RADHA GOVIND UNIVERSITY
RAMGARH, JHARKHAND

Department of Civil Engineering

Under Faculty of Engineering and Technology

Choice Based Credit System Curriculum for Diploma in Civil Engineering

(Effective from Academic Session 2025-26)

29/05/25

Scheme of Teaching and Examination for

1st Semester of 3 Years Diploma in Engineering (All Branches except Non Tech

Duration of : **14 Weeks**
Semester Student : **36 Hrs**
Total Marks : **800**

Sl. No.	Name of Subject	Subject Code	Subject	Teaching Scheme			Examination Scheme					
				L	T	P	Hours of Exam	Full Marks of Subject	Final Exam / committee marks	Internal Assessment	Pass Marks Final / Ext. Exam	Pass Marks in Subjects
1.	Communication Skill – I	101	Theory	3	-	-	3	100	80	20	26	40
2.	Engineering Math – I	102	Theory	3	1	-	3	100	80	20	26	40
3.	Engineering Physics - I	103	Theory	3	-	-	3	100	80	20	26	40
4.	Engineering Chemistry – I	104	Theory	3	-	-	3	100	80	20	26	40
5.	Engineering Graphics – I Th	105	Theory	2	-	-	4	50	40	10	13	20
6.	Fundamental of Computer	106	Theory	2	-	-	3	50	40	10	13	20
7.	Engineering Physics Lab – I	107	Practical	-	-	2	4	50	40	10	13	20
8.	Engineering Chemistry Lab- I	108	Practical	-	-	2	4	50	40	10	13	20
9	Engineering Graphics – I SS	109	Sessional	-	-	4	-	50	30	20	-	25
10	Communication Skill I	110	Sessional	-	-	2	-	50	30	20	-	25
11.	Fundamental of Computer - I	111	Sessional	-	-	2	-	50	30	20	-	25
12.	Workshop - I	112	Sessional	-	-	4	-	50	30	20	-	25
Total Hours of Teaching per week :				**16**	**1**	**16**						

Note:
1. Period of Class hours should be of 1 hrs duration as per AICTE norms.
2. Remaining Hrs every week has been marked for students Library and Student Centered Activities.
3. Drawing / Graphics / Practical / Sessional examinations will be held at parent institution.
4. Board will depute examiner for Practical examination.
5. Regarding sessional examination the parent institution will form a three member committee and this committee will examine the sessional records and hold viva of the examinee for 60 % marks allotted to the subject. Marks for remaining 40 % will be provided by the Faculty concerned on the basis of evaluation of each job / work throughout the semester.

Scheme of Teaching and Examination for

2nd Semester of 3 Years Diploma in Engineering (All Branches except Non Tech)

Duration of Semester : **14 Weeks**
Student Contact Hours : **36 Hrs**
Total Marks : **800**

Sl. No.	Name of Subject	Subject Code	Subject	Teaching Scheme			Examination Scheme					
				L	T	P	Hours of Exam	Full Marks of Subject	Final Exam / committee marks	Internal Assessment	Pass Marks Final / Ext. Exam	Pass Marks in Subjects
1.	Communication Skill – II	201	Theory	3	-	-	3	100	80	20	26	40
2.	Engineering Math – II	202	Theory	3	1	-	3	100	80	20	26	40
3.	Engineering Physics - II	203	Theory	3	-	-	3	100	80	20	26	40
4.	Engineering Chemistry - II	204	Theory	3	-	-	3	100	80	20	26	40
5.	Programming in C	205	Theory	3	-	-	3	100	80	20	26	40
6.	Engineering Physics II	206	Practical	-	-	2	3	50	40	10	13	20
7.	Engineering Chemistry II	207	Practical	-	-	2	3	50	40	10	13	20
8.	Programming in C	208	Sessional	-	-	4	3	50	30	20	-	25
9.	Workshop Practices	209	Sessional	-	-	4	4	100	60	40	-	50
10.	Professional Practice I	210	Sessional	-	-	4	-	50	30	20	-	25
Total Hours of Teaching per week :				**15**	**1**	**16**						

Note:
1. Period of Class hours should be of 1 hrs duration as per AICTE norms.
1. Remaining Hrs every week has been marked for students for Library and Student Centered Activities.
2. Drawing / Graphics / Practical / Sessional examinations will be held at parent institution.
3. Board will depute examiner for Practical examination.
4. Regarding sessional examination the parent institution will form a three member committee and this committee will examine the sessional records and hold viva of the examinee for 60 % marks allotted to the subject. Marks for remaining 40 % will be provided by the Faculty concerned on the basis of evaluation of each job / work throughout the semester.

Vishwa Deepak
29/3/25

Scheme of Teaching and Examination for

3 rd Semester of 3 Years Diploma in Civil Engineering

Duration of Semester : **14 Weeks**
Student Contact Hours : **36 Hrs**
Total Marks : **800**

Sl. No.	Name of Subject	Subject Code	Subject	Teaching Scheme			Examination Scheme					
				L	T	P	Hours of Exam	Full Marks of Subject	Final Exam / committee marks	Internal Assessment	Pass Marks Final / Ext. Exam	Pass Marks in Subjects
1.	Math III	301	Theory	4		-	3	100	80	20	26	40
2.	Surveying	CIV303	Theory	3	-	-	3	100	80	20	26	40
3.	Building Material	CIV304	Theory	3	-	-	3	100	80	20	26	40
4.	Strength of Material	CIV305	Theory	3	-	-	3	100	80	20	26	40
5.	Building Drawing (AutoCAD)	CIV306	Theory	3	-	-	3	100	80	20	26	40
6.	Surveying Lab	CIV307	Sessional	-	-	4	4	100	80	20	26	40
7.	Strength of Material Lab	CIV308	Practical	-	-	2	4	50	40	10		40
8.	Building Material Lab	CIV309	Sessional			4	4	100	40	10		20
9.	DLS	302	Sessional			4		50	30	20	-	20
Total Hours of Teaching per week :				**16**		**14**		800				25

Note:
1. Period of Class hours should be of 1 hrs duration as per AICTE norms.
1. Remaining Hrs every week has been marked for students for Library and Student Centered Activities.
2. Drawing / Graphics / Practical / Sessional examinations will be held at parent institution.
3. Board will depute examiner for Practical examination.
4. Regarding sessional examination the parent institution will form a three member committee and this committee will examine the sessional records and hold viva of the examinee for 60 % marks allotted to the subject. Marks for remaining 40 % will be provided by the Faculty concerned on the basis of evaluation of each job / work throughout the semester.

29/3/25

Scheme of Teaching and Examination for

4th Semester of 3 Years Diploma in Civil Engineering

Duration of Semester : **14 Weeks**
Student Contact Hours : **36**
Total Marks : **80hrs**

Sl. No.	Name of Subject	Subject Code	Subject	Teaching Scheme			Examination Scheme					
				L	T	P	Hours of Exam	Full Marks of Subject	Final Exam /committe e marks	Internal Assessment	Pass Marks Final/ Ext. Exam	Pass Marks in Subjects
1.	Construction Technology	CIV 402	Theory	3	-	-	3	100	80	20	26	40
2.	Geo-Technical Engineering	CIV 403	Theory	3	-	-	3	100	80	20	26	40
3.	Hydraulics	CIV 404	Theory	3	-	-	3	100	80	20	26	40
4.	Theory of Structure	CIV 405	Theory	3	-	-	3	100	80	20	26	40
5.	Transportation Engineering	CIV 406	Theory	3	-	-	3	100	80	20	26	40
6	Construction Technology Lab	CIV 407	Sessional	-	-	2	-	50	30	20		25
7	Geo-Technical Engineering Lab	CIV 408	Practical	-	-	4	-	100	80	20	13	40
8	Hydraulics Lab	CIV 409	Practical	-	-	2	-	50	40	10	13	20
9	Transportation Lab	CIV 410	Practical	-	-	2	-	50	40	10	13	20
10	Professional Practice II	401	Sessional	-	-	4	-	50	30	20		25
Total Hours of Teaching per week :				**15**		**14**	**800**					

Note:

1. Period of Class hours should be of 1 hrs duration as per AICTE norms.
2. Remaining Hrs. every week has been marked for students Library and Student Centered Activities.
3. Drawing/ Graphics/ Practical/ Sessional examinations will be held at parent institution.
4. Board will depute examiner for Practical examination.
5. Regarding sessional examination, the parent in situation will format here member committee and this committee will examine these sessional records and hold viva of the examinee for 60% marks allotted to the subject. Marks for remaining 40% will be provided by the Faculty concerned on the basis of evaluation of each job/ work throughout the semester.

Amit Mishra Deepak 29/3/25

Scheme of Teaching and Examination for

5th Semester of 3 Years Diploma in Civil Engineering

Duration of Semester : **14 Weeks**
Student Contact Hours : **36 Total**
Total Marks : **80 hrs**

Sl. No.	Name of Subject	Subject Code	Subject	Teaching Scheme			Examination Scheme					
				L	T	P	Hours of Exam	Full Marks of Subject	Final Exam /committee marks	Internal Assessment	Pass Marks Final/Ext. Exam	Pass Marks in Subjects
1.	Irrigation Engineering	CIV503	Theory	3	-	-	3	100	80	20	26	40
2.	RCC Design	CIV504	Theory	3	-	-	3	100	80	20	26	40
3.	Adv Surveying	CIV505	Theory	3	-	-	3	100	80	20	26	40
4.	Environmental Engineering	CIV506	Theory	3	-	-	3	100	80	20	26	40
5.	Elective I	CIV 507/508/AAA 507	Theory	3	-	-	3	100	80	20	26	40
6.	Environmental Engg Lab	CIV509	Practical	-	-	2	4	50	40	10	-	20
7.	Adv .Surveying Lab	CIV510	Practical	-	-	2	4	50	40	10	-	20
8.	RCC Design Lab	CIV511	Sessional	-	-	2	-	50	30	20	-	25
9.	Elective-I Lab	CIV 512/513/AAA 514	Sessional	-	-	2	-	50	30	20	-	25
10.	InPlant Training	502	sessional	-	-	-	-	50	30	20	-	25
11.	DLS	501	Sessional	-	-	4	-	50	30	20	-	25
Total Hours of Teaching per week:				**15**		**14**	**800**					

Elective I (Traffic Management–CIV507/Adv Construction Methodology & Equipments -CIV 508/ Disaster Mangt.–AAA507)

Practical Note:

1. Period of Class hours should be of 1hrs duration as per AICTE norms.
2. Remaining Hrs every week has been marked for students for Library and Student Centred Activities.
3. Drawing/Graphics/Practical/Sessional examinations will be held at parent institution.
4. Board will depute examiner for Practical examination.
5. Regarding sessional examination, the parent institution will form a three member committee and this committee will examine the sessional records and hold viva of the examinee for 60 % marks allotted to the subject. Marks for remaining 40 % will be provided by the Faculty concerned on the basis of evaluation of each job/work throughout the semester.
6. In plant Training of 04 weeks duration to be undertaken after 4th semester Exam and before start of 5th semester classes.

29/3/15

Scheme of Teaching and Examination for

6th Semester of 3 Years Diploma in Civil Engineering

Duration of Semester : **14 Weeks**
Student Contact Hours : **36 Total**
Total Marks : **80 hrs**

Sl. No	Name of Subject	Subject Code	Subject	Teaching Scheme			Examination Scheme					
				L	T	P	Hours of Exam	Full Marks of Subject	Final Exam /committee marks	Internal Assessment	Pass Marks Final/Ext. Exam	Pass Marks in Subjects
1.	Industrial Engineering & Management	601	Theory	3		-	3	100	80	20	26	40
2.	Design of Steel Structure	CIV604	Theory	3		-	3	100	80	20	26	40
3.	Estimating & Costing	CIV605	Theory	3	-	-	3	100	80	20	26	40
4.	Contract & Account	CIV606	Theory	3	-	-	3	100	80	20	26	40
5.	Elective II	CIV607/6 08/609	Theory	3	-	-	3	100	80	20	26	40
6.	Design of Steel Structure Lab	CIV610	Sessional	-	-	2	-	50	30	20	26	40
7.	Estimating & Costing Lab	CIV611	Sessional	-	-	2	-	50	30	20	-	25
8	Contract & Account Lab	CIV612	Sessional	-	-	2	-	50	30	20	-	25
9.	Elective II Lab	CIV613/6 14/615	Sessional	-	-	2	-	50	30	20	-	25
10.	Project Work	603	Sessional	-	-	4	-	50	30	20	-	25
11.	Professional Practices	602	Sessional	-	-	4	-	50	30	20	-	25
Total Hours of Teaching per week:				**15**		**16**	15	**800**				

Elective II (Adv Structure- CIV-607/ Water Resources Planning& Management-CIV608/Earth quake Resistant Structure-CIV609):

Note:

1. Period of Class hours should be of 1hrs duration as per AICTE norms.
2. Remaining Hrs every week has been marked for students for Library and Student Centered Activities.
3. Drawing /Graphics /Practical/Sessional examinations will be held at parent institution.
4. Board will depute examiner for Practical examination.
5. Regarding sessional examination the parent institution will form a three member committee and this committee will examine the sessional records and hold viva of the examinee for 60 % marks allotted to the subject. Marks for remaining 40 % will be provided by the Faculty concerned on the basis of evaluation of each job/ work through out the semester.

3/3/25

RADHA GOVIND UNIVERSITY
RAMGARH, JHARKHAND

Department of Civil Engineering

Under Faculty of Engineering and Technology

Choice Based Credit System Curriculum for
Diploma in Engineering

SEMESTER I

(Effective from Academic Session 2025-26)

Scheme of Teaching and Examination for

1st Semester of 3 Years Diploma in Engineering (All Branches except Non Tech

Duration of : 14 Weeks

Semester Student : 36 Hrs

Contact Hours : 800

Total Marks

Sl. No.	Name of Subject	Subject Code	Subject	Teaching Scheme			Examination Scheme					
				L	T	P	Hours of Exam	Full Marks of Subject	Final Exam / committee marks	Internal Assessment	Pass Marks Final / Ext. Exam	Pass Marks in Subjects
1.	Communication Skill – I	101	Theory	3	-	-	3	100	80	20	26	40
2.	Engineering Math – I	102	Theory	3	1	-	3	100	80	20	26	40
3.	Engineering Physics - I	103	Theory	3	-	-	3	100	80	20	26	40
4.	Engineering Chemistry – I	104	Theory	3	-	-	3	100	80	20	26	40
5.	Engineering Graphics – I Th	105	Theory	2	-	-	4	50	40	10	13	20
6.	Fundamental of Computer	106	Theory	2	-	-	3	50	40	10	13	20
7.	Engineering Physics Lab – I	107	Practical	-	-	2	4	50	40	10	13	20
8.	Engineering Chemistry Lab- I	108	Practical	-	-	2	4	50	40	10	13	20
9	Engineering Graphics – I SS	109	Sessional	-	-	4	-	50	30	20	-	25
10	Communication Skill I	110	Sessional	-	-	2	-	50	30	20	-	25
11.	Fundamental of Computer - I	111	Sessional	-	-	2	-	50	30	20	-	25
12.	Workshop - I	112	Sessional	-	-	4	-	50	30	20	-	25
Total Hours of Teaching per week :				16	1	16						

Total Marks : Theory : Practical : Sessional :

L : Lecture, T : Tutorial P : Practical

Note:

1. Period of Class hours should be of 1 hrs duration as per AICTE norms.
2. Remaining Hrs every week has been marked for students Library and Student Centered Activities.
3. Drawing / Graphics / Practical / Sessional examinations will be held at parent institution.
4. Board will depute examiner for Practical examination.
5. Regarding sessional examination the parent institution will form a three member committee and this committee will examine the sessional records and hold viva of the examinee for 60 % marks allotted to the subject. Marks for remaining 40 % will be provided by the Faculty concerned on the basis of evaluation of each job / work throughout the semester.

Course Name : 03 Years Diploma in Engineering
Semester : First

Subject Title : Communication skills-I Subject Code : 101

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
L TH	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
03	1		100	80	20	26	40	3 Hrs

NOTE:

Internal marks will be allotted on the basis of two snap tests and 2 assignment of equal marks to be conducted by the faculty teaching the subject.

RATIONALE:

The comprehensive knowledge of communication and communication skill is essential for role of technicians in industry. Diploma pass outs are key persons between workforce and management and they need to be most effective in communication skills. The communication often includes grammar of the language in practice which is these days English. The in house practice before the faculty as part of scheme will develop the abilities in students a practical aspect of effective communication. Further exercises have been included for improving oral communication. Practical exposure gives a comprehensive communication skill effectiveness.

OBJECTIVES:

1. Comprehend the given passage
2. Answer correctly the questions on seen and unseen passages
3. Increase the vocabulary
4. Apply rules of grammar for correct writing

CONTENTS: Theory

Name of Topic	Hours	Marks
PART : 1 TEXT • Comprehension-Responding to Questions from text (Spectrum) • Vocabulary-Understanding meaning of new word from text. • Identifying part of Speech from text.	10	18
PART-II : Application of Grammar • Verbs Tense • Do as directed (active / passive, Direct /Indirect, affirmative/negative/assertive/interrogative, question tag, remove too, use of article, preposition ,conjunction, punctuation) • Correct the errors from the sentences.	10	18
PART-III : Paragraph Writing Types of Paragraph (Narrative, Descriptive, Technical) Unseen passage for Comprehension.	04	8
PART-IV : Vocabulary Building. • Synonyms • Antonyms • Homophones • Use of Contextual word in a given Paragraph	06	12
PART-V : Soft Skill Development • Speaking Skill • Introduction to Group Discussion • Process of Group Discussion • Leadership skill • Instant public speaking	08	16
PART- VI Etiquettes & Body Language • Telephone etiquettes listening/speaking • Problems of telephonic Conversation • Verbal/ oral etiquettes • Physical appearance Eye Contact/Body Language • Group Discussion	4	8

Total	42	80

List of Assignment :

1. Building of Vocabulary
   25 words from the glossary given at the end of each chapter, to be used to make sentences.
2. Applied Grammar
   Identify the various parts of speech and insert correct parts of speech in the sentences given by the teachers.
3. Punctuation
   Punctuation 20 sentences given by the teachers.
4. Tenses
   List 12 tenses and give two examples for each tense.
5. Dialogue Writing
   Write at least two dialogues on different situations. (Conversation between two friends, conversation between two politicians etc.)
6. Identifying the Error
   Identify the error in the sentences given by the teachers. (20 Sentences)
7. Idioms and Phrases
   Use of Idioms and Phrases in sentences. (20 Examples)
8. Biography
   Write a short biography on your favorite role model approximately. (250- 300 words with pictures)

ACTIVITIES TO BE CONDUCTED DURING PRACTICALS

01. Student should perform role-plays on the situations given by the teachers. (04 Hours)(e.g. V. Sasikumar & Dhamija 2nd edition (04 Hrs) or Linuga Phon L-21 Multimedia (Desirable)

Learning Resources :

Reference Books :

Sl. No.	Title	Author	Publisher
01.	Spectrum-A Text Book on English	--------	SBTE, Maharastra
02.	Contemporary English Grammar structures and composition	David Green	Macmillan
03.	English for practical Purpose	Z.N. Patil et el	Macmillan
04.	English Grammar and composition	R.C.Jain	Macmillan
05	Grammer & Composition	Nesfield	
06	Technical English		Longman
07	English Workplace	Editor- Mukti Sanyal	Macmillan
08	Thesaurus	Rodgers	Macmillan
09	Dictionary	Oxford	Oxford University
10	Dictionary	Longman	Oriental Longman

Web Sites for Reference :

Serial No.	Website Address
01	www. edufind.com
02	www.english_the _the_easy_eay.com
03	www.englishclub.com
04	www.english_grammar_lessons.com
05	www.wikipedia.org/wiki/english_grammar

Course Name : 03 Years Diploma in Engineering

Semester : First

Subject Title : Engineering Chemistry-I

Subject Code : 104 / 108

Teaching and Examination Scheme:

Teaching Scheme			Examination					
L	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
03			100	80	20	26	40	3 Hrs
Practical		2	50	40	10	13	20	4 Hrs

NOTE:

Internal marks will be allotted on the basis of two snap tests and 2 assignment of equal marks to be conducted by the faculty teaching the subject.

RATIONALE:

Chemistry is a basic science subject which is essential to all engineering courses. It gives knowledge of engineering materials, their properties, related applications & selection of materials for engineering applications.

Due to technological progress there are hazardous effects on environment & human life. The core knowledge of environmental effects will bring awareness in students about the precautions & preventions to be taken to reduce the ill effects.

This subject will generate curiosity of carrying out further development in engineering fields.

OBJECTIVES:

The student will be able to:

1. Draw the orbital configuration of different elements.
2. Represent the formation of molecules schematically.
3. Describe the mechanism of electrolysis.
4. Identify the properties of metals & alloys related to engineering applications.
5. Identify the properties of non metallic materials, related to engineering applications.
6. Compare the effects of pollutants on environments & to suggest preventive measures & safety.

Content: Theory

Chapte r No.	Name of the Topic	Hours	Marks

01	Atomic Structure Definition of Atom, Fundamental Particles of Atom – their Mass, Charge, Location, Definition of Atomic no, Atomic Mass no., Isotopes & Isobars, & their distinction with suitable examples, Bohr's Theory, Definition, Shape of the orbitals & distinction between Orbits & Orbitals, Hund's Rule, Aufbau's Principle (till Atomic no. 30), Definition & types of valency (Electrovalency & Covalency), Octet Rule, Duplet Rule, Formation of Electrovalent & Covalent Compounds e.g. Nacl, CaCl2, MgO, AlCl3, CO2, H2O, Cl2, NH3, C2H4, N2, C2H2. Distinction between electrovalent & covalent compounds.	06	12
02	Electrochemistry Electrolytic dissociation, Arrhenius Theory of Ionisation, Degree of Ionisation & factors affecting degree of ionization. Significance of the terms involved in Electrolysis- Such as Conductors, Insulators ,Dielectrics, Electrolyte, Non Electrolyte, Electrolysis, Electrolytic Cell, Electrodes. Mechanism of Electrolysis. Concept of electrode potential such as reduction potential & oxidation potential. Electrochemical Series, Electrolysis of CuSO4 Solution by using Cu Electrode & Platinum Electrode, Electrolysis of NaCl solution & fused NaCl by using carbon electrode, Faraday's first & second law of Electrolysis & Numericals, Electrochemical Cells & Batteries, Definition, types such as Primary & Secondary Cells & their examples. Construction, Working & Applications of Dry Cell & Lead – Acid Storage Cell, Applications of Electrolysis such as Electroplating & Electro refining, Electrometallurgy & Electrotyping	08	16
03	Metals & Alloys 3.1 Metals (Marks:10) Occurrence of Metals, Definition of Metallurgy, Mineral, Ore, Gangue, Flux & Slag, Mechanical Properties of metals such as Hardness, Toughness, Ductility, Malleability, Tensile strength, Machinability, Weldability, Forging, Soldering, Castability. Stages of Extraction of Metals from its Ores in detail i.e. Crushing, Concentration, Reduction, Refining. Physical Properties & Applications of some commonly used metals such as Fe, Cu, Al, Cr, Ni, Sn, Pb, Zn, Co, Ag, W. 3.2 Alloys (Marks: 08) Definition of Alloy, Purposes of Making alloy. Preparation Methods, Classification of Alloys such as Ferrous & Non Ferrous & their examples. Composition, Properties & Applications of Alnico, Duralumin, Dutch Metal, German Silver / Nickel Silver, Gun Metal, Monel metal, Wood's Metal, Babbit metal.	10	18

04	Non Metallic Materials 4.1 Plastics (Marks: 04) Definition of Plastic, Formation of Plastic by Addition & Condensation Polymerisation by giving e.g. of Polyethylene & Backelite plastic Respectively, Types of Plastic, Thermosoftening & Thermosetting Plastic, with Definition, Distinction & Compounding of Plastics – Resins, Fillers, Plasticizers, Acceleraters, Pigments & their examples, Engineering Applications of Plastic based on their properties. 4.2 Rubber (Marks: 04) Natural Rubber: Its Processing, Drawbacks of Natural Rubber, Vulcanisation of Rubber with Chemical Reaction. Synthetic Rubber: Definition, Distinction Between natural & synthetic rubber. Properties of rubber such as elasticity, abrasion resistant, stress & strain and related engg. application. 4.3 Thermal Insulating Materials (Marks: 04) Definition ,& types. Characteristics of insulators. Thermal insulators. Properties & Applications o f glasswool, Asbestos, Cork.	06	12
05	Environmental Effects (Awareness Level) 5.1 Pollution & Air pollution (Marks 10) Definition of pollution & pollutant, Causes of Pollution, Types of Pollution - Air & Water Pollution. Air Pollution Definition, Types of Air pollutants their Sources & Effects, Such as Gases, Particulates, , Radio Active Gases, Control of Air Pollution, Air Pollution due to Internal Combustion Engine & Its Control Methods, Deforestation their effects & control measures. Causes , Effects & control measures of Ozone Depletion & Green House Effects. 5.2 Water Pollution & Wastes (Marks 12) Definition, Causes & Methods of Preventing Water Pollution, Types of Waste such as Domestic Waste, Industrial Waste, their Physical & Biological Characteristics, Concept & significance of BOD, COD, Biomedical Waste & E – Waste, their Origin, Effects & Control Measures. Preventive Environmental Management (PEM) Activities.	12	22
Total		42	80

Practical:

Intellectual Skills: 1. Analyse given solution
2. Interpret the results

Motor Skills : 1. Observe Chemical Reactions
2. Measure the quantities Accurately
3. Handle the apparatus carefully

List of Experiments:

01 – 07 Qualitative Analysis of four salts , Containing One Basic & One Acidic Radical Listed below

Basic Radicals:

Pb^{+2}, Cu^{+2}, Al^{+3}, Fe^{+2}, Fe^{+3}, Cr^{+3}, Zn^{+2}, Ni^{+2}, Ca^{+2}, Ba^{+2}, Mg^{+2}, K_4^{+} , NH^{+}.

Acidic Radicals:

Cl^{-}, Br^{-}, I^{-}, $CO3^{-2}$, $SO4^{-2}{}_3$, NO^{-}.

05 To Determine E.C.E. of Cu by Using CuSO4 Solution & Copper Electrode

06 To standardize KMnO4 using Sodium oxalate.

07 To determine percentage of Fe in the given mohr's salt.

08 To Prepare a chart to showing application of metals like Fe, Cu, Al, Cr, Ni, Sn, Pb, Co.

09 To determine Carbon Monooxide, CO2 content emission from petrol vehicle

To Determine Dissolved Oxygen in a Water Sample.

Learning Resources:

Reference Books:

Sr. No.	Author	Name of the book	Publisher
01	Jain & Jain	Engineering Chemistry	Dhanpat Rai and Sons
02	S. S. Dara	Engineering Chemistry	S. Chand Publication
03	B. K. Sharma	Industrial Chemistry	Goel Publication
04	S. S. Dara	Environmental Chemistry & Pollution Control	S. Chand Publication
05	Vedprakash Mehta	Polytechnic Chemistry	Jain brothers
06	Uppal	Engineering Chemistry	

Course Name : 03 Years Diploma in Engineering

Semester : First

Subject Title : Engineering

Graphics-I Subject Code : 105

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
L	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
02	0	4	50+50	40+30	10+20	13 TH	20+25	4 Hrs (TH)

NOTE:

Internal marks for theory will be allotted on the basis of two snap tests and 2 assignment of equal marks to be conducted by the faculty teaching the subject.

RATIONALE:

Normally Graphical representation are used for expressing intents and contents. Engineering Graphics is the language of engineers. The concepts of Engineering Graphics are used to develop, express the ideas, and conveying the instructions which are used to carry out jobs in the field Engineering. The course illustrates the techniques of graphics in actual practice. This preliminary course aims at building a foundation for the further course in drawing and other allied subjects.

OBJECTIVES:

The student should be able to:-

1) Draw different engineering curves and know their applications.
2) Draw orthographic projections of different objects.
3) Visualize three dimensional objects and draw Isometric Projections.
4) Use the techniques and able to interpret the drawing in Engineering field.
5) Use computer aided drafting packages.

Chapter	Name of Topic		No. of Sheet	No. of Hr.	
				Theory	Practical
01.	1.1- 1.2- 1.3-	Drawing Instruments and sheet layout Letters and Numbers as per BIS: SP46-2003 Scale (Plane and diagonal scale)	02	01	04
02	2.1- 2.2- 2.3-	Curves and Conic Section To draw ellipse by directrix and arc of circle method To draw parabola by directrix and rectangle method To draw hyperbola by rectangle and directrix method.	01	02	04
03	3.1- 3.2-	Introduction to orthographic projection. Projection of point on principal, auxiliary and profile planes. Idea of shortest distance.	01	01	04
04	4.1- 4.2- 4.3-	Projection of straight line on principal plane in the following cases. Parallel to both H.P and V.P Inclined to one plane and parallel to other plane. Inclined to both plane.	01	02	04
05	5.1-	Projection of different simple shapes eg. Circle, Triangle, Rectangle, Pentagon, & Hexagon on principal plane (Inclined to one plane and to both planes)	01	02	04
06	6.1-	Projection of simple solid. Projection of Prism, Pyramid, Cone, Cylinder, and Cube with their axis inclined to one reference plane and parallel to other.	01	02	04
07	7.1- 7.2-	Section of simple solids with true shape of sectioned portion. Development of solid surfaces eg. Prism, Cylinder, Cone, Pyramid and Cubes.	01	02	04

08	8.1-	Isometric Scale and their use in drawing isometric views of single and compound solids. (Simple case only)	01	02	04
09	9.1-	Intersection of solids. Curves of intersection of the surfaces of the solids in the following case; a. Prism with Prism b. Cylinder with cylinder c. Prism with cylinder d. Cylinder with cone with different axis.	01	02	04
10	10.1-	Prospective Projection	01	02	04
11	11.1-	AutoCAD Basics, Layers, multi-layer images, graphic interfaces, different views to be drawn.	03	10	16
		Total-	14	28	56

Learning Resources:

a. Book-

Sl. No.	Author	Title	Publication
1.	N.D.Bhatt	Engineering Drawing	Charotkar Publishing House
2.	R.K.Dhawan	Engineering Drawing	S.Chand Co.
3.	K.R.Mohan	Engineering Graphics	Dhanpat Rai & Publication Co.
4.	P.J.Shah	Engineering Drawing	----
5.	P.S.Gill	Engineering Drawing	----
6.		Mastering AutoCAD	BPB Publication

Course Name : 03 Years Diploma in Engineering

Semester : First

Subject Title : Engineering Mathematics-1

Subject Code : 102

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
L TH	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
03	01		100	80	20	26	40	3 Hrs

NOTE:

Internal marks will be allotted on the basis of two snap tests and 2 assignment of equal marks to be conducted by the faculty teaching the subject.

RATIONALE:

Mathematics provides foundation for all engineering subjects. Deep thought is given while selecting topics of this subject known as "Engineering Mathematics" which intends to teach students basic facts, concepts and principles of mathematics as a tool to analyze engineering problems. It lays down the foundation for understanding core engineering and technology subjects.

OBJECTIVE:

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

Sub Objective:

This subject is divided into four units

1) Algebra, 2) Trigonometry, 3) Coordinate Geometry and

4) Vector. Upon completion of these Units the student shall be able to:

1.1 Use Logarithms in engineering calculations
1.2 Resolve Rational Fraction into sum of Partial Fractions in engineering problems
1.3 Use Matrices for solving engineering problems
1.4 Understand the concept of Binomial Expansion and use of Permutation & Combination

2.1 Solve simple problems on Compound Angles
2.2 Solve problems using the formulae for Multiple and Sub- multiple Angles

2.3 Apply Transformations for solving the problems in Trigonometry
2.4 Use Inverse Trigonometric Functions for solving engineering problems 2.5 Understand Properties of triangles

3.1 Appreciate the concept of position of any point in a plane or in space
3.2 Distance between two points and its application in solving engineering problems
3.3 Solve the problems on straight line
3.4 Solve the problems on Circles

4.1 Appreciate the concept of a new type of physical quantity called Vector
4.2 Algebra of Vectors
4.3 Solve engineering problems like work done, moment of force about a point as well as about a line.

Chaper no	NAME OF TOPICS	Hours	Marks
	ALGEBRA		
1	1.1 Prerequisites Revision of □ Arithmetic, Geometric and Harmonic Progressions, □ Formula of nth term and sum to n-terms of A.P. and G.P. □ Expression of $\sum n$, $\sum n^2$ and $\sum n^3$. □ Quadratic equations with real coefficients and relation between their roots & coefficient	01	01

	1.2 Logarithms: • Definition of logarithm (Natural and Common logarithm.) • Laws of logarithm • Examples based on 1.2.1 to 1.2.2	03	04
	1.3 PARTIAL FRACTION • Definition of Polynomial Fraction Proper & Improper Fractions and definition of Partial fractions. • To Resolve proper fraction into partial fraction with denominator containing non repeated linear factors, repeated linear factors and irreducible non repeated quadratic factors. • To resolve improper fraction into partial fraction.	03	06
	.4 DETERMINANT AND MATRICES. Determinant ---------- 4 Marks • Definition and expansion of determinants of order 2 and 3. • Cramer's rule to solve simultaneous equations for 2 and 3 unknowns. Matrices ---------- 12Marks • Definition of a matrix of order m X n and types of Matrices with examples. • Algebra of matrices such as equality, addition, subtraction, scalar multiplication and multiplication of two matrices. • Transpose of a matrix. • Minor, Cofactor of an element of a matrix, adjoint of matrix and Inverse of matrix by Adjoint method. • Solution of simultaneous equations containing 2 and 3 unknowns by matrix inversion method. • Idea of Rank of Matrix and their calculation	08	16
	1.5 BINOMIAL THEOREM • Definition of factorial notation, definition of permutation and combinations with formula (without proof). • Derivation of simple identities and solution based on it • Binomial theorem for positive index. • General term, Middle term, independent term and coefficient of x^n • Binomial theorem for negative index (only idea). • Approximate value (only formula)	02	04
2	TRIGONOMETRY		

	2.1 REVISION □ Measurement of an angle (degree and radian). Relation between degree and radian. □ Trigonometrical ratios of 0^0 , 30^0 , 45^0 , 60^0, 90^0, $90^0 \pm \theta$, $180^0 \pm \theta$ and $360^0 \pm \theta$ □ Fundamental identities.	01	01
	2.2 TRIGONOMETRIC RATIOS OF ALLIED, COMPOUND, MULTIPLE & SUBMULTIPLE ANGLES Questions based on numerical computations.	03	06
	2.3 Transformation formula of Product into sums or difference and vice versa, simple problems based on it	03	06
	2.4 INVERSE TRIGONOMETRIC RATIOS Definition of inverse trigonometric, ratios, Principal values of inverse trigonometric ratios. □ Relation between inverse trigonometric ratios.	02	04
	2.5 PROPERTIES OF TRIANGLE Sine, Cosine, Projection and tangent rules (without proof). Simple problems.	02	04
03	COORDINATE DISTANCES		
	3.1 POINT AND DISTANCES □ Distance formula, Section formula, midpoint, centroid of triangle. □ Area of triangle and condition of collinearity.	2	04
	3.2 STRAIGHT LINE □ Slope and intercept of straight line. □ Equation of straight line in slope point form, slopeintercept form, two-point form, two-intercept form, normal form. General equation of line □ Angle between two straight lines condition of parallel and □ Intersection of two lines. □ Length of perpendicular from a point on the line and perpendicular distance between parallel lines.	05	10
	3.3 CIRCLE □ Equation of circle in standard form, centre – radius for □ General equation of circle, its centre and radius, simple problem	02	04
	VECTOR ALGEBRA		

	4 VECTORS • Definition of vector, position vector, Algebra of vectors (Equality, addition, subtraction and scalar multiplication) • Dot (Scalar) product with properties. • Vector (Cross) product with properties.	03	06
	4.4 Applications 4.4.1 Work done and moment of force/s about a point & line	02	04
	TOTAL:	42	80

LEARNING RESOURCES:

Sr. No.	Title	Authors	Publications
1	Mathematics: A Textbook for Class XI Part I &II	National Council of Educational Research and Training	
2	Mathematics: A Textbook for Class XII Part I &II	National Council of Educational Research and Training	
3	Mathematics for Class XI Volume I and II	R. D. Sharma	Dhanpat Rai Publication, New Delhi.
4	Mathematics for Class XII Volume I and II	R. D. Sharma	Dhanpat Rai Publication, New Delhi.
5	Co ordinate Geometry	S. L. Loney	S. Chand Publication
6	Trigonometry	S. L. Loney	S. Chand Publication
7	Higher Algebra	H. S. Hall & S. R. Knight	Metric edition, Book Palace, New Delhi
8	Higher Sr. Secondary School Mathematics for XI & XII	R.S. Agrawal	Bharti Bhawan, Patna
9	Vector Algebra	L Prasad	Bharti Bhawan, Patna

Note:
In board examination, question setter may be advised to select 20% questions of objective, 30% of short type and remaining 50% of long type based on basic concepts, formula and calculations respectively.

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Course Name : 03 Years Diploma in

Engineering Semester : First

Subject Title : Engineering Physics-I

Subject Code : 103/ 107

Teaching and Examination Scheme:

Teaching Scheme			Examination					
L	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams

03	1		100	80	20	26	40	3 Hrs
Practical		2	50	40	10	13	20	4 Hrs

NOTE:

Internal marks will be allotted on the basis of two snap tests and 2 assignment of equal marks to be conducted by the faculty teaching the subject.

RATIONALE:

Basic science forms the foundation of Engineering. In particular Physics provides fundamental facts, principles, l aws, and proper sequence of events to streamline Engineering knowledge.

OBJECTIVES:

Student will be able to:

- Measure given dimensions by using appropriate instruments accurately.
- Select proper measuring instrument on the basis of range, least count & precision required for measurement.
- Differentiate kinetic and kinematics and solve the problems on kinematics and kinetics.
- Use principles of illumination for enhancing work efficiency.
- Analyze variation of sound intensity with respect to distance.
- Identify different factors affecting acoustical planning of buildings.
- Select proper material for intended purpose by studying properties of materials.
- Identify good & bad conductors of heat.
- Identify, analyze, discriminate and interpret logical sequence of field problems with the study of physics.

CONTENTS: Theory

CHAPTER	CONTENT	HOURS	MARKS
1.	UNITS AND MEASUREMENTS 1.1 Need of measurement and unit in engineering and science, definition of unit , requirements of standard unit, systems of units-CGS,MKS and SI, fundamental and derived quantities and their units 1.2 Definition of dimensions with examples, principle of homogeneity of dimensions, limitations of dimensions. 1.3 Definition of accuracy, precision and error, estimation of errors – absolute error, relative error and percentage error, rules and identification of significant figures. (Numericals on percentage error and significant figures)	04	06

2	MECHANICS 2.1 Motion along a straight line and Force Concept of scalar and vector quantities, Equations of motion with constant acceleration (derivation not required), Equations of motion of falling body under gravity, Newton's laws of motion, Force, inertia, Action and reaction, tension, , momentum, impulse and impulsive force with practical examples (basic Idea), Conservation of linear momentum, (Simple problems on linear motion)	04	10
	2.2Angular Motion Definition of angular displacement, angular velocity and angular acceleration, relation between linear velocity and angular velocity, definition of simple harmonic motion (SHM), SHM as a projection of uniform circular motion on any diameter, equation of SHM, derivation of displacement, velocity and acceleration of a body executing SHM.	05	08
3	GRAVITATION Newton's laws of gravitation,Newton's gravitational constant (G) and its SI unit, Acceleration due to gravity (g) and its relation with "G",Variation of g with altitude and latitude(deduction not required) (Simple problems)	03	06

4.	WORK , ENERGY & POWER Definition of work, energy and power, equations for P.E. & K.E., Work-Energy principle, Representation of work by using graph, work done by a torque (no derivation) (Numericals on work, potential and kinetic energy)	02	06
5.	GENERAL PROPERTIES OF MATTER 5.1 Elasticity Deforming force, restoring force, elastic and plastic body, stress and strain with their types. elastic limit, Hooke's law, Young's modulus, bulk modulus, modulus of rigidity and relation between them (no derivation). (Numerical on stress, strain and Young's modulus)	04	08
	5.2 Surface Tension. Molecular force, cohesive and adhesive force, Molecular range , sphere of influence, Laplace's molecular theory, Definition of surface tension and its S.I. unit, angle of contact, capillary action with examples, shape of meniscus for water and mercury, relation between surface tension , capillary rise and radius of capillary (no derivation),effect of impurity and temperature on surface tension (Numerical on relation between surface tension, capillary rise and radius)	04	08

	5.3 Viscosity Definition of viscosity, viscous force, velocity gradient, Newton's law of viscosity, coefficient of viscosity and its S.I. unit, streamline and turbulent flow with examples, critical velocity, Reynolds's number and its significance, derivation of viscous force for free fall of spherical body through viscous medium, upthrust, terminal velocity, Stoke's law (statement and formula). (Numerical on coefficient of viscosity, Reynolds number and Stoke's formula)	04	08
CHAPTER	CONTENT	HOURS	MARKS
6	HEAT Transmission of heat and expansion of solids: Three modes of transmission of heat -conduction, convection and radiation, good and bad conductor of heat with examples, law of thermal conductivity, coefficient of thermal conductivity and its S.I. unit, Definition of linear, aerial and cubical expansion and relation between them. (no derivation) (Numericals on law of thermal conductivity, and coefficients of expansions)	04	08
7	ACOUSTICS 7.1 Sound Definition of wave motion, amplitude, period, frequency, and wavelength, relation between velocity, frequency and wavelength , longitudinal and transverse wave, definition of stationary wave , node and antinode, forced and free vibrations, definition of resonance with examples, derivation of formula for velocity of sound with end correction. (Numericals on relation $v = n\lambda$ and resonance)	04	06
	7.2 Acoustics of Building Acoustics-concept and definition, Intensity and loudness of sound, echo, Reverberation standard reverberation time, Sabine's formula, Conditions for good acoustics, Factors affecting Acoustical planning of auditorium. (Numericals on Sabine's formula)	04	06
	TOTAL	42	80

Practical:

Skills to be developed

1) Intellectual skills-

   Proper selection of measuring instruments on the basis of range, least count, precision and accuracy required for measurement.
   Analyze properties of matter & their use for the selection of material.
   To verify the principles, laws, using given instruments under different conditions. To read and interpret the graph. To interpret the results from observations and calculations. To use these results for parallel problems.

2) Motor skills-

   Proper handling of instruments. Measuring physical quantities accurately.
   To observe the phenomenon and to list the observations in proper tabular form. To adopt proper procedure while performing the experiment.
   To plot the graphs.

List of Experiments:

1. To know your Physics Laboratory.
2. To use Vernier Callipers for the measurement of dimensions of given object.
3. To use Micrometer Screw Gauge for the measurement of dimensions (Length, Thickness, Diameter) of given object.
4. To use spherometer for the measurement of thickness of a given glass piece.
5. To calculate Young's modulus of elasticity of steel wire by Vernier method
6. To study capillary phenomenon and to verify that the height of liquid in capillary is inversely proportional to the radius of capillary

7. To determine coefficient of viscosity of given liquid using Stoke's Method
8. To calculate the Linear Thermal coefficient of expansion for copper by using Pullinger's apparatus.
9. To determine refractive index of a glass using glass slab by pin method. (sin i/sin r=μ).
10. To determine the velocity of sound by using resonance tube.

Reference Books:

Sr. No.	Name of book	Author	Publisher & Address
1.	Physics-I	V. Rajendran	Tata McGraw- Hill raw- Hill publication, New Delhi
2.	Applied physics	Arthur Beiser	Tata McGraw- Hill raw- Hill Publication, New Delhi
3.	Engineering Physics	by R.K.Gaur and S.L.Gupta	Dhanpat Rai Publication, New Delhi.
4.	Fundamentals of Physics	Resnick ,Halliday & Walker	Wiley India Pvt. Ltd.
5.	Core Physics-I	A. Kumar	Bharti Bhavan
6.	Pradeep's Fundament al PhysicsXI	K.L. Gomber & K.L Gogia	Pradeep Publication
7.	S. Chand's Principles of Physics-XI	V.K Mehta & Rohit Mehta	S. Chand Publication
8.	Dinesh New Millennium Physics-XI	S. K Sharma	Dinesh Publication

Course Name:- All Branches of Diploma in Engineering Semester: First

Subject Title: Fundamental of Computer Subject Code; 106/111

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
L	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
02	0		50	40	10	13	20	3 Hrs

Sessional	2	50	30	20		25	

NOTE:

Internal marks will be allotted on the basis of two snap tests and 2 assignment of equal marks to be conducted by the faculty teaching the subject.

RATIONALE:

In Engineering Education role of computers and its knowledge is day by day increasing and every documentation and analysis requires basic fundamentals of computers. The accessibility to internet and presentation techniques are essential elements these days which is fully dependent on knowhow of computers irrespective of branches or discipline.

OBJECTIVES:

Student will be able to:

1. Understand a computer system that has hardware and software components, which controls and makes them useful.
2. Understand the operating system as the interface to the computer system.
3. Use the basic function of an operating system.
4. Set the parameter required for effective use of hardware combined with and Application software's.
5. Compare major OS like Linux and MS- Windows.
6. Use file managers, word processors, spreadsheets, presentation software's and Internet.
7. Have hands on experience on operating system and different application software.
8. Use the Internet to send mail and surf the World Wide Web.

CONTENTS : Theory

Chapter	Name of Topic	Hr	Marks
1.	Fundamentals of Computer 1.1 Introduction 1.2 Type of Computer 1.3 Components of PC 1.4 Inputs & Output Devices 1.5 Computer Languages 1.6 Memory of Computer	4	6
2.	Introduction to MS Office 3.1 MS- Word : Introduction, Starting MS-Word Screen and its Components, Elementary Working with MS-Word 3.2 MS- Excel: Introduction, Starting MS-Excel, Basics of Spreadsheet, MS- Excel Screen and its Components, Elementary Working with MS- Excel. 3.3 MS –Power Point: Introduction, Starting MSPowerPoint, Basics of PowerPoint, MS-PowerPoint	8	12

	Screen and Its Components, Elementary Working with MS-PowerPoint.		
3.	Introduction to Internet 4.1 What is Internet? 4.2 Computer Communication and Internet. 4.3 WWW and Web Browsers. 4.4 Creating own Email Account. 4.5 Networking and types.	4	6
4.	Introduction to HTML and Software 5.1 Introduction to HTML. Working of HTML 5.2 Creating and loading HTML pages, tags. 5.3 Structure of on HTML, Document, Stand Alone Tags. 5.4 Formatting text, Adding Images, Creating hyper Links, Tables. 5.6 Cyber security. 5.7 Computer virus.	8	10
5.	Information Technology 6.1 Current IT Tools. 6.2 Social networking, mobile computing, cloud computing. 6.3 Introduction of IOT and IOE 6.4 Computer Application in various fields like Data analysis, database management, artificial intelligence.	6	6
	Total	30	40

List of Practical

Exp- 1

Identification of different part of computer system and peripherals

Exp – 2: Operations on operating system

1. Create a new folder and do the following:
   a. Make a new folder in it.
   b. Rename the initial folder.
   c. Opening a new file.
   d. Creating document in note pad.
   e. Move the initial folder.
   f. Copy the initial folder.
   g. Delete the initial folder

2. Implement the various well known features of Windows operating system such as Notepad, WordPad, Calculator, System tools etc. enclosed in Start→Programs→Accessories.
3. Implement various display properties by right clicking on the Windows Desktop.
4. Explore the taskbar of Windows.
5. Set the wall paper and screen saver.
6. Set the date /time.

Exp.3 Basic operations on MS Word

1. Create a document and
   a. Put Bullets and Numbers
   b. Apply various Font parameters.
   c. Apply Left, Right, and Centre alignments
   d. Apply Hyperlinks
   e. Insert pictures
   f. Insert ClipArt
   g. Show the use of Word Art
   h. Add Borders and shading
   i. Show the use of Find and Replace.
   j. Apply header/footers

Exp- 4 Advance operations on MS Word

2. Create any document and show the use of File→Versions.
3. Create any document and show the difference between paste and paste special.
4. Create any document and show the use of Washout/Watermark.
5. Implement the concept of mail merge.
6. Implement the concept of macros.
7. Implement the concept of importing a file/document.
8. Implement the concept of merging the documents.
9. Create a student table and do the following :

a. Insert new row and fill data
b. Delete any existing row.
c. Resize rows and columns.
d. Apply merging/ splitting of cells
e. Apply sort.
f. Apply various arithmetic and logical formulas.
g. Apply various arithmetic and logical formulas.

10. Create your resume using General Templates.

Exp- 5 Basic operation on electronic spreadsheet/excel

1. Computer the division of each and every student of a class.
2. Generation of Electricity Bill
3. Generation of Telephone Bill
4. Generation of Salary statement of an employee
5. Generation of Mark Sheet of a student.
6. To compute mean / median / mode.
7. Generation graph to show the production of goods in a company during the last five years.

8. Compare the cost, overheads and sales figure of a company for last three years through appropriate chart.

Exp – 6 Advance operations on electronic spreadsheet

1. Generation the following worksheet

Roll No.	Marks
2050	67
2051	49
2052	40
2053	74
2054	61
2055	57
2056	45

and do the following:

a. Create chart of the marks.
b. Compute sum of marks using auto sum, auto calculate and sum function.
c. Compute average of marks.
d. Show pass or fail if marks are above 50 or less than 50
e. Put header and footer in the spread sheet. Importing and exporting data from other files.

Program development in excel using simple commands.

Exp – 7 Power Point Presentation preparation

1. Make a presentation of College Education System using
   a. Blank Presentation
   b. From Design Template
   c. From Auto Content Wizard

Exp – 8 Animation and various effect in Power Point Presentation, exporting and importing contents from word/excel

1. Make a presentation on “Wild Life " and apply the following:
   a. Add audio and video effects
   b. Apply various Color Schemes
   c. Apply various animation schemes.
   d. Apply slide show

Exp – 9 Simple program in HTML

1. Create any webpage using following HTML tags:
   a. Background Colour

b. Font (Colour, Size, Face)
c. Bold / Italic / Underline
d. Big / Small
e. H 1, H 2, etc.
f. Marquee
g. Ordered / Unordered List
h. Data list

2. Create Employee Table and apply various operations on it using HTML. Also put Border around the table.
3. Create Internal and External Hyperlinks in a Webpage.
4. Implement the concept of Frames in a Webpage.
5. Insert an image in a Webpage.
6. Design Home page of your Institute
7. Design Web page for tourism spots in your area
8. Prepare your CV and link on the web page
9. Use animation of image in a web page
10. Insert a table and perform table handling in web page

Exp – 10 Basics of Internet, surfing, email account opening and transactions through email account

1. Connect the Internet; open any website of your choice and save the Web Pages.
2. Search any topic related to your syllabus using any search engine and download the relevant material.
3. Create your E-Mail ID on any free E-Mail Server.
4. Login your E-Mail ID and do the following:

a. Read your mail
b. Compose a new Mail
c. Send the Mail to one person
d. Send the same Mail to various persons
e. Forward the Mail
f. Delete the Mail
g. Send file as attachment

5. Surf Internet using Google to find information about yours state college.
6. Surf Internet using Google to find Tourism information about your state.
7. Surf Internet using Yahoo to find Hotel around your state

Text Books:

i) C.S. French "Data processing and Information Technology ", BPB Publications.
ii) P.K Sinha Computer Fundamentals , BPB Publications iii) Guy Hart-Davis "The ABCs of Microsoft Office Professional Edition", BPB Publication.
iv) Karl Schwartz, "Microsoft Windows 98 Training Guide"

Course Name : 03 Years Diploma in

Engineering Semester : First

Subject Title : Workshop-I

Subject Code : 112

Teaching and Examination Scheme:

Teaching Scheme			Examination					
L TH	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
01		4	50	30	20	--	25	---

Rationale:

Engineering diploma technician is expected to know basic workshop practice. like Wood working, Sheet metal. The students are required to identify, operate, control various machines, select and use various tools and equipments related to Wood working and sheet metal processes together with exposure to fabrication soldering and joint making of various types.

Objectives:

The student will able to

- Know basic workshop processes.
- Read and interpret job drawing.
- Identify, select and use various marking, measuring, holding, striking and cutting tools & equipments.
- Operate, control different machines and equipments.
- Inspect the job for specified dimensions
- Produce jobs as per specified dimensions.
- Adopt safety practices while working on various machines.

CONTENTS:

Sr.No.	Details Of Theory Contents	Jobs	Theory (hr)	Practice(hr)
01	CARPENTRY SHOP 1. Introduction. 2. Various types of woods. 3. Different types of tools, machines and accessories. 4. Practice Job a. Preparation of cross lap joints. b. T Lap joints c. Dovetail Joints d. Wood turning	04	04	14
02	FITTING SHOP: 1. Introduction 2. Various marking, measuring, cutting, holding and striking tools. 3. Different fitting operation like chipping, filing, right angle, marking, drilling, tapping etc. 4. Working Principle of Drilling machine, Tapping dies its use. 5. Safety precautions and safety equipments. 6. Practice 3 Jobs (V groove, Square notch, Fitting of two parts)	03	03	12
03	SHEET METAL SHOP. 1. Introduction 2. Various types of tools, equipments and accessories. 3. Different types of operations in sheet metal shop. 4. Soldering and riveting. 5. Safety precautions 6. Practice Jobs (Making funnel, tray, cylinder)	03	03	14
04	TURNING SHOP 1. Introduction 2. Various marking, measuring, cutting, holding and striking tools. 3. Working Principle of Drilling machine, Tapping dies its use. 4. Drilling and Tapping 5. Turning: Plain, taper 6. Threading and Knurling 7. Safety precautions and safety equipments.	03	04	16

	Total	13	14	56

Skill to be developed:

Intellectual Skills:

1. Ability to read job drawing
2. Ability to identify and select proper material, tools, equipments and machine. 3. Ability to select proper parameters (like cutting speed, feed, depth cut use of lubricants) in machine.

Motor Skills:

- Ability to set tools, work piece, and machines for desired operations.
- Ability to complete job as per job drawing in allotted time.
- Ability to use safety equipment and follow safety procedures during operations.
- Ability to inspect the job for confirming desired dimensions and shape.
- Ability to acquire hands-on experience.

Notes: 1] The Faculty/ Instructor shall give demonstration to the students by preparing a specimen job as per the job drawing.

2] The workshop diary shall be maintained by each student duly signed by Faculty/Instructor of respective shop

Books:

- S.K. Hajara Chaudhary- Workshop Technology-Media Promotors and Publishers, New Delhi
- B.S. Raghuwanshi- Workshop Technology- Dhanpat Rai and sons, New Delhi
- R K Jain- Production Technology- Khanna Publishers, New Delhi
- H.S.Bawa- Workshop Technology- Tata McGraw Hill Publishers,New Delhi
- Kent's Mechanical Engineering Hand book- John Wiley and Sons, New York
- Electronics Trade & technology Development Corporation.(A Govt. of India undertaking) Akbar Hotel Annex, Chanakyapuri, New Delhi- 110 021
- Learning Materials Transparencies, CBT Packages developed by N.I.T.T.E.R. Bhopal.

RADHA GOVIND UNIVERSITY
RAMGARH, JHARKHAND

Department of Civil Engineering

Under Faculty of Engineering and Technology

Choice Based Credit System Curriculum for
Diploma in Engineering

SEMESTER II

(Effective from Academic Session 2020-21)

Scheme of Teaching and Examination for

2nd Semester of 3 Years Diploma in Engineering (All Branches except Non Tech)

Duration of Semester : 14
Weeks Student Contact Hours :36 Hrs
Total Marks : 800

Sl. No.	Name of Subject	Subject Code	Subject	Teaching Scheme			Examination Scheme					
				L	T	P	Hours of Exam	Full Marks of Subject	Final Exam / committee marks	Internal Assessment	Pass Marks Final / Ext. Exam	Pass Marks in Subjects
1.	Communication Skill – II	201	Theory	3	-	-	3	100	80	20	26	40
2.	Engineering Math – II	202	Theory	3	1	-	3	100	80	20	26	40
3.	Engineering Physics - II	203	Theory	3	-	-	3	100	80	20	26	40
4.	Engineering Chemistry - II	204	Theory	3	-	-	3	100	80	20	26	40
5.	Programming in C	205	Theory	3	-	-	3	100	80	20	26	40
6.	Engineering Physics II	206	Practical	-	-	2	3	50	40	10	13	20
7.	Engineering Chemistry II	207	Practical	-	-	2	3	50	40	10	13	20
8.	Programming in C	208	Sessional	-	-	4	3	50	30	20	-	25
9.	Workshop Practices	209	Sessional	-	-	4	4	100	60	40	-	50
10.	Professional Practice I	210	Sessional	-	-	4	-	50	30	20	-	25
Total Hours of Teaching per week :				15	1	16						

Total Marks :	Theory	:		Practical	:		Sessional	:		
	L	:	Lecture,	T	:	Tutorial	P	:	Practical	

Note:

1. Period of Class hours should be of 1 hrs duration as per AICTE norms.
2. Remaining Hrs every week has been marked for students for Library and Student Centered Activities.
3. Drawing / Graphics / Practical / Sessional examinations will be held at parent institution.
4. Board will depute examiner for Practical examination.
5. Regarding sessional examination the parent institution will form a three member committee and this committee will examine the sessional records and hold viva of the examinee for 60 % marks allotted to the subject. Marks for remaining 40 % will be provided by the Faculty concerned on the basis of evaluation of each job / work throughout the semester.

Course Name : All Branches of Diploma Engineering

Semester : Second

Subject Title : Communication Skills

Subject Code : 201

Teaching and Examination Scheme:

Teaching Scheme			Examination					
L	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
03	1		100	80	20	26	40	3 Hrs

NOTE:
Internal marks will be allotted on the basis of two snap tests and 2 assignment of equal marks to be conducted by the faculty teaching the subject.

Rationale:

The Students have been already been exposed to the Language Skills pertaining to English, leading to a better understanding of English & use of grammar, developing a base for the language. Now with a view to achieve some mastery over the language & to develop Communication Skills, which is the main objective of this subject, the basic concepts of communication, Non-verbal and written skills have been Introduced.

Objectives:

The Students will be able to:

1) Understand and use the basic concepts of communication and principles of effective communication in an organized set up and social context.
2) Give a positive feedback in various situations, to use appropriate body language & to avoid barriers for effective communication.
3) Write the various types of letters, reports and office drafting with the appropriate format.

Contents: Theory

Chapter	Name of the Topic	Hours	Mark s

01	Introduction to communication: 1.1 Definition, communication cycle., 1.2 The elements of Communication: sender- message – channel- Receiver –Feedback. 1.3 Concept of Communication Process. 1.4 Stages in the process: defining the context, knowing the audience, designing the message, encoding, selecting proper channels, transmitting, receiving, decoding and giving feedback. (Case lets.)	04	08
02	Types of communication 2.1 Formal Communication. 2.2 Formal: Types – a) Vertical Communication. b) Horizontal Communication. 2.3 Informal: Types – a) Diagonal Communication. 2.4 Verbal Vs Non-Verbal Communication. 2.5 Verbal: Types-a) Oral Communication. b) Written Communication. 2.6 Non-Verbal: Types- a) Body Language. b) Graphic Language.	06	10
03	Principles of Effective Communication : 3.1 Principles of Effective Communication. (One example each.) 3.2 Communication barriers & how to overcome them. 3.3 Developing effective messages: Thinking about purpose, knowing the audience, structuring the message, selecting proper channels, minimizing barriers & facilitating feedback. (Examples: Writing articles for newspapers, magazines.)	04	08
04	Non verbal- graphic communication: 4.1 Non- verbal codes: A- Kinesecs , B- Proxemics , C – Haptics D-Vocalics , E- Physical appearance. F -Chronemics , G –Artifacts. (One example each.) 4.2 Aspects of Body Language. Types of Body Language. (One example each.) 4.3 Interpreting visuals & illustrating with visuals like tables, charts & graphs.	06	12

05	Formal written skills : 5.1 Office Drafting: Circular, Notice, and Memo. 5.2 Job Application with resume. 5.3 Business correspondence: Enquiry, Order letter, Complaint letter, and Adjustment letter. 5.4 Report writing: Accident report, Fall in production, Progress Report,, Investigation Report. 5.5 Defining, Describing Objects &Giving Instructions. 5.5.1 Defining Objects- Appearance, It's Use. 5.5.2 Describing Objects- Purpose, Components, Functions, Applications. 5.5.3 Giving Instructions- Precise, Directive, Imagistic Statements of a futuristic stance.	10	20
06	Oral Skills : 6.1Phonetics and Phonology - Introduction - Phonetics symbols - Consonants/vowels/Dipthongs - Stress and Intonation 6.2 Discussion Skills - Importance of group discussion - Leadership skills - Team management 6.3 Presentation Skills - Importance of presentation - Planning of presentation - Handling stage fright 6.4 Mock Interview - The Interview process - Pre-Interview preparation - Answering strategies	12	22
	Total	42	80

Assignments:

1. Communication Cycle (With the Help of Diagram) + Any two communication situations to be represented with the help of Communication Cycle. (Use Pictures)
2. Communication Situations (List of 5 Communication situations stating the type of communication viz; Vertical, Horizontal, Diagonal.
3. Barriers That Hinder a Particular Communication Situation. (State the type of barrier, and how to overcome them). (04 Caselets)
4. Writing articles (two) in keeping with the parameters of developing effective messages.

(Collect samples from newspapers, articles, Internet and pate them in the assignment.)

5. Business Letters: a) Job Application with Resume.
   b) Enquiry Letter.
   c) Order Letter.
   d) Complaint Letter.
6. Non-Verbal Communication:
   a) Body Language: Five Illustrations of appropriate use of Body Language used on the part of student in formal and Informal setups. (Example- formal setup- classroom
   b) Graphic Language: Five Illustrations of the use of Signs, Symbols, Colours, Maps, Graphs, Charts in day to day life.
7. Presentation Skills: Select topic (current issues) and ask students to give a class presentation as per the principles of effective communication and paste these topics as an assignment in the file.
8. Non-Verbal Codes: Kinesics, Physical Appearance, Haptics. (Collect five pictures per group of five students on the above mentioned non-verbal codes, analyse and discuss them in the class. Ask the students to paste these pictures along with explanation in their individual files.

GUIDELINES: Teachers can make use of group discussions, class presentations, role plays, simulations, caselets, listen and repeat drills with the help of cassettes etc to give a hand on experience for students. Students should maintain the Institute Files to write all the eight assignments with aprper Index and get it duly certified.

Learning Resources:

Books:

Sr. No.	Author	Title	Publisher
01	SBTE, Mumbai.	Text book of Communication Skills.	SBTE, Mumbai.
02	M.Ashraf Rizvi	Effective Technical Communication	Tata McGraw Hill Companies.

03	Krushna Mohan, Meera Banerji	Developing Communication Skills	Macmillan
04	Joyeeta Bhattacharya	Communication Skills.	Reliable Series
05	Jayakaran	Every ones guide to effective writing.	Apple Publishing.
06	Website: www.mindtools.com/page8.html-99k		
07	Website: www.khake.com/page66htm/-72k		
08	Website: www.BM Consultant India.Com		
09	Website: www.letstak.co.in		
10	Website: www.inc.com/guides/growth/23032.html-45k		

Course Name : 03 Years Diploma

Engineering Semester : Second

Subject Title : Engineering

Chemistry-II Subject Code : 204 / 207

Teaching and Examination Scheme:

Teaching Scheme			Examination					
L	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
03			100	80	20	26	40	3 Hrs
Practical		2	50	40	10	13	20	4 Hrs

NOTE:

Internal marks will be allotted on the basis of two snap tests and 2 assignment of equal marks to be conducted by the faculty teaching the subject.

RATIONALE:

This syllabus of chemistry of 2^{ND} semester for all the branches of Diploma Engineering has been given the name “Engineering Chemistry”. In this it is intended to make students learn about the Engineering Materials and their appropriate uses, Lubrication process and protection of machines in

different working environments, quality of water and its treatment as per the requirement, corrosion and its control by various methods.

OBEJECTIVE:

The student will be able to:

1. Suggest the appropriate use of metals, alloys and non-metallic material in engineering.
2. Knowledge of corrosion of metal and control methods.
3. Knowledge of choosing suitable lubricants for smooth running machines.
4. Implementing the knowledge and utilization of water and water treatment to serve the requisites of a particular use.

Contents: Theory

Chapter	Name of the Topic	Hours	Marks
1.	Electrochemistry: Conductivity of Electrolytes – Concept of Ohms Law, Specific Conductance, Specific Resistance, Equivalent Conductivity & Molar Conductance, Variation of Specific, Molar and Equivalent Conductance with dilution. Concept of: Cell Constant, PH, POH and Buffer solution. Numerical based on PH and POH. Application of PH and Buffer solution.	04	08

2.	Metals and Alloys 2.1 Metals: Definition of Metallurgy, Brief introduction of the terms involved in metallurgy. Metallurgy of Iron: Resources of Fe, Important Ores of Iron, Extraction process, Smelting in Blast Furnace, Chemical Reactions in Blast Furnace. Composition of Pig Iron. Engineering applications of Pig Iron, Cast Iron, wrought Iron or Malleable Iron. Metallurgy of Copper: Important ores of Copper, Extraction of Copper from chief ore. Engineering properties of Copper and applications. Metallurgy of Aluminium: Important Ores of Aluminium, Extraction of Aluminium from Alumina by Electrolytic Reduction Process, Electrolytic Refining of Aluminium, Engineering Properties of Aluminium & Uses. 2.2 Alloys: Ferrous Alloys Various methods of steel making, Composition, Properties &Applications of Plain Carbon Steel (Low Carbon, medium Carbon, High Carbon & Very Hard Steel) & Effect of Various Alloying Elements (Cr, W, V, Ni, Mn, Mo, Si) etc. on Steel. Non-Ferrous Alloys: Copper Alloys–Brass, Bronze, Nickel Silver or German Silver, their Composition, Properties & Applications. Aluminium Alloys – Duralumin, Magnalium, their Composition, Properties & Applications Other Alloys: Definition, Compositions, Properties &Applications of Soft Solder, Tinmann's Solder, Brazing Alloy, Plumber's Solder, Rose Metal.	12	24
3	Non-Metallic Engineering Matrerial 3.1 Ceramics: Definition, Properties & Engineering Applications, Types – Structural Ceramics, Facing Material, Refractories, Fine Ceramics, Special Ceramics. 3.2 Refractories:	06	12

	Definition, Properties, Applications & Uses of Fire Clay Bricks, Silica Bricks and Masonry Bricks. 3.3 Composite Materials: Definition, Properties, Advantages, Applications & Examples. 3.4 Adhesives:(Marks 4) Definition, Characteristics, Advantages of adhesives, examples such as phenol-formaldehyde resin, urea formaldehyde resin, epoxy resin-their properties and applications as an adhesives.		

4	Water: Characteristics, Sources, Impurities, Hard & Soft Water, Causes of Hardness, Types of Hardness, Degree of Hardness, Boiler and Steam Generation, Scale & Sludge Formation – Causes, Disadvantage, Softening Methods such as Boiling, Clark's, Soda Ash, Lime Soda, Zeolite & Ion Exchange Methods with Principle Chemical Reactions. Plumbo solvency & its Removal. Numerical Problems.	5	10
5	Corrosion: Definition of Corrosion, Types of Corrosion (Dry and Wet chemical Corrosion) and their mechanism. Protection of metal from corrosion (Corrosion Control). Application of Protective Coatings like metal coating such as Galvanising, Tinning, Metal Spraying, Sherardizing, Electroplating and Metal Cladding. Paints & Varnishes: Paints Definition, Characteristics of Good Paint, Constituents & their functions & Examples, Methods of Applications. Introduction to Chemical Resistant Paints, Heat Resistance Paint, Cellulose Paint, Luminous Paints, Emulsion Paints, Metal Paints, Cement Paints, Water Paint or Distempers. Varnishes: Definition, Characteristics, Constituents, Types, Composition, Properties & Application of Japans, Enamels, Lacquers.	09	16
6	Lubricant and Lubrication: Lubricant – Definition, Classification with examples. Functions of lubricant, Lubrication – Mechanism of Lubrication (Fluid Film, Boundary and Extreme Pressure). Physical Characteristics of Lubricants Such as Viscosity, Viscosity Index, Oiliness, Volatility, Flash & Fire Point, and Cloud& Pour Point, Chemical Characteristics such as Acid Value or Neutralization Number, Emulsification, Saponification Value, Selection of Lubricants, Characteristics of Transformer oil.	06	10
Total		42	80

List of Practical:

1	To determine neutralization point of Fatty Acid and ammonium hydroxide. Calculate normality and strength of Fatty Acids.
2	To determine the equivalent conductivity of precipitation of $BaCl_2$ with H_2SO_4 by titrating method. Also find the normality and strength of $BaCl_2$ Solution.
3	To verify Faraday's second law of electrolysis.
4	To determine PH of given solution by universal indicator and PH meter.

5	To determine the strength of given hydrochloric acid solution by titrating it against sodium hydroxide solution by using PH meter.
6	To determine thinner content in Oil paint.
7	To determine the flash and fire point of a given sample of lubricating oil.
8	To prepare Phenol formaldehyde resin (Backelite)
9	To determine viscosity of given lubricating oil.
10	To determine the alkalinity of given sample of water to decide the suitability of water for use in industry, steam generation, etc.
11	To determine degree of hardness of water by EDTA method to find the suitability of water in industrial and domestic use.
12	Study of fire clay bricks and furnaces.

Learning Resources Books:

Sl. No	Authors	Nameofthebook	Publisher
1	Jain&Jain	EngineeringChemistry	DhanpatRaiandSons
2	S.S.Dara	EngineeringChemistry	S. ChandPublication
3	B. K.Sharma	IndustrialChemistry	GoelPublication
4	S.S.Dara	EnvironmentalChemistry &PollutionControl	S. ChandPublication
5	VedprakashMehta	Polytechnicchemistry	JainBrothers

Course Name : 03 Years Diploma in Engineering
Semester : Second

Subject Title : Engineering Mathematics-II

Subject Code : 202

Teaching and Examination Scheme:-

Teaching Scheme			Examination Scheme					
L TH	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
03	01		100	80	20	26	40	3 Hrs

NOTE:

Internal marks will be allotted on the basis of two snap tests and 2 assignment of equal marks to be conducted by the faculty teaching the subject.

Rationale:

The subject is extension of Engineering Mathematics - 1 of First Semester and stepping into the prerequisites to learn Applied Mathematics applicable in engineering solutions. Engineering Mathematics lay down the foundation to understand and express principles and laws involved in other technological subjects. The study of Engineering Mathematics will help to develop the skills essential for new emerging avenues.

Objective:

The student will be able to acquire knowledge of mathematical terms, concepts and principles. They can acquire sufficient mathematical techniques and can develop the ability to apply mathematical methods to solve technical and day to day practical problems.

Sub Objective:

This course is divided into five units. After completion of this course one could become able to learn the following.

1. Intuitive meaning of Function, Limit and Continuity for solving the problems
2. Differentiation and its meaning in engineering situations
3. Applications of the Differentiation
   - 3.1 Understand the Geometrical Applications of Derivatives
   - 3.2 Use Derivatives to find extreme values of functions
   - 3.3 The concept of Derivatives as Rate Measure
   - 3.4 Use Derivatives to find Radius of Curvature.
4. Basic terms of Statistics And Prob
5. Complex Number
   - 5.1 Representation of Complex numbers in various forms
   - 5.2 Definition of complex number, its operations and property.
   - 5.3 De-Moivre's theorem (without proof) and simple problems.

Contents: Theory

Chapter	Name of the Topic	Hours	Marks

01	1. Function, Limit and Continuity 1.1 Function • Definition of variable, constant, intervals and their type • Definition of Function, value of a function and types of functions, Simple Examples • Definition of sinh x, cosh x and tanh x and some hyperbolic identities 1.2 Use the concepts of Limit for solving the problems • Explain the concept of limit and intuitive meaning of $\lim_{x \to a} f(x) = l$ and its properties. • Derive the Standard limits $\lim_{x \to a} \frac{x^n - a^n}{x - a}$, $\lim_{x \to 0} \frac{\sin x}{x}$, $\lim_{x \to 0} \frac{1}{x}$, $\lim_{x \to 0} \cos x$, $\lim_{x \to 0} \frac{\tan x}{x}$, $\lim_{x \to 0} \frac{a^x - 1}{x}$, $\lim_{x \to 0} \frac{e^x - 1}{x}$, $\lim_{x \to 0} (1+x)^x$, $\lim_{x \to \infty} \left(1 + \frac{1}{x}\right)^x$ with simple example. • Evaluate the limits of the type $\lim_{x \to a} \frac{f(x)}{g(x)}$. • Explain the Concept of continuity of a function at a point and in interval with some examples whether a given function is continuous or not. $\lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$ and Standard notations to denote the derivative of a function.	06	12

	2. Differentiation and its meaning in engineering situations Concept of derivative of a function y = f(x) from the first principle as Derivatives of elementary functions like x^n, a^x, e^x, log x, sin x, cos x, tanx, secx, cosecx, cot x and Invise Trigonometrical function using the first principles. Rules for differentiation of sum, difference, scalar multiplication, product and quotient of functions with illustrative and simple examples. Differentiation of a function of a function (Chain rule) with illustrative examples such as 2 $t^2 +$ $\sqrt{\text{(ii) } x^2 \sin 2x}$.	12	24

	Applications of the Differentiation 3.1 Geometrical Applications of Derivatives • State the Geometrical meaning of the derivative as the slope of the tangent to the curve y=f(x) at any point on the curve. • Equation of tangent and normal to the curve y=f(x) at any point on it. • The concept of angle between two curves and procedure for finding the Angle between two given curves with illustrative examples. 3.2 Use of Derivatives to find extreme values of functions • The concept and condition of increasing and decreasing functions with illustrative examples. • Find the extreme values (maxima or minima) of a function of single variable - simple problems yielding maxima and minima. 3.3 Concept of Derivatives as Rate Measure with illustraribe examples. 3.4 Concept of Derivatives to find Radius of Curvature with illustraribe examples.	14	24
	4. Statistics • Measures of Central tendency (mean, median, mode) for ungrouped and grouped frequency distribution. • Graphical representation (Histogram and Ogive Curves) to find mode and median • Measures of Dispersion such as range, mean deviation, Standard Deviation, Variance and coefficient of variation. Comparison of two sets of observations.	04	08
	5. Complex Number. • Represent the complex number in various forms like modulus-amplitude, polar form, Exponential (Euler) form – illustrate with examples • Modulus, Conjugate and Argument of Complex Number and their properties. • Operations on complex numbers (Equality, Addition, Subtraction, Multiplication and Division) with examples. • Square root of complex number • Cube roots of units and their properties, simple problems based on them. • De-Moivre's theorem (without proof) and simple problems.	6	12
	Total	42	80

Tutorial: Tutorials are to be used to get enough practice for solving problems. It is suggested that in each tutorial at least five problems should be solved.
Learning Resources:

Books:

Sr. No	Title	Authors	Publications
1	Mathematics: A Textbook for Class XI Part I & II	National Council of Educational Research and Training	
2	Mathematics: A Textbook for Class XII Part I & II	National Council of Educational Research and Training	
3	Mathematics for Class XI Volume I and II	R. D. Sharma	Dhanpat Rai Publication, New Delhi.
4	Mathematics for Class XII Volume I and II	R. D. Sharma	Dhanpat Rai Publication, New Delhi.
5	Higher Engineering Mathematics	B.S Grewal	Khanna Publication, New Delhi
6	Higher Sr. Secondary School Mathematics for XI & XII	R.S. Agrawal	Bharti Bhawan, Patna

Note:
In board examination, question setter may be advised to select 20% questions of objective, 30% of short type and remaining 50% of long type based on basic concepts, formula and calculations respectively.

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Course Name : 03 Years Diploma Engineering

Semester : Second

Subject Title : Engineering Physics-II

Subject Code : 203/ 206

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
L	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
03			100	80	20	26	40	3 Hrs
Practical		2	50	40	10	13	20	4 Hrs

NOTE:

Internal marks will be allotted on the basis of two snap tests and 2 assignment of equal marks to be conducted by the faculty teaching the subject.

RATIONALE:

Basic science forms the foundation of Engineering. In particular Physics provides fundamental facts, principles, l aws, and proper sequence of events to streamline Engineering knowledge.

Objectives : The Student will be able to :

1. Analyze the basic properties of light.
2. Differentiate between field intensity and potential.
3. List the advantages of optical fibre.
4. Describe principal of working of optical fibre.
5. Differentiate between conductor, Insulator and semi conductor on the basis of band theory.
6. Know simple idea of Nano Technology.
7. Know simple idea of non conventional sources of energy.

Contents : Theory

Chapter	Name of the Topic	Hours	Marks
1.	LIGHT Properties of light Reflection, refraction, Snell's law, physical significance of refractive index, definition of dispersion of light along with ray diagram. (Numericals on refractive index)	03	06
2.	Electric Field and Potential 2.1 Electric field Electric charge, Coulomb's inverse square law, Definition of unit charge, Electric field, Electric lines of force and their properties, Elect field intensity, Electric flux, Electric flux density. (Numericals on Coulombs law, Electrical Intensity)	05	08
	2.2 Electric Potential Concept of potential, Definition and unit, Potential due to point charge using integration method, Potential difference between two points, Definition of dielectric strength and breakdown potential. (Numericals on electric potential)	05	08
	2.3 Capacity & Condensers Electrostatics capacity & its S.I unit, Capacity of parallel plate condenser, Condensers in series & parallel (Formula only,no derivation), Uses of condensers. (Simple problems)	03	06

3	CURRENT ELECTRICITY Ohm's law, Resistance and its unit, Specific resistance, Factors affecting resistance, Kirchhoff's law and its application to Wheat stone bridge circuit.	03	08
4	Fiber Optics Introduction, Total internal reflection, critical angle, acceptance angle. Structure of optical fiber, Numerical Aperture, Fiber optic materials, Types of optical fibers, Applications in communication systems. (Numerical on critical angle, numerical aperture)	05	08
5	Band Theory of Solids Energy levels in solids, Valence & conduction bands, forbidden gap, Conductors, Semiconductors and Insulators, Intrinsic and Extrinsic Semiconductors, p-type and n-type semiconductors, P-N junction diode-forward and reversed biased characteristics.	05	08
6	MODERN PHYSICS. 7.1 Photo electricity Concept of photon, Plank's hypothesis, properties of photon, photo electric effect, Laws of photoelectric effect, work function, Einstein's photoelectric equation(no derivation), Basic Concept of Solar Energy. (Numericals on Energy of photon, work function, photoelectric equation) 7.2 LASER Properties of laser, Characteristics and applications of Laser 7.3 X-rays Introduction to X-rays, production of X-rays using Coolidge tube, minimum wavelength of X-rays, properties and applications. of X-rays (Numericals on minimum wavelength of x-rays)	03 01 02	06 04 06
7	Introduction to nanotechnology Definition of nanoscale, nanometer & nanoparticle, applications of nanotechnology- electronics, automobiles, medical, textile, cosmetics, environmental, space and defence.	03	06
	Non- Conventional Sources of energy Introduction- Non Renewable and renewable (Alternate)		

8	energy sources, Examples- Solar Energy, Wind Energy, Tidal Energy, Geo-Thermal Energy and Bio-Mass. Advantages and disadvantages of renewable energy.	04	06	
Total			42	80

Practical :

Skills to be

Developed :

Intellectual

Skills :

- Proper selection of measuring instruments on the basis of range, least count, precision and accuracy required for measurement.
- To verify the principles, laws, using given instruments under different conditions.
- To read and interpret the graph.

- To interpret the results from observations and calculations.
- To use these results for parallel problems.

Motor
Skill :

- Proper handling of instruments.
- Measuring physical quantities accurately.
- To observe the phenomenon and to list the observations in proper tabular form.
- To adopt proper procedure while performing the experiment.

List of Experiment :

1. To represent simple harmonic motion with the help of vertical oscillation of spring to determine spring constant (K) (Stiffness Constant).
2. To determine time period of oscillation of compound bar pendulum and calculate acceleration due to gravity (g).
3. To calculate refractive index of material of prism using spectrometer device.
4. To determine effective capacitance of series and parallel combination of capacitors by calculating its reactance.
5. Verification of Ohm's Law.
6. To convert galvanometer into ammeter of required range using appropriate value of shunt.
7. To verify Total Internal Reflection (TIR) phenomenon for given glass slab and to calculate critical angle of incidence.
8. Determination of Energy Gap (Forbidden Gap) of a semi-conductor.
9. To determine I-V characteristics of P-N junction Diode.
10. To verify inverse square law by using photoelectric cell.

Learning :
Recourses :
Books :

Sr. No.	Author	Title	Publisher
01.	Arthur Beiser	Applied physics	Tata McGraw-Hill
02.	R.K.Gaur and S.L.Gupta	Engineering Physics	Dhanpatrai and Sons.
03.	Rensic and Halliday	Physics	Wiley publication
04.	Dr. S.K. Kulkarni	Nanotechnology-Principles and practices	Capital publishing company
05.	S.K.Gupta	ABC of Physics	Modern Publisher New Delhi
06.	A.S. Vasudeva	Senior Practical Physics	S.K.Kataria & Sons.
07.	Core Physics-II	A. Kumar	Bharti Bhavan

08.	Pradeep's Fundamental Physics-XII	K.L. Gomber & K.L Gogia	Pradeep Publication
09.	S. Chand's Principles of Physics-XII	V.K Mehta & Rohit Mehta	S. Chand Publication
10.	Dinesh New Millennium Physics-XII	S. K Sharma	Dinesh Publication

Course Name : 03 Years Diploma in Engineering

Semester : Second

Subject Title : Professional Practice-I

Subject Code : 210

Teaching and Examination Scheme:

Teaching Scheme			Examination					
L TH	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External
			50	30	20	---	25	---

Rationale:

Most of the diploma holders are employed in industries. Due to globalization and competition in the industrial and service sectors the selection for the job is based on campus interviews or competitive tests.

While selecting candidates a normal practice adopted is to see general confidence, ability to communicate and attitude, in addition to basic technological concepts.

The purpose of introducing professional practices is to provide opportunity to students to undergo activities which will enable them to develop confidence. Industrial visits, expert lectures, seminars on technical topics and group discussion. These are planned in the semester so that there will be increased participation of students in learning process.

Objectives:

Student will be able to:

1. Acquire information from different sources.
2. Prepare notes for given topic.
3. Present given topic in a seminar.
4. Interact with peers to share thoughts.
5. Prepare a report on industrial visit, expert lecture.

Sr. No.	Activity
1	Industrial Visits: Structured industrial visits be arranged and report of the same should be submitted by the individual student, to form part of the term work. Visits to any two of the following : i) Construction site for residential / Public building. ii) Petrol Pump iii) Media Center iv) Small Scale industry. v) Domestic Appliances repair centre vi) Visit public utility place
2	Lectures by Professional / Industrial Expert to be organized on any three topics of the following suggested areas or any other suitable topics: i) Pollution control. ii) Fire hazards due to short circuits iii) Fire Fighting / Safety Precautions and First aids. iv) Vedic Mathematics and Abacus. v) Topics related to Social Awareness such as –Traffic Control System, Career opportunities , Communication in Industry, Yoga Meditation, Aids awareness and health awareness
3	Group Discussion : The students should discuss in group of six to eight students and write a brief report on the same as part of term work. The topic for group discussions may be selected by the faculty members. Some of the suggested topics are - i) Sports ii) Cultural iii) Discipline and House Keeping iv) Current topic related to Electrical Engineering field.

4	Literature Survey Student will be provided an emerging engineering topic for literature survey from Internet and other media. Based on inputs on the topics students will prepare a report and submit the sample for evaluation after due presentation before the faculty.
5	Presentation preparation and demonstration on live sociao economics technical aspects. Students in batch of maximum 5 numbers are expected to prepare a power point presentation on a topic with minimum of 20 slides. The topics can be from the following: a. Rural vs urban divide b. Make in India c. Gender equality d. Satellite launching programs of India e. Global Stake in Economics of India f. Super power in making: India g. Bottom of the pyramid h. Social Responsibility of Individual i. Swachh Bharat ABhiyan j. Namami Gange Project k. Digital India

Course Name : 03 Years Diploma in

Engineering Semester : Second

Subject Title : Programming in C

Subject Code : 205/208

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
L	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
03	0		100	80	20	26	40	3 Hrs

Sessional	2	50	30	20		25	3 Hrs

NOTE:

Internal marks will be allotted on the basis of two snap tests and 2 assignment of equal marks to be conducted by the faculty teaching the subject.

Rationale : These days computer knowledge is essential for engineers. Analysis and logical development of basic entities is any engineering field requires software development which in turn requires a programming tool. The best opted tool for program development paving way for software is C language these days. The advancement of C and subsequent program development utilising the concepts of strings arrays decision making in unconditional and conditional manner is required.

Objectives:

1. Development of flowcharts/algorithms for engineering problem solutions.
2. Structural modular program development for software implementation.
3. Working upon a statistical attributes on different aspects of engineering problem for arriving at best suited solutions.
4. Decision making in various atmosphere and conditions.
5. A tool for better learning and grasp of basics.

Chapter	Contents	Hours	Marks
01	Basics of C 1.1 Introduction to number system 1.2 Introduction to flowchart and algorithm 1.3 History of C, where C stands 1.4 C character set ,tokens ,constants ,variables, keywords 1.5 C operators (arithmetic, Logical, assignment, relational, increment and decrement, conditional, bit wise, special, operator precedence),C expressions data types. 1.6 Formatted input, formatted output.	06	12

02	Decision making 2.1 Decision making and branching if statement (if, if-else ,else-if ladder, nested if-else) Switch case statement ,break statement. 2.2 Decision making and looping while, do, do-while statements for loop, continue statement.	06	10
03	Arrays and Strings 3.1 Arrays Declaration and initialization of one dimensional, two dimensional and character arrays, accessing array elements. 3.2 Declaration and initialization of string variables, string handling functions from standard library (strlen(), strcpy(), strcat(), strcmp()).	08	16

04	Functions, Structures 4.1 Functions Need of functions, scope and life time of variables, defining functions, function call (call by value, call by reference), return values, storage classes. category of function (No argument No return value, No argument with return value, argument with return value), recursion 4.2 Structures Defining structure, declaring and accessing structure members, initialization of structure, arrays of structure.	08	16
05	Pointers 5 Understanding pointers, declaring pointer variable, initialization of pointer variable, accessing address of a variable, pointer expressions, Pointers arithmetic, pointers and arrays, array of pointers	08	16

06	File Handling File System Basics, opening and closing of files, reading and writing in files, File opening modes, string I/O in files.	06	10
Total		42	80

Exp. -1: Introduction to C compiler

Exp. -2: Simple basic program in C language using unconditional branching statements.

Exp. -3: Development of C program using conditional branching and subroutines.

Exp.-4 : Development of program for functions.

Exp. – 5 : Development of program in c for operation of one dimensional arrays.

Exp. – 6 : Development of program in c for operation of Multi-dimensional arrays.

Exp.- 7: Development of program in C for display using in different modes.

Exp.-8: Development of program in C for operation on structures.

Exp.-9 : Development of program in C for operation on pointers.

Exp.-10: Development of program in C for file handling.

Course Name : 03 Years Diploma in

Engineering Semester : Second

Subject Title : Workshop- II

Subject Code : 209

Teaching and Examination Scheme:

Teaching Scheme			Examination					
L TH	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
		4	50	30	20	--	25	---

Rationale:

Engineering diploma technicians are expected to know basic workshop practice with special reference to Gas and arc Welding, Gas cutting, Drilling, Tapping, Plumbing and Hot Working Processes. The students are required to select and use various tools and equipments for welding, fitting, tapping drilling, plumbing and forging operations.

Objectives:

The student will able to:

- Know basic workshop processes.
- Read and interpret job drawings.
- Identify, select and use various marking, measuring, and holding, striking and cutting tools & equipments wood working and sheet metal shops.
- Operate, control different machines and equipments.
- Select proper welding rods and fluxes.
- Inspect the job for specified dimensions
- Produce jobs as per specified dimensions.
- Adopt safety practices while working on various machines.

Notes: 1] The F a c u l t y / Instructor shall give demonstration to the students by preparing a specimen job as per the job drawing.

2] The workshop diary shall be maintained by each student duly signed by F a c u l t y / Instructor of respective shop.

CONTENTS: Subject practical content as shown in the table below: Skill to be develop.

Intellectual Skills:

1. Ability to read job drawings.
2. Ability to identify and select proper material, tools and equipments and machines.
3. Ability to select proper parameters (like cutting speed, feed, depth cut use of lubricants) in machine.

Motor Skills:

1. Ability to set tools, work piece, and machines for desired operations.
2. Ability to complete job as per job drawing in allotted time.
3. Ability to use safety equipment and follow safety procedures during operations.
4. Ability to inspect the job for confirming desired dimensions and shape.
5. Ability to acquire hands-on experience

Sr. No.	Details of	Job	Theory	Practice
01	HOUSE WIRIING AND ELECTRICAL FITTING 1. Introduction 2. Various types of electrical wiring 3. Safety precautions 4. Preparation of different type of joints 5. Wiring of two way switching system 6. Wiring of two bulb, one fan one power point with a fuse connection. 7. Introduction to commonly used equipments, earth resistance measurement 8. Fault finding and repairing of common household appliances	03	02	10
02	Electronics 1. Introduction to different types of components 2. Soldering practice 3. Soldering of a pyramid 4. Soldering of a battery eliminator circuit/charger 5. Soldering on PCB 6. Introduction to desoldering and practice 7. Introduction to CRO and other electronic measuring instrument	03	02	10
03	WELDING SHOP 1. Introduction to equipments and accessories used in welding 2. Gas, Arc, Spot, welding practice 3. Lap welding practice 4. Butt welding practice 5. Spot welding practice	03	04	12
04	PLUMBING SHOP 1. Introduction. 2. Various marking, measuring, cutting, holding and striking tools. 3. Different types of G.I. & PVC pipes, flexible pipes used in practice. 4. Piping layout. 5. G.I. & PVC pipes fittings and accessories, Adhesive solvents- chemical action,	03	03	12

05	Black Smithy Shop 1. Introduction to tools and techniques 2. Preparation of commonly used instruments such as flat chisel, ring, screw driver.	03	03	12
	Total	15	14	56

Skill to be developed:

Intellectual Skills:

1. Ability to read job drawing
2. Ability to identify and select proper material, tools, equipments and machine. 3. Ability to select proper parameters (like cutting speed, feed, depth cut use of lubricants) in machine.

Motor Skills:

1. Ability to set tools, work piece, and machines for desired operations.
2. Ability to complete job as per job drawing in allotted time.
3. Ability to use safety equipment and follow safety procedures during operations.
4. Ability to inspect the job for confirming desired dimensions and shape.
5. Ability to acquire hands-on experience.

01	TURNING SHOP Note:1] One job related to Plane and Taper turning, threading and knurling 2] One job related to Drilling and tapping 3] Batch size should be selected depending on volume of work. 4] Job allotted should comprise of 6-8 hours of actual working 5] Student shall calculate the cost of material and labor cost for their job from the drawing.
02	WELDING SHOP Note:1] One job of standard size (Saleable/marketable article shall be preferred) 2] Batch size should be selected depending on volume of work . 3] Job allotted should comprise of 6-8 hours of actual working operations. 4] Student shall calculate the cost of material and labor required for their job from the drawing.
03	PLUMBING SHOP • Demonstration of PVC pipe joint with various fittings. • Exercise for students on preparing actual pipeline layout for PVC pipe. Preparing actual drawing and bill of material.

(Note: Utility item are not to be assessed

Learning Resources:

Books:

Sr. No.	Author	Title	Publisher
01	S.K. Hajara Chaudhary	Workshop Technology	Media Promotors and Publishers,New Delhi
02	B.S. Raghuwanshi	Workshop Technology	Dhanpat Rai and Sons, New Delhi
03	R K Jain	Production Technology	Khanna Publishers, New Delhi
04	H.S.Bawa	Workshop Technology	Tata McGraw Hill Publishers,New Delhi
05	--	Kent's Mechanical Engineering Hand book	John Wiley and Sons, New York

Video Cassettes / CDS

- Learning Materials Transparencies, CBT Packages developed by NITTER Bhopal.

RADHA GOVIND UNIVERSITY
RAMGARH, JHARKHAND

Department of Civil Engineering

Under Faculty of Engineering and Technology

Choice Based Credit System Curriculum for Diploma in Engineering

SEMESTER III

(Effective from Academic Session 2020-21)

Scheme of Teaching and Examination for

3 rd Semester of 3 Years Diploma in Civil Engineering

Duration of Semester : 14 Weeks
Student Contact Hours : 36 Hrs
Total Marks : 800

Sl. No.	Name of Subject	Subject Code	Subject	Teaching Scheme			Examination Scheme					
				L	T	P	Hours of Exam	Full Marks of Subject	Final Exam / committee marks	Internal Assessment	Pass Marks Final / Ext. Exam	Pass Marks in Subjects
1.	Math III	301	Theory	4		-	3	100	80	20	26	40
2.	Surveying	CIV303	Theory	3	-	-	3	100	80	20	26	40
3.	Building Material	CIV304	Theory	3	-	-	3	100	80	20	26	40
4.	Strength of Material	CIV305	Theory	3	-	-	3	100	80	20	26	40
5.	Building Drawing (AutoCAD)	CIV306	Theory	3	-	-	3	100	80	20	26	40
6.	Surveying Lab	CIV307	Sessional	-	-	4	4	100	80	20		40
7.	Strength of Material Lab	CIV308	Practical	-	-	2	4	50	40	10		20
8.	Building Material Lab	CIV309	Sessional			4	4	100	40	10		20
9.	DLS	302	Sessional			4		50	30	20	-	25
Total Hours of Teaching per week :				16		14		800				

Total Marks : Theory : Practical : Sessional :

L : Lecture, T : Tutorial P : Practical

Note: 1. Period of Class hours should be of 1 hrs duration as per AICTE norms.

2. Remaining Hrs every week has been marked for students for Library and Student Centered Activities.
3. Drawing / Graphics / Practical / Sessional examinations will be held at parent institution.
4. Board will depute examiner for Practical examination.
5. Regarding sessional examination the parent institution will form a three member committee and this committee will examine the sessional records and hold viva of the examinee for 60 % marks allotted to the subject. Marks for remaining 40 % will be provided by the Faculty concerned on the basis of evaluation of each job / work throughout the semester.

HIGH LIGHTS OF REGULATIONS OF FYUGP

PROGRAMMEDURATION

- The Full-time, Regular DIPLOMA programme for a regular student shall be for a period of three years with multiple entry and multiple exit options.
- These session shall commence from 1st of July.

ELIGIBILITY

- The selection for admission will be primarily based on availability of seats in the Major subject and marks imposed by the institution. Merit point for selection will be based on marks obtained in Major subject at Class 10 (or equivalent level) or the aggregate marks of Class 10 (or equivalent level) if Marks of the Major subject is not available. Reservation norms of The Government of Jharkhand must be followed as amended in times.

ADMISSIONPROCEDURE

- The reservation policy of the Government of Jharkhand shall apply in admission and the benefit of the same shall be given to the candidates belonging to the State of Jharkhand only. The candidates of other states in there served category shall be treated as General category candidates. Other relaxations or reservations shall be applicable as per the prevailing guidelines of the University for AICTE.

ACADEMICCALENDAR

- Each year the University shall draw out a calendar of academic and associated activities, which shall be strictly adhered to. The same is non-negotiable. Further, the Department will make all reasonable end eavors to deliver the programmes of study and other educational services as mentioned in its Information Brochure and website. However, circumstances may change prompting the Department to reserve the right to change the content and delivery of courses, discontinue or combine courses and introduce or withdraw areas of specialization.

CALCULATION OF MARKS FOR THE PURPOSE OF RESULT

- Student's final marks and the result will be based on the marks obtained in Semester Internal Examination and End Semester Examination organized taken together.
- Passing in a subject will depend on the collective marks obtained in Semester internal and End Semester University Examination both. However, students must pass in Theory and Practical Examinations separately.

PUBLICATION OF RESULT

- There suit if the examination shall be notified by the Controller of Examinations of the University in different newspapers and also on University website.

- If a student is found indulged in any kind of mal practice/ unfair means during examination, the examination taken by the student for the semester will be cancelled. The candidate has to reappear in all the papers of the session with the students of next coming session and his one year will be

detained. However, marks secured by the candidate in all previous semesters will remain unaffected.

- There shall be no Supplementary or Re-examination for any subject. Students who have failed in any subject in an even semester may appear in the subsequent even semester examination for clearing the backlog. Similarly, the students who have failed in any subject in an odd semester may appear in the subsequent odd semester examination for clearing the backlog.

- Regulation related with any concern not mentioned above shall be guided by the Regulations of the University for AICTE

Civil Engineering Objectives And Student Outcomes

Mission

The mission of the Civil Engineering Program is to create and administer a quality civil engineering program designed to achieve four major goals:

- Educate new generations of civil engineers to meet the challenges, demands, and expectations of our global society;
- Cultivate, enrich and promote scholarship, responsibility and service among our graduates;
- Disseminate new knowledge;
- Nurture interdisciplinary education for solving the problems facing an ever-changing society.

Program Educational Objectives (PEOs)

Within a few years of graduation, the graduates of the Civil Engineering Program at the University of New Haven will:

- Practice the profession of civil engineering, make progress toward Professional Engineering licensure and/or pursue graduate studies
- Serve the civil engineering profession and society through involvement in professional and community organizations
- Engage in life-long learning through professional training and/or independent inquiry and study to meet their career goals
- Develop the expertise that allows graduates to make judgment-based decisions with confidence
- Contribute creative ideas and innovations that empower others and promote advancements in their profession

Student Learning Outcomes (SLOs)

In order to achieve its mission and educational objectives the Civil Engineering Faculty must ensure that graduates have attained the following program outcomes:

- Have the ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
- Have the ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
- Have the ability to communicate effectively with a range of audiences

- Have the ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
- Have the ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
- Have the ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
- Have the ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Diploma in Engineering (All branch except Mining, Arch & Non Tech) Semester: Third

Subject Title: Engineering Mathematics-III

Subject Code: 301

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
L TH	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
03	01		100	80	20	26	40	3 Hrs

NOTE: Internal marks will be allotted on the basis of two snap tests and 2 assignment of equal marks to be conducted by the faculty teaching the subject.

Rational: The subject is extension of Engineering Mathematics – 1 & 2 of First year and stepping into the prerequisites to learn Applied Mathematics applicable in engineering solutions. Engineering Mathematics lay down the foundation to understand and express principles and laws involved in other technological subjects. The study of Engineering Mathematics will help to develop the skills essential for new emerging avenues.

Objective:

The student will be able to acquire knowledge of mathematical terms, concepts and principles. They can acquire sufficient mathematical techniques and can develop the ability to apply mathematical methods to solve technical and day to day practical problems and to execute management plans with precision.

Sub Objective:

This course is divided into five units. After completion of this course one could become able to learn the following.

- Intuitive meaning and Methods of finding integration definite integration and its properties.
- Application of Integration in finding Area, volume of irregular shapes.
- Methods of solving differential equation of first order and first degree.
- Methods for finding approximate roots by using bisection, Regula-falsi, Newton-Raphson method, Gauss elimination, Jacobi and Gauss- Seidalmethods.
- Use of Binomial, Normal and Poisson distributions for solving different examples.
- Use of Laplace transform for solving problems of Differential Equations.
- Use of Fourier series for expansion of function at thegiven intervals

Contents: Theory

Chapter	Name of the Topic	Hours	Marks
01	Integration: 1.1 Definition of integration as anti-derivative. Integration of standard function. 1.2 Rules of integration (Integrals of sum, difference, scalar multiplication). 1.3 Methods of Integration. 1.3.1 Integration by trigonometrical transformation. 1.3.2 Integration by substitution 1.3.3 Integration by parts. 1.3.4 Integration of rational and irrational functions. 1.3.5 Integration by Partial fractions.	7	16
	1.4 Definite Integration. 1.4.1 Concept of definite integrations with examples. 1.4.2 Properties of definite integral with simple problems.	3	
	1.5 Applications of definite integrals. 1.5.1 Area under the curve. 1.5.2 Area bounded by two curves.	3	
2	Differential Equation 2.1 Definition of differential equation, order and degree of differential equation. Formation of differential equation. 2.2 Solution of differential equations of first order and first Degree such as variable separable form, reducible to Variable separable, Homogeneous and Linear Differential Equation.	6	16
	2.3 Applications of Differential equations. 2.3.1 Rectilinear motion (motion under constant and variable acceleration) 2.3.2 Newton's Law of Cooling	3	
3	Numerical Methods 3.1 Solution of algebraic equations Bisection method, Regula falsi method and Newton–Raphson method.	3	16
	3.2 Solution of simultaneous equations containing 3 unknowns 3.2.1 Gauss elimination method. 3.2.2 Jacobi's Iterative method. 3.3.3 Gauss Seidal method.	3	

	3.3 Interpolation 3.3.1 Concept of interpolation and extrapolation. 3.3.2 Different operators (Δ, ∇& E), relation between them, some problems based on operators, formation of Difference Table. 3.3.3 Newton's Forward and Backward difference interpolation formulae. 3.3.4 Lagrange's interpolation formula. 3.3.5 Problems based on above.	6	
	3.4 Numerical Differentiation &Integration. 3.4.1 Newton's forward and backward difference first and second order formula for differentiation at any point 3.4.2 Numerical integration Trapezoidal rule and Simpson's $1/3^{rd}$rule.	3	
4	4.1 Probability: 4.1.1 Definition of random experiment, sample space, event occurrence of event and types of events (impossible, mutually exclusive, exhaustive, equally likely) 4.1.2 Definition of probability, addition and multiplication theorems of probability.	05	16
	4.2 Probability Distribution 4.2.1 Binomial distribution. 4.2.2 Poisson's distribution. 4.2.3 Normal distribution 4.2.4 Simple examples based on above .	05	
5	5.0 Laplace Transform 5.1 Definition of Laplace transforms Laplace transform of standard functions. 5.2 Properties of Laplace transform such as Linearity, first shifting, second shifting, multiplication by t^n, division by t. 5.3 Inverse Laplace transforms. Properties-linearly first shifting, second shifting. Method of partial fractions,	3	16
6	6.0 Fourier Series 6.1 Definition of Fourier series (Euler's formula). 6.2 Series expansion of continuous functions in the intervals $(0,2l),(-l,l),(0,2\pi),(-\pi,\pi)$	3	
7	7.0 Linear Programming 7.1 Introduction 7.2 Solution of Linear Programming problem (LPP) by Graphical Method.	3	
	TOTAL:	56	80

Tutorial: Tutorials are to be used to get enough practice for solving problems. It is suggested that in each tutorial at least five problems should be solved.

Books Information:

S. No.	Title	Authors	Publications
1.	Higher Engg. Mathematics	B. S. Grewal	Dhanpat Rai
2.	Engineering Mathematics	H.K.Das	S.Chand& Company LTD, New Delhi
3.	Higher E ngineering Mathematics	B.V,Ramana	Mcgraw Hill Education (India) Private limited, New Delhi
4.	Practical Mathematics	I.B. Prasad	Khanna
5.	Introductory Method of Numerical Analysis	S.S.Shastri	P.H.I
6.	Linear Programming	G. Hadley	
7.	A text book for class 12, Part- I & II	NCERT	NCERT, Delhi

Learning Objectives:

1. Formulate and solve abstract mathematical problems recognize real-world problems that are amenable to mathematical analysis, and formulate mathematical models of such problems

Learning Outcomes:

1. Critical thinking, research, and reasoning.
2. Recognizing and differentiating among diverse cultures through the history of mathematics.
3. Engaging in activities directly benefitting the broader community.

SURVEYING
LTP 30
Subject Code: CIV303 Total
Contact: 42 hrs Total marks:
100(80+20)

Course outcome:

1. Understand the basic principles of surveying
2. Learn linear and angular measurement to arrive at solution to basic surveying problems.
3. Employ conventional surveying data capturing techniques and process the data for computation.

4. Analyse the obtained spatial data to compute areas and volumes and draw contours to represent 3D data on plane figure.

1.0 Introduction: 02hrs
1.1 Definition of surveying and related terms
1.2 Aims and objectives of surveying
1.3 Primary division of surveying with their purposes
1.4 Classification of surveying
1.5 Principles of surveying
1.6 Field work- essential feature and organization
1.7 Office work- feature, plotting, scales, effect to ferroneous scale
1.8 Maintenance and adjustments of instruments
1.9 Precision and accuracy of measurements

2. 0 Linear measurement: 10hrs

Method of measuring distance, their merit sand demerits. Instruments for measuring distance: Tape and Chains Equipment and accessories for chaining – description only. Use of chain- unfolding & folding, use of arrows, reading a chain, testing and adjusting of chain. Ranging– purpose, signalling, direct and indirect ranging, line ranger-featuring and use, error due to incorrect tranging. Method of chaining- Role of leader and follower, Chaining on flat ground, chaining on sloping ground-stepping method, Clinometers-feature and use, slope correction. (Demonstration in field). Field problems- Setting perpendicular with chain & tape, chaining across different type of obstacles- Chaining around obstacle possible: Vision fee but chaining obstructed both vision and chaining obstructed. Chaining around obstacle not possible: Vision free but chaining obstructed, chaining free but vision obstructed. Numerical problem on chaining across obstacles. Error and mistakes in liner measurement-classification, sources of error and remedies. Correction to measured length due to-incorrect length, temperature variation, pull, sag, numerical problem applying corrections. Precaution during chaining. Principle of chain surveying- well conditioned and ill conditioned triangles. Field books – single line & double line entry, field book recording. Selection of survey station, baseline, Tie line, Check lines. Offsets-necessity, perpendicular and Oblique offsets, setting offsets with chain &tape, Instruments for setting offset- Cross staff, optical Square, feature, use & handling, suitability, sources of error& remedies. Error in chain surveying-causes & remedies, Precautions during chain surveying.

3.0 Compass Surveying: 08 hrs

3.1 Compass- types- surveyor's compass, Prismatic compass, feature, parts, merits & demerits, suitability of different types.
3.2 Concept of meridians-magnetic, true, arbitrary. Concept of bearings-whole circle bearing, Quadrantal bearing/ reduced bearing, numerical problems on conversion of bearings.
3.3 Use of compass-setting in field- centering, levelling, taking readings, concept off ore-bearing, Back bearing, Numerical problems on computation of interior & exterior angles from bearings.
3.4 Effect of earth's magnetism- dip of needle, magnetic declination, variation in declination numerical problems on application of correction for declination.

3.5 Local attraction-causes, detection, error, corrections, numerical problems on application on application of correction due to local attraction.

3.6 Principle of traversing- open & closed traverse, advantage & disadvantages over chain surveying.

3.7 Method of traversing- locating objects, field book entry.

3.8 Plotting of traverse- check of closing error in closed & open traverse.

3.9 Computations of area from plotted survey, plain meter, feature, use of menstruation techniques-average ordinate rule. Trapezoidal rule, Simpson's rule.

4. 0 Levelling: 08

4.1 Purpose of levelling Definition of terms used in levelling- concept of level surface, Horizontal surface, vertical surface, datum, RL, Bench mark, Concept of line of collimation, axis of bubble tube, axis of telescope, vertical axis, BS, IS,FS,CP, HI.

4.2 Types of levels and Levelling staff, auto level.

4.3 Temporary adjustment of level, taking reading with level

4.4 Principle of levelling- simple levelling, Different types of levelling, use and method -Fly levelling, check levelling- longitudinal section and cross- sections

4.5 Field data, entry of level Book- Height of collimation method and rise & fall method comparison, Numerical problems on reduction of level applying both methods, Arithmetic checks.

4.6 Effect of curvature and refraction, numerical problems on application of correction.

4.7 Reciprocal levelling- principle method, numerical problems, precise levelling.

4.8 Difficulties in levelling, erroring levelling and precautions

4.9 Contouring: Counter interval, horizontal interval, characteristics of counter lines, inter polation of contour, uses of contour maps

5. Theodolite Survey 10hrs

5.1 Types of theodolite and terminologies in theodolite survey

5.2 Temporary and permanent adjustment of theodolite

5.3 Relation between fundamental lines of theodolite

5.4 Measurement of horizontal and vertical angles, baseline, extension of baseline

5.5 Feature sand use of Total Station and modern survey equipments.

5.6 Tachometry survey for determination of horizontal distance of plane and slope ground. (numerical problems)

5.7 Latitude, departure and computation of length and bearing of closed traverse. Bowditch and transit rule.

6. Plane Table Survey 4hrs

6.1 Different instruments used

6.2 Different Methods

Sub: Surveying Lab

Subject Code: CIV 307

ALL PRACTICAL FIELD WORKS ARE ATTACHED WITH FIELD BOOK AND DRAWING WORK ON FULL IMPERIAL SIZE DRAWING SHEETS.

(Minimum experiments to be performed should be 10)

1. Measurement of distances with chain & tape on ground with director in Direct Ranging.
2. Use of Optical Square for setting out perpendicular and running survey line for locating details.
3. Measuring For bearing and back bearing of 5-6 sided closed polygon. Identifying stations affected by local Attraction and their corrections.
4. Measuring for bearing and back bearing for an open traverse (5 to 6 sided). Calculated I rectangles between successive lines.
5. Use of Dumpy Level, temporary adjustments and recording readings in Field Book. Differential levelling practice, reduction of level by H.I. method/ Rise and fall method.
6. Carrying Bench mark from one point to another point about 200m by fly levelling with auto level.
7. Preparation of Contour Map of a small area by direct levelling
8. Locating details with plain table by method of Radiation and inter section.
9. Measurement of Horizontal Angle by Transit Theodolite (repetition method)
10. Measurement of Vertical Angles by theodolite.
11. To find reduced level sand horizontal all distances using Theodolite as a Tacheometer.
12. Use of Total Station for finding Horizontal and Vertical distance sand reduced levels.
13. Use of Digital Planning meter for determination of area

REFERENCE BOOKS:

1. Surveying levelling– beet's. Kanetkar & S.V. Kuljarni; Griha prakash, Pune
2. Surveying–by B.C Punmia; Laxmi publication,Delhi-6
3. A text book of surveying and levelling-by R. Agor ;Khanna Publishers,delhi-6
4. Surveying and levelling- by Hussain and Nagraj ;S. Chand & co, Delhi
5. Surveying & levelling– by S.C Rangawal; Charotar Book Stall, Pune 6. Surveying & levelling– by N.N Basak; Tata Mc. Grave Hill
7. Plane Surveying– by A. De; S chand & co.

BUILDING MATERIALS

Total marks: 100 (80+ 20)
Subject Code CIV 304
Theory: 42

COURSE OBJECTIVE:

The subject of building material is very important for the diploma holder in civil engineering.

The course material has been designed for the student to know the properties of the building material as well as the strength of the material as per IS code of practices. Further, practices input has been given for augmenting the learning by the student.

COURSE OUTCOMES:

1 To know the properties of different material for use and quality control in constructions works.
2 Ability to communicate effectively the mechanical properties of material.
3 Understanding of professional and ethical responsibility in the area of material testing.
4 Ability to use the techniques, skill and modern engineering tools necessary for engineering.

Rational:

The subject of building material is very important for the diploma holder in civil engineering. The course material has been designed for the student to know the properties of the building material as well as the strength of the material as per IS code of practices. Further, practices in put have been given for augmenting the learning by the student.

Aim: To know the properties of different material for use and quality control in construction works.

1.0 Bricks: 05hrs

- 1.1 Bricks earth–its composition & selection
- 1.2 Brick making– preparation of brick moulding, drying, burning in kiln.
- 1.3 Classification of bricks, size of traditional and modular bricks, qualities of good building bricks.
- 1.4 Uses of brick bats and surkhi, uses of hollow bricks.

2.0 Lime: 01hrs

- 2.1 Type of lime
- 2.2 Uses of lime

3. 0 Cement: 02hrs

Type of cements, Properties of cements, testing of quality of cement

4.0 Sand: 02hrs

- 4.1 Sources and classification of sand
- 4.2 Bulking factor and finesses of sand
- 4.3 Qualities and grading of sand for plaster and for masonry Work as per BIS specification (IS: 1542, 2116, 38)

5 .0 Stone: 03hrs

- 5.1 Classification of rock, uses of stone, natural bed of stone, Qualities of good building stone.
- 5.2 Stone quarrying- tools for blasting, process of blasting, Precautions in blasting, machines for quarrying, dressing of stone.
- 5.3 Characteristics of different type of stone and their uses

6.0 Refractory material and clay products: 03hrs

6.1 Definition, classification of refractory.

6.2 Properties and uses of refractory like terra cotta, porcelaing lazing.

6.3 Different types of Tile and similar products.

7. Mortar and concrete: 10Hrs

7.0 Composition and properties of ingredients in both cement & lime mortar and concrete

7.1 Properties and uses of cement & lime mortar and concrete

7.2 Grading of aggregates in concrete

7.3 Water- cement ratio

7.4 Concreting- mechanical properties of aggregate, mixing of ingredients, placing, compacting and curing of concrete.

7.5 Introduction to Ready Mixed Concrete

7.6 Factors responsible for deterioration of concrete

8.0 Timber: 04Hrs

8.0 Classification and structure of timber

8.1 Defects in timber

8.2 Disease and decay of timber

8.3 Seasoning and preservation of timber

8.4 Manufacturing and uses of plywood

8.5 Special characteristics of Assam type timber

8.6 Substitute building materials of timber

9.0 Paint, Varnish and Distemper: 04Hrs

9.0 Purpose of painting a surface

9.1 Characteristics of ideal paint and varnish

9.2 Ingredients of paint and varnish

9.3 Process of painting and varnishing

9.4 Repainting of old surface

9.5 Purpose of applying distemper, properties, ingredients, process of distempering

9.6 Application of white washing and colour washing

10.0 Iron and steel: 03Hrs

10.1 Uses of cast iron, wrought iron, mild steel and tor steel

10.2 Classification and uses of steel

11.0 Bituminous material: 03hrs

11.1 Distinction among tar, bitumen and asphalt

11.2 Different types of asphalt and tor and their uses

12. Introduction to Nano Materials 02Hrs

Building Materials Lab Subject
Code CIV 309

List of Experiments (Minimum10 Experiments are to be performed)

1. Identification of various construction materials
2. Determination of compressive strength of brick.

3. Water absorption test on Bricks, Stone sand Tiles.
4. Hardness test of floor marbles and tiles.
5. Construction of bonds in brick work
6. Compressive strength test of Cement mortar
7. Tensile strength of cement mortar 8. Compressive strength of concrete cube
9. Slump test of concrete.
10. Demonstration of log of a timber cross section.
11. Checking spreading quality of paints.
12. Determination of Hardness of glass.

REFERENCE OF BOOKS:

1. Materials of construction- by D.N Ghosh, :Tata Mc – Grew hills
2. Text book of materials- by Ranga wala.
3. Building Materials– by Shri S.K. Basuand Shri A.K. Ray; :S.K. Lahiri & Co. (P)ltd
4. Civil engineering materials- T.T.T.I, Chandigarh, Tata Mc Grew Hills
5. Building Materials– Duggal
6. Building Materials- J Jha & S K Sinha
7. Building Materials– Sushil Kumar

STRENGTH OF MATERIALS

Total marks 100(80+20)

Total Contact hours: 42 Subject Code: CIV 305

Course outcome:

The aim of the subject Mechanics of Materials is to develop background preparation of student for taking up Engineering subjects like Theory and Design of Structures, Design of Machines mostly through the followings:

1. Describe the Mechanical properties of important Engineering materials.
2. Determination stresses trains and deformations in elastic bodies of different shapes under Different loading conditions for engineering applications.
3. Determination load carrying capacity of different types of members.

1. Introduction 02 Hrs

Elementary knowledge of stress & strain. Concept of Homogeneous, Isotropic & orthotropic material. Principle of superposition, St. Venant principle. Assumption in the analysis of solid material and their idealized behaviors: elastic, linearly elastic, ductile, brittle, viscous & visco elastic such as creep & stress relaxation.

2. Stress and Strain: 12 Hrs

2.1 Stress & strain and their types, complimentary shear stress. Tensile test of ductile & brittle material. Feature point on the curve. Factor of safety.

2.2 Hooke's law, poisson's ratio, Generalized Hooke's law, relation among the elastic constants for an isotropic material. Volumetric strain & their calculation for some common solid shapes.

2.3 Thin cylindrical & spherical shell. Hoop stress & strain. Change in dimension due to rise in pressure.

2.4 Deformations of Axially Loaded Members: Bars of varying section, tapering rod, bars of composite section, Deformation due to self weight, Thermal stress. (Simple problems on determination of stresses and shortening).

3. Centroid & Moment of Inertia. 05hrs

Difference between c.g & centroid, Axis of symmetry. Centriod of simple common Figure by 1st principle, Calculation of centroid of composite section M.I & their Calculation for simple planes hape by 1st principle perpendicular axis theorem. Polar Moment of interia. Parallel axis theorem and their use for calculation M.I of composite section radius of gyration.

4. Analysis of beams: 8hrs

Forces, Types, Resolution of forces, Equilibrium of forces Types of support, load and beam. Shear force and bending moment. Relation between Shear force, bending moment & uniformly distributed load. Shear force diagram and bending moment diagram of simply supported & cantilever beam with concentrated, UDL or combination of them.

Introduction of singularity function for calculation SFD & BMD.

5 Stresses in Beams: 9hrs

5.1 Assumptions in the theory of pure bending, derivation of bending stress formula, concept to neutral axis, section modulus, calculation of bending stresses for different types of loading and sections (in SS and Cantilever beam).

5.2 Shear stresses in beams – Formula for shear stress in rectangular cross section. Calculate shear stresses at different layers of a given Beam; draw the distribution of shear stress for different structural sections (only application of formula).

5.3 Torsional Stresses: Basic assumption for pure torsion, torsion of circular shafts (hollow and solid) – polar moment of inertia, torsional shearing stress, angle of twist, torsional rigidity. Determination of maximum shear stress and angle of twist in shafts transmitting given torque. Horse power transmitted by a shaft.

6 Columns and Struts: 06hrs

Definition of columns and struts: buckling load (critical or crippling load); Slenderness ratio, Classification of columns.

Euler's Theory– Basic assumptions made in Euler's theory for column buckling. Effective lengths for different end conditions. Factors affecting buckling strength of long column. Limitations of Euler's theory.

Other Formulae– Practical deviations from ideal column, Rankine's formula, factor of safety for different column materials, IS -800 latest edition.

Strength of Material Lab

Subject Code CIV 308

1. Tension test on Tor/ deformed steel bar using UTM.
2. Determination of support reaction of beam.
3. Testing of central deflection of a simply supported beam model (e.g M.S flat) with concentrated loading at the middle.
4. Determination of Young's Modulus for the material of beam model by load deflection method.
5. Determination of torsion and torque of steel.
6. Fleural test on Floor Tiles/ Marble.
7. Transverse strength test on flooring Tiles.
8. Determination of compressive strength of concrete cube by CTM. 9. Determination of compressive strength of cast iron
10. Determination of critical Euler's load of column.

REFEFENCE BOOKS:

1. Elements of Strength of materials– by S.P. Timoshenko, D.H. Young; Affiliated East– West Press Private Limited.
2. Engineering Mechanic sand Strength of materials of materials–by R.K. Bansal; Laxmi Publication, New Delhi.
3. Strength of Materials –by Surendra Singh; Vikas Publication House Pvt. +Ltd.
4. Strength of Materials– by Ferdinand L. Singer; Harper and Row and John Weather bill.
5. Theory and Problems of Strength of Materials–by William A Nash; Shaum'm outline of Shaum's Outline Series, Mc. Graw Hill. Inc.
6. Engineering Mechanics of Solids – by Egor P. Popov; Prentice Hall of India Private Ltd. New Delhi.
7. Strength of Materials– by R.S. Khurmi.
8. Strength of Materials–by Dr. Sadhu Singh; Khanna Publications, Delhi –110 006.
9. Engineering Mechanics & Strength of Materials – by S. Ramamrutham; Dhanpat Rai Publication Co. Delhi–110 006.
10. Mechanics of Materials through problems–by A.C. Ugural; Mc. Graw Hill. Inc.
11. Strength of Materials–by D.R. Malhotra and H.C. Gupta; Satya Prakashan, New Delhi - 110005.
12. Strength of Materials through problems–by B.K. Sarkar; Allied Publishers Limited, NEW DELHI-110002
13. Strength of Material by Bhavi katti

Subject: BUILDING DRAWING (AUTOCAD)

Subject Code: CIV 306

Module	Contents

1	CAD Software: 6Hrs Meaning of various CAD software available in the market auto CAD, Felix CAD, Auto CAD civil 3D, 3D max, etc. user inter face Starting up of CAD, CAD window, Tool bar, Drop down menu, command window, saving the drawing. Introduction of graphic screen.
2	CAD Command: 6Hrs WCS icon, UCS icon, co-ordinates, drawing limits, ellipse, polygon etc. Editing commands- copy, move, offset, fillet, chamfer, trim, lengthen, working with hatches, fills, dimensioning, text etc.
3	Planning of Buildings 6Hrs Principles of planning of residential and public building (Load bearing and RCC framed structure) Space requirements and norms for various units of residential and public buildings Rules and Jharkhand State bye laws of building for construction e.g. building line , open spaces, FSI/ FAR, head room, minimum room dimensions.
4	Creating, modifying points and surfaces: I. 6Hrs Creating & managing points. II. AutoCAD user interface. III. Basics of using AutoCAD draw tools. IV. Basics of using AutoCAD modify tools. V. Creating surfaces. VI. Surface styles. VII. Edit surfaces.
5	Parcel & Alignments: 6Hrs I. Creating parcel. II. Editing parcel. III. Labelling parcel and creating tables. IV. Working with alignments. V. Editing alignments. VI. Working with alignment sand parcels.
6	Drawing of Doors & Windows, Stair case and lift, lintel, beam and column 6Hrs
7	Submission/ working Drawing: 6Hrs Generation of line plan, Detailed plan, elevation, section, site plan, Area statement. Generation of 3D view and print commands Introduction to Auto Civil, 3D Max.

Reference Books :-

Auto CAD: BPB Publication
Building Drawing: BP Verma
Mastering Auto CAD (Civil)

Course outcomes and Objectives:

1) It allows a designer to analyses design and plan easily and efficiently.
2) Understanding the fundamental concepts and futures of Auto CAD.
3) Plan various services and safety requirements of the building, there functionality, and construction techniques.

4) Create and draw the plan of different buildings in different view using computer aided graphic tools.
5) Drawings plays an important role in the construction field to convey the ideologies and perspective of the designer to the layman at sight.

3rd Semester Diploma in Engineering (Common)

Subject Title: Development of Life Skills- I

Subject Code: 302

Rationale:
In today's competitive world, the nature of organizations is changing at very rapid speed. In this situation the responsibility of diploma holder is not unique. He will be a part of a team in the organization. As such the individual skills are not sufficient to work at his best.
This subject will develop the student as an effective member of the team. It will develop the abilities and skill stopper format highest degree of quality as an individual as well as a member of core group or team. Such skills will enhance his capabilities in the field of searching, as simulating information, managing the given task, handling people effectively, and solving challenging problems.

THE SUBJECT IS CLASSIFIED UNDER HUMAN SCIENCE

Objectives: The students will be able to:

1. Develop team spirit i.e. concept of working in teams
2. Apply problem solving skills for a given situation
3. Use effective presentation techniques
4. Apply techniques of effective time management
5. Apply task management techniques for given projects
6. Enhance leadership traits
7. Resolve conflict by appropriate method
8. Survives lf in today's competitive world
9. Face interview without fear
10. Follow mora land ethics
11. Convince people to a void frustration

CONTENTS: Interaction by faculty/ professional

Chapter	Name of the Topic	HOURS
1	SOCIALSKILLS Society, Social Structure, Develop Sympathy and Empathy.	1
2	Swot Analysis–Concept, How to make use of SWOT.	1
3	Inter personal Relation: Sources of conflict, Resolution of conflict, Ways to enhance inter personal relations.	2

4	Problem Solving I) STEPS IN PROBLEM SOLVING: Identify and clarify the problem, Information gathering related to proble Evaluate the evidence, consider alternative solution sand their implications, Choose and implement the best alternative, Review. II)Problem solving technique: any one technique may be considered, Trialand error, Brains torming, Lateral thinking.	2
5	Presentation Skills Body language- Dress like the audience Posture, Gestures, Eye contact and facial expression. STAGEFRIGHT, Voice and language– Volume, Pitch, Inflection, Speed, Pause Pronunciation, Articulation, Language, Practice of speech. Use of aids– OHP, LCD projector, white board.	3
6	Group discussion and Interview technique– Introduction to group discussion, Ways to carry out group discussion, Parameters—Contact, body language, analytical and logical thinking, decision making INTERVIEWTECHNIQUE Necessity, Tips for handling common questions.	3
8	Working in Teams: Understand and work within the dynamics of a groups. Tips to work effectively in teams, Establish good rapport, interest with other sand work effectively with the m to meet common objectives, Tips to provide and accept feedback in a constructive and considerate way, Leadership in teams, Handling frustration sin group.	2
9	Task Management: Introduction, Task identification, Task planning, organizing and execution, Closing the task	2
TOTAL		16

CONTENTS: PRACTICAL

List of Assignment: (Any Eight Assignment)

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. Under go attest on reading skill/ memory skill administered by your teacher.
3. Solve the true life problem.
4. Forma 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 slump area, social activities like giving cloths to poor etc. (One activity per group)
5. Deliver a seminar for10-12 minutes using presentation aids on the topic given by your teacher.
6. Watch/ listen an informative session on social activities. Make a report on topic of your interest using audio/ visual aids. Make a report on the programme.
7. Conduct an interview of a personality and write are port on it.
8. Discuss a topic in a group and prepare minutes of discussion. Write thorough description of the topic discussed

9. Arrange an exhibition, displaying flow- charts, posters, paper cutting, photograph set on the topic given by your teacher.

Note: - 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. The term work will consist of any eight assignments.

Mini Project on Task Management: Decide any task to be completed in as tipulated time with the help of teacher. Write are port considering various steps in task management.

LEARNING RESOURCES:

S.No	Title of the book	Author	Publisher
1	A dams Time management	Marshall Cooks	Viva Books
2	Basic Managerial Skills for All	E.H. Mc Grath, S.J.	Pretice Hall of India
3	Body Language	Allen Pease	Sudha Publications Pvt. Ltd.
4	Creativity and problem solving	Lowe and Phil	Kogan Page(I) P Ltd
5	Decision making & Problem Solving	by Adair, J	Orient Longman
6	Develop Your Assertiveness	Bishop, Sue	Kogan Page India
7	Make Every Minute Count	Marion E Haynes	Kogan page India
8	Organizational Behavior	Steven LMc Shaneand Mary Ann Glinow	Tata Mc Graw Hill
9	Organizational Behavior	Stephen P. Robbins	Pretice Hall of India, Pvt Ltd
10	Presentation Skills	Michael Hatton (Canada–India	ISTE New Delhi
11	Stress Management Through Yoga and Meditation	--	Sterling Publisher Pvt Ltd
12	Target setting and Goal Achievement	Richard Hale, Peter Whilom	Kogan page India
13	Time management	Chakravarty, Ajanta	Rupa and Company
14	Working in Teams	Hardingham. A	Orient Longman

Learning objectives:

1. To enhance one's ability to be fully self aware by helping oneself to overcome all fears and insecurities and to grow fully from inside out and outside in.
2. To increase one's knowledge and awareness of emotional competency and emotional intelligence at place of study/work.
3. To provide opportunity for realising one's potential through practical experience.
4. To develop interpersonal skills and adopt good leadership behaviour for empowerment of self and others.

5. To set appropriate goals, manage stress and time effectively.
6. To manage competency- mix at all levels for achieving excellence with ethics.

Learning outcomes:

1. Gain Self Competency and Confidence
2. Practice Emotional Competency
3. Gain Intellectual Competency
4. Gain an edge through Professional Competency
5. Aim for high sense of Social Competency
6. Be an integral Human Being

RADHA GOVIND UNIVERSITY
RAMGARH, JHARKHAND

Department of Civil Engineering

Under Faculty of Engineering and Technology

Choice Based Credit System Curriculum for
Diploma in Engineering

SEMESTER IV

(Effective from Academic Session 2020-21)

Scheme of Teaching and Examination for
4th Semester of 3 Years Diploma in Civil Engineering

Duration of Semester : 14
Weeks Student Contact Hours : 36
Total Marks : 80 hrs

Sl. No.	Name of Subject	Subject Code	Subject	Teaching Scheme			Examination Scheme					
				L	T	P	Hours of Exam	Full Marks of Subject	Final Exam /committe e marks	Internal Assessment	Pass Marks Final/ Ext. Exam	Pass Marks in Subjects
1.	Construction Technology	CIV 402	Theory	3	-	-	3	100	80	20	26	40
2.	Geo-Technical Engineering	CIV 403	Theory	3	-	-	3	100	80	20	26	40
3.	Hydraulics	CIV 404	Theory	3	-	-	3	100	80	20	26	40
4.	Theory of Structure	CIV 405	Theory	3	-	-	3	100	80	20	26	40
5.	Transportation Engineering	CIV 406	Theory	3	-	-	3	100	80	20	26	40
6	Construction Technology Lab	CIV 407	Sessional	-	-	2	-	50	30	20		25
7	Geo-Technical Engineering Lab	CIV 408	Practical	-	-	4	-	100	80	20	13	40
8	Hydraulics Lab	CIV 409	Practical	-	-	2	-	50	40	10	13	20
9	Transportation Lab	CIV 410	Practical	-	-	2	-	50	40	10	13	20
10	Professional Practice II	401	Sessional	-	-	4	-	50	30	20		25
Total Hours of Teaching per week :				15		14	800					

Note:

1. Period of Class hours should be of 1 hrs duration as per AICTE norms.
2. Remaining Hrs. every week has been marked for students Library and Student Centered Activities.
3. Drawing/ Graphics/ Practical/ Sessional examinations will be held at parent institution.

4. Board will depute examiner for Practical examination.
5. Regarding sessional examination, the parent in situation will format here member committee and this committee will examine these sessional records and hold viva of the examinee for 60% marks allotted to the subject. Marks for remaining 40% will be provided by the Faculty concerned on the basis of evaluation of each job/ work throughout the semester.

Construction Technology

Subject Code: CIV 402

Total Contact hrs: 42

Total marks: 100(80+20)

1.0 Introduction: (02hrs)

1.1 Definition of a building, classification of building based on Occupancy

1.2 Different parts of a building. Substructure-foundation, plinth. Superstructurewalls, sill, l Intel, doors, and window, floor, roof, parapet, beams, columns.

1.3 Type of structure- load bearing structure, framed structure, composite structures

2.0 Site Investigation (01 hrs)

2.1 Objectives of site investigation

2.2 Site reconnaissance

2.3 Site exploration

3.0 Site Layout and control: (02hrs)

3.1 Site Layout & layout of storage materials

3.2 Construction of temporary site structure and provision of temporary services, fencing and hoarding.

4. 0 Foundations: (04hrs)

4.1 Concept of foundation and its purpose

4.2 Type of foundations- shall owand deep

4.2.1 Shallow foundation-construction details of: spread foundation for walls, thumb rules for depth and width of foundation and thickness of concrete block, stepped foundation, masonry pillars and concrete columns, raft foundation, combined footing

4.2.2 Deep foundation: Pile foundation; their suitability, classification of piles according to function, material and installation of concrete piles (undreamed, bored, compacted)

4.2.3 Construction: Preparing foundation plans, setting out, excavation, and timber in gand dewatering.

5.0 Construction of Superstructure: (10 hrs)

5.1 Purpose of walls

5.2 Classification of walls – load bearing, non-load bearing walls, retaining

5.3 Classification of walls as per material of construction: brick, stone, reinforce brick, reinforced concrete, precast, hollow and solid concrete block and composite masonry walls.

5.4 Brick masonry– Definition of term; mortar, bond, facing, backing, hearting, column, pillar, jambs, reveals, soffit, plinth, plinth masonry, header, stretcher, bed of brick, bat, queen closer, king closer, frog and quoin

5.4.1 Bond—meaning and necessity; English and Flemish bond; one and half and two Brick thick walls in English and Flemish Bond. T, X and right angled corner junctions. Thickness for one, one and a half, and two brick square pillars in English bond.

5.4.2 Construction of bricks walls- Method of laying bricks in walls, precautions observed in the construction of walls, methods of bonding new brickwork with old (toothing, raking back, and block bonding).

5.4.3 Construction, expansion and construction joints; purpose and construction details

5.5 Stone masonry:

5.5.1 Glossary of term – Natural bed, bedding planes, string course, corbel, cornice, block-in-course, grouting, mouldings, pilaster and buttress

5.5.2 Types of stone masonry: Rubber masonry: random and coarse, Ashlar masonry: Ashlar fine, Ashlar rough, Ashler facing, specification for coarse rubble masonry, principles to be observed in construction of stone masonry walls.

5.6 Partition walls: construction details, suitability and uses of brick and wooden partition walls

5.7 Mortar–preparation, use, average strength and suitability of cement, lime, lime cement, lime surkhi and mud mortar

5.8 Scaffolding: construction detail sand suitability of mason's brick layers and tubular scaffolding

5.9 Shoring and under pinning: type and uses

5.10 Safety in construction of low rise and high rise buildings

6.0 Door and windows: (04 hrs)

6.1 Glossary of terms used indoors and windows

6.2 Door – name, uses and sketches of metal doors, laced and battened doors, framed and panelled doors, glazed and panelled doors, flush doors, collapsible doors, rolling steel shutters, side sliding doors, doorframes, PVC shutter and metal doors

6.3 Windows – names, uses and sketches of metal windows, fully panelled windows, fully glazed windows, casement windows, fanlight windows and ventilators, sky light window frames, louvered shutters (emphasis shall be given for using meta land plastic setc.in place of timber)

7.0 Damp Proofing: (02hrs)

7.1 Dampness and its ill effects on bricks, plaster, wooden fixtures, metal fixtures, and reinforcement; damage to aesthetic appearance; damage to heat-insulating materials; damage to stored articles and health; sources and causes of dampness.

7.2 Type of dampness – moisture penetration the building from outside e.g., rainwater, surface water ground moisture Damp proofing materials and Method of damp proofing basement, ground floors plinth and walls, special damp proofing

arrangements in bathrooms, WC and kitchen, damp proofing for roof sand window sills

7.3 Plinth protection and aprons

8.0 Floors: (04hrs)

8.1 Ground floors

8.1.1 Type of floor finish–cast-in-situ, concrete flooring (monolithic, bonded) terrazzo tile flooring, cast-in-situ, terrazzo flooring, Timber flooring, description with sketches of the method of construction of the floors and their specification, floor polishing equipment

8.1.2 PVC floor, ceramic floor

9.0 Roofs: (04hrs)

9.1 Type of roofs, concept of flat, pitched, hipped, arched and cell roofs.

9.2 Glossary of terms for pitched roofs – batten, eaves, barge, fascia board, gable, hip, lap, purlin, rafter, rag bolt, valley, ridge. Drainage arrangement for pitched roofs.

9.3 Drainage arrangement for roofs

10.0 Stairs: (04 hrs)

10.1 Glossary of terms: staircase, winder, landing, stringer, newel, baluster, riser, tread, width of staircase, hand rail, nosing

10.2 Planning and layout of staircase: Relations between rise and tread, determination of width of stair, landing etc.

10.3 Various type of layout–straight flight, dog legged, open well, quarter turn, half turn (newel and geometrical stairs), bifurcated stair, spiral stair.

11.0 Surface finishes: (03 hrs)

11.1 Plastering – classification according to use and finishes like grit finish, rough cast, pebbled ashes, plain plaster etc., dubbing, proportion of mortar used for different plaster, preparation of mortar, techniques of plastering and curing

11.2 Pointing–different types of pointing, mortar used and method of pointing

11.3 Painting–preparation and application of paints in wooden, steel and plastered wall surfaces

11.4 White washing, colour washing and distempering, application of cement and plastic paints

11.5 Commonly used water repellents for exterior surfaces, their names, and applications.

12.0 Building maintenance: (02 hrs)

Causes and types of cracks, identification and repair of cracks. Guniting and grouting, use of epoxy and crack fillers. Construction Technology Lab

Subject Code: CIV-407

List of Experiments

1. To collect various building materials from building sites to study their properties and uses.

2. To visit Brick Kiln to understand manufacturing process of Bricks and fly ash bricks.
3. To set out foundation plan on ground for load bearing structure by centre line method.
4. To set out/ layout foundation plan of a framed structure on ground.
5. To Visit Building construction site to understand various types of foundation.
6. To understand construction procedure of English and Flemish Bond for Brick masonry.
7. To visit site and check shuttering and centring form works.
8. To visit site and check reinforcement Detailing
9. To visit Building Construction site to understand plastering & painting process.
10. To visit Building Construction site to understand Plumbing process.
11. To Visit building construction site to understand Water Proofing process.

REFERENCE BOOKS:

1. "A text book of building construction" – by Gupta, Sushil kumar, Singia, D.R., and Juneja BM; sadhiana, Katsea Publishing House.
2. "A text Book of Building Construction" – by Deshpande, RS and Vartak, GV; Poona, United Book Corporation.
3. "Building Construction"–by Rangwala, SC; Anand, Charotar Book Stall
4. "A Text Book of Building Constriction"–by Kulkarni, GJ; Ahmedabad Book Depot
5. "A Text Book of Building Construction" – by Arora, SP and bindra, SP; New Delhi Dhanpt Rai and sons
6. "A Text Book of Building Construction" – by Sharma, SK and Kaul, BK; Delhi, S Chand and Co.
7. "Building Construction"-by Sushil kumar; Delhi standard Publishers Distributors.

Course Outcomes:

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

CO1	Comprehend the role sand responsibilities of a project manager
CO2	Prepare schedule of activities in a construction project
CO3	Prepare tender and contract document for a construction project
CO4	Demonstrate the safety practices in construction industry
CO5	Identify thee equipment used in construction

Geo-Technical Engg.

Subject Code- CIV403

Total marks: 100 (80+20)

Theory: 42 hrs

1. Over view of geotechnical engineering: (03 hrs)

Introduction of Soil, soil mechanics, geotechnical engineering, historical development of geo technical engineering, and soil as construction material in Civil Engineering structure as foundation, pavement, and earth retaining structures.

2. Properties of soil: (08 hrs)
   Soil as three phase system, Physical and Engineering properties of soil. water content, void ratio, porosity, degree of saturation, unit wt. of soil mass, bulk density, dry density, bulk unit wt. dry unit wt. , saturated unit wt., submerged unit wt. and methods to determine them

   Particles size distribution, mechanical sieve analysis, asper IS code, particle sized is tribution curve, effective diameter of soil uniformity coefficient and coefficient of curvature, well graded and uniformly graded soil, IS classification of soil

   Consistency of soil, Atterberg limits – liquid limit, plastic limit, shrinkage limit, plasticity index, and their determination as per IS code.

3. Shear strength of soil: (06 hrs)
   Components of shearing resistance of soil, shear parameters of soil, Mohr Coulomb failure theory, strength envelop, strength equation purely cohesive and cohesion less soil. Determination of shear strength of soil:-Direct, Indirect confined, unconfined compression test and vane shear test.

4. Bearing capacity& Earth pressure: (12hrs)
   Definition of bearing capacity, ultimate bearing capacity, safe bearing capacity, allowable bearing capacity. Terzaghi' analysis and assumptions, effect of water table on bearing capacity Field determination of bearing capacity: Plate load test standard penetration test, test procedure as per IS1888&IS 2131, typical value of bearing capacity from building code IS 1904 Definition of Earth pressure, active earth pressure, passive earth pressure, coefficient of earth pressure. Rankin's theory and assumptions made for non-cohesive soil, total earth pressure for non-cohesive soil having dry back fill, submerged back fill and surcharge for horizontal plane surface and examples based on it.

5. Foundation: (03 hrs)
   Types of foundation, Shallow, Deep, Pile and Well foundation, problems and remedies regarding different site condition, introduction to machine foundation.

6. Compaction, Consolidation and stabilization: (05 hrs)
   Definition and difference between compaction & consolidation, their requirements. Standard proctor test, modified proctor test, Different method sand equipments for field compaction, Stabilization Definition necessity methods and mechanism of soil stabilization, California bearing ratio and CBR test and its significance.

Course Outcomes:

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

CO1	Characterize and classify the soils.
CO2	Calculate the stress distribution and effective stress under various field conditions and estimate the consolidation settlements.
CO3	Select the suitable shear strength parameters for different field conditions and carry out the stability of slopes.
CO4	Determine the compaction parameters and exercise field compaction control. Understand the principles of compaction and its control.
CO5	Carry out the laboratory testing on soil samples to determine their index and engineering properties.

Geo-Technical Engineering Lab

SubjectCode-CIV408

List of Practical (Minimum 10 experiments are to be performed)

1. Determination of grainsize distribution of given soil sample by sieve analysis (gradation of fine aggregate, fineness modules, effective size and uniformity coefficient)
2. Determination of specific gravity of soil (G) by Pycnometer.
3. Determination of moisture content of given soil sample by oven drying method
4. Determination of bulk unit weight dry unit weight of soil in field by core cutter method
5. Determination of bulk unit weight dry unit weight of soil infield by sand replacement method
6. Determination of Liquid limit & Plastic limit of given soil sample.
7. Determination of coefficient of permeability by constant head test
8. Determination of shear strength of soil using direct shear test
9. Determination of shear strength of soil using unconfined compression test.
10. Determination of shear strength of soil using tri-axial shear test.
11. Determination of MDD & OMC by standard proctor test on given soil sample.
12. Determination of CBR value of given soil sample.

Hydraulics

Subject Code- CIV404 Total Contact Hours – 42 Full Marks – 100 (80+20)

AIM: To aim of the subject Hydraulics is to develop basic concepts regarding behaviour of fluid, especially water, at rest in motion.

1. Hydrostatics: (08 hrs)

1.1 Properties of fluids, density, specific gravity, surface tension, capillarity, viscosity and their uses.

1.2 Pressure and its measurements: Definitions–intensity of pressure, atmospheric pressure, gauge pressure, absolute pressure and vacuum pressure; Relation between atmospheric pressure, absolute pressure and gauge pressure, pressure head, pressure gauges.

1.3 Pressure exerted on an immersed surface; Definitions–total pressure, resultant pressure, expression of equation for total pressure and center of pressure for horizontal, vertical and inclined immersed surface.

1.4 Equilibrium of floating body, concept of center of buoyancy, meta center, metacentric height, and meta centric radius , determination of meta centric height by experimental and analytical method, types of equilibrium (stable, unstable & neutral).

2. Kinematics of fluid flow (09 hrs)

Types of flow, flow lines and flow numbers. Circulation and vorticity, Equation for angular velocity, linear velocity an acceleration. Velocity potential and stream function. Condition of rotational flow. Generalised continuity equation.

3. Dynamic of fluid flow (09 hrs)

3.1 Types of energy, Bernoulli's principle and different types of energy losses. Concept of TEL & HGL, flow between two tanks. Compound pipe system in series and parallel, power transmission through pipe. Introduction of water hammer.

3.2 Application of Bernoulli's principle: Pilot tube, venture meter and or if cemeter. Vena contracts a, relation between Cc, CV and Cd. Discharge measurement through large orifice. Submerged and partially submerged orifice, External cylindrical mouth piece. Types of notches & wire. Discharge formula for different notch & weir, Effect of end contraction.

4. Open channel flow: (10 hrs)

Comparison between channel and pipe flow, Types of channel, Hydraulic parameter, Chezy's and Manning formula, most economical Rectangular and trapezoidal channel section (Derivation not required) Specific energy in channel flow, Reynold & Froude number, condition for critical flow, Specific force, Specific energy diagram and analysis of Hydraulic jump in rectangular channel. Gradually varied flow.

5. Fluid machines:

Types of pumps Centrifugal pumps- basic principles, discharge, horse power of pump, Efficiency of centrifugal, pump. Reciprocating pumps: Turbines and their types.

Layout sketch of a Hydropower Generating Station

Course Outcomes:

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

CO1	Plan and Design Diversion Head Works
CO2	Design Canal Regulators, Canal Falls and Cross Drainage Works
CO3	Analyse Gravity Dams
CO4	Analyse Earth Dams
CO5	Design Spillways and Energy Dissipation Systems

HydraulicsLab

Subject Code CIV 409 List of Practicals

Part A (Minimum Six experiments)

1. Measurements of pressure and pressure head by Pyrometer, U-tube manometer, Measurement of pressure difference by U-tube differential manometer.
2. Verification of Bernoulli's theorem
3. Reynolds experiment to study types of flows in pipe.
4. Determination of Darcy's friction factor for a given pipe
5. Determination of Minor losses in pipes (any two losses)
6. Determination of coefficient of discharge, contraction and velocity of the orifice{Cd, Cc and Cv}
7. Determination of coefficient of discharge for given Rectangular or Triangular Notch.
8. Determination of coefficient of discharge for a given Venturimeter.

Part B (Minimum Four experiments)

1. Study and use of Manning's or Chezy's equation for open channel flow.
2. Demonstration and use of Pitot tube and current meter.
3. Demonstration of model of Kaplan turbine.
4. Demonstration of model of Pelton wheel.
5. Study of a model of centrifugal pump.
6. Study of a model of reciprocating pump.

REFERENCE BOOKS:

1. Hydraulics–by Jagdish Lal; Metro Publishing Books Limited Hydraulics, Fluid Mechanics and Fluid Machines – by S. Ramamrutham; Dhanpat Rai &Sons, Delhi.
2. Hydraulics –by R.S.Khurmi
3. Hydrulics– by A KJain
4. Hydraulics –by S.K. Lakhi
5. Hydraulics –by Dr. P.N. Modi & S.M.Seth.
6. Hydraulics and Hydraulic Machinery – V Thanikachalam, Tata McGraw hill Publishing Company Limited.
7. Hydraulics-by RK Bansal

Theory of Structure Subject

Code: CIV405 Contact Hours- 42

1.0 Introduction to indeterminate structure 2 Hrs Degree of indeterminacy– static and kinematic, force and flexibility Method.

2.0 Combined direct and bending stress: 8 hrs

2.1 Combination of direct stress and flexural/ bending stress for eccentric load, limit of eccentricity, core of section, middle third and middle fourth rule.

2.2 Stability of Concrete and masonry dams. Distinction between concrete & masonry dams, check the stability of rectangular and trapezoidal dams with Water face vertical, solve numerical problems. Solve problems to calculate maximum and minimum pressure/ stresses at the base of dams, chimney & retaining walls.

3.0 Principal Stresses and Principal planes 6hrs

3.1 The occurrence and Concept of Normal & Tangential stresses on an oblique plane, Concept of principal stresses and principal planes and their orientation. Formulae with assumptions (no proofs) for major and minor principal stresses and their orientation. (Numerical problems on complex stresses only).

3.2 Use of Mohr's circle – Alternative graphical solution procedure (sketch only) by using Mohr's circle without proof. Supplement the solution of numerical problems by Mohr's circle method.

4.0 Framed Structures: 6hrs

4.1 Introduction: Statically determinate frame, distinguish between beams and determinate trusses, state the important uses of determinate frames.

4.2 Methods of analysis: Method of joints, method of section.

4.3 Applications: Forces in the members of simple trusses by methods of joint and method of section.

5.0 Slope & Deflection of Beams: 6hrs

5.1 Concept of slope and deflection, stiffness of beam.

5.2 Relation among bending moment, slope, deflection and radius of curvature, differential equation (no derivation), double integration method to finds lope and deflection of simply support and cantilever beam.

5.3 Macaulay's method for slope and deflection, application to simply supported and cantilever beam subjected to concentrated and uniformly distributed load, locating point of maximum deflection and its magnitude.

5.4 Introduction to graphical method of slope and deflection (Mohr's theorem).

6.0 Analysis of Continuous and Fixed Beam 8 hrs

6.1 Concept of continuous beams & fixed beams. Sketch of deflected shape of two and three- span continuous beams under symmetrical vertical loads by Clapeyron's theorem of three moment method (no theoretical proof of formula). Problems for two/ three spans with concentrated or UDL and no sinking of support.

6.2 Advantage and disadvantage of fixed beam. Principle of super position.

6.3 Determination and Drawing of shear force diagram and BM diagram for continuous beam and fixed beam.

7.0 Moment distribution method 6hrs

7.1 Introduction and sign convention.

7.2 Carryover factor, stiffness factor, distribution factor.

7.3 Application of moment distribution method for various types of continuous beams subjected to concentrated loads and uniformly distributed load over entire span having same or different moment of inertia upto three spans or two unknown support moment only, SF and BM diagrams (Support at same level)

7.4 Application of moment distribution method to single-storey, single-bay symmetrical portal frame, SF and BM diagrams.

REFERENCE BOOKS:

1. Structural Analysis Vol.I & II–S.S Bhavikatti (Vikaspublication)
2. Theory of Structure – by S. Ramamruthan
3. Theory of Structure– by R.S. Khurmi & J.K.Gui
4. Theory of Structure – by Dr. B.C Punmia
5. Programmed Text in Strength of Materials–by TTTI, Chandigarh.
6. Analysis of structures, Vol. I –by V.N. Vazirani and M.M. Ratwani
7. Introduction to Mechanics of Solids– by E.P.Popov
8. Elements of Strengths of Material–by S.P.Timoshenko and D.H. Young
9. Strengths of Material – by Surendra Singh.

Course Outcomes :

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

	Formulate Equilibrium and Compatibility equations for structural members
	Analyse one dimensional in determinate problems using classical methods
	Analyse Indeterminate structures using energy methods
	Analyse structures for gravity loads and moving loads

TRANSPORTATION ENGINEERING

Subject Code- CIV406
Total marks:
100(80+20) Duration-
42 Hrs

AIM: To develop a thorough knowledge associated with different components of road & highway surveys & plans, construction, maintenance, drainage & related traffic engineering.

COURSECONTENTS:

1. Overview of transportation Engineering: 1hrs
   - 1.1. Role of transportation in the development of nation.
   - 1.2. Modes of transportation system - Roads, Railway, Airways, Waterways, Importance of each mode, Comparison and their relative merits and demerits.
   - 1.3. Functions of Indian Road Congress.
   - 1.4. IRC classification of roads.

2. 0 Road Geometrics: 6hrs

2.1 Glossary of terms used in geometric and their importance: Right of way, formation width, road margin, road shoulder, carriageway, side slopes, kerbs, formation level, camber and gradient.

2.2 Design and average running speed, stopping and overtaking sight distance

2.3 Necessity of curves, horizontal and vertical curves including transition curve and super-elevation, Methods of providings uper-elevation and extra widening.

2.4 Use of IRC design tables and specifications for finding elements of road geometric, Drawing of typical cross-section in cutting and filling on straight alignment and at a curve

3.0 Road Materials: 6hrs

3.1 Different types of road materials in use; soil, aggregates binders

3.2 Function of soil as highway sub-grade material.

3.3 California Bearing Ratio; methods of finding CBR values in the laboratory and at site and their significance

3.4 Testing aggregates; Gradation analysis, elongation and flakiness test, abrasion test, impact test, crushing strength test, water absorption test and soundness test

3.5 Binders: Common binders; cements, bitumen and Tar, properties as per IS specifications, ductility test, penetration and viscosity test of bitumen, procedure and a significance, cut back and emulsion and their uses.

4.0 Road Pavements: 6hrs

4.1 Road pavement: Flexible and rigid pavement, their merits and demerits, typical crosssections, functions of various components

4.2 Flexible pavements: necessity of subbase, stabilized subbase. Preparation of flexible pavement such as earthen road ,Water Bound Macadam, granular road &bituminous road.

4.3 Surfacing:

Type of surfacing

a. Surface dressing
b. (i) Premix carpet
   (ii) Semi dense carpet

c. Bituminous concrete
d. Grouting: Methods of constructions as per Ministry of Surface Transport (MORTH), Specifications and quality control as per IRC code.

4.4 Rigid Pavements: Construction of concrete roads as per IRC specifications: Form laying, mixing and placing the concrete, compacting and finishing, curing, joints in concrete pavement.

5.0 Hill Roads: 2hrs

5.1 Introduction: Typical cross sections showing all detail so for typical hill road in cut, partly in cutting and partly in filling

5.2 Landslides: Causes prevention and control measures

5.3 Breast Walls, retaining walls, different types of bends

6.0 Road Maintenance: 1hrs

6.1 Common types of road failures–their causes and remedies

6.2 Maintenance of bituminous and concrete road.

7. 0 Traffic studies: 4 hrs

7.1 Basic concept of traffic study

7.2 Traffic safety and traffic control signal

7.3 Road junctions

7.4 Traffic is land and refuse is land; advantages and disadvantages 7.5 Origin and estimation studies.

8. 0 Railway Engineering: 8hrs

8.1 Alignment and Gauges: Classification of Indian Railway, Zones of Indian Railway. Alignment- Factor Government Rail alignment. Rail Gauges Types, Factors affecting selection of gauge. Rail track cross-section – standard cross-section of BG and MG single and Double line in cutting and Embankment.

8.2 Permanent ways: Ideal requirement, component parts. Rail- Function and its types. Rail joint- Requirements, types, Creep of rail. Sleepers-functions and requirement, types, sleeper density. Ballast-function and Different types with their properties, relative merit s and demerits. Rail fixtures and Fastenings.

8.3 Railway track Geometrics: Coning of wheels, tilting of rails, Gradient and its Types, super elevation, points and crossing lines, cant deficiency, negative cant, Grade Compensation on Curve.

9.0 Bridge engineering: 6 hrs

9.1 Site selection and investigation: Factors affecting selection of site of bridge, bridge alignment. Collection of design data. Classification of bridge according to function, material, span, size, alignment, position of HFL.

9.2 Component parts of bridge: Plan and sectional elevation of bridge showing component parts of, substructure and superstructure. Different terminologies such as effective span, clear span, economical span, waterway, afflux, scour, HFL, freeboard, different types

of loadings on bridges. Foundation-function, types. Piers- function, requirement, types. Abutment- function, types. Wing walls- functions and types. Approaches- in cutting and embankment. Bridge flooring- open and solid floors.

10.0 Tunnel Engineering: 2hrs

Definition, Necessity, advantage, disadvantages. Classification of tunnels. Shape and size of tunnels. Tunnel cross-section for highway and railway. Methods of tunnelling. Tunnel lining and ventilation

TOTAL 42hrs

RECOMMENDED BOOKS:

1. Highway Engineering– by S.K. Khanna & C.E.J. Justo; Nemchand & Bros.
2. Principles and Practices of Highway Engineering –by R.C.Sharma & K.K. Sharma; Wiley Eastern
   Highway Engineering–by Dr.N.K.Vaswani; Roorkee
3. Highway Material Tests –by S.K.Khanna & C.E.J.Justo; Nemchand & Bros.
4. Highway and Airport Engineering–by Priani,VB; Anand, Charotar Book Stall
5. A text Book on Highway Engineering and Airport–by Sehgal, SB and Bhanot; S Chand & Co.,Delhi
6. A Course on Highway Engineering– by Bindra, SP ; Dhanpat Raiand Sons, New Delhi
7. Principles and Practice of Highway Engineering–by Sharma, RC and Sharma, SK; Asia Publishing House.
8. Railway engineering by Saxena and Arora.
9. Bridge engineering by S.P. Bindra.
10. Railway Bridge and tunnel engineering by A.K Upadhayay Course Outcomes:

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

CO1	Plan highway networks.
CO2	Design highway geometrics.
CO3	Determine the characteristics of traffic flow.
CO4	Characterize the pavement materials and design a bituminous mix.
CO5	Select appropriate pavement construction techniques and maintenance options.

Transportation Engg. Lab

Subject Code- CIV 410

(Minimum 10 experiments to be performed)

1. Gradation test (Sieve test) of Coarse Aggregates.
2. Determination of Flakiness & Elongation of Coarse Aggregates.
3. Determination of aggregate impact value.
4. Determination of aggregate abrasion value.
5. Determination of aggregate crushing value.

6. Determination of Softening point of Bitumen.
7. Determination of Flash & Fire point of Bitumen.
8. Ductility test of Bitumen.
9. Penetration test on Bitumen.
10. To find Camber/ Super Elevation of road.
11. Determination of Roughness and level of surface by Benkelman beam method.
12. Setting out of Simple circular curve by Rankine's method/Long Chord method/Offset method for a given problem.

➢ Laboratory test for highway material:-

Determination of Aggregate crushing valve

Aggregate impact test.

- Los Angeles abrasion test.
- Laboratory CBR test.
- Standard penetration test for bitumen

  Softening point of bituminous material
- Ductility test.
- Marshall Stability test.

Transportation Engineering-I Laboratory

S.NO.	ITEM	EXPERIMENTNO.
1	2000KN compression testing with load gauges	2.2
2	Standard mould for aggregate crushing valve	2.2
3	Aggregate impact tester	2.2
4	Los Angeles abrasion test apparatus	2.3
5	Laboratory CBR test apparatus	2.1
6	Standard penetrometer for bitumen	2.4
7	Ring & ball apparatus for softening point of bituminous Material	2.5
8	Ductility test apparatus	2.6
9	Marshall stability test apparatus	13.9
10	Standard accessories	All

Professional Practices-II

Subject Code:401

Rationale: Most of the diploma holders join industries. Due to globalization and competition in the industrial and service sectors the selection for the job is based on campus interviews or competitive tests. Whiles electing candidates a normal practice adopte distosee general confidence, ability to communicate and their attitude, in addition obasic technological concepts. The purpose of introducing professional practices is to provide opportunity to students to undergo activities which will enable them to develop confidence. Industrial visits, expert lectures,

seminars on technical topics and group discussion are planned in a semester so that there will be increased participation of students in learning process.

Objectives: Student will be able to:

1. Acquire information from different sources
2. Prepare notes for given topic
3. Present given topic in a seminar
4. Interact with peers to share thoughts
5. Prepare are porton industrial visit, expert lecture

Course Outcomes:

Sl. No.	Activity Heads	Activities	Suggested Hrs
1.	Acquire information from different sources	Topic related to the branch and current area of interest i.e. articles in internet on which research or review is under going may be decided for the students group. The group may be restricted to maximum 5 students. Literature survey from Internet, print media and near by practices may be undertaken. Minimum of 10to 15 papers maybe suggested for reading to get an overview and idea of matters.	12
2.	Prepare notes for given topic	Making review or concept to be penned down in form of a article.(the article or review may be of 8 – 10 pages length in digital form of 12 font size in Times New Roman font)	4
3.	Present given topic in a seminar	A seminar or conference or workshop on branch related topic is to be decided and all students in group of 5-6 students may be Asked to present their views.	4
4.	Interact with peers to share thoughts	A power point presentation of the article prepared in stage 2 may be presented be for the classmates and faculty members.	4
5.	Prepare are port on industrial visit, Expert lecture	A topic on best practices and product / software development may be assigned to the student group. The group may be asked to prepare a survey, come to opinion making and list out the Activities to develop the activities with SWOT analysis.	12

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

CO1	Explain basic grammar principles
CO2	Write clear and coherent passages
CO3	Write effective letters for job application and complaints
CO4	Prepare technical reports and interpret graphs

CO5	Enhance reading comprehension
CO6	Comprehend English speech sounds, stress and intonation

RADHA GOVIND UNIVERSITY
RAMGARH, JHARKHAND

Department of Civil Engineering

Under Faculty of Engineering and Technology

Choice Based Credit System Curriculum for
Diploma in Engineering

SEMESTER V

(Effective from Academic Session 2020-21)

Scheme of Teaching and Examination for

5th Semester of 3 years Diploma in Civil Engineering

Duration of Semester : 14 Weeks Student
Contact Hours : 36 Hrs
Total Marks : 800

Sl. No.	Name of Subject	Subject Code	Subject	Teaching Scheme			Examination Scheme					
				L	T	P	Hours of Exam	Full Marks of Subject	Final Exam /committee marks	Internal Assessment	Pass Marks Final/Ext. Exam	Pass Marks in Subjects
1.	Irrigation Engineering	CIV503	Theory	3	-	-	3	100	80	20	26	40
2.	RCC Design	CIV504	Theory	3	-	-	3	100	80	20	26	40
3.	Adv Surveying	CIV505	Theory	3	-	-	3	100	80	20	26	40
4.	Environmental Engineering	CIV506	Theory	3	-	-	3	100	80	20	26	40
5.	Elective I	CIV 507/508/AAA 507	Theory	3	-	-	3	100	80	20	26	40
6.	Environmental Engg Lab	CIV509	Practical	-	-	2	4	50	40	10	-	20
7.	Adv .Surveying Lab	CIV510	Practical	-	-	2	4	50	40	10	-	20
8.	RCC Design Lab	CIV511	Sessional	-	-	2	-	50	30	20	-	25

9.	Elective-I Lab	CIV 512/513/AAA 514	Sessional	-	-	2	-	50	30	20	-	25
10.	InPlant Training	502	sessional	-	-	-	-	50	30	20	-	25
11.	DLS	501	Sessional	-	-	4	-	50	30	20	-	25
Total Hours of Teaching per week:				15		14	800					

Elective I (Traffic Management–CIV507/Adv Construction Methodology & Equipments -CIV 508/ Disaster Mangt.–AAA507)

Practical Note:

1. Period of Class hours should be of 1hrs duration as per AICTE norms.
2. Remaining Hrs every week has been marked for students for Library and Student Centred Activities.
3. Drawing/Graphics/Practical/Sessional examinations will be held at parent institution.
4. Board will depute examiner for Practical examination.
5. Regarding sessional examination, the parent institution will form a three member committee and this committee will examine the sessional records and hold viva of the examinee for 60 % marks allotted to the subject. Marks for remaining 40 % will be provided by the Faculty concerned on the basis of evaluation of each job/work throughout the semester.
6. In plant Training of 04 weeks duration to be undertaken after 4^{th} semester Exam and before start of 5^{th} semester classes.

SUBJECT : Irrigation Engineering
SUBJECT CODE:
CIV503
HOURS 42
FULL MARKS :

80+20=100 COURSE

OBJECTIVE:

To impart the knowledge for understanding elementary aspects of hydrology and fluvial Hydraulics for use in the planning, design and management of water resources projects. Also to impart understanding of introductory aspects of integrated water resources development and management.

COURSE OUTCOMES:

CO	COURSE OUTCOMES
CO1	To impart the knowledge for understanding elements.
CO2	To estimate various components of hydrological cycle such as stream flow, Run off, evapotranspiration and Infiltration.
CO3	To measure components of hydrological water balance in field.
CO4	To perform hydrograph analysis and estimate Magnitude of flood.
CO5	To perform steady state analysis of ground water movement.
CO6	To determine the technical, social and economic aspects of water resources planning and management

DETAILED CONTENTS

Introduction Definition:
Irrigation and irrigation engineering, advantages of irrigation ill effects of over irrigation, types of irrigation project (purpose wise and administrative wise), Methods of irrigation [3Hrs]

Hydrology: Definition of rainfall, rain gauge and rain gauge station, types of rain gauges (names only) average annual rain fall and its calculation, definition of run-off, factor affecting run-off, calculation of run-off by run of coefficient, Ingles' formula, Stranges and Binnie's tables and curves. Maximum food discharge and methods of calculation. Yield and
Dependable yield and methods calculation [5Hrs]

Water Requirement of Crops: Cropping seasons and cropping Jharkhand.
Definition – Crop period, base period, duty & delta; factors affecting duty; relation between duty & delta and base period. Definition – CCA, GCA, IA, intensity of irrigation, time factor,

capacity factor. Problems on water requirement and capacity of canal, assessment of irrigation water.

[5Hrs]

Investigation and Reservoir Planning: Survey for irrigation project, data collected for irrigation project area capacity curve, silting of reservoir, rate of silting, factors affecting silting, methods to control, levels and respective storage in reservoir. Fixing control levels.

[5Hrs]

Dams and Spillways: Types of dams –Earthen dams and Gravity dams (masonry and concrete) Comparison of earthen and gravity dams with respect to foundation, seepage, construction and maintenance.

[3Hrs]

Earthen Dams –Components and their function, typical cross section seepage through embankment and foundation seepage control though embankment and foundation. Methods of constructions, types of failure of earthen dams and remedial measures.

[4Hrs]

Gravity Dams: Theoretical and practical profile, typical cross section, stability analysis, drainage gallery, joint in gravity dam, high dam and low dam. Spillways- Definition, function, location and components. Emergency and services, ogee spillway and bar type spillway, discharge over spillway. Spillway with and without gates.

[5Hrs]

Diversion Head Works: Weirs –components parts, layout of diversion head works & its components and their function, canal head regular, silt excluders and slit ejectors. Barrages – components and their function. Difference between weir and barrage. [5Hrs]

CANALS- Classification of canals according to alignment and position in the canal network. Design of most economical canal section. Design of canal section by Lacey & Kennedy method, Canal lining Definition, purpose, types of canal lining advantages of canal lining properties of good canal lining material. CD works- different C.D works, canal falls, escapes, cross regulators and canal outlets.

[7Hrs]

Suggested books:

Irrigation Engg by S.k Garg
Irrigation Engg by H.M Raghunath Irrigation Enginnering – Dr.
B.C. Punamia Engg Hydrology by K Subramanium

Subject: RCC DESIGN

Subject Code: CIV504
Full Marks: 80+20=100

Hours: 42

RATIONALE

This subject is an applied engineering subject. Diploma holders in Civil Engineering will be required to supervise RCC construction and fabrication. He may also be required to design simple structural elements, make changes in design depending upon availability of materials (bars of different diameters). He must be able to read and interpret structural drawings of different elements. This subject thus deals with elementary design principles as per BIS code of practice and their relevant drawings.

Course Objective:-

1. Analyze the section by LSM.
2. Select Proper materials and calculate the design values for the materials.
3. Calculate the loads on structural components asperIS875 (Part-I&II) provisions.
4. Read and interpret structural drawing.
5. Understand the basic principles of design of R.C.C sections.
6. Use & Correlate the specifications of IS 456- 2000 code & SP-16.
7. Draw and appreciate the proper reinforcement detailing of R.C. structural member and their connection using SP-34&IS13920.
8. Prepare the detailed drawing of structural elements with key plans and schedule of reinforcement
9. Design singly reinforced, Doubly reinforced and flanged section of beams, simply supported one way & two way slabs, cantilevers slab, axially loaded columns & footings by LSM.

Course Outcomes :-

CO1:	To develop basic understanding of reinforced concrete as a construction material.
CO2:	To develop understanding of various design philosophies and their differences.
CO3:	To understand behavior of RCC beams.
CO4:	To understand behavior of RCC members under flexural shear.
CO5:	To understand behavior of compression members.

CO6:	To understand behavior of two-way slabs using moment coefficient.

DETAILED CONTENTS

1. GENERAL:

Reinforced cement concrete- Concept of composite material-Purpose of providing reinforcement materials used in R.C.C and their requirement -different grades of cement and steel-Characteristic strength and grades of concrete-modular ratio, types of loads on structures as per(IS:875). Analysis, Design & Detailing: Methods of design-working stress method, limit state method–Introduction of IS456andSP-16.I.S.

2. INTRODUCTIONTOWORKINGSTRESSMETHOD:

Assumption made in the working stress method-Permissible stresses(IS:456-2000) Flexural members singly reinforced rectangular section-strain and stress distribution due to bending-actual and critical neutral axes-under/over reinforced sections-balanced sections-lever arm-moment of resistance of singly reinforced rectangular sections (simple problems).

3. INTRODUCTIONTOLIMITSTATEMETHOD:

Concept – different limit states; characteristic strength and design strength of materials; characteristic loads; partial safety factor for loads and material strength; limit state of collapse in flexure; assumptions; stress-strain curves for concrete and steel, stress block; maximum strain in concrete; limiting values of neutral axis for different grades of steel; moment of resistance of singly and doubly reinforced rectangular sections; numerical problems.

4. ANALYSISANDDESIGNOFBEAMSFORFLEXUREBYL.S.M:

Effective span of cantilever, Simply Supported and continuous beam-breadth and depth requirement of beam-control of deflection-minimum and maximum reinforcement, spacing for main enforcement and side face reinforcement as per IS 456-2000-design bending moments- design of singly and doubly reinforced rectangular beams - cantilever, simply supported beams. Necessity of providing doubly reinforced Section, reinforcement limitations. Analysis of doubly reinforced section, strain diagram, stress diagram, depth of neutral axis, moment of resistance of the section. Simple numerical problems on finding moment of resistance and design of beam sections.

1. SHEAR, BOND AND DEVELOPMENT LENGTH (LSM):

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. 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 Standard Lapping of bars, check for development length. Simple 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; Determination of Development length required for tension reinforcement of cantilevers beam and slab, check for development length. Limit, state of collapse in shear-design shear strength of concrete-design strengths vertical/inclined stirrups and bent up bars in shear - principle of shear design - critical sections shear -nominal shear stress - design of vertical stirrups, inclined stirrups and bent up bars rectangular beams using limit state method –simple problems.

2. DESIGN OF T- BEAM AND CONTINUOUS BEAMS BY L.S.M:

General features, advantages, effective width of flange as per IS:456-2000 code provisions. Analysis of singly reinforced T-Beam, strain diagram &stress diagram, depth of neutral axis, moment of resistance of T-beam Section. Design of singly reinforced T-beam -cantilever /simply supported beams-design of continuous beam using B.M coeffts (equal spans & udl only.

3. DESIGN OFSLABSBYL.S.M:

Classification of slabs - Effective spans- Imposed loads on slabs (IS: 875) - strength and stiffness requirements - minimum and maximum permitted size, spacing and area of main and second reinforcement as per IS 456 - 2000 Design of cantilever, simply supported, slabs and sunshades limit state method Design of continuous slabs using B.M. coefficients - check for shear and stiffness –curtailment of tension reinforcement.

Introduction to two-way slab - Effective span - thickness of slab for strength and stiffness requirements Middle and edge strips-B.M. coefficients - design B. Ms. - simply supported and restrained slabs - tension and torsion reinforcement requirement - design of two way slabs using B.M. coefficients curtailment of reinforcement- check for stiffness.

4. DESIGNOFSTAIRCASESBYL.S.M:

Types of stairs according to geometry and structural behavior planning a staircase – effective length of stairs - effective breadth of flights - design of cantilever stairs – design steps of dog legged and open well stairs spanning parallel to the flight.(No numerical Problem)

5. DESIGNOFCOLUMNSANDFOOTINGSBYL.S.M:

Limit state of collapse in compression - assumptions - limiting strength of short axially loaded compression members effective length of compression members - slenderness limits for columns classification of column minimum eccentricity for column loads longitudinal and transverse inforcement as per IS 456 - 2000. Design of axially loaded short columns with lateral ties/ helical reinforcement.

Types of footings-Footings with uniform thickness and sloped footings-minimum thickness - critical sections minimum reinforcement, distribution of reinforcement, development lengthen chorage , cover , minimum edge thickness requirements as per IS 456 - 2000 - Design, of isolated footing(square and rectangular)with uniform/varying thickness by limit state method.

6. PRE-STRESSEDCONCRETE:

Introduction to pre stressed concrete. Externally and internally pre stressed member. Advantages and disadvantages of pre stressed concrete. Methods of pre stressing, pre tensioning and Post tensioning. Losses in pre stressing. Concept of pre stressing–Stress concept, Load balancing concept. (No numerical Problem).

REFERENCE BOOKS:

1. Jai Krishna and Jain. OP; "Plain and Reinforced Concrete".Vol.1.Roorkee. Nem Chand and Bros.

2. Handoo,B L: Mahajan. V M and Singla. DR;" Elementary of RCC Design" New Delhi Satya Prakashan.
3. Mallick. S K:and Gupta, AP;" Reinforced Concrete ’’New Delhi. Oxford and IBH Publishing Co.
4. Punmia BC;‘‘Reinforced Concrete Structure Vol. I Delhi Standard Publishers Distributors.
5. N. Subramanian “design of Rainforced concrete structure”oxford University Press.
6. A. K Jain”Limit State Methods of design”.

Subject: RCC Design Lab

Subject Code: CIV511

1. Analyse the Data for Design. 2. Design component parts of building.
3. Draw proportional Sketches.
4. Draw construction Details. Sketch book:

Sketch book consists of approximately ten plates from R.C.C. Design shall include important information of clauses of IS 456- 2000 code. Typical sketches of components members/stress distribution & strain distribution diagrams R.C.C. section/detailing of reinforcement in joints/ members. Design of R.C.C structural components by LSM.

The students should make detailed simple design and drawing of reinforcement detailing onto full imperial size sheets finished in pencil on any five of the following R.C.C. component members of a two storied building with detailing of reinforcement(G+1) at the joints as per requirements & IS 13920

1. One-way simply supported slab.
2. Two-way simply supported slab.
3. Cantilever slab/ chajja.
4. T-Beam.
5. Column and column footing.
6. Dog-legged staircase

Total 10 Experiments / Sessionals has to completed by the Students

Subject: Advance Surveying
Subject Code: CIV505 Full Marks: 80+20=100

Hours: 42

Rationale:

This is an applied technology Course Which is intended to teach Students application off acts, Concepts, Principles, and procedures in surveying. It is also intended to teach students the odolite traversing and use of Modern Surveying equipment's. With this knowledge and skill, He will be able to choose appropriate survey depending on requirement to carry out survey works for various civil engineering activities.

COURSE OBJECTIVE:

CO1:	Know the Use of Modern Survey equipment's
CO2:	Selection of baseline and stations in Triangulation surveying.
CO3:	Use of Remote sensing, GPS and GIS in civil Engineering.
CO4:	Know the use of photogrammetric Camera and Aerial survey.

COURSE OUTCOMES:

CO1:	To understand traversing and numerical aspects of traversing.
CO2:	To understand trigonometric levelling and geodetic surveying.
CO3:	To understand curves and setting out works.
CO4:	To understand tachometric surveying involving angular measurements.
CO5:	To develop a complete understanding of total station surveying.
CO6:	To able to determine various tachometric surveying in field.

ADVANCE SURVEYING

Topic/Subtopic

1. Curves: 12hrs □

Simple Circular Curves:

Need and definition of a simple circular curve; Elements of simple circular curves-Degree of the curve, radius of curve, tangent length, point of intersection (Apex point, tangent point length of curve, long chord, Deflection angle, Apex distance and Mid-ordinate, Elements of Simple Circular Curves. Setting out of simple circular curve.

• By linear measurements only: Offsets from the tangents Successive bisection of arcs, Offsets from the chord produced. By tangential angles using a theodolite Obstacles in setting circular curve.

□ Compound Curves:

Elements and Parts of compound curve relation between parts of compound curve and methods of setting.

□ Reverse Curve: Type sand elements.

□ Vertical curves: Types and length of vertical curve, setting out of vertical curve by tangent correction and Chord Gradient.

□ Transition Curves:

Need (centrifugal force and super elevation) definition of transition curve; Requirements of transition curves; Length of transition curves for roads; By cubic parabola; Calculation of offsets for a transition curve; Setting out of a transition curve by tangential off sets only. Combined curve.

2. Trigonometrical Leveling: 6 Hrs

Introduction: Different cases with base accessible and in accessible for distance and elevation measurement, curvature and refraction corrections, axis signal correction, method of single and reciprocal observations , calculation R.L's.

3. Triangulation and geodetic surveying: 6hrs

Introduction: Classification of triangulation system, Triangulation figures of system, The strength of figure, Baseline measurement , Satellite station: reduction to centre.

4. Volume measurements: 6Hrs

Introduction, different method of volume computation – cross section method, unit area or borrow pit method and contour method, Cross section method – level section, two level section, side hill two level section, three level section and multilevel section; formula for volume computation -volume average end areas, trapezoidal rule, prismoidal rule (simple numerical problems), Volume through transitions – in highway/railway construction, volume from spot level 9 for foundation of underground reservoir, volume from contour plan, salient features of Mass Haul diagram and its applications.

5. Aerial Survey & Remote Sensing 06 Hrs

Aerial Survey Introductions, definition, Aerial photograph. No. of photo graphs considering overlap, scale and ground coordinate of vertical photo graph. Displacement due to ground relief. Simple numerical problems,

Remote Sensing – Introduction, Electro-Magnetic Energy, Remote sensing system-Passive system, Active system, Application of remote sensing : mineral location, Land use/Land cover, Natural Hazards and Environmental engineering system.

6. Modern Surveying Techniques & Equipment's 06Hrs

Components and Use of one second Micro Optic Theodolite, Digital Theodolite. Features of Electronic Theodolite Principle and use of Electromagnetic Distance Measurement (E.D.M). Components and Use of Auto level, Digital Level & Total Station Components and Use of G.P.S (Global Positioning System) Penta Graph and
Digital Plannimeter, GIS: Introduction and Uses

Subject : Advance Surveying Lab Subject Code : CIV510

List of Experiment-

List of Practical's (Any10 Practical's may be performed)

1. Study of electronic theodolites, electronic distance meter and total station.
2. EDM traversing and preparation of contour maps.
3. Distance and elevation measurement by stadia tachometer.
4. Setting out simple circular curve by ordinates from long chord.
5. Setting out a circular curve by Rankine's method of tangential angles.
6. Setting out a circular curve by Double Theodolite method.
7. Setting out Compound Curves.
8. Setting out Vertical Curves by tangent correction.
9. Setting out Vertical Curves by chord gradient.
10. Setting out transition curves.
11. Distance and elevation measurement by sub tense bar method.
12. Setting out Works-Foundation Marking.
13. Determination of the azimuth of a survey line by observation of the sun.
14. Preparation of GPS survey.
15. Setting of On Observation plan.
16. GPS applications in Cadastral Surveys.
17. GPS application in remote sensing and GIS.

Text Books:

Title	Author(s)	Publisher	Edition
Surveying Vol. I & II	B.C. Punmia, Ashok Kumar Jain, Arun Kumar Jain	Laxmi Publications	17th Edition
Surveying and Levelling Vol. I	T.P. Kanetkar, S.V. Kulkarni	Pune Vidyarthi Griha Prakashan	Latest Edition
Surveying and Levelling Vol. II & III	T.P. Kanetkar, S.V. Kulkarni	Pune Vidyarthi Griha Prakashan	Latest Edition
Fundamentals of Surveying	S.K. Roy	PHI Learning	2nd Edition
Advanced Surveying	R. Agor	Khanna Publishers	2nd Edition
Remote Sensing and GIS	Basudeb Bhatta	Oxford University Press	2nd Edition
Remote Sensing and Image Interpretation	Thomas M. Lillesand, Ralph W. Kiefer	John Wiley & Sons	7th Edition

Subject : Environmental Engineering Subject Code : CIV506

Full Marks- : 80+20=100 Hours- 42

COURSE OBJECTIVE:

To impart training to the student of various aspects related to water quality, quantity, storage and distribution in addition to sanitation of buildings.

COURSE OUTCOMES:

CO1: To be able to assess the water demand for various uses based on population estimation. CO2: To be able to identify the sources of water and assesses it's water quality parameters.
CO3: To able to design various components of water supply distribution system which includes reservoirs, pipe networks, pumps.
CO4: To able to understand various processes involved in water treatment.
CO5: To able to understand various aspects of water and sanitation in buildings including plumbing fixtures.

Water Supply

UNIT- I PLANNING FOR WATER SUPPLY SYSTEM 4Hrs

Public water supply system -Planning - Objectives -Design period - Population forecasting –Water demand -Sources of water and their characteristics -Surface and Groundwater- Impounding Reservoir Well hydraulics -Development and selection of source-Water quality- Characterization and standards-Impact of climate change.

UNIT-II CONVEYANCE SYSTEM 4Hrs

Pipe layout (Radial and Grid System) and its components (different types of joints and accessories) capacity design of pump & pipes, materials of pipe.

UNIT-III WATER TREATMENT 6Hrs

Treatment plants: Components and Layout, functions, design and drawing of sedimentation tank and filtration tanks, Disinfection. Aeration-Iron and manganese removal, De- fluoridation and demineralization-Waters oftening- Desalination-Membrane Systems- Recent advances.

UNIT-IV WATER DISTRIBUTION AND SUPPLY TO BUILDINGS 4Hrs

Requirement soft water distribution- Components- Service reservoirs-Functions and drawings Network design-Economics-Computer applications-Analysis of distribution networks Appurtenances -operation and maintenance -Leak detection, Methods. Principles of design of water supply in buildings -House service connection-Fixtures and fittings- Systems of plumbing and drawings of type so f plumbing.

A. Sewage Treatment.

UNIT I: PLANNING FOR SEWERAGE SYSTEMS 04Hrs

Sources of waste water generation – Effects – Estimation of sanitary sewage flow – Estimation of storm runoff – Factors affecting, Characteristics and composition of sewage (BOD, COD, Oxygen

demand and other characteristics) and their significance–Effluent standards–Legislation requirements.

UNIT II : SEWER DESIGN 04Hrs

Sewerage – Hydraulics of flow in sewers – Objectives – Design period - Design of sanitary and storm sewers, Laying, joining & testing of sewers – appurtenances – Pumps – selection of pumps and pipe Drainage-.

UNIT III: PRIMARY TREATMENT OF SEWAGE 06Hrs

Objective – Selection of treatment processes – Principles, Functions, Design and Drawing of Units – On site sanitation-Septic tank with dispersion-Grey water harvesting–Primary treatment– Principles, functions design and drawing of screen, grit chambers and primary sedimentation tanks – Construction, operation and Maintenance aspects.

UNIT IV: SECONDARY TREATMENT OF SEWAGE 06Hrs

Objective – Selection of Treatment Methods – Principles, Functions, Design and Drawing of Units Activated Sludge Process and Trickling filter–Oxidation ditches, Waste Stabilization Ponds– Reclamation and Reuse of sewage - sewage recycle in residential complex-Recent Advances in Sewage Treatment–Construction and Operation & Maintenance of Sewage Treatment Plants.

UNIT V: DISPOSAL OF SEWAGE AND SLUDGE MANAGEMENT 04Hrs

Standards for Disposal - Methods – dilution – Self Purification of surface water bodies – Oxygen sag curve – Land disposal – Sludge characterization – Thickening – Sludge digestion – Biogas recovery –Sludge Conditioning and Dewatering – disposal–Advances in Sludge Treatment and disposal.

Subject :Environmental Engineering Lab Subject Code :CIV 509

LIST OF EXPERIMENTS:

1. Determination of Ammonia Nitrogen in waste water.
2. Coagulation and Precipitation process for treating waste water
3. Determination of suspended, volatile, fixed and settleable solids in wastewater.
4. B.O.D. test
5. C.O.D. test
6. Nitrate in waste water.
7. Phosphate in wastewater.
8. Determination of Calcium, Potassium and Sodium.
9. Heavy metals determination-Chromium, Lead and Zinc.(Demon stration only) TEXT BOOKS:

1. Garg, S .K.,"EnvironmentalEngineering",Vol.1Khanna Publishers, NewDelhi,2005.

2. Modi, P.N. "Water Supply Engineering", Vol. I Standard Book House, New Delhi, 2005.

3. Punmia, B.C., Ashok K Jain and Arun K Jain," Water Supply Engineering", Laxmi Publications Pvt .Ltd., New Delhi, 2005 REFERENCES: 1. Government of India, "Manual on Water Supply and Treatment", CPHEEO, Ministry of Urban Development, New Delhi, 2003

4. Syed R. Qasim and Edward M. Motley Guang Zhu, "Water Works Engineering Planning", Design and Operation, Prentice Hall of India Private Limited, New Delhi, 2006.

TEXT BOOKS:

1. Garg,S.K.,"Environmental Engineering" Vol. II, Khanna Publishers, New Delhi,2003.

2. Punmia, B.C., Jain, A.K., and Jain. A., "Environmental Engineering", Vol. II, Lakshmi Publications ,News letter,2005.

REFERENCES:

1. "Manual on Sewerage and Sewage Treatment", CPHEEO, Ministry of Urban Development, Government of India, New Delhi,1997.

2. Metcalf & Eddy, "Wastewater Engineering"–Treatment and Reuse, Tata Mc Graw Hill Company ,New Delhi,2003.

3. Karia GL & Christian R A," Wastewater Treatment" , Prentice Hall ofIndia,NewDelhi,2013.

Subject :Traffic Management (Elective-I)
Subject Code :CIV507
Full Marks :80+20=100

Hours 42

UNIT 1 Traffic Surveys (to obtain traffic data for the organization and management)

1. Speed, Journey Time and Delay Surveys: [4hours]
    - 1.1 Introduction
    - 1.2 Use of Speed, Journey Time and Delay Studies
    - 1.3 Methods of Measuring Spot Speeds
    - 1.4 Direct Timing Procedure for Spot Speed Determination
    - 1.5 Enoscope
    - 1.6 Pressure Contact Tubes
    - 1.7 Short-Base Methods for Determination Spot Speeds
    - 1.8 Rader Speed Meters
    - 1.9 Photographic Method and Video Camera Method
    - 1.10 Method and Measurement of Running Speed and Journey Speed
    - 1.11 Moving Observer Method
    - 1.12 Registration Number Method
    - 1.13 Elevated Observed Method
    - 1.14 Presentation of Travel Time and Journey Speed Data
    - 1.15 Delay Studies

2. Vehicle Volume Counts, Classification and Occupancy: [2hours]
    - 2.1 Need for Vehicle Volume, Classification and Occupancy Counts
    - 2.2 Types of Counts
    - 2.3 Methods Available for Traffic Counts
    - 2.4 Manual Methods
    - 2.5 Combination of Manual and Mechanical Method
    - 2.6 Automatic Devices
    - 2.7 Planning and Programming Traffic Counts
    - 2.8 Vehicle Occupancy Surveys

3. Origin-Destination S urvey: [2hours]
    - 3.1 Need for O.D. Surveys
    - 3.2 Preliminaries
    - 3.3 Survey Methods
    - 3.4 Checking the Accuracy of O.D. Survey Data
    - 3.5 Presentation of Results
4. Parking Survey: [2hours]
    - 4.1 Need for Parking Surveys
    - 4.2 Definition of Common terms
    - 4.3 Types of Parking Surveys
    - 4.4 Parking Space Inventory
    - 4.5 Parking Usage Survey by Patrol
    - 4.6 Questionnaire Type Parking Usage Survey
    - 4.7 Cordon Count
    - 4.8 Photographic Methods

UNIT 2. Analysis and Interpretations of Traffic Studies

1. Statistical methods for traffic engineering: [2 hours]

1.1 Need
1.2 Elementary Concepts of Probability
1.3 Mean, Standard Deviation and Variance
1.4 Poisson and Binomial Distributions
1.5 Normal Distribution

2. Speed Studies: [2 hours]

2.1 Introduction
2.2 Grouping of Spot Speed Data and Tabular Presentation
2.3 Histogram and Cumulative Frequency Curves
2.4 Arithmetic Mean Standard Deviation
2.5 Fitting a Normal Distribution Curves to Observed Speed Data
2.6 Accuracy of Sampling
2.7 General Trends in Speed Data
2.8 Time Mean Speed and Space Mean Speed

3. Traffic Forecasting: [2hours]

3.1 Need for Traffic Forecasting
3.2 Limitations of Traffic Forecasting
3.3 Type of Traffic
3.4 Forecasts Based on Past Trends and Extrapolation
3.5 Forecasts and Mathematical Models
3.6 Period for Forecasting

UNIT 3. Parking: [2hours]

3.1 Traffic and Parking Problems
3.2 Ill-Effect of Parking
3.3 Zoning and Parking Space Requirement Standards 3.4 Design Standards for on Street Parking Facilities
3.5 Traffic Regulatory Measures for on Street Parking
3.6 Off Street Parking Facilities
3.7 Peripheral Parking Schemes
3.8 Loading and Uploading Facilities
3.9 Truck Terminals
3.10 Long Distance Bus Terminals

UNIT 4 .Traffic controls

1.1. Traffic Signs: [2hours]

1.1 Importance of Traffic Signs
1.2 Need for International Standardisation 1.3 The Situation in India
1.4 General Principals of Traffic Signing
1.5 Type of Traffic Signs
1.6 Danger Sings (Warning Signs or Cautionary Signs)

1.7 Prohibitory Signs
1.8 Mandatory Signs
1.9 Informatory Signs
1.10 Indication Signs
1.11 Direction Signs, Advance Direction Signs and Place Identification Signs
1.12 Overhead Signs
1.13 Route Marker Signs
1.14 Location, Height and Maintenance of Traffic Signs

2. Road Markings: [2hours]

1.1 Function
1.2 Types of Road Markings
1.3 General Principals of Longitudinal Pavement Markings
1.4 Material and Colour
1.5 Centre Lines
1.6 Traffic Lane Lines
1.7 No Overtaking Zone Markings
1.8 Pavement Edge Lines
1.9 Carriageway Width Reduction Transition Markings
1.10 Obstruction Approach Markings
1.11 Stop Lines
1.12 Pedestrian Crossings
1.13 Cyclist Crossings
1.14 Route Direction Arrows
1.15 Word Messages
1.16 Markings at Approaches to Intersections
1.17 Parking Space Limits
1.18 Object Markings

3. Traffic Signals: [2hours]

1.1 Introduction
1.2 Advantages and Disadvantages of Traffic Signals
1.3 Signal Indications
1.4 Signal Face
1.5 Illustration of the Signals
1.6 Number and Location of Signals Faces
1.7 Amber Period, Red/Amber Period and Inter green Period

1.8 Fixed Time Signals and Vehicle Actuated Signals
1.9 Determination of Optimum Cycle Length and Signal Settings for an Intersection with Fixed Time Signals
1.10 Warrants for Signals
1.11 Co-ordinated Control of Signals
1.12 Signal Approach Dimensions

1.13 Area Traffic Control
1.14 Delay at Signalised Intersection

UNIT- 5 : TRAFFIC MANAGEMENT: [12hours]

Introduction, Area Traffic Management System – Traffic System Management (TSM) with IRC standards, Traffic Regulatory Measures-Travel Demand Management (TDM),Direct and Indirect methods – Congestion and parking pricing , All segregation methods, Coordination among different agencies, Intelligent Transport System for traffic management, enforcement and education. Scope of traffic management measures, Restriction of turning moments, one way streetsadvantages and disadvantages, Tidal flow operation, Closing side – streets, its advantages and disadvantages, Exclusive bus lanes

Subject: Traffic Management Lab(Elective-I) Subject Code : CIV512

List of Experiments

1. Draw flow chart of Traffic Engineering organisation in transportation department of city.
2. Carryout origin & destination survey for given area.
3. Perform traffic volume study at given intersection.
4. Compute signal frequency (cycle) time by any method from given data.
5. Draw Various traffic sign
6. Draw various type of Road marking.
7. Draw the sketch of given traffic control Aids.
8. Draw the collision and condition diagram.
9. Study & Design of parking for various type of vehicles.

TEXTBOOKS:

- Kadiyali .L.R."Traffic Engineering and Transport Planning" ,Khanna Publishers,Delhi,2013
- Indian Roads Congress (IRC) Specifications: Guidelines and Special Publications on Traffic Planning and Management
- Salter. R.I and Hounse llN.B," Highway Traffic Analysis and design", MacmillanPressLtd.1996.

REFERENCES:

- Fred L. Mannering, Scott S. Washburn and Walter P. Kilareski, Principles of Highway Engineering and Traffic Analysis, Wiley India Pvt. Ltd., New Delhi,2011
- Garberand Hoel, "Principles of Traffic and Highway Engineering", CENGAGE Learning, New Delhi,2010
- SP:43-1994,IRC Specification, "Guideline son Low- cost Traffic Management Techniques" for Urban Areas,1994
- John ETy worth," Traffic Management Planning, Operations and control",AddisonWeslyPublishingCompany,1996
- Hobbs.F.D. "Traffic Planning and Engineering", University of Brimingham, Peragamon PressLtd,2005
- Taylor MAP and Young W, "Traffic Analysis – New Technology and New Solutions", Hargreen Publishing Company,1998.
- Transportation Planning Handbook, Institute of Transportation Engineers, Practice Hall, Engle wood Cliffs,1992.

SUBJECT: Advance Construction Methodology & Equipment (Ele-I)
SUBJECT CODE:CIV 508

HOURS: 42
FULL MARKS: 80+20=100

Unit I [6 Hrs]

1. Fibres And Plastics: Types of fibres, Steel, Carbon, Glass fibres. Use of fibres as construction materials. Properties of fibres. Types of Plastics-: PVC, RPVC, HDPE, FRP, GRP etc . Coloured plastic, sheets. Use of plastic as construction Material.
2. Artificial Timber: Properties and uses of artificial timber. Types of artificial timber available in market , strength of artificial timber.
3. Miscellaneous materials: Properties and uses of acoustics materials, wall claddings, plaster boards, Micro, silica, artificials and, bonding agents, adhesive set c.

Unit2: [10Hrs]

Advance Concreting Methods: Prestressed Concrete, Grades of Concrete and prestressing cables for prestressed concrete. Methods of pre-tensioning and post-tensioning. Equipment and accessories for pre-stressing. Precautions during prestressing of members.

Underwater Concreting: Underwater concreting for bridge piers and bored pile construction. Procedure and equipment required for tremie method. Properties, workability, and water- cement ratio of the concrete required.

Ready Mix Concrete: Necessity and use of Ready Mix Concrete. Production and equipment for RMC. Ready Mix Concrete plant. Conveying of RMC. Transit mixers working and time of transportation. Workability and water-cement ratio for RMC. Strength of RMC.

Tremix Concreting Method: Definition, application of vacuum dewatering concreting. Equipment used in tremix concreting. Procedure of vacuum dewatering concreting (Tremix).

Special Concretes: Properties, use and procedure of Roller Compacted Concrete. Properties and uses of High Impact Resisting Concrete. Properties, use and constituents of Steel Fibre Reinforced Concrete. Percentage of steel fibres in SFRC. Effect of size, aspect ratio, and percentage of steel fibres on strength of concrete.

Unit3 [12Hrs]

Advanced Construction Methods.

1. Formwork: Steel Formwork, H frames, Steel plates, Steel props, Telescopic props, Girder sort restless. Tubular formwork. Slip form work meaning, use of slip form work. Process of concreting with slip forms.
2. Construction of Multi-storeyed Buildings, Use of lifts belt conveyors, Pumped concrete, Equipment sand machinery required for construction of Multi-storeyed Buildings. Precaution sand safety measures.
3. Pre fabricated Construction: Meaning of pre fabrication and precast. Methods of prefabrication plant prefabrication and site prefabrication. Linear members, rigid frames, roofing and flooring members, R.C. Doors and windows, wall panels, Jointing of structural members.

4. Soil Reinforcing techniques Necessity of soil reinforcing, Use of wire mesh and Geo synthetics. Strengthening of embankments, slope stabilization in cutting and embankments by soil reinforcing techniques.

Unit 4 [3Hrs]

Hoisting and Conveying Equipments

1. Hoisting Equipments Principle and working of Tower cranes, Crawler cranes ,Truck Mounted cranes, gantry cranes, Mast cranes, Derricks.
2. Conveying Equipments : Working of belt conveyors. Types of belt sand conveying mechanism. Capacity and use of dumpers, tractors and trucks.

Unit 5 [3Hrs]

Earth Moving machinery

1. Excavation Equipments Use,Working and output of bull dozers, scrapers, graders and power JCB ,drag lines.
2. Compacting Equipment's Use of rollers, Roller types Plain rollers, Sheep footed rollers, Vibratory rollers, pneumatic rollers. Rammers use and working.

Unit 6 [5 hrs]

1. Concreting Equipments
2. Concrete Mixers Types of concrete mixers. Weigh batching equipments, Equipments For transportation of concrete trollies, lifts. Transit mixers, Concrete vibrator Needle vibrators, Screed vibrators. Automatic concrete plants layout, process and working.
3. Stone Crushers Types of stone crushers, capacities and working. Equipments for production of artificial sand.

Unit 7 [3Hrs]

1. Miscellaneous Equipments and Equipment management
2. Miscellaneous Equipments. Pile driving equipment, Pile hammers, selection of hammers. Working of hot mix bitumen plant, Bitumen paver. Grouting equipments, Floor polishing machine.
3. Equipment Management Standard equipment ,Special equipment, Selection of equipment,

Subject: Advance Construction Methodology & Equipment Lab Subject Code

:CIV513

List of Experiments

1. Collect specification/properties of at least five advanced materials of construction and write the report on the same.
2. Write report on tremie method of concreting for piles/Bridge piers.
3. Finding effect of size of fibres and a
4. Spect ratio (I/d ratio) of steel fibers on the strength of steel fibre reinforce concrete.
5. Finding effect of percentage of steel fibers on the strength of steel fiber reinforce concrete.

6. Writing are port on method of preparation and conveyance of ready mix concrete.
7. Writing a report on working and output of any three earth moving machinery.
8. Observing at site/video/LCD demonstration of bitumen paver and writing report of the process and equipment observed.
9. Preparing a detailed account of types, numbers and drawing of steel formwork required for a two-storied framed structure resistance building.

Subject :Disaster Management Subject Code-:AAA507
Full Marks-:80+20=100 Hours-:42

Course Objectives:

1. Define the scope and objectives of the field of disaster management.
2. Introduce concepts and terms of disaster assistance examine tools and methods, and learn some technology appropriate to the field.
3. Develop knowledge on various types of disasters, acquire techniques for lessening impact of disaster and be all to involve community in disaster preparedness.
4. Apply modern skills and scientific technologies to combat disasters.

COURSE OUTCOMES:

CO1: To understand the basic principles and various stages of disaster management and develop a knowhow about regional, national and international level regulatory authorities.

CO2: To have an understanding of various aspects of floods as disasters and various planning and mitigation measures.

CO3: To develop an understanding about droughts and socio-economic impacts-drought management.

CO4: To be able to understand different aspects of landslides and their mitigation.

CO5: To understand different aspects of earthquake and their impacts on the Civil Engineering structures and control and mitigation thereof.

CO6: To develop an understanding it's about safety programs.

MODULE I 6Hrs

Contemporary, Natural & Man-made Disaster: Fundamentals of Disaster, Dimension & typology of Disaster, Phases of Disaster, Social & Political imperatives, Scale of Disaster, Causes of Disaster, and Disaster Cycle.

MODULE II 6Hrs

Agencies in Relief: Organisations dealing with disaster, UNDRO's mandate in Disaster relief and management, Role of UN in emergencies, IDNDR. Risk assessment & Analysis: Estimation of Risk, Problems with risk assessment, Risk perception and communication, instruments and equipments involved, Objectives of assessment, Type of risk.

MODULE III 6Hrs

Common Disasters: Causes, General characteristics, Predictability, Factor contributing to vulnerability, Risk reduction nmeasures, Management measures, Specific preparedness, Plan for Remedial measure: cyclone, flood, drought, earthquake, landslides including arsenic contamination.

MODULE IV 6Hrs

Earthquakes: Causes, Plate tectonic and seismic waves, Magnitude and Intensity of earthquake, Seismic Zones, BIS provisions on earthquake resistant built environment for non-engineered and reinforced concrete buildings. Fundamentals of ductile detailing.

MODULE V 6Hrs

Planning Considerations for mitigation: Study of disaster and effects on settlements, disaster atlas, Intervention into land use plan. Post disaster action, Community rehabilitation, Temporary and permanent basis, Institution al involvement and policy legislation organization

MODULE VI 6Hrs

Capacity building of disaster management teams, Role of Financial Institutions in Mitigation Effort, Group Dynamics, Concept of Team Building, Motivation Theories and Applications, School Awareness and Safety Programmes.

MODULE VII 6Hrs

Remote-sensing and GIS applications in real time disaster monitoring, prevention and rehabilitation, Laser Scanning Applications in Disaster Management, Quick Reconstruction Technologies, Role of Mediain Disasters, Management of Epidemics, Forecasting / Management of Casualties.

Subject :Disaster Management Lab Subject Code-:AAA514

List of Experiments

1. Study of Contemporary Disaster
2. Study of Natural Disaster
3. Study of Non-mode Disaster
4. Disaster agencies in relief.
5. Study of common disaster
6. Earth quakes as disaster
7. Capacity building of disaster Management.
8. Post disaster action & rehabilitation
9. GIS application.
10. Role of media In disaster Management.

Recommended Books:(Disaster Management)

1. Vinod Kr. Sharma; Disaster Management, IIPA, New Delhi.

2. Robest Mc Namara; Blundering into Disaster, 1987,Bloomsbusy,London.

3. Disaster Prevention and Mitigation,1984,UNDRO Publication, Geneva.

4. Disaster Response,-AHandbookforEmergencies,BabuThomas,1993

5. Disaster Management books of IGNOU

Subject Title: Development of Life Skills (Common Paper)

Subject Code:502 Full
Marks :50

Rationale:

In today's competitive world, the nature of individual and organizations is changing at very rapid speed. In this situation the responsibility of diploma holder is not unique. After completing his course work he has to face the world and seek meaningful employment also. Merely having knowledge is not sufficient these days. He has to show his communicative skill also. As such the individual skills with capability to show his strength and communicate his willingness new skills for further advancement with to impart his ability and acquiring has to be displayed and learned. This subject will develop the student as an effective individual to grab the availables it action and be member of the unseen team in which he may be put in .It will develop the abilities and skills to perform at highest degree of quality as an individual as well as a member of core group or team. Such skills will enhance his capabilities in the field of searching, assimilating information managing the given task handling people effectively, solving challenging problems.

Objectives: The students will be able to:

1. Develop acumen to face interview.
2. Lead in the group discussion and set goals and targets for others
3. Develop team spirit i.e. concept of working in teams
2. Apply problem solving skills for a given situation
3. Use effective presentation techniques
4. Apply techniques of effective time management
5. Apply task management techniques for given projects
6. Enhance leader ship traits
7. Resolve conflict by appropriate method
8. Survive self into day's competitive world
9. Follow moral and ethics
10. Convince people to avoid frustration

CONTENTS:

SOCIAL SKILLS

1. Social understanding for group discussion, imaginative thinking and develop free ideas.

2. SWOT Analysis– Concept, and know himself in details. Learn how to make use of SWOT.

3. Inter personal Relation:- How to effectively counter arguments of others without the arting their feeling Sources of conflict and conflict resolution, Ways to enhance interpersonal dependence and relations.
4. Problem Solving

I) STEPS IN PROBLEM SOLVING,

1) Identify and clarify the problem,
2) Information gathering related to problem,
3) Evaluate the evidence,
4) Consider alternative solutions and their implications,
5) Choose and implement the best alternative,
6) Review

II) Problem solving technique.(anyone technique may be considered)
   1) Trial and error
   2) Brain storming
   3) Lateral thinking
5. Presentation Skills 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 presentation aids, Summarizing the facts

6. Group discussion–

Introduction to group discussion, Ways to carryout group discussion, Parameters— Contact, body language, analytical and logical thinking, decision making

7. INTERVIEW TECHNIQUE

Necessity, Techniques to influence interviews and giving directions, Tips for handling common questions.

8. Working in Teams

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.

9. Task Management

Introduction, Task identification, Task planning, organizing and execution, Closing the task.

REFERENCE BOOKS:

Sr. No	Title of the book	Author	Publisher
1	Adams Time management	Marshall Cooks	Viva Books
2	Basic Managerial Skills for All	E.H. McGrath ,S.J.	Pretice Hall of India
3	Body Language	Allen Pease	Sudha Publications Pvt.
4	Creativity and problem solving	Lowe and Phil	Kogan Page(I) P Ltd
5	Decision making & Problem Solving	By Adair,J	Orient Longman
6	Develop Your Assertiveness	Bishop ,Sue	Kogan Page India
7	Make Every Minute Count	Marion EHaynes	Kogan page India
8	Organizational Behavior	Steven LMc Shaneand Mary Ann Glinow	Tata McGraw Hill
9	Organizational Behavior	Stephen P.Robbins	Pretice Hall of India ,Pvt Ltd
10	Presentation Skills	Michael Hatton(Canada – India Project)	ISTE New Delhi
11	Stress Management Through Yoga and Meditation	--	Sterling Publisher Pvt Ltd
12	Target setting and Goal Achievement	Richard Hale,Peter Whilom	Kogan page India
13	Time management	Chakravarty,Ajanta	Rupa and Company
14	Working in Teams	Hardingham. A	Orient Longman

Department of Civil Engineering

Under Faculty of Engineering and Technology

Choice Based Credit System Curriculum for Diploma in Engineering

SEMESTER VI

(Effective from Academic Session 2020-21)

Scheme of Teaching and Examination for

6th Semester of 3 Years Diploma in Civil Engineering

Duration of Semester : 14 Weeks

Student Contact Hours : 36

Total Marks : 80

Sl. No	Name of Subject	Subject Code	Subject	Teaching Schme			Examination Scheme					
				L	T	P	Hours of Exam	Full Marks of Subject	Final Exam /committee marks	Internal Assessment	Pass Marks Final/ Ext. Exam	Pass Marks in Subjects
1.	Industrial Engineering & Management	601	Theory	3		-	3	100	80	20	26	40
2.	Design of Steel Structure	CIV604	Theory	3		-	3	100	80	20	26	40
3.	Estimating & Costing	CIV605	Theory	3	-	-	3	100	80	20	26	40
4.	Contract & Account	CIV606	Theory	3	-	-	3	100	80	20	26	40
5.	Elective II	CIV607/608/609	Theory	3	-	-	3	100	80	20	26	40
6.	Design of Steel Structure Lab	CIV610	Sessional	-	-	2	-	50	30	20	-	25
7.	Estimating & Costing Lab	CIV611	Sessional	-	-	2	-	50	30	20	-	25
8	Contract & Account Lab	CIV612	Sessional	-	-	2	-	50	30	20	-	25
9.	Elective II Lab	CIV613/614/615	Sessional	-	-	2	-	50	30	20	-	25
10.	Project Work	603	Sessional	-	-	4	-	50	30	20	-	25

11.	Professional Practices	602	Sessional	-	-	4	-	50	30	20	-	25
Total Hours of Teaching per week:				15		16	15	800				

Elective II (Adv Structure- CIV-607/ Water Resources Planning& Management-CIV608/Earth quake Resistant Structure-CIV609)

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Note:

1. Period of Class hours should be of 1hrs duration as per AICTE norms.
2. Remaining Hrs every week has been marked for students for Library and Student Centered Activities.
3. Drawing /Graphics /Practical/Sessional examinations will be held at parent institution.
4. Board will depute examiner for Practical examination.
5. Regarding sessional examination the parent institution will form a three member committee and this committee will examine the sessional records and hold viva of the examinee for 60 % marks allotted to the subject. Marks for remaining 40 % will be provided by the Faculty concerned on the basis of evaluation of each job/ work through out the semester.

SUBJECT: INDUSTRIAL ENGINEERING AND MANAGEMENTSUBJECT CODE : 601

FULLMARKS : 80+20=100

Hours : 42

Rationale:

After completion of three years of technical training, Polytechnic students are expected to enter into the World of Work. The business environment is altogether different and new to the students. A proper introduction and under standing of Business Processes is therefore essential for all Polytechnic students. Management subject which deals with basics of Management science required to understand the processes the in Industrial & Commercial environment. Thiswill enable the students of Polytechnic to become familiar and to understand various Business Organizational structures, their functioning and the Role these technicians will have to play in these setups with responsibilities.

Industrial Engineering is concerned with the design, improvement and installation of integrated system of people, materials, equipment and energy. Polytechnic students must be able to analyze the use and cost of there sources of the organization in order to achieve the objective, i.e. to increase productivity, profits etc. and carry out the policies efficiently and effectively.

COURSE OBJECTIVE:

The students will able to:

1. Familiarize environment in the world of work.
2. Explain the importance of management process in Business.
3. Identify various components of management.
4. Describe Role & Responsibilities of a Technician in an Organizational Structure.
5. Apply various rule sand regulations concerned with Business & Social responsibilities of the technician.

COURSE OUTCOMES:

1. Develop the ability to explain economic terms and concepts.
2. Understand and explain the function of market, it’s types and determination of price under various competencies.
3. Demonstrate the ability to employ the economic way of thinking like application of marginalanalysis, use of benefits/cost analysis, utility and demand forecasting techniques.
4. Demonstrate the ability to recognize when change is needed, adapt to change as it occurs, and lead the change as effective managers.
5. Practice the process of management’s four functions: planning, organizing, directing and controlling. Make an appropriate staffing decision which includes recruitment and selection design,implement and evaluate training programs.

6. Understand an organization's characteristics and how they might impact on management practices and analyze both qualitative and quantities information to isolate issues and formulate best control methods.

Detailed Syllabus

1. Productivity: 02Hrs

Production and productivity, importance of productivity, factors affecting productivity, means of increasing productivity.

2. Plant Layout and Material Handling: 02Hrs

Definition of plant layout, objectives of good plant layout, principles of plant layout, types of plant layout, flow pattern, steps in planning the layout for a new enterprise, definition of material handling, functions and principles of material handling, material handling devices.

3. Work Study: 04Hrs

Definition, concept and need for work study, objectives of method study and work measurement, basic procedure/ steps in method study, recording technique, critical examination, principles of motion economy, stop watch procedure for collecting time study data, including performance rating and allowances, work sampling.

4. Production Planning and Control (PPC): 04Hrs

Definition and objectives of PPC, functions of PPC, routing, scheduling, loading, dispatching, production control definition and objectives, principle of sound production control system.

5. Material, Purchase and Stores Management: 04Hrs

Definition, functions& objectives of materials management, inventory control, economic order quantity(EOQ), ABC analysis. Objectives of purchasing department, buying techniques, purchasing procedure(steps involved in one complete purchasing cycle); functions of stores department, location and layout of stores ,receipt an disuse of materials.

6. Quality Control and TQM: 04Hrs

Meaning of quality and quality control, dimensions of quality, quality circle, concept and definition of TQM, elements of TQM,Kaizen,5'S' and six sigma.

7. Management: 04Hrs

Various definition, concept of management, levels of management, administration and management, scientific management by F. W. Taylor. Principles of management (14principles of Henry Fayol). Functions of management- planning, organizing, coordinating, directing, controlling, decision making.

8. Organizational Management: 04Hrs

Organization - definition, steps in forming organization. Types of organization. Types of organization -line, line and staff, functions, project type. Departmentation- Organized and decentralized, authority and responsibility, span of control (management). Forms of ownership - proprietorship, partnership, joint stock company, co-operative society, govt. sector.

9. Human Resource Management: 06Hrs

Personnel Management – Introduction, definition, function. Staffing – Introduction to HR, introduction to HR planning, recruitment procedure. Personnel Training & Development – Types of training, induction, skill enhancement. Leadership & Motivation – Leadership styles and types, motivation: definition, intrinsic and extrinsic, Maslow's theory of motivation and its significance. Safety Management – Causes of accidents, safety procedures. Introduction, objectives & features of industrial legislation such as the Factory Act, ESI Act, Workmen's Compensation Act, Industrial Disputes Act, and salary & wages.

10. Financial Management: 04Hrs

Financial Management- Objectives & Functions. Capital Generation & Management- Types of capitals ,Sources of finance. Budgets and accounts- Types of budgets, Production budget (including varience report), Labour budget, Introduction to Profit & Loss Accounts (Only concept), Balance sheet etc.

11. Entrepreneurship: 04Hrs

Concept and definition of entrepreneur and entrepreneurship, factors influencing entrepreneurship, entrepreneurial characteristics, need for promotion of entrepreneurship and small scale industries, steps in setting up a small scale industrial enterprise.

References Books:

1. Industrial Engineering and Management by O.P. Khanna
2. Industrial Engineering and Production Management by M. Mahajan. Publisher Dhanpat Rai Publication(P)Ltd. New Delhi
3. Business Administration and Management by Dr.S.C .Saksena Publisher: Sahitya Bhawan, Agra.

Subject : Design of Steel Structure Course code :CIV604
Full Marks :80+20=100
Hours 42

Aim:-

1. Study of design and implementation steel structure used in building construction.

Course Objective:- Students will be able to:-

1. Analyze the steel structure and its members for determining the force sacting in the member
2. Select proper material and sections from steel table
3. Calculate design values for members
4. Use IS875 Part 1,2&3 provisions for dead load,live load and wind load.
5. Design the tension member, compression member, beam, purloins and column bases and theirconnection.
6. Use of IS800–2007 for designing the member.
7. Read and interpretation the structural drawings
8. Prepare the detailed working drawing of steel roof truss, showing sections and connections.

Course Outcomes:

1. Design of bolted and welded connection concentric and eccentric.
2. Design of rolled and built-up tension member.
3. Design of rolled and built-up compression members.
4. Design of laterally supported and unsupported flexural members.
5. Design of plate girders.
6. Understanding failure modes and application of Limit states design philosophies of steel design.

Pre- Requisite:-

1. Student should understand the load bearing capacity of components of building.
2. Student should be perfect in building drawing and its reading process.

Unit No	Topic	Contact periods	Marks
1	Introduction	3	3
2	Limit State Design	4	5
3	Design Of Connections And Detailing	12	12
4	Design Of Tension Members by L.S.M	6	10

5	Design Of Compression Members and Column Bases by L.S.M	12	12
6	Design off lexural members for BM and SF by L.S.M	7	8
7	Steel Roof Truss	8	10
8	Plastic Analysis	12	10

Content: Theoy (DESIGN OF STEEL STRUCTURES)

Unit-1: 4 hours per week

Introduction

Advantages and disadvantages of steel as construction material. Types of sections, Grades of steel(IS2062) and strength characteristics; Use of steel table(SP6-Part1); Types of loads on steel structure and its I. S. code specification. Methods of design and comparison between them.

Unit 2: Limit State Design

Basis for design–Classification of Limit States–Characteristic and Design Actions–Ultimate and Design Strengths-Partial Safety Factors for Loads and Materials– Factors Governing the Ultimate Strength: Stability, Fatigue and Plastic collapse– Serviceability.

Unit-3: Design of Connections And Detailing

General- Types of connections– Bolted, Riveted and Welded connections– Rigid and Flexible connections– Components of connections– Basic requirements of connections- Clearance for holes– Minimum and Maximum spacing of fasteners– Minimum edge/ end distances– Requirements of Tacking fasteners. Bolted Connection– Types of bolts– Bearing type Bolts– Nominal and Design shear strengths of bolts– Reduction factors for Long joints, Large grip lengths, Thick packing plates– Nominal and Design bearing strengths of bolts– Reduction factors for over sized and slotted holes– Nominal and Design tensile strengths (tension capacity) of bolts- Simple problems. Welded Connection-Types of welds– Fillet welds– Minimum and maximum sizes– Effective length of weld- Fillet welds oninclined faces–-Design strengths of shop/site welds– Butt welds– Effective throat thickness and effective length of butt weld- Simple problems. Design problems related to eccentric riveted/bolted and welded connections.

Unit-4: Design of Tension Members by L.S.M

Tension Members-effective length and Effective Sectional Area of tension members - Design Strength of Tension members against yielding of gross section requirements: Deflection limits, Vibration, Durability and Fire resistance, again structure of critical section and due to block shear. Problems on determination of design strength of given members and designing tension members usingrolled steel sections for given loads– Design of bolted/ riveted and welded connections for tension members–Problems.

Unit-5: Design of Compression Members and Column Bases by L.S.M

Compression Members- Effective Length and Effective Sectional Area of Compression members – Design Stress and design strength– Buckling Class of cross sections– Imperfection factor– Stress reduction factor–Thickness of elements. Analysis and design of axially loaded column. Introduction to lacing and battening (Non numerical problem on Lacing and Battening) Slab base and Gusseted base – Code Provisions (IS:800-2007) – Minimum thickness and Effective Areaof Base plate– Design of Slab base for axially loaded columns using bolts/riveted/welds. Introduction to Gusseted base (non numerical problems on gusseted Base).

Unit-6: Design of Flexural Members for BM and SF by L.S.M

General- Effective span of Beams, Design strength of bending,(Flexure), Limiting deflection of beams –Design of laterally supported Simple beams for Bending moment and Shear force using single / double rolled steel sections (symmetrical cross sections only) – Problems. Names of various componentsof plate girder and their functions with usual IS recommendations

Unit-7: Steel Roof Truss

Types of steel roof truss & its selection criteria. Calculation of panel point load for Dead load; Live load and wind load as per I.S. 875-1987. Analysis and Design of steel roof truss. Design of Angle purlinas per I. S. Arrangement of members at supports.

Unit-8: Plastic Analysis

Plastic Analysis: Analysis of Steel Structures– Methods– Elastic, Plastic and Advanced method of analysis based on IS: 800-2007– Idealized Stress vs Strain curve– Problems. For Structural Steel– Requirements and Assumptions of Plastic method of analysis– Formation of Plastic hinges in Flexural members– Plastic Moment of Resistance and Plastic Modulus of Sections– Shape Factors of rectangular / circular/ I / T-Sections– Collapse load.

Text/Reference Books :-

1. Dr. N. Subramanian “Steel Structures,” Oxford University Press.
2. K. S. Sai Ram “Design of Steel Structures,” Pearson Prentice Hall, India.
3. M. R. Shiyekar “Limit State Design in Structural Steel,” PHI Learning Pvt. Ltd., 2011.
4. S. K. Duggal “Design of Steel Structures,” Tata McGraw-Hill Publishing Company Ltd., New Delhi.
5. M. Raghupati “Design of Steel Structures,” Tata McGraw-Hill Publishing Company Ltd., New Delhi.
6. Ramchandra “Design of Steel Structures,” Dalpat Rai & Sons Publication Company Ltd., New Delhi.
7. S. S. Bharikatti “Design of Steel Structures,” I.K. International Publishing House.
8. Kazimi & Jindal “Design of Steel Structures,” Prentice Hall India, New Delhi.
9. S. N. Malik “Design of Steel Structures,” Prentice Hall India, New Delhi.
10. BIS Code: IS 800:2007.

Subject: Design of Steel Structure Lab Subject Code: CIV610

PRACTICAL SHALL CONSISTS OF SKETCH BOOK AND DESIGN REPORT OF STEEL ROOF TRUSS FORAN INDUSTRIAL BUILDING, TWO FULL IMPERIAL SIZE SHEET SHALL BE USED FOR DRAWINGS.

1. Sketch Book:

Sketch book shall consists of any five plates out of the below mentioned

1. Typical sketches of sections of tension member, determination of net effective cross sectional areaof tension member for angle section.
2. Typical sketches of sections of compression member, determination of effective length for different end conditions.
3. Type of trusses for different spans.
4. Riveted and welded connections for axially loaded member.
5. Column section and slab base
6. Important in formation of clauses of IS800-1984 and IS875 (Part-1, 2 & 3)

2. Design of Steel roof truss:

The student should draw two full imperial size sheets covering design of steel roof truss any one of the truss fink, fan, Pratt, lattice truss for Span from 8 to 16 meter the design shall cover calculations for the dead load, live load, wind load with design of the various elements. The drawing shall include detailing the truss for below mentioned elements.

a. Architectural drawing
b. Data for structural design
c. Key plan at tie level
d. Detailed layout of steel roof truss.
e. Details at end support.

3. Is Codes:
   1. IS800-1984 Indian Standard code of practice for use of structural steel in general building construction, BIS New Delhi.
   2. IS-875 Part-1, 2 ,& 3- 1987 Indian Standard code of practice use of structural steel in general building construction, BIS New Delhi.
   3. I S hand book No.1 Properties of structural steel rolled section
   4. Steel table.

Subject : Estimating & Costing Course code : CIV605
Full Marks : 80+20=100

Hours 42

Rationale:

With this knowledge and skill, he will be able to prepare estimate before start of construction and systematically procure materials during execution using specifications for ensuring appropriate type of construction processes & quality of engineering product in specialized areas in Building Construction, Irrigation, Transportation and Environmental Engineering.

Course Objectives:

Students should be able to:

1) Decide approximate cost of civil engineering structure.
2) Prepare check list of items of construction.
3) Prepare detailed estimate for civil engineering work.

4) Take measurement of completed work.

6) Compare actual quantity with estimated quantity.

7) Prepare estimate of earthwork and rate analysis of different civil works.

Course Outcomes:

1. Importance of estimation in civil engineering
2. Importance of specification in civil engineering.
3. How we can perform estimate of different civil engineering structures.
4. Importance and objectives of rate analysis.
5. Importance of road estimate and its cost analysis.
6. Importance of detailed estimate and it's rate analysis.

Course Topic / Sub Topic

Introduction 2Hrs

Meaning of the terms estimating and costing, Purpose of estimating, methods of estimating, Various Perform a used in estimates: Measurement/ Quantity Sheet, Abstract sheet & material consumption statement form, Types of estimate- Approximate and Detailed.

Approximate estimate- 6Hrs

Plinth area rate method, Cubical Content method, Service Unit method and its application, Typical bay method, Approximate Quantity method, problems.

Detailed Estimate 16Hrs

Type of detailed estimate and its uses, Detailed estimate, Revised estimate, Supplementary estimate, Revised & supplementary estimate, Maintenance & Repair estimate, Unit quantity method, Total quantity method, Data required for detailed estimate. Factors to be considered during preparation of detailed estimate, Preparing check list– by adoption of Sequence of execution and describing item of works.

Detailed estimate of various items of Load bearing Structure by Long Wall and short wall Centerline method, for single room and two room with verandah and other residential and public building.

Detailed estimate Double storeyed residential building with staircase. Estimate of Inclined roof buildingwith King post and queen post truss.
Detailed Estimate of Framed Structure building by centre line method of slab, lintel, T-beam and Columnwith foundation.

Preparation of bar bending schedule. Percentage of reinforcement for various structural member Detailed estimate of Roof slab culvert, pipe culvert and Bridge with return wall and straight splayed wing wall.

Mode of Measurements 4Hrs

Units of Measurements for different item of works as per IS1200 & As per PWD specification Book. Desired accuracy in taking measurements of various items of works Rules of deductions for openings as per IS 1200 for brickwork, plastering, painting Rate Analysis 8hrs

Market Rate and labour rate. Transportation of Materials, capacity of conveyance for different materials. Transportation Charges. Labour -Categories of labours, labour rates, over head charges, contractor's profit, water charges. Preparing rate analysis of different items of work viz P.C.C., Brick work, RCC works, Plastering, flooring only.District Schedule of rates, completed rates & labour rates.

Estimate for Earthwork 6hrs

Concept of Lead and Lift. Framing estimate by taking out quantities of Earthwork of Road and Irrigation Canal embankment using mean are a and earthwork of BBM septic tank for 25 usersc) Community well for10m.dia.

Subject: Estimating & Costing Lab Course code: CIV611

List of Experiments:

1. Prepare Check list of items of Load Bearing type Building
2. Writing the rules of deduction's for below mentioned items of work as per IS1200.

a) Brickwork b) Plastering / Pointing work c) Painting work

3. Taking out quantities of various items of work for load bearing building.

i) Excavation for foundation ii) Plain Cement Concrete of foundation iii) U.C.R./BB Masonry work in foundation and plinth. iv) D.P.C.

v) Plinth Filling.

vi) Brick Masonry work. vii) Flooring, skirting, dados viii) Plastering .(Internal & External)

ix) Wood work indoors.

4. Writing/drafting detailed specifications for some important items of Civil Works. Learning Resources:

Books:

Sr. No.	Title	Author	Publisher
01	Estimating & costing in Civil Engineering	B.N.Datta S	Publishers Distris Pvt Ltd New Delhi
02	Estimating & costing, Specification and Valuation in Civil Engineering	M. Chakraborti	M.Chakraborti, Calcutta

03	Estimating & costing	S.C. Rangwala	Charotar Publication Anand
04	Estimating & costing	G.S .Birdie	Dhanpat Raiand Sons Delhi

Subject: Contract & Account Course code: CIV606
Full Marks: 80+20=100

Hours: 42

Rationale:
This is a core technology subject which will enable the students to learn facts, concepts, principle and procedure in contracts and accounts. With this knowledge and skill, he will be able to prepare tender papers for contract and contract documentation before start of construction. He will get acquainted with procedures and different forms used by PWD as well as private construction firms and will therefore be able to prepare bills and pay contractor for the work as well as penalize for defective work He will also use the core knowledge of this subject area for assessment of expenses for repairs and maintenance of civil engineering works.

COURSE OBJECTIVE:

The students shall be able to:

1) Differentiate between types of contract.
2) Prepare tender documents.
3) Draft tender notice for various types of construction
4) Prepare the Account document (bills)
5) Know the Contractor payment procedure 6) Prepare specification of an item of construction.
7) Calculate the value of a land and old buildings.

COURSE OUTCOMES:

1) Execute the method of PWD for initiating the works.
2) Execute the contract for civil engineering works.
3) Prepare the tender documents for civil engineering work.
4) Use the relevant type of form used in PWD to pay the bill of the executed work 5) Prepare the detailed specification for various items of construction.
6) Justify the rent fixation of civil structures.

Topic/ Subtopic

Procedure of execution of work by P.W.D 04Hrs

1.1 Organizational structure of P.W.D, functions of their personnel.

1.2 P.W.D. Procedure of initiating the work, administrative approval, technical sanction, budget provision.

1.3 Methods used in P.W.D. For carrying out works contract method and departmental method, rate list method, piece work method, day's work method, department method (N M R and Casual Muster Roll.) Contract 10Hrs

2.1 Definition of contract, Objects of contract, requirements of valid contract

2.2 Types of engineering contract with advantages and disadvantages their suit abilities- Lump sum contract, item rate contract, percentage rate contract, cost plus percentage, cost plus fixed fee, cost plus variable percentage and cost plus variable fee contract, labour contract, demolition contract, target contract, negotiated contract.

2.3 Class of contractor, Registration of contractor.

2.4 BOT Project: Objectives, scope, advantages, disadvantages, example Tender & Tender Documents 10Hrs

3.1 Definition of tender, necessity of tender, types-local and global.

3.2 Tender notice, points to be included while drafting tender notice, drafting of tender notice.

3.3 Meaning of terms: earnest money, security deposit, validity period, right to reject one or all tenders, corrigendum to tender notice and its necessity.

3.4 Tender documents–list, schedule a, schedule band schedule C

3.5 Terms related to tender documents–contract conditions: time limit, time extension, penalty, defective material and workmanship, termination of contract, suspension of work, subletting of contract, extra items, escalation, arbitration, price variation clause, defect liability period, liquidated and un-liquid a ted damages.

3.6 Filling the tender by contractor and points to be observed by him.

3.7 Procedure of submitting filled in tender document, procedure of opening tender, comparative statement, scrutiny of tenders, award of contract, acceptance letter and work order.

Unbalanced tender, ring formation accounts in P.W.D. 02Hrs

4.1 Various account forms and their uses- Measurement Books, Nominal Muster Roll, Imp rest Cash, Indent, Invoice, Bills, Vouchers, Cash Book, Temporary Advance.

Payment to Contractors 04Hrs

5.1 Mode of payment to the contractor-Interim Payment and Its Necessity,

5.2 Advance Payment, Secured Advance, On Account Payment, Final Payment, First And Final Payment,Retention Money, Reduced Rate Payment, Petty Advance, Mobilization Advance.

Specifications 06Hrs

6.1 Necessity and Importance of Specification so fan Items, Points to be observedin framing Specifications of an Item,

6.2 Types of Specification: Brief and Detailed Specification, Standard and Manufacturers Specification.

6.3 Preparing Detailed Specifications of Items of following Civil Engineering Works. Building Construction System, Irrigation Engineering System, Transportation EngineeringSystem, Environmental Engineering System

6.4 Legal Aspects of Specification.

Valuation 06Hrs

7.1 Definition, Necessity of Valuation. Definitions–Cost, Price, Value, Characteristics of Value, Factors Affecting Value.

7.2 Types of Value:- Book Value, Scrap Value, Salvage Value, Speculative Value, Distress Value, MarketValue Monopoly Value, Sentimental Value, Factors Affecting Value.

7.3 DEPRECIATION, Obsolescence, Sinking Fund. Methods of Calculation of Depreciation– Straight Line Method, Sinking Fund Method,Constant Percentage Method Quantity Survey Method. Computation of Capitalized Value, Gross Income, Outgoing, Net Income, Years Purchase. Types of Outgoing and Their Percentages.Fixation of Rent as Per PWD Practice

Subject: Contract & Account

Course code: CIV612

List of Experiments:

1. Collecting old set of tender document and writing are port on it.
2. Collection of tender notices published in newspapers for various items of civil engineering works. (Atleast5) Writes alient features of them.
3. Drafting at ender notice for construction of a civil engineering Work (W.B.M. Road, Residential Building)
4. Preparation of Tender Document for the Building. (Detailed Estimate prepared for R.C.C. Buildingin Estimating and Costing shall be used)
5. Collection of various account forms from PWD & writing report on it
6. Writing are porton store procedure and account producer of PWD. For it Guest Lecture of PWDofficial may be arranged.
7. Writing detailed Specifications for one item from each of following:
   a. Building construction system.
   b. Irrigation engineering system.
   c. Transportation engineering system.

d.Environment engineering system

BOOKS:

Sr. No.	Author	Title	Publisher
01	B.N. Datta	ESTIMATING &COSTINGINCIVIL ENGINEERING	UBS Publishers
02	M. Chakraborti	Estimating & costing, Specification and Valuation in Civil Engineering	M.Chakraborti ,Calcutta
03	S.C .Rangwala	Estimating &costing	Charotar Publication
04	B.S. Patil	Civil Engineering Contracts andaccounts Vol I & II	Orient Longman,
05	G.S. Birdie	ESTIMATING&COSTING	Dhanpat Rai and Sons

Subject: Advance Structure (Elective-II)

Course code: CIV607

Full Marks: 80+20=100

Hours: 42

Content:

DISPLACEMENT:

- Geometric methods: Deflected shape, Moment area method ,and Conjugate beam method.
- Energy Methods: Introduction, Form of elastic Strain energy, strain energy in member, energy relations in structural theory, virtual work, Betti's and Maxwell's Law's of reciprocal Deflections, Application of Trusses and Frames, Castiglione's Theorems.

1. ARCHES:
   Three hinge parabolic arch, Analysis for normal thrust, Horizontal Thrust, Radial shear, Shear force and bending moment. Two hinge parabolic arch with secant variation of moment of inertia. Analysis for radialshear and normal thrust.

2. ROLLING LOADS AND INFLUENCE LINES:

- Introduction, A single concentrated load, Uniformly Distributed load longer than the span, UniformlyDistributed load shorter than span, Two concentrated loads, Series of concentrated loads, Equivalent U.D.L, Influence Lines, influence lines for panelled beam, Influence lines for Truss member, Influence lines for three-Hinged Arches, influence lines from Deflected Shapes, Muller-Breslau's principle, Influence line using Muller-Breslau's principle.

3. PROPPEDCANTILEVERBEAM:

Analysis by slope and Deflection. Shear force and bending moment diagram, Deflection using consistentdeformation and strain energy method. Simple problems.

4. MATRIXMETHODOFANALYSIS:

Introduction, Axes & co-ordinates, Flexibility & stiffness influence Coefficient, Flexibility Matrix, Stiffness matrix, Relation between flexibility & Stiffness matrices, comparison of methods, System approach of flexibility& Stiffness methods. Transformation of information in structures through matrices. Analysis of continuous beam and orthogonal rigid frames.

Subject : Advance Structure Lab (Elective-II)Course code :CIV613

List of Experiments

List of Experiments (Any10Experimentmay be performed)

1. Experiment on a 2-hinged Arch for Horizontal Thrust and Influence Line for Horizontal Thrust
2. Experiment on a 3-hinged Arch for Horizontal Thrust and Influence Line for Horizontal Thrust
3. Experimental and Analytical Study of a 3-bar Pin-Jointed Truss
4. Experimental Verification of Betti's Theorem of Reciprocal Deflections
5. Experimental Verification of Maxwell’s Laws of Reciprocal Deflections
6. Verify the Müller-Breslau Theorem Using Begg’s Deformeter Set
7. Study the Cable Geometry and Statics for Different Loading Conditions
8. Determination of Reflection of a Prop Cantilever Beam
9. Demonstration of Sway in Portal Frames
10. Influence Line Diagram (ILD) for Deflection in a Steel Beam Using the Load Method
11. ILD for Support Reaction Using Müller-Breslau PrincipleAnalysis of Redundant Frame

REFERENCE BOOKS:

1. Dayaratnam,P.advancedstructuralanalysis,TataMcGraw-HillPublishingco.ltd.,NewDelhi,1978.
2. Junnarkar, S.B., Mechanics of structure vol. II, Charotar Publishing House, anand1989.
3. Kardestuncer, H.,Elementary Matrix analysis of structure, McGraw- Hill Bookco.,NewYork1974.
4. Laursen, H.I.,Matrixanalysisofstructures,McGraw-HillBookCo.,NewYork,1966.
5. Martin H.C., Introduction to Matrix methods of Structure analysis, McGraw-Hill Book Co., New York,1966.
6. Noris, C.H.,and Wilbur, J.B., Elementary structural analysis,McGraw-Hill BookCo.NewYork,1960.
7. Pandit, G.S., Gupta, S.P, structural analysis-A Matrix approach. Tata McGraw-Hill Publishing Co., NewYork,1963.

8. Popov,E.P.,Introductiontomechanicsofsolids,prentice-HallofIndialtd.,NewDelhi,1973.
9. Timoshenko, S. and Young, D.H, Theory of structures, secondedn., McGraw-Hill Book Co., New York,1965.

Subject : Water Resources Planning& Management(Elective-II)
Course code : CIV608
Full Marks : 80+20=100
Hours 42

COURSE OBJECTIVES:

The student is exposed to different phases in Water Resources Management and National Water Policy. Further they will be imparted required knowledge on Reservoir planning, management and economic analysis including Irrigation and Irrigation management practices.

COURSE OUTCOMES:

1. To appreciate various methods of irrigation and application to agricultural fields.
2. To appreciate the soil-water-plant relationship and understand the crop water requirements.
3. To determine the technical, social and economic aspects of water resources planningand management.
4. To carry out Hydraulic design of irrigation canals, diversion headwork and crossdrainage works.
5. To understand various aspects of water logging of agricultural lands.
6. To appreciate the concept of integrated water resources management.

DETAILED SYLLABUS

UNIT-I WATER RESOURCES

Water resources survey–Water resources of India–Description of water resources planning– Estimation of water requirements for irrigation and drinking -Single and multipurpose reservoir – Multi objective – Fixation of Storage capacity-Strategies for reservoir operationDesign flood-levees and flood walls.

UNIT-II WATER RESOURCE MANAGEMENT

Economics of water resources planning; – National Water Policy – Consumptive and non consumptive water use- Water quality –Scope and aims of master plan - Concept of basin as a unit for development-Water budget-Conjunctive use of surface and groundwater

UNIT-III IRRIGATION ENGINEERING

Need – Merits and Demerits – Duty, Delta and Base period – Irrigation efficiencies – Crops and Seasons-Crop water Requirement–Estimation of Consumptive use of water.

UNIT-IV CANAL IRRIGATION

Types of Impounding structures: Gravity dam – Diversion Head works - Canal drop – Cross drainage works – Canal regulations – Canal outlets – Canal lining - Kennady's and Lacey's Regime theory

UNIT-V IRRIGATION METHODS AND MANAGEMENT

Lift irrigation – Tank irrigation – Well irrigation – Irrigation methods: Surface and Sub- Surface and Micro Irrigation-Merits and demerits–Irrigation scheduling–Water
distribution–Participatory irrigation management with a case study

Subject : Water Resources Planning& Management Lab Course code : CIV614

List of Experiment

1. Integrated water resource management of small area (College campus, small village)
2. Report writing on visit to farm with drip irrigation system and preparing layout plan and neat labelled sketches.
3. Design of sprinkler irrigation system for farm with cost estimated.
4. Study of duty, Delta and Base period of any field.
5. Visit and report of any flood control system.
6. Study and visit of diversion head work of canal.
7. Visit and estimation of storage capacity of multipurpose reservoir.

8. Visit and estimate of capacity of irrigation well and small Pond. 9. Study and estimate of variation of ground water table.

TEXT BOOKS:

1. Linsley R.K. and Franzini J.B,“ Water Resources Engineering ”, McGraw-HillInc,2000.
2. Punmia B.C., et.al; Irrigation and water power Engineering, Laxmi Publications, 16th Edition, New Delhi,2009
3. Garg S.K.,“ Irrigation Engineering and Hydraulic structures”, Khanna Publishers, 23rd Revised Edition, New Delhi,2009

REFERENCES:

1. Duggal, K.N. and Soni, J.P.,“ Elements of Water Resources Engineering”,New Age International Publishers,2005
2. Chaturvedi M.C.,“Water Resources Systems Planning and Management”, Tata McGraw HillInc.,New Delhi,1997.
3. Michael A.M., Irrigation Theory and Practice, 2nd Edition, Vikas Publishing House Pvt. Ltd.,Noida,Up,2008
4. Dilip Kumar Majumdar, “Irrigation Water Management”, Prentice-Hall of India, NewDelhi,2008.
5. Asawa, G.L.,“ Irrigation Engineering”, New Age International Publishers, New Delhi, 2000.

Subject :Earth Quake Resistant Structure Course code :CIV609

Full Marks :80+20=100
Hours 42

Content-

UNIT:01–THE EARTH QUAKES 4Hrs

1.01 Earthquakes
1.02 Epicentre, hypocentre and earth quake waves
1.03 Measurement of Ground Motion
1.04 Cause of Earthquake (Platetectonic)
1.05 Intensity and Isoseismals of an earthquake
1.06 Magnitude and Energy of anearthquake
1.07 Consequences of earthquakes
1.08 Seismic Zoning
1.09 Risk Maps

UNIT:02–VIBRATIONS OF SINGL EDEGREE OFF REEDOM SYSTEM 8Hrs

2.01 Types of Vibrations
2.02 Degrees of Freedom
2.03 Spring Action and damping
2.04 Equation of motion of single degree of freedom
2.05 Free Vibrations of Undamped system shaving single degree of freedom
2.06 Combination of stiffnesses
2.07 Vibration of Damped System having single degree of freedom
2.08 Dry Friction Damping
2.09 Negative Damping
2.10 Forced Vibration of a Undamped System
2.11 Forced vibrations of a damped system
2.12 Equivalent viscous damping
2.13 Vibration isolation
2.14 Vibration Measuring Instruments

UNIT:03–BEHAVIOROFTRADITIONALLYBUILTCONSTRUCTIONOFINDIA 4 Hrs

3.01 Introduction
3.02 Strong motion earthquakes
3.03 Elastic spectra
3.04 Ground velocity and displacement
3.05 Inelastic spectra seismic.

Seismic performance during earth quake and mode of failure (out of plane failure, in plane failure, Diaphragm failure, connection failure, nonstructural component failure).

UNIT:04–AS EISMIC DESIGN OF STRUCTURES 7 Hrs

4.01 Design data and philosophy of design
4.02 Multi-storey Buildings (G+2) Design-Analysis Design
4.03 Earth quake resistant construction of buildings
4.04 Ductility provisions in reinforced concrete construction
4.05 Base Isolation
4.06 Capacity building Design

UNIT:05 –MASONRY BUILDINGS 3 Hrs

5.01 Categories of masonry buildings
5.02 Improving seismic behavior masonry buildings
5.03 Seismic design requirement
5.04 Seismic design of masonry building
5.05 Restoration and strengthening of masonry walls

UNIT:06–RAINFORCED CONCERET BUILDINGS 4 Hrs

Common modes of Failure of Reinforced Concrete buildings

Horizontal & vertical irregularities identifications seismic damage in building Components (columns, beams, slabs, in fill wall, foundation etc.)ductile detailing as per IS13920

UNIT:07-IS CODES PROVISIONS RELATED TO EARTHQUAKE 4Hrs

Seismic provision of strengthening and retrofitting measure for traditionally built constructions. Introduction of IS : 4326:1993.IS: 13928:1993& IS:13927:993 with certain clauses.

Subject : Earth Quake Resistant Structure Lab Course code :CIV615

List of Practical-

1. Prepare seismic zone mapping of India & world.
2. Prepare Isoseismals of Indian earthquake & Risk map.
3. Preparation of Design Data required for Aseismic design of G+2 Building and their analysis.
4. Prepare design for Ductility provision in G+2 Building taking suitable examples.
5. Prepare drawing (sectional elevation) for A seismic design of Masonary building limited to single storey,3 bed room, attached bathroom, front & back veranda with RCC Stair.
6. Sketch design detailing of Reinforcement as per IS:13920 of following items taking suitable size-a.) Column with Foundation. b.) Slab with Beam.
7. PreparelistforretrofittingmeasurementofatraditionalG+2building.

Books Recommended :-

01	Earthquake Resistant Design & Analysis	Jai Krishna.
02	Earthquake Resistant Design of Structure	S.K. DUGGAL, Oxford University Press
03	Earthquake Resistant Design of Structure	Pankaj Agrawal, Manish Shrikhande, PHI
04	Dynamic of Structures	A.K. Chopra.
05	IS :1893-2002;IS:13920-1993;IS :13828-1993,IS :4326-1993	BISCODES of India
06	Hand book of Earthquake Resistant Structure	Farzard Naim.
07	Dynamics of Structures	Claugh & Penzien.

IIIK-BMTPC Earthquake Tips is a project for twenty four tips of two pages each. Written in simple language. These are available at www.nicee.org for anyone to download. These are very suitable for

teachers and Students for polytechnics. Hindi translation of the tips are expected to become available shortly.

Subject : Professional Practices (Common Paper)
Subject Code 602

Rationale:

Most of the diploma holders join industries. Due to globalization and competition in the industrial and service sectors the election for the job is based on campus interviews or competitive tests. While selecting candidates a normal practice adopted is to see general confidence, ability to communicate and attitude, in addition to basic technological concepts. The purpose of introducing professional practices is to provideopportunity to students to Undergo activities which will enable the m to develop confidence. Industrial visits, expert lectures, seminars on technical topics and group discussion are planned in a semester so that there will be increased participation of students in learning process.

Activities to be undertaken:

Students are expected to undertake these activities:

1. Acquire information from different sources (Print and electronic) on the topics of specialization and related to the subjects of II nd and final year. The class is to be divided in groups of not more than five to six students in agroup and all groups are to be allotted topic of their choice. The topic should not be repeated to other group for originality of work to be performed by the group.This activity will develop inter dependence and leadership among the students.

2. Prepare notes for given topic at point no 1. The notes will be in form of a project report, having all the sections of report. There port should not be of 30–50pages.

3. Prepare presentation and Present the learning and finding on given topic in aseminar. The presentation should be prepared in Power Point module having more than 25 slides. All students should be asked to deal with suitable partsdecided by the group itself.

4. Interact with peers to share thoughts. After the final presentation the students should been courage to interact with the faculty members, students' fellows and other experts for suggestions and advanced and structured learning.

5. Undertake industrial visit of their area and choice. Prepare a report on industrial visit. Expert lectures on the topic selected may be invited for the students and these expert lectures also the students should be asked to prepare a report and present the same in seminar or have a group discussion before the expert and faculty members.

6. Develop entrepreneurial traits. Students group may be asked to have a field survey and product assessment and analysis for a product of their choice. Prepare a report for all the inputs of their requirement and submit it for evaluation.

7. To prepare for startups. Expert lectures for exploring this option may be arrange das this is also a viable option and much talked about option for self employment and avail the encouragement by

the government. Based on the above rationale students will advised to develop traits under guidance of dedicated faculty members/mentors.