMAR DEHURY)	R E C E S S	MINE SURVEY – II LAB. (MNA & MNB) (GOBINDA CHANDRA SETHY / ATISH SAHU)		
TUESDAY	MNA & MNB	UNDERGROUND COAL MINING (ANANDA KUMAR PADHAN)	MINE SURVEY – II (SUNIL KUMAR SAHU)	ELECTRICAL EQUIPMENTS IN MINES (RADHAKRUSHNA BHUTIA)	MINE VENTILATION (DILLIP KUMAR DEHURY)		MINE VENTILATION LAB. (MNA & MNB) (DILLIP KUMAR DEHURY / ANANDA KUMAR PADHAN)		
WEDNESDAY	MNA & MNB	UNDERGROUND COAL MINING (ANANDA KUMAR PADHAN)	MINE SURVEY – II (ALOK KUMAR MAHAPATRA)	ELECTRICAL EQUIPMENTS IN MINES (PRATYUSH ROUT)	MINE VENTILATION (SUNIL KUMAR SAHU)		ELECTRICAL EQUIPMENTS IN MINES (RADHAKRUSHNA BHUTIA / PRANAYA KUMAR BEHERA)		
THURSDAY	MNA & MNB	UNDERGROUND COAL MINING (SATYABRATA SAHOO)	MINE SURVEY – II (PRABIN KUMAR SAHOO)	ELECTRICAL EQUIPMENTS IN MINES (PRATYUSH ROUT)	MINE VENTILATION (UDAYA BISWANATH PRADHAN)		MINE SURVEY – II LAB. (MNA & MNB) (SRIKANTA SAMAL / ATISH SAHOO)		
FRIDAY	MNA & MNB	UNDERGROUND COAL MINING (SATYABRATA SAHOO)	MINE SURVEY – II (PRABIN KUMAR SAHOO)	ELECTRICAL EQUIPMENTS IN MINES (PRATYUSH ROUT)	MINE VENTILATION (UDAYA BISWANATH PRADHAN)		MINE VENTILATION LAB. (MNA & MNB) (DILLIP KUMAR DEHURY / AMARENDRA SAHOO)		
SATURDAY	MNA & MNB	ELECTRICAL EQUIPMENTS IN MINES (PRATYUSH ROUT / RADHAKRUSHNA BHUTIA)							

SECTION GROUPINGS: (MNA1) Mining Regd. No. : F19060010001 TO 10031
 (MNA2) Mining Regd. No. : F19060010032 TO 10037, 10038 TO 10063
 (MNB1) Mining Regd. No. : F19060010064 TO 10065, 10068 TO 10095, 10097, 10098
 (MNB2) Mining Regd. No. : F19060010099 TO 10105, 10108 TO 10121, 10123 TO 10125 & L20000010001 TO 10014

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NO. PCIEET/ACAD/1431/2020

DATE - 22-08-2020

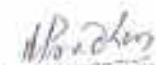
ONLINE CLASSES TIME TABLE FOR 5TH SEMESTER (3RDYEAR) CIVIL ENGINEERING FOR THE SESSION 2020-21 W.E.F. 12/08/2020 / REVISED DT. 01.09.2020

DAYS	09.15 A.M. – 10.10 A.M. (1ST)	10.10 A.M. – 11.05 A.M. (2ND)	11.05 A.M. – 12.00 NOON (3RD)	12.00 NOON – 12.55 P.M. (4TH)	12.55 P.M. – 01.25 P.M.	01.25 P.M. – 02.20 P.M. (5TH)	02.20 P.M. – 03.15 P.M. (6TH)	03.15 P.M. – 04.10 P.M. (7TH)
MONDAY	STRUCTURAL DESIGN – II (SUJATA DALEI)	ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY (ANUPAMA BEHERA)	WATER SUPPLY & WASTE WATER ENGG. (BABITA SAHU)	RAILWAY & BRIDGE ENGG. (SIBANI SAHU)	R E C E S S	CIVIL ENGINEERING LAB – II (C1 & C2) (SUNIL KUMAR SAHU / BABITA SAHU)		
TUESDAY	WATER SUPPLY & WASTE WATER ENGG. (SWARNAPRAVA PARIDA)	STRUCTURAL DESIGN – II (PRITAM SAGAR SAHOO)	ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY (ANUPAMA BEHERA)	RAILWAY & BRIDGE ENGG. (SATYA NARAYAN MOHANTY)		ESTIMATING PRACTICE – II (COMPUTER AIDED) (C1 & C2) (SUNIL KUMAR SAHU)		
WEDNESDAY	ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY (ANUPAMA BEHERA)	RAILWAY & BRIDGE ENGG. (SIBANI SAHU)	WATER SUPPLY & WASTE WATER ENGG. (BABITA SAHU)	ESTIMATING & COST EVALUATION-II (SUNIL KUMAR SAHU)		PROJECT PHASE – I (C1 & C2) (SIBANI SAHU / PRITAM SAGAR SAHOO)		
THURSDAY	ESTIMATING & COST EVALUATION-II (NANDINI PRADHAN)	RAILWAY & BRIDGE ENGG. (SATYA NARAYAN MOHANTY)	WATER SUPPLY & WASTE WATER ENGG. (SWARNAPRAVA PARIDA)	STRUCTURAL DESIGN – II (PRITAM SAGAR SAHOO)		CIVIL ENGINEERING LAB – II (C1 & C2) (SIBANI SAHU / SUNIL KUMAR SAHU / SOUMYADARSINI SWAIN)		
FRIDAY	STRUCTURAL DESIGN – II (SUJATA DALEI)	ESTIMATING & COST EVALUATION-II (SUNIL KUMAR SAHU)	WATER SUPPLY & WASTE WATER ENGG. (SWARNAPRAVA PARIDA)	ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY (ANUPAMA BEHERA)		STUDENT CENTRED ACTIVITIES (SCA) (C1 & C2) (SATYABRATA DEHURY)		
SATURDAY	ESTIMATING & COST EVALUATION-II (NANDINI PRADHAN)	PROJECT PHASE – I (C1 & C2) (BABITA SAHU / PRITAM SAGAR SAHOO)						

Group C1 (Civ) Regd. No : F1806001001 TO F18060001031, F18060001033 TO F18060001035

C2 (Civ) Regd. No : F18060001036 TO F18060001052 & L19060001001 TO L19060001007

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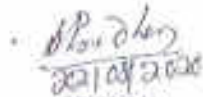
DATE: 20-01-2021

ONLINE CLASSES TIME TABLE FOR 5TH SEMESTER (3RD YEAR) ELECTRICAL ENGINEERING FOR THE SESSION 2020-21 W.E.F. 12/08/2020 / REVISED DT. 01.09.2020

DAYS	SECTION	09.15 A.M. – 10.10 A.M. (1ST)	10.10 A.M. – 11.05 A.M. (2ND)	11.05 A.M. – 12.00 NOON (3RD)	12.00 NOON – 12.55 P.M. (4TH)	12.55 P.M. – 01.25 P.M.	01.25 P.M. – 02.20 P.M. (5TH)	02.20 P.M. – 03.15 P.M. (6TH)	03.15 P.M. – 04.10 P.M. (7TH)
MONDAY	EA & EB	POWER ETC & PLC (SUBHASHREE PRADHAN)	ENERGY CONVERSION-II (RANDEEP PRADHAN)	DIGITAL ETC. & MICROPROCESSOR (SAKTIDATTA PRADHAN)	ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY (ANUPAMA BEHERA)	R E C E S S	ELECTRICAL MACHINE LAB – II (EA & EB) (RAMESH CHANDRA PRADHAN/KRUTIBASA BEHERA)		
TUESDAY	EA & EB	ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY (ANUPAMA BEHERA)	UTILIZATION OF ELECTRICAL ENERGY & TRACTION (RAMESH CHANDRA PRADHAN)	DIGITAL ETC. & MICROPROCESSOR (SASWATI SANGHAMITRA PRADHAN)	ENERGY CONVERSION-II (SUBHASHREE PRADHAN)		POWER ETC & PLC LAB, (EA & EB) (SUBHASHREE PRADHAN / JYOTI PRAKASH SWAIN / SUSHIL SAHU)		
WEDNESDAY	EA & EB	UTILIZATION OF ELECTRICAL ENERGY & TRACTION (RANDEEP PRADHAN)	POWER ETC & PLC (JYOTI PRAKASH SWAIN)	ENERGY CONVERSION – II (RANDEEP PRADHAN)	DIGITAL ETC. & MICROPROCESSOR (SAKTIDATTA PRADHAN)		PROJECT PHASE – I (EA & EB) (SUGYANI SAHOO / SUBHRAMANYA PRADHAN / SATYA NARAYAN SAHU)		
THURSDAY	EA & EB	ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY (ANUPAMA BEHERA)	POWER ETC & PLC (SUBHASHREE PRADHAN)	DIGITAL ETC. & MICROPROCESSOR (SASWATI SANGHAMITRA PRADHAN)	UTILIZATION OF ELECTRICAL ENERGY & TRACTION (RAMESH CHANDRA PRADHAN)		ELECTRICAL MACHINE LAB – II (EA & EB) (RANDEEP PRADHAN / KRUTIBASA BEHERA)		
FRIDAY	EA & EB	ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY (ANUPAMA BEHERA)	DIGITAL ETC. & MICROPROCESSOR (SASWATI SANGHAMITRA PRADHAN)	UTILIZATION OF ELECTRICAL ENERGY & TRACTION (RANDEEP PRADHAN)	ENERGY CONVERSION-II (SUBHRAMANYA PRADHAN)		DIGITAL ETC. & MICROPROCESSOR LAB (EA & EB) (SUBHASHREE PRADHAN / SAKTIDATTA PRADHAN / AJAYA KU. BEHERA)		
SATURDAY	EA & EB	POWER ETC & PLC (JYOTI PRAKASH SWAIN)	STUDENTS CENTRE ACTIVITIES (SCA) (EA & EB) (BISWARANJAN JENA / BIJAYA KUMAR BEHERA / SATYA NARAYAN SAHU / AMIT KUMAR BEHERA)						

SECTION GROUPINGS :
 (EA1) F18060002001 to 2002, 2004 to 2011, 2013 to 2018, 2020 to 2026
 (EA2) F18060002037 to 2038, 2041, 2042, 2044 to 2059, 2071
 (EB1) F18060002072 to 2080, 2083 to 2088, 2088 to 2108
 (EB2) F18060002107 to 2126 & L19060002001 to L190600992012

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NO. PCIEIT/Acad/1430/2020

DATE: 22-05-2020

ONLINE CLASSES TIME TABLE FOR 5TH SEMESTER (3RD YEAR) MECHANICAL ENGINEERING FOR THE SESSION 2020-21 W.E.F. 12/08/2020 / REVISED DT. 01.09.2020

DAYS	SECTION	09.15 A.M. – 10.10 A.M. (1ST)	10.10 A.M. – 11.05 A.M. (2ND)	11.05 A.M. – 12.00 NOON (3RD)	12.00 NOON – 12.55 P.M. (4TH)	12.55 P.M. – 01.25 P.M.	01.25 P.M. – 02.20 P.M. (5TH)	02.20 P.M. – 03.15 P.M. (6TH)	03.15 P.M. – 04.10 P.M. (7TH)
MONDAY	MA & MB	REFRIGERATION & AIR CONDITIONING (JAYANANDA DEHURY)	ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY (ANUPAMA BEHERA)	MECHATRONICS (SASWATI SANGHAMITRA PRADHAN)	DESIGN OF MACHINE ELEMENTS (MADHUMITA SAHU)	R E C E S S	HYDRAULIC MACHINES & INDUSTRIAL FLUID POWER (HIMANSU SEKHAR SAMAL)	REFRIGERATION & AIR CONDITIONING LAB. (MA & MB) (JAYANANDA DEHURY/GOBINDA BARIK)	
TUESDAY	MA & MB	DESIGN OF MACHINE ELEMENT (TARANISEN MOHANTY)	REFRIGERATION & AIR CONDITIONING (JAYANANDA DEHURY)	MECHATRONICS (SASWATI SANGHAMITRA PRADHAN)	ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY (ANUPAMA BEHERA)		HYDRAULIC MACHINE & INDUSTRIAL FLUID POWER LAB. (MA & MB) SUBODHAKANTA GARNAIK / GOBINDA BARIK)		
WEDNESDAY	MA & MB	MECHATRONICS (MADHUMITA SAHU)	DESIGN OF MACHINE ELEMENTS (TARANISEN MOHANTY)	HYDRAULICS MACHINE & INDUSTRIAL FLUID POWER (SUBODHAKANTA GARNAIK)	REFRIGERATION & AIR CONDITIONING (LAKIN KUMAR SAHU)		ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY (ANUPAMA BEHERA)	REFRIGERATION & AIR CONDITIONING LAB. (MA & MB) (BIKASH RANJAN SAHU / GOBINDA BARIK)	
THURSDAY	MA & MB	DESIGN OF MACHINE ELEMENTS (MADHUMITA SAHU)	HYDRAULICS MACHINE & INDUSTRIAL FLUID POWER (HIMANSU SEKHAR SAMAL)	ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY (ANUPAMA BEHERA)	REFRIGERATION & AIR CONDITIONING (LAKIN KUMAR SAHU)		HYDRAULIC MACHINE & INDUSTRIAL FLUID POWER LAB (MA & MB) (MADAN MOHAN DEHURY / GOBINDA BARIK)		
FRIDAY	MA & MB	HYDRAULIC MACHINES & INDUSTRIAL FLUID POWER (SUBODHAKANTA GARNAIK)	REFRIGERATION & AIR CONDITIONING (LAKIN KUMAR SAHU)	MECHATRONICS (SASWATI SANGHAMITRA PRADHAN)	DESIGN OF MACHINE ELEMENTS (TARANISEN MOHANTY)		CAD/CAM LAB (MA & MB) (TARANISEN MOHANTY) MADHUMITA SAHU)		
SATURDAY	MA & MB	PROJECT WORK – PHASE – I (MA & MB) (TARANISEN MOHANTY / SHAKTI PRASAD ACHARYA / SUBASH CHANDRA PRADHAN)			STUDENTS CENTRED ACTIVITIES (SCA) (BABULAL MOHAPATRA)				

SECTION GROUPINGS :

(MA1) F18060004001 TO 4918, 4020 TO 4032, 4035
(MA2) F18060004038 TO 4058, 4060, 4062 TO 4069, 4071, 4072
(MB1) F18060004073 TO 4075, 4081 TO 4085, 4087 TO 4092, 4094 TO 4107
(MB2) F18060004108 TO 4126 & L19060004001 TO L19060004013.

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NO. PCIEG/Acad/1430/2020

DATE: 22-08-2020

ONLINE CLASSES TIME TABLE FOR 5TH SEMESTER (3RDYEAR) MINING ENGINEERING FOR THE SESSION 2020-21 W.E.F. 12/08/2020 / REVISED DT. 01/09/2020.

DAYS	SECTION	09.15 A.M. – 10.10 A.M. (1ST)	10.10 A.M. – 11.05 A.M. (2ND)	11.05 A.M. – 12.00 NOON (3RD)	12.00 NOON – 12.55 P.M. (4TH)	12.55 P.M. – 01.25 P.M.	01.25 P.M. – 02.20 P.M. (5TH)	02.20 P.M. – 03.15 P.M. (6TH)	03.15 P.M. – 04.10 P.M. (7TH)
MONDAY	MNA & MNB	MINE LEGISLATION & GENERAL SAFETY-I (DILLIP KUMAR DEHURY)	UNDERGROUND METAL MINING (ANANDA KUMAR PADHAN)	ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY (ANUPAMA BEHERA)	MINE MACHINERY-I (AMARENDRA SAHOO)	R E C E S S	MINE MACHINERY – I LAB (MNA & MNB) (PRABINA KUMAR SAHOO / ALOK KUMAR MAHAPATRA)		
TUESDAY	MNA & MNB	ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY (ANUPAMA BEHERA)	MINE MACHINERY-I (ATISH KUMAR SAHOO)	MINE HAZARD & SAFETY (DILLIP KU. DEHURY)	MINE LEGISLATION & GENERAL SAFETY-I (DURGA PRASAD SAHU)		STUDENTS CENTRED ACTIVITIES (MNA & MNB) (SRINATH KUMAR SWAIN / GOBINDA CHANDRA SETHY / LIPUN DEHURY)		
WEDNESDAY	MNA & MNB	MINE MACHINERY-I (AMARENDRA SAHOO)	UNDERGROUND METAL MINING (ANANDA KUMAR PADHAN)	MINE LEGISLATION & GENERAL SAFETY-I (DURGA PRASAD SAHU)	MINE HAZARD & SAFETY (DILLIP KU. DEHURY)		MINE HAZARD & SAFETY LAB (MNA & MNB)- (UDAYA BISWANATH PRADHAN / PRATYUSH ROUT)		
THURSDAY	MNA & MNB	MINE HAZARD & SAFETY (UDAYA BISWANATH PRADHAN)	MINE LEGISLATION & GENERAL SAFETY-I (DILLIP KU. DEHURY)	ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY (ANUPAMA BEHERA)	UNDERGROUND METAL MINING (SRINATH KUMAR SWAIN)		MINE MACHINERY – I LAB (MNA & MNB) (ANANDA KUMAR PADHAN / PRABIN KUMAR SAHOO)		
FRIDAY	MNA & MNB	UNDERGROUND METAL MINING (SRINATH KUMAR SWAIN)	MINE HAZARD & SAFETY (UDAYA BISWANATH PRADHAN)	MINE MACHINERY-I (ATISH KUMAR SAHOO)	ENTREPRENEURSHIP & MANAGEMENT & SMART TECHNOLOGY (ANUPAMA BEHERA)		MINE HAZARD & SAFETY LAB (MNA & MNB) (DILLIP KUMAR DEHURY / PRATYUSH ROUT)		
SATURDAY	MNA & MNB	PROJECT PHASE – I (MNA & MNB) (CHINMAYA KUMAR PRADHAN / ANANDA KUMAR PADHAN / ALOK KUMAR MAHAPATRA)							

SECTION GROUPINGS : (MNA1) F18060010001 TO F18060010034
 (MNA2) F18060010035 TO 10051, 10063 TO 10068
 (MNB1) F18060010069 TO 10084, 10086 TO 10098, 10100 TO 10104
 (MNB2) F18060010105 TO 10115, 10118 TO 10123 & L19060010001 TO L19060010018

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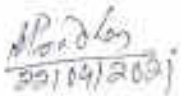
DATE: 22-04-2021

ONLINE CLASSES TIME TABLE FOR 6TH SEMESTER (3RDYEAR) CIVIL ENGINEERING FOR THE SESSION 2020-21 W.E.F. 15/04/2021

DAYS	09.15 A.M. – 10.10 A.M. (1ST)	10.10 A.M. – 11.05 A.M. (2ND)	11.05 A.M. – 12.00 NOON (3RD)	12.00 NOON – 12.55 P.M. (4TH)	12.55 P.M. – 01.25 P.M.	01.25 P.M. – 02.20 P.M. (5TH)	02.20 P.M. – 03.15 P.M. (6TH)	03.15 P.M. – 04.10 P.M. (7TH)	
MONDAY	ADVANCE CONSTRUCTION TECHNIQUE & EQUIPMENT (SWARNAPRAVA PARIDA)	LAND SURVEY – II (SUNIL KUMAR SAHU)	CONCRETE TECHNOLOGY (NANDINI PRADHAN)	CONSTRUCTION MANAGEMENT (BABITA SAHU)	R E C E S S	CONSTRUCTION WORKSHOP PRACTICE & M.S. PROJECT (C1 & C2) (SUJATA DALEI / SOUMYADARSINI SWAIN)			
TUESDAY	LAND SURVEY – II (PRITAM SAGAR SAHOO)	CONSTRUCTION MANAGEMENT (SUJATA DALEI)	CONCRETE TECHNOLOGY (SIBANI SAHU)	ADVANCE CONSTRUCTION TECHNIQUE & EQUIPMENT (SWARNAPRAVA PARIDA)		LAND SURVEY PRACTICE – II (C1 & C2) (SATYABRATA DEHURY / PRITAM SAGAR SAHOO)			
WEDNESDAY	CONSTRUCTION MANAGEMENT (BABITA SAHU)	CONCRETE TECHNOLOGY (SIBANI SAHU)	ADVANCE CONSTRUCTION TECHNIQUE & EQUIPMENT (SWARNAPRAVA PARIDA)	LAND SURVEY – II (SUNIL KUMAR SAHU)		CONSTRUCTION WORKSHOP PRACTICE & M.S. PROJECT (C1 & C2) (BABITA SAHU / SOUMYADARSINI SWAIN)			
THURSDAY	ADVANCE CONSTRUCTION TECHNIQUE & EQUIPMENT (SWARNAPRAVA PARIDA)	LAND SURVEY – II (SUNIL KUMAR SAHU)	CONSTRUCTION MANAGEMENT (SUJATA DALEI)	CONCRETE TECHNOLOGY (SIBANI SAHU)		LAND SURVEY PRACTICE – II (C1 & C2) (SUNIL KUMAR SAHU / PRITAM SAGAR SAHOO)			
FRIDAY	LAND SURVEY – II (PRITAM SAGAR SAHOO)	CONCRETE TECHNOLOGY (NANDINI PRADHAN)	CONSTRUCTION MANAGEMENT (BABITA SAHU)	ADVANCE CONSTRUCTION TECHNIQUE & EQUIPMENT (SWARNAPRAVA PARIDA)		CAD LAB / DESIGN & DETAILING PRACTICE (C1 & C2) (SUNIL KUMAR SAHU / SWARNAPRAVA PARIDA)			
SATURDAY	PROJECT PHASE – II (C1 & C2) (SIBANI SAHU / NANDINI PRADHAN / BABITA SAHU)								

Group C1 (Civil) Regd. No. F18060001051 TO F18060001031, F18060001033 TO F10000001035
C2 (Civil) Regd. No. F10000001036 TO F19060001062 & L19060001001 TO L19060001007

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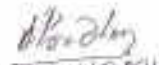
DATE 22-04-2021

ONLINE CLASSES TIME TABLE FOR 6TH SEMESTER (3RDYEAR) ELECTRICAL ENGINEERING FOR THE SESSION 2020-21 W.E.F. 15/04/2021

DAYS	SECTION	09.15 A.M. – 10.10 A.M. (1ST)	10.10 A.M. – 11.05 A.M. (2ND)	11.05 A.M. – 12.00 NOON (3RD)	12.00 NOON – 12.55 P.M. (4TH)	12.55 P.M. – 01.20 P.M.	01.25 P.M. – 02.20 P.M. (5TH)	02.20 P.M. – 03.15 P.M. (6TH)	03.15 P.M. – 04.10 P.M. (7TH)
MONDAY	EA & EB	ELECTGRICAL INSTALLATION & ESTIMATING (SUBHASHREE PRADHAN)	CONTROL SYSTEM ENGINEERING (SAKTIDATTA PRADHAN)	RENEWABLE ENERGY SYSTEM (SUSHIL SAHOO)	SWITCHGEAR & PROTECTIVE DEIVCES (PRAKASH CHANDRA MOHARANA)	R E C E S S	ELECTRICAL WORKSHOP PRACTICE (EA & EB) (RAMESH CHANDRA PRADHAN / KRUTIBASA BEHERA)		
TUESDAY	EA & EB	ELECTGRICAL INSTALLATION & ESTIMATING (RAMESH CHANDRA PRADHAN)	CONTROL SYSTEM ENGINEERING (SAKTIDATTA PRADHAN)	RENEWABLE ENERGY SYSTEM (SUSHIL SAHOO)	SWITCHGEAR & PROTECTIVE DEIVCES (PRAKASH CHANDRA MOHARANA)		LIFE SKILL (EA & EB) (SAKTIDATTA PRADHAN / BIJAYA KUMAR BEHERA / SASWATI SANGHAMITRA PRADHAN)		
WEDNESDAY	EA & EB	ELECTGRICAL INSTALLATION & ESTIMATING (RAMESH CHANDRA PRADHAN)	CONTROL SYSTEM ENGINEERING (SASWATI SANGHAMITRA PRADHAN)	RENEWABLE ENERGY SYSTEM (SUSHIL SAHOO)	SWITCHGEAR & PROTECTIVE DEIVCES (PRAKASH CHANDRA MOHARANA)		PROJECT PHASE – B (EA & EB) (SUBHASHREE PRADHAN / SATYANARAYAN SAHU)		
THURSDAY	EA & EB	CONTROL SYSTEM ENGINEERING (SASWATI SANGHAMITRA PRADHAN)	RENEWABLE ENERGY SYSTEM (PRAKASH CHANDRA MOHARANA)	ELECTGRICAL INSTALLATION & ESTIMATING (SUBHASHREE PRADHAN)	SWITCHGEAR & PROTECTIVE DEIVCES (SUBHENDU SEKHAR BEHERA)		PROJECT PHASE – II (EA & EB) (SAKTIDATTA PRADHAN / KRUTIBASA BEHERA)		
FRIDAY	EA & EB	CONTROL SYSTEM ENGINEERING (SASWATI SANGHAMITRA PRADHAN)	RENEWABLE ENERGY SYSTEM (PRAKASH CHANDRA MOHARANA)	ELECTGRICAL INSTALLATION & ESTIMATING (SUBHASHREE PRADHAN)	SWITCHGEAR & PROTECTIVE DEIVCES (SUBHENDU SEKHAR BEHERA)		ELECTRICAL WORKSHOP PRACTICE (EA & EB) (SASWATI SANGHAMITRA PRADHAN / KRUTIBASA BEHERA)		
SATURDAY	EA & EB	STUDENTS CENTRED ACTIVITIES (SCA) (EA & EB) (SWADHIN KUMAR SAHOO / SUBHRAMANYA PRADHAN / BIBHUTI BHUSAN SAHU)							

SECTION GROUPINGS :
 (EA1) F18060002001 to 2002, 2004 to 2011, 2013 to 2018, 2020 to 2025
 (EA2) F18060002037 to 2039, 2041, 2042, 2044 to 2059, 2071
 (EB1) F18060002072 to 2080, 2083 to 2086, 2088 to 2106
 (EB2) F18060002107 to 2125 & L19060002001 to L19060002012

Copy to : Office N.B./All Dept./Academic Section/T.F./G.F. for information & necessary action.


22/04/2021
 PRINCIPAL
 P.C.I.E.T., Chhendipada,
 PURNA CHANDRA INSTITUTE OF
 ENGINEERING & TECHNOLOGY
 CHHENDIPADA, ANGUL

PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY, CHHENDIPADA, ANGUL.

NO. PCIEE/EJT/17-18/81

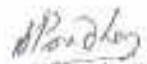
DATE: 22-04-2021

ONLINE CLASSES TIME TABLE FOR 6TH SEMESTER (3RDYEAR) MECHANICAL ENGINEERING FOR THE SESSION 2020-21 W.E.F. 15/04/2021

DAYS	SECTION	09.15 A.M. – 10.10 A.M. (1ST)	10.10 A.M. – 11.05 A.M. (2ND)	11.05 A.M. – 12.00 NOON (3RD)	12.00 NOON – 12.55 P.M. (4TH)	12.55 P.M. – 01.25 P.M.	01.25 P.M. – 02.20 P.M. (5TH)	02.20 P.M. – 03.15 P.M. (6TH)	03.15 P.M. – 04.10 P.M. (7TH)	
MONDAY	MA & MB	POWER STATION ENGINEERING (LAKIN KUMAR SAHU)	ADVANCE MANUFACTURING PROCESS (JAYANANDA DEHURY)	AUTOMOBILE ENGINEERING (TARANISEN MOHANTY)	INDUSTRIAL ENGG. & MANAGEMENT (SUBODHAKANTA GARNAIK)	R E C E S S	AUTOMOBILE ENGINEERING LAB: (MA & MB) (GOURI SANKAR PRACHAN / DEWAN KUMAR SAHU)			
TUESDAY	MA & MB	POWER STATION ENGINEERING (LAKIN KUMAR SAHU)	ADVANCE MANUFACTURING PROCESS (JAYANANDA DEHURY)	AUTOMOBILE ENGINEERING (TARANISEN MOHANTY)	INDUSTRIAL ENGG. & MANAGEMENT (SUBODHAKANTA GARNAIK)		POWER STATION ENGINEERING LAB. (MA & MB) (SUBODHAKANTA GARNAIK / JAYANANDA DEHURY)			
WEDNESDAY	MA & MB	POWER STATION ENGINEERING (LAKIN KUMAR SAHU)	ADVANCE MANUFACTURING PROCESS (JAYANANDA DEHURY)	AUTOMOBILE ENGINEERING (TARANISEN MOHANTY)	INDUSTRIAL ENGG. & MANAGEMENT (SUBODHAKANTA GARNAIK)		AUTOMOBILE ENGINEERING LAB. (MA & MB) (GOURI SANKAR PRADHAN / DEWAN KUMAR SAHU)			
THURSDAY	MA & MB	ADVANCE MANUFACTURING PROCESS (TARANISEN MOHANTY)	POWER STATION ENGINEERING (LAKIN KUMAR SAHU)	AUTOMOBILE ENGINEERING (BABULAL MOHAPATRA)	INDUSTRIAL ENGG. & MANAGEMENT (HIMANSU SEKHAR SAMAL)		POWER STATION ENGINEERING LAB. (MA & MB) (SUBODHAKANTA GARNAIK / JAYANANDA DEHURY)			
FRIDAY	MA & MB	ADVANCE MANUFACTURING PROCESS (TARANISEN MOHANTY)	POWER STATION ENGINEERING (JAYANANDA DEHURY)	AUTOMOBILE ENGINEERING (BABULAL MOHAPATRA)	INDUSTRIAL ENGG. & MANAGEMENT (HIMANSU SEKHAR SAMAL)		LIFE SKILLS (DEJILINE SAHOO / LAKIN KUMAR SAHU / BABULAL MOHAPATRA)			
SATURDAY	MA & MB	PROJECT PHASE – II (TARANISEN MOHANTY / DEWAN KUMAR SAHU)								

SECTION GROUPINGS :
 (MA1) F18060004001 TO 4018, 4020 TO 4032, 4035
 (MA2) F18060004038 TO 4058, 4060, 4062 TO 4069, 4071, 4072
 (MB1) F18060004073 TO 4079, 4081 TO 4085, 4087 TO 4092, 4094 TO 4107
 (MB2) F18060004108 TO 4126 & L19050004001 TO L19050004013.

Copy to : Office N.B./All Dept./Academic Section/T.F./G.F. for information & necessary action.


22/04/2021
 PRINCIPAL
 P.C.I.E.T. - Chhendipada,
 Purna Chandra Institute of
 Engineering & Technology,
 CHHENDIPADA, ANGUL.

PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY, CHHENDIPADA, ANGUL.

NO. PC/ET/ESTT/1712/2021


DATE: 22-04-2021

ONLINE CLASSES TIME TABLE FOR 6TH SEMESTER (3RDYEAR) MINING ENGINEERING FOR THE SESSION 2020-21 W.E.F. 15/04/2021

DAYS	SECTION	09.15 A.M. – 10.10 A.M. (1ST)	10.10 A.M. – 11.05 A.M. (2ND)	11.05 A.M. – 12.00 NOON (3RD)	12.00 NOON – 12.55 P.M. (4TH)	12.55 P.M. – 01.25 P.M.	01.25 P.M. – 02.20 P.M. (5TH)	02.20 P.M. – 03.15 P.M. (6TH)	03.15 P.M. – 04.10 P.M. (7TH)
MONDAY	MNA & MNB	MINE MACHINERY – II (DILLIP KUMAR DEHURY)	MINERAL DRESSING (SATYABRATA SAHOO)	MINE LEGISLATION & GENERAL SAFETY (GOBINDA CHANDRA SETHY)	MINE GEOLOGY – II (SRIKANTA SAMAL)	R E C E S S	MINE GEOLOGY – II LAB. (MNA & MNB) (DILLIP KUMAR DEHURY / PRATYUSH ROUT)		
TUESDAY	MNA & MNB	MINE MACHINERY – II (DILLIP KUMAR DEHURY)	MINERAL DRESSING (SATYABRATA SAHOO)	MINE LEGISLATION & GENERAL SAFETY (GOBINDA CHANDRA SETHY)	MINE GEOLOGY – II (SRIKANTA SAMAL)		MINE MACHINERY – II LAB. (MNA & MNB) (RADHAKRUSHNA BHUTIA / ANANDA KUMAR PADHAN)		
WEDNESDAY	MNA & MNB	MINE MACHINERY – II (DILLIP KUMAR DEHURY)	MINERAL DRESSING (RADHAKRUSHNA BHUTIA)	MINE LEGISLATION & GENERAL SAFETY (DILLIP KUMAR DEHURY)	MINE GEOLOGY – II (SRIKANTA SAMAL)		MINE GEOLOGY – II LAB. (MNA & MNB) (SRIKANTA SAMAL / PRATYUSH ROUT)		
THURSDAY	MNA & MNB	MINE LEGISLATION & GENERAL SAFETY (SRIKANTA SAMAL)	MINE MACHINERY – II (AMARENDRA SAHOO)	MINE GEOLOGY – II (DILLIP KUMAR DEHURY)	MINERAL DRESSING (SRINATH KUMAR SWAIN)		MINE MACHINERY – II LAB. (MNA & MNB) (DILLIP KUMAR DEHURY / RADHAKRUSHNA BHUTIA)		
FRIDAY	MNA & MNB	MINE LEGISLATION & GENERAL SAFETY (SRIKANTA SAMAL)	MINE MACHINERY – II (AMARENDRA SAHOO)	MINE GEOLOGY – II (DILLIP KUMAR DEHURY)	MINERAL DRESSING (SRINATH KUMAR SWAIN)		PROJECT PHASE – II (MNA & MNB) (PRANAYA KUMAR BEHERA / RADHAKRUSHNA BHUTIA)		
SATURDAY	MNA & MNB	PROJECT PHASE – II (MNA & MNB) (DILLIP KUMAR DEHURY / PRANAYA KUMAR BEHERA)			LIFE SKILLS (SRINATH KUMAR SWAIN / GOBINDA CHANDRA SETHY)				

SECTION GROUPINGS (MNA1) F18060010001 TO F18060010034
 (MNA2) F18060010035 TO 10051, 10053 TO 10068
 (MNB1) F18060010069 TO 10094, 10086 TO 10095, 10100 TO 10104
 (MNB2) F18060010105 TO 10115, 10118 TO 10123 & L18060010091 TO L18060010016

Copy to: Office R.B./All Dept./Academic Section/T.F./D.F. for information & necessary action.


 PRINCIPAL
 P.C.I.E.P.T. CHHENDIPADA
 Purna Chandra Institute of
 Engineering & Technology
 CHHENDIPADA, ANGUL



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

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. In case 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:

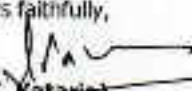
1. That the management shall provide adequate funds for development of land and building and for providing related infrastructural, instructional and other facilities as per Council's norms and standards laid down by the Council from time to time and for meeting recurring expenditure.
2. (a) That the 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.

- (f) That the institutions shall not have any collaborative arrangements with any Indian and/or Foreign Universities for conduct of technical courses other than those approved by AICTE without obtaining prior approval from AICTE.
- (g) That the Institution shall not allow conduct of any unapproved course whether technical or non technical in the premises of AICTE approved institution/campus and /or in the name of the Institution without prior permission from AICTE.
3. That the institution shall operate only from the approved location, and that the institution shall not open any off campus study centers/ extension centers directly or in collaboration with any other institution/ university/ organization for the purpose of imparting technical education without obtaining prior approval from the AICTE.
4. That the tuition and other fees shall be charged as prescribed by the Competent Authority within the overall criteria prescribed the Council from time to time. No capitation fee shall be charged from the students/guardians of students in any form.
5. That the accounts of the Institution shall be audited annually by a certified Chartered Accountant and shall be 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 according to procedures, qualifications and experience prescribed by the Council from time to time and pay scales are paid as per the 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.L.C. in order to ensure proper maintenance of administrative and academic standards.
- (b) That the technical institution shall publish an information booklet before commencement of the academic year giving details regarding the institution and courses/programmes being conducted and details of infrastructural facilities including faculty etc. in the form of mandatory disclosure. The information booklet may be made available to the stakeholders of the technical education on cost basis. The mandatory disclosure information shall be housed in the Institution Web-Site. The information shall be revised every year with updated information about all aspects of the institution.
- (c) That it shall be mandatory for the technical institution to maintain a web-site providing the prescribed information. The website information must be continuously updated as and when changes take place.
- (d) That a compliance report in the prescribed format along with mandatory disclosure on fulfillment of the above conditions, shall be submitted each year by the Institution within the time limit prescribed by the Council from time to time.
- (e) That if Technical Institution fails to disclose the information or suppress and/or misrepresent the information, 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 the concerned affiliating University /University under whose ambit the institution is functioning, and shall be in operational condition before making admissions.
9. That a library shall be established with adequate number of titles, books, journals (both Indian & Foreign) etc as per AICTE norms.
10. That a computer center with adequate number of terminals, Printers, legal software etc. shall be established as per AICTE norms.
11. That a Joint FDR with DTE is required to be created for an amount and period prescribed by the Council from time to time.
12. AICTE may carry out random inspections round the year any time for verifying the status of the Institutions to ensure maintenance of norms and standards.
13. That the AICTE / DTE may also conduct inspections with or without notifying the dates to verify specific complaints of mis-representation, violation of norms and standards, mal-practices etc.
14. That the Institution by virtue of the approval given by Council shall not automatically become claimant to any 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. In case 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.



अखिल भारतीय तकनीकी शिक्षा परिषद्
ALL INDIA COUNCIL FOR TECHNICAL EDUCATION
(भारत सरकार का एक सांविधानिक संस्थान) (A Statutory Body of the Govt. of India)
EASTERN REGIONAL OFFICE, KOLKATA

Extension of Approval / Variation in Intake

F. No. ERO/AICTE/OR/ET/07/2009-10 / 5423

Dated - 06.07.2010

To
Commissioner -cum- Secretary
Dept. of Industries
Govt. of Orissa, Secretariat
Bhubaneswar 751 001



Sub: Extension of AICTE approval to Purna Chandra Institute of Engineering & Technology (Polytechnic), At/PO Chhendipada, Angul 759 124, Orissa (Diploma Engineering).

Sir,

Based on recommendations of the State Level Committee for Diploma Education vide letter no. Orissa IX-TTI-35/10 (pt). 9502/I, dated - 03.07.2010, the All India Council for Technical Education (AICTE), is pleased to accord approval to Purna Chandra Institute of Engineering & Technology (Polytechnic), At/PO Chhendipada, Angul 759 124, Orissa for Extension of approval / Introduction of new course(s) / Variation in Intake, as applicable for Diploma Engineering programme with annual intake of each course(s) as given below:

Approved Existing Course(s)	Entry Level	Duration	Approved Intake		Period of approval
			Existing	New	
Electrical Engineering	10+	3 Yrs.	60	90	2010-2011
Mechanical Engineering	10+	3 Yrs.	60	90	2010-2011
Civil Engineering	10+	3 Yrs.	60	60	2010-2011
Mining Engineering	10+	3 Yrs.	60	60	2010-2011
Total			240	300	

This approval has been accorded subject to fulfillment of Norms & Standards of the Council for the Course(s) and Intake approved above.

Further, the observation and specific conditions (if any) of the Expert Committee are enclosed in this letter. The Institution shall fulfill all the conditions without any delay. Non-fulfillment shall lead to withdrawal of approval.

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 admissions. Admissions shall be 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 syllabi of the concerned 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 Level Central Counseling for admissions in the concerned State/Union Territory, this letter of approval will not be valid for making any admission during the above specified academic year.
5. No excess admission shall be made by the institution during any academic year.

6. The approval is valid only for the academic year as mentioned in the above table. If, no further extension of AICTE approval is received beyond the academic year this approval letter will not be valid for making any admission for the subsequent years.
7. Name of the Institution, Name of the Trust/Society is not allowed to change without prior approval of AICTE. The name and title of the Institution should be such that "the emblems and Names (Prevention of improper use) Act [1950]" of Government of India is not violated in any manner.
8. In exercise of power conferred under 10(P) of the AICTE Act, AICTE may inspect the Institution any time it may deem fit to verify the progress/compliance of AICTE norms or for any other purpose.
9. Any other condition(s) as may be specified by AICTE from time to time.
10. It is to ensure that as per direction of Supreme Court of India in Writ Petition No. (C) 656/1998 that the ragging in educational institutions should be prevented and appropriate measures should be taken by AICTE for prevention of ragging in Technical Educational Institution. The Technical Institutions also to ensure that the ragging does not take 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 notified in the Gazette of India on November 28, 2005. All the provisions contained in the interim policy regulations shall be applicable for all the AICTE approved Institutions.

In the event of infringement/contravention of non-compliance of the above Conditions and/or the provision of AICTE Act & Regulations/Guidelines/Norms and Standards as prescribed by AICTE, further actions leading to "Reduced Intake, no admission or withdrawal of approval" may be take by AICTE and the liability arising out of such actions will be solely of the Management of the Institutions.

Deficiencies / Suggestions / Improvements are as follows:

NIL

Thanking you,

Yours faithfully,


(Narender Singh)
Regional Officer

Copy to:

1. The Director, Dept. 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 Principal / Director, Purna Chandra Institute of Engineering & Technology (Polytechnic), At/PO Chhendipada, Angul 759 124, Orissa
(A request to fulfill the deficiencies (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, Orissa,
4. Guard file.



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



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:

- 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
- The Director Of Technical Education,**
Orissa
- The Registrar,**
Board of Technical Education, Orissa
- The Principal / Director,**



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

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)





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



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.



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
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PIN-759124,
CHHENDIPADA,ANGUL,
Orissa,759124
6. **Guard File(AICTE)**



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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/1-1476843933/2013/EOA

Date: 19-Mar-2013

To,
The Commissioner cum Secretary,
Deptt. Of Higher & Technical Education,
Govt. of Orissa, Orissas Sectt.
Bhubaneswar-751001

Sub: Extension of approval for the academic year 2013-14

Ref: Application of the Institution for Extension of approval for the academic year 2013-14

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	1-1476843933
		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 2013-14

Application Number: 1-1476843933*

Page 1 of 3

Note: This is a Computer generated Extension of Approval Letter. No signature is required.

Letter Printed On: 20 March 2013.

Printed By : aic001789



Application Id: 1-1476843933			Course	Full/Part Time	Affiliating Body	Intake 2012-13	Intake Approved for 13-14	NRI	PIO	Foreign Collaboration
Program	Shift	Level								
ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	CIVIL ENGINEERING	FULL TIME	Directorate of Technical Education and Training, Cutack	60	60	No	No	No
ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	ELECTRICAL ENGINEERING	FULL TIME	Directorate of Technical Education and Training, Cutack	120	120	No	No	No
ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	MECHANICAL ENGINEERING	FULL TIME	Directorate of Technical Education and Training, Cutack	120	120	No	No	No
ENGINEERING AND TECHNOLOGY	1st Shift	DIPLOMA	MINING ENGINEERING	FULL TIME	Directorate of Technical Education and Training, Cutack	60	120	No	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



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,**
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,
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)**



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



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.

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(Dr. Kuncheria P. Isaac)

Member Secretary, AICTE



All India Council for Technical Education
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7th Floor, Chandralok Building, Janpath, New Delhi- 110 001
PHONE: 23724151/52/53/54/55/56/57 FAX: 011-23724183 www.aicte-India.org

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
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PO-CHHENDIPADA
PS-CHHENDIPADA
DIST-ANGUL
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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)**



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



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.

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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.



All India Council for Technical Education
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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
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ORISSA,
VILL-CHHENDIPADA,ANGUL,
Odisha,759124
5. **The Secretary / Chairman,**
PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
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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	Affiliating Body	Intake 2015-16	Intake Approved for 2016-17	NRI Approval status	PIO / FN / Gulf quota Approval status	Foreign Collaboration/ Twining Program Approval status*
Program	Shift	Level	Full/Part Time						



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ENGINEERING AND TECHNOLOGY	1st Shift	DIPL OMA	CIVIL ENGINEERING	FULL TIME	Directorate of Technical Education and Training , Cuttack	60	60	NA	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	DIPL OMA	ELECTRICAL ENGINEERING	FULL TIME	Directorate of Technical Education and Training , Cuttack	120	120	NA	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	DIPL OMA	MECHANICAL ENGINEERING	FULL TIME	Directorate of Technical Education and Training , Cuttack	120	120	NA	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	DIPL OMA	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.

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Note: Validity of the course details may be verified at www.aicte-india.org

Dr. Avinash S Pant
Vice - Chairman, AICTE

Copy to:

- 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
- The Director Of Technical Education,**
Odisha
- The Registrar,**
Directorate of Technical Education and Training , Cuttack
- The Principal / Director,**



All India Council for Technical Education
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PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
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PO-CHHENDIPADA
PS-CHHENDIPADA
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ORISSA,
VILL-CHHENDIPADA,ANGUL,
Odisha,759124

5. The Secretary / Chairman,

PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
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PO-CHHENDIPADA
PS-CHHENDIPADA
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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 Marg Vasant 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-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/CCCI	Foreign Collaboration/Twinning Program



All India Council for Technical Education

(A Statutory body under Ministry of HRD, Govt. of India)

Nelson Mandela Marg Vasant Kunj, New Delhi-110067

PHONE: 23724151/52/53/54/55/56/57 FAX: 011-23724183 www.aicte-india.org

Program	Shift	Level								
ENGINEERING AND TECHNOLOGY	1st Shift	DIPL OMA	CIVIL ENGINEERING	FULL TIME	Directorate of Technical Education, Odisha	60	60	NA	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	DIPL OMA	ELECTRICAL ENGINEERING	FULL TIME	Directorate of Technical Education, Odisha	120	120	NA	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	DIPL OMA	MECHANICAL ENGINEERING	FULL TIME	Directorate of Technical Education, Odisha	120	120	NA	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	DIPL OMA	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.

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

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



All India Council for Technical Education

(A Statutory body under Ministry of HRD, Govt. of India)

Nelson Mandela Marg Vasant Kunj, New Delhi-110067

PHONE: 23724151/52/53/54/55/56/57 FAX: 011-23724183 www.aicte-India.org

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,Or ssa,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/ OCl/ 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.



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,Or issa,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
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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.



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

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, 2019 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, 2019

AND

- ii) IN THE CASE OF INCOME AND EXPENDITURE ACCOUNT OF THE EXCESS OF INCOME OVER EXPENDITURE FOR THE YEAR ENDED ON 31ST MARCH, 2019.

PLACE: ANGUL
DATE : 16/05/2019.

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)

INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED ON 31ST MARCH, 2019.
ACCOUNTING YEAR : 2018-19

EXPENDITURE	AMOUNT	INCOME	AMOUNT
To Annual Function	303000.00	By Fees Received	63247060.90
To Advertisement	996763.00		
To AICTE Exp.	100000.00	By Insurance Claim	159352.00
To Bank Charges	62374.37		
To Consumables	5107461.90	BY Interest (SB)	15070.00
To Donation	78500.00		
To Electricity	798613.00	BY Interest (FD)	62180.00
To E.P.F.	545871.00		
To Workshop Raw Materials	1175188.00		
To Examination Exp.	3288818.00		
To Fuel Exp.	6378624.00		
To Hire Charges	683270.00		
To Insurance	464788.90		
To Interest	282514.00		
To Medical Exp.	454776.00		
To Membership & Subscription	20000.00		
To Electrical Exp.	499710.00		
To Misc. Exp.	128358.00		
To Newspaper & Periodicals	56947.00		
To Office Exp.	191186.00		
To Postage	10606.50		
To Printing & Stationery	828869.00		
To Student Welfare Fees	56000.00		
To Puja Exp.	593351.00		
To Canteen Exp.	9582572.52		
To Refreshment	217359.00		
To Rent	73420.00		
To Repair & Maintenance	2901636.00		
To Road Tax & Fitness	14706.00		
To Remuneration to visiting /Guest	195000.00		
To <u>Salary</u>			
Teaching Staff	14128260.00		
Non Teaching Staff	1820806.00		
To Seminar Exp.	128450.00		
To Sports Exp.	148975.00		
To Study Tour Exp.	678345.00		
To Telephone & Internet Exp.	182475.00		
To Travelling Exp.	974655.98		
To Training Exp.	64600.00		
To Fire Safety	458000.00		
To Gardening	22930.00		
To Audit Fees	15000.00		
To Depreciation	8445072.00		
To Excess of Income over Expenditure			
Transferred to Capital Fund	325790.73		
	<u>63483662.90</u>		<u>63483662.90</u>

In terms of our report of even date annexed

PLACE: ANGUL
DATE: 16/05/2019



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 - I
DETAILS OF FIXED ASSETS AS ON 31ST MARCH, 2019

Sl.No.	Particulars	Rate of Depreciation	W.D.V. as on 01.04.2018	Addition		Deduction during the Year	Total	Depreciation Amount	W.D.V. as on 31.03.2019
				More than Six months	Less than Six months				
1	BUILDING	5.00%	79512231.00	1625805.00	1755947.00	0.00	82893983.00	4100800.00	78793183.00
2	FURNITURE & FIXTURES	10.00%	3105661.00	1068673.00	612278.00	0.00	4786612.00	448047.00	4338565.00
3	COMPUTERS	40.00%	2460601.00	1672425.00	72328.00	0.00	4205354.00	1667676.00	2537678.00
4	ELECTRICAL FITTINGS	15.00%	1115439.00	1526147.00	871130.00	0.00	3512716.00	461573.00	3051143.00
5	LIBRARY BOOKS	15.00%	2788911.00	0.00	85932.00	0.00	2874843.00	424782.00	2450061.00
6	TOOLS & EQUIPMENTS	15.00%	4438846.00	1674622.00	935683.00	0.00	7049151.00	987196.00	6061955.00
7	VEHICLE	15.00%	2091026.00	0.00	0.00	0.00	2091026.00	313654.00	1777372.00
8	CCTV	15.00%	205443.00	0.00	0.00	0.00	205443.00	30816.00	174627.00
9	XEROX MACHINE	15.00%	35318.00	0.00	69742.00	0.00	105060.00	10528.00	94532.00
	Grand Total		95753476.00	7567672.00	4403040.00	0.00	107724188.00	8445072.00	99279116.00



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, 2020 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, 2020

AND

- ii) IN THE CASE OF INCOME AND EXPENDITURE ACCOUNT OF THE EXCESS OF INCOME OVER EXPENDITURE FOR THE YEAR ENDED ON 31ST MARCH, 2020.

PLACE: ANGUL
DATE : 05/03/2021.
UDIN: 21059905AAAAHB2514

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)

BALANCE SHEET AS AT 31ST MARCH, 2020

LIABILITIES	AMOUNT	ASSETS	AMOUNT
<u>CAPITAL FUND</u>		<u>FIXED ASSETS</u>	94115770.00
Opening Balance	8580995.30	As per Schedule "I"	
Add: Excess of Income over Expenditure	382612.00	Advances	100000.00
	8963607.30		
Less: Income Tax & TDS	238442.00	<u>CASH & BANK BALANCE</u>	
	8725165.30	S.B. A/c. with Canara Bank, Chhendipada	1028465.00
<u>LOANS & BORROWINGS</u>		C. A/c. with Canara Bank, Chhendipada	4892077.97
Term Loan from S.B.I., Chhendipada	791285.00	S.B. A/c. with S.B.I., Chhendipada	14547.00
Term Loan from TMFL	254414.67	Current A/c. with S.B.I., Chhendipada	145060.64
Term Loan from Canara Bank, Chhendipada	1652670.00	C. A/c. with ICICI Bank, Chhendipada	99657.39
Unsecured Loans	88121575.00	Fixed Deposit with S.B.I., Chhendipada (Including Accrued Interest)	3225460.00
<u>CURRENT LIABILITIES</u>		Fixed Deposit with S.B.I., Chhendipada (Including Accrued Interest)	882635.00
Sundry Creditors	3612465.00	Cash in Hand	54093.97
Salary Payable	1321220.00		
EPF Payable	63972.00		
Audit Fees	15000.00		
	<u>104557766.97</u>		<u>104557766.97</u>

In terms of our report of even date annexed

PLACE: ANGUL
DATE: 05/03/2021
UDIN: 21059905AAAAHB2514

For Murarilal Agarwalla & Co.
Chartered Accountants



M. L. Agarwalla
Proprietor
M. L. Agarwalla
M. No.: 059905

PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
AT/PO: CHHENDIPADA, DIST: ANGUL - 759124 (ORISSA)

INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED ON 31ST MARCH, 2020.
ACCOUNTING YEAR : 2019-2020

EXPENDITURE	AMOUNT	INCOME	AMOUNT
To Annual Function	335000.00	By Fees Received	51892605.00
To Advertisement	573054.00		
To AICTE Exp.	70000.00	By Interest on SB	7277.00
To SCTE & VT Affiliation	30000.00		
To Bank Charges	57655.00	By Interest on SB A/c.	17519.00
To Consumables	3006166.00		
To Donation	61400.00	By Interest on FD	60782.00
To Electricity	807095.00		
To E.P.F.	552950.00		
To Workshop Raw Materials	937864.00		
To Examination Exp.	3218413.00		
To Fuel Exp.	2730840.00		
To Hire Charges	504363.00		
To Insurance	218628.00		
To Interest	426992.00		
To Medical Exp.	118157.00		
To Membership & Subscription	20000.00		
To Electrical Exp.	655824.00		
To Misc. Exp.	119749.00		
To Newspaper & Periodicals	39952.00		
To Office Exp.	167500.00		
To Postage	13736.00		
To Printing & Stationery	791179.00		
To Student Welfare Fees	17500.00		
To Puja Exp.	584270.00		
To Canteen Exp.	4835590.00		
To Refreshment	490010.00		
To Rent	50500.00		
To Repair & Maintenance	2944411.00		
To Road Tax & Fitness	14706.00		
To Remuneration to visiting /Guest	130000.00		
To <u>Salary</u>			
Teaching Staff	15433579.00		
Non Teaching Staff	1895840.00		
To Seminar Exp.	103405.00		
To Sports Exp.	59582.00		
To Study Tour Exp.	557021.00		
To Telephone & Internet Exp.	542995.00		
To Travelling Exp.	685432.00		
To Training Exp.	47700.00		
To Audit Fees	15000.00		
To Depreciation	7731513.00		
To Excess of Income over Expenditure Transferred to Capital Fund	382612.00		
	<u>51978183.00</u>		<u>51978183.00</u>

In terms of our report of even date annexed

PLACE: ANGUL
DATE: 05/03/2021
UDIN: 21059905AAAAHB2514



For Murarilal Agarwalla & Co.
Chartered Accountants

M. L. Agarwalla

Proprietor
M. L. Agarwalla
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, 2020

Sl.No.	Particulars	Rate of Depreciation	W.D.V. as on 01.04.2019	Addition		Deduction during the Year	Total	Depreciation Amount	W.D.V. as on 31.03.2020
				More than Six months	Less than Six months				
1	BUILDING	5.00%	78793183.00	0.00	0.00	0.00	78793183.00	3939659.00	74853524.00
2	FURNITURE & FIXTURES	10.00%	4338565.00	0.00	0.00	0.00	4338565.00	433857.00	3904708.00
3	COMPUTERS	40.00%	2537678.00	0.00	0.00	0.00	2537678.00	1015071.00	1522607.00
4	ELECTRICAL FITTINGS	15.00%	3051143.00	0.00	0.00	0.00	3051143.00	457671.00	2593472.00
5	LIBRARY BOOKS	15.00%	2450061.00	0.00	0.00	0.00	2450061.00	367509.00	2082552.00
6	TOOLS & EQUIPMENTS	15.00%	6061955.00	1451471.00	1116696.00	0.00	8630122.00	1210766.00	7419356.00
7	VEHICLE	15.00%	1777372.00	0.00	0.00	0.00	1777372.00	266606.00	1510766.00
8	CCTV	15.00%	174627.00	0.00	0.00	0.00	174627.00	26194.00	148433.00
9	XEROX MACHINE	15.00%	94532.00	0.00	0.00	0.00	94532.00	14180.00	80352.00
	Grand Total		99279116.00	1451471.00	1116696.00	0.00	101847283.00	7731513.00	94115770.00



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, 2021 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, 2021

AND

- ii) IN THE CASE OF INCOME AND EXPENDITURE ACCOUNT OF THE EXCESS OF INCOME OVER EXPENDITURE FOR THE YEAR ENDED ON 31ST MARCH, 2021.

PLACE: ANGUL
DATE : 16/12/2021.
UDIN: 21059905AAABCS9001

For Murarilal Agarwalla & Co.
Chartered Accountants



M. L. Agarwalla
Proprietor
M. L. Agarwalla
M. No.:059905

PURNA CHANDRA INSTITUTE OF ENGINEERING & TECHNOLOGY
AT/PO: CHHENDIPADA, DIST: ANGUL - 759124 (ORISSA)

BALANCE SHEET AS AT 31ST MARCH, 2021

LIABILITIES	AMOUNT	ASSETS	AMOUNT
CAPITAL FUND		FIXED ASSETS	
Opening Balance	8725165.30	As per Schedule "I"	90360513.00
Add: Excess of Income over Expenditure	653078.68	Advances	100000.00
	9378243.98		
Less: Income Tax & TDS	143221.00	CASH & BANK BALANCE	
	9235022.98	S.B. A/c. with Canara Bank, Chhendipada	240383.10
LOANS & BORROWINGS		C. A/c. with Canara Bank, Chhendipada	1688962.16
Term Loan from S.B.I., Chhendipada	775290.00	S.B. A/c. with S.B.I., Chhendipada	14946.00
Term Loan from TMFL	0.00	Current A/c. with S.B.I., Chhendipada	170829.02
Term Loan from Canara Bank, Chhendipada	1586489.00	C. A/c. with ICICI Bank, Chhendipada	99657.39
Term Loan from Canara Bank, Chhendipada	340000.00	Fixed Deposit with S.B.I., Chhendipada (Including Accrued Interest)	3225460.00
Term Loan from Canara Bank, Chhendipada	2989285.00	Fixed Deposit with S.B.I., Chhendipada (Including Accrued Interest)	942271.00
Unsecured Loans	80342109.00	Cash in Hand	61379.31
CURRENT LIABILITIES			
Sundry Creditors	753978.00		
Salary Payable	740787.00		
EPF Payable	126440.00		
Audit Fees	15000.00		
	96904400.98		96904400.98

In terms of our report of even date annexed

PLACE: ANGUL
DATE: 16/12/2021
UDIN: 21059905AAAABC59001

For Murarilal Agarwalla & Co.
Chartered Accountants



M. L. Agarwalla
Proprietor
M. L. Agarwalla
M. No.: 059905

INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED ON 31ST MARCH, 2021
ACCOUNTING YEAR : 2020-2021

EXPENDITURE	AMOUNT	INCOME	AMOUNT
To Annual Function	18340.00	By Fees Received	32969328.00
To Advertisement	219200.00		
To AICTE Exp.	70000.00	By Interest on SD	6046.00
To SCTE & VT	30000.00		
To Bank Charges	111857.47		
To Consumables	363785.00	BY Interest on SB A/c.	18786.00
To Donation	56500.00		
To Electricity	277021.00	BY Interest on FD	64472.00
To E.P.F.	477193.00		
To Examination Exp.	880236.00		
To Fuel Exp.	955988.00		
To Hire Charges	258100.00		
To Insurance	293782.95		
To Interest	457935.00		
To Medical Exp.	87880.00		
To Membership & Subscription	20000.00		
To Electrical Exp.	198585.00		
To Misc. Exp.	5837.00		
To Gardening Exp.	87650.00		
To Newspaper & Periodicals	8047.00		
To Office Exp.	143580.00		
To Postage	287.90		
To Printing & Stationery	144544.00		
To Puja Exp.	86387.00		
To Canteen Exp.	864270.00		
To Refreshment	124781.00		
To Refund to Students	35000.00		
To Rent	73008.00		
To Repair & Maintenance	733534.00		
To Road Tax & Fitness	51863.00		
To Remuneration to visiting /Guest	1000.00		
To <u>Salary</u>			
Teaching Staff	14779195.00		
Non Teaching Staff	2384474.00		
To Student Registration Fees	6750.00		
To Student Welfare Fees	15800.00		
To Seminar Exp.	8861.00		
To Telephone & Internet Exp.	493419.00		
To Travelling Exp.	124146.00		
To Training Exp.	8500.00		
To Computer Exp.	173570.00		
To Audit Fees	15000.00		
To Depreciation	7259646.00		
To Excess of Income over Expenditure			
Transferred to Capital Fund	653078.68		
	<u>33058632.00</u>		<u>33088632.00</u>

In terms of our report of even date annexed

PLACE: ANGUL
 DATE: 16/12/2021
 UDIN: 21059905AAAABC9001

For Murarilal Agarwalla & Co.
Chartered Accountants



M. L. Agarwalla

Proprietor
 M. L. Agarwalla
 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, 2021

Sl.No.	Particulars	Rate of Depreciation	W.D.V. as on 01.04.2020	Addition		Deduction during the Year	Total	Depreciation Amount	W.D.V. as on 31.03.2021
				More than Six months	Less than Six months				
1	BUILDING	5.00%	74853524.00	818192.00	1152048.00	0.00	76823764.00	3812387.00	73011377.00
2	FURNITURE & FIXTURES	10.00%	3904708.00	10360.00	0.00	0.00	3915068.00	391507.00	3523561.00
3	COMPUTERS	40.00%	1522607.00	661154.00	246978.00	0.00	2430739.00	922900.00	1507839.00
4	ELECTRICAL FITTINGS	15.00%	2593472.00	0.00	265000.00	0.00	2858472.00	408896.00	2449576.00
5	LIBRARY BOOKS	15.00%	2082552.00	2500.00	180125.00	0.00	2265177.00	326267.00	1938910.00
6	TOOLS & EQUIPMENTS	15.00%	7419356.00	150000.00	18032.00	0.00	7587388.00	1136756.00	6450632.00
7	VEHICLE	15.00%	1510766.00	0.00	0.00	0.00	1510766.00	226615.00	1284151.00
8	CCTV	15.00%	148433.00	0.00	0.00	0.00	148433.00	22265.00	126168.00
9	XEROX MACHINE	15.00%	80352.00	0.00	0.00	0.00	80352.00	12053.00	68299.00
	Grand Total		94115770.00	824014.00	710135.00	0.00	97620159.00	7259646.00	90360513.00

