GOVERNMENT POLYTECHNIC NASHIK

(AN AUTONOMOUS INSTITUTE OF GOVT. OF MAHARASHTRA)

CURRICULUM - 2011

DIPLOMA PROGRAMME
IN
CIVIL ENGINEERING

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Preface

Government Polytechnic, Nashik is established in 1980. The institute has been conferred an academic autonomous status in 1995 by Government of Maharashtra because of excellent performance.

The vision of the institute is to develop world class pragmatic engineers. For this the institute aims to provide students technical education training and guidance that lead to personality development, meaningful employment and entrepreneurship and to develop and maintained Center of Excellence for education of new emerging trends in information technology. To achieve this continuous efforts are made to design the curriculum considering the latest development in the industrial sector and technology.

The three year Diploma Programme in Civil Engineering is being offered since 1980 under MSBTE. After academic autonomy, first curriculum was implemented in 1995 and subsequently it was revised and implemented in 2001 and 2007. The curriculum revision is a regular activity and system approach is followed for designing the curriculum. The curriculum has been revised and the implementation has started from the academic year 2011- 12. The revised curriculum is designated as "Curriculum 2011".

For designing the curriculum, the questionnaire has been designed to get the feedback from different stake holders i.e. industries, teachers and students. The feedback from different stake holders has been analysed in search conference and the programme structure is finalised and approved by Programme Wise Committee (PWC), Board of Studies (BOS) and Governing Body (GB).

The content detailing of individual course has been carried out by Group of Experts, consisting of faculty from this institute as well as from other nearby institute and industrial experts. The content detailing was presented before the PWC, BOS and GB for approval.

In this curriculum-2011, the student has to acquire 200 credits for successful completion of Diploma Programme.

The courses of curriculum are structured at different 5 levels i.e. Foundation Courses, Basic Technology Courses, Allied Courses, Applied Technology Courses, Diversified Courses. In addition to these 5 levels, for overall development of the students "Non Examination Credit Courses" are also included.

The minimum entry level is 10th. However, the curriculum provides "Multi Point Entry and Credit system (MPEC)" for the students opting admission after passing 12th, ITI, MCVC. In this, the students will get exemptions in certain courses as per the rules.

There is a flexibility for opting the courses as per the choice of students.

The curriculum provides "Sample Path" as a guide line for selection of courses in each term for entry level as 10th.

The List of Courses for Award of Class after completion of Diploma Programme is prescribed separately in this curriculum.

The fulfilment of objectives of curriculum-2011 will depend on its effective implementation. The teachers who are implementing the curriculum were also involved in design process, hence, I hope that the curriculum-2011 will be implemented in effective way.

(Dr. D. R. Nandanwar)
Principal
Government Polytechnic, Nashik

Diploma Programme in Civil Engineering

Rationale :

Civil Engineering is the basic branch of Engineering. All Engineering works involve Civil Engineering activities in the National development. Civil Engineering plays a vital role by creating a large employment potential. It involves about 20 percent of the labour force of India. Majority of this labour force is unskilled which is handled by Civil Engineering technicians.

This Programme offers courses to acquire supervisory skills and knowledge in Basic, allied, applied and diversified field of Civil Engineering. This programme intends to develop skills in Civil Engineering technicians, so that they will be able to handle the Civil Engineering works.

Programme Objectives :

The diploma programme in Civil Engineering will enable student to

1. Read, prepare and interpret Civil Engineering drawing.
2. Handle and use different surveying instruments and prepare maps from the collected data.
3. Understand the construction procedure and maintenance of roads, railways and bridges.
4. Select proper construction material.
5. Understand components of building.
6. Prepare estimate and cost analysis of Civil Engineering Structures.
7. Understand design of simple civil Engineering R.C.C. structures.
8. Design simple structural steel member like beam, column and simple trusses.
9. Maintain accounts of Civil Engineering work.
10. Write technical reports for maintenance work.
11. Use Civil Engineering Softwares for various Civil Engineering applications.
12. Execute works as per CPM and bar chart.
13. Prepare muster rolls and bill of payments.
14. Keep updated site records for materials.
15. Follow safety norms of construction works.
16. Create awareness for environmental pollution and control.

Job Profile of Civil Engineering Technician :

A diploma technician in Civil Engineering has to carry out various activities in various areas during his implementation of engineering knowledge.

Diploma Civil Engineer has to perform following duties.

1. Surveyor
2. Building layout planning
3. Site supervisor
4. Estimator
5. Contractor
6. Entrepreneur
7. Labour management
8. Maintaining accounts
9. Design of minor works
10. Writing technical reports
11. Maintenance Engineer
12. Material planning
13. Construction manager
14. Execution of Civil Engineering Works
15. Valuer
16. Quality control of Civil Engineering Works
17. Stores management
18. Finance management
19. Material Testing
20. Developer
21. Marketing of Civil Engineering products/structures
22. Building services.

Skills to be developed :

The curriculum aims at developing skills so that the diploma pass outs would be suitable for industry.

The skills are listed below

- Communication ability.
- Presentation skills.
- Observation skills.
- Search information from various sources.
- Read and interpret building plans, Structural drawing and Civil Engineering drawing.
- Understand facts, concepts and principles related to construction of Civil Engineering structures.
- Understand construction procedure of various Civil Engineering Structures.
- Supervision and execution of Civil Engineering works.
- Analyse and interpret test results.
- Use survey instruments for taking various types of measurement.
- Plot survey data and prepare drawings.
- Draw building plans manually and by using CAD software.
- Prepare working drawing for construction work and structural details.
- Prepare Civil Engineering Drawing.
- Give layout of Civil Engineering structures.
- Calculate quantities of Civil Engineering structures and prepare estimates.
- Understand procedure of tender notice and contract agreement.
- Understand accounting procedures for Civil Engineering Works.
- Prepare valuation of buildings.
- Understand the principles of management.
- Analysis and design of simple RCC structure.
- Design of simple steel structure.
- Use standard codes.
- Planning and organisation of construction activities.
- Maintain required technical record.
- Quality control techniques in construction.
- Work as a member of a team and as leader.
- Write report for given task / project.
- Conduct and interpret the results of field and laboratory test on construction materials and various types of soil.
- Suggest suitable type of foundation for soil strata.
- Understand the construction procedure and maintenance of roads, bridges and railways.
- Understand the treatment required for water purification.
- Understand the aspect of building sanitation and treatment and disposal of sanitary sewage.
- Understand construction and working of various irrigation structures
- Able to apply principles of hydraulics in Civil Engineering works.

- Use computer softwares.
- Know the use of construction equipments and machinery in Civil Engineering fields.

PROGRAMME STRUCTURE

PROGRAMME - DIPLOMA IN CIVIL ENGINEERING
PROGRAMME STRUCTURE

SCHEME AT A GLANCE

Level	Name of Level	Total Number of Courses offered	Number of Courses to be completed	TH	TU	PR	Total Credits	Marks
Level-1	Foundation Courses	10	10 Compulsory	24	02	22	48	1000
Level-2	Basic Technology Courses	10	10 Compulsory	29	--	26	55	1275
Level-3	Allied courses	08	04 (02 Compulsory +02 Elective)	10	--	02	12	350
Level-4	Applied Technology Courses	12	12 Compulsory	30	01	36	67	1475
Level-5	Diversified Courses	09	O3 Elective	06	--	08	14	400
Total		**49**	**34 compulsory +5 Elective 39**	**99**	**03**	**94**	**196**	**4500**
Non Examination Credit Courses		15	02 Electives	--	--	04	04	--
Grand Total		**64**	**41**	**99**	**03**	**98**	**200**	**4500**

Abbreviations :

TH : Theory, TU : Tutorial, PR: Practical.

PROGRAMME - DIPLOMA IN CIVIL ENGINEERING
PROGRAMME STRUCTURE
LEVEL – 1
FOUNDATION COURSES

Sr. No.	Course Code	Course Title	PRQ	TEACHING SCHEME				EXAMINATION SCHEME						
				TH	TU	PR	Total Credits	Theory Paper		Test	PR	OR	TW	Total
								Hrs	Mark					
01	1101	Communication Skills	--	3	--	2	5	3	80	20	--	--	50	150
02	1102	Development of Generic Skills	--	1	--	2	3	--	--	--	--	--	50	50
03	1103	Basic Mathematics	--	3	1	--	4	3	80	20	--	--	--	100
04	1104	Engineering Mathematics	--	3	1	--	4	3	80	20	--	--	--	100
05	1105	Applied Physics	--	4	--	2	6	3	80	20	--	--	50	150
06	1106	Applied Chemistry	--	4	--	2	6	3	80	20	--	--	50	150
07	1107	Engineering Graphics	--	2	--	4	6	--	--	--	--	25	25	50
08	1108	Engineering Mechanics	--	4	--	2	6	3	80	20	--	--	50	150
09	1109	Workshop Practice	--	--	--	6	6	--	--	--	--	--	50	50
10	1110	Computer Applications	--	-	--	2	2	--	--	--	--	--	50	50
Total			--	**24**	**2**	**22**	**48**	**--**	**480**	**120**	**--**	**25**	**375**	**1000**

Level : 1

Total Courses : 10
Total Credits : 48
Total Marks : 1000

Abbreviations :

PRQ : Prerequisite, TH : Theory, TU : Tutorial, PR: Practical, OR : Oral, TW : Term Work

Course code Indication :

First digit : Indicates Year of Revision
Second digit : Indicates Level.
Third & Fourth digit : Indicates Course Number.

Assessment of PR / OR / TW :

1) All orals & practicals are to be assessed by external & internal examiners.
2) * Indicates TW to be assessed by external & internal examiners.
3) Other TW are to be assessed by internal examiners.

PROGRAMME - DIPLOMA IN CIVIL ENGINEERING
PROGRAMME STRUCTURE
LEVEL – 2
BASIC TECHNOLOGY COURSES

Sr. No.	Course Code	Course Title	PRQ	TEACHING SCHEME				EXAMINATION SCHEME						
				TH	TU	PR	Total Credits	Theory Paper		Test	PR	OR	TW	Total
								Hrs	Mark					
01	1201	Computer Aided Graphics	--	--	--	4	4	--	--	--	--	--	50	50
02	1202	Building Drawing	--	1	--	4	5	4	80	20	--	25	25	150
03	1203	Concrete Technology	--	3	--	2	5	3	80	20	--	25	25	150
04	1204	Hydraulics	--	4	--	2	6	3	80	20	--	25	25	150
05	1205	Mechanics of Structures	--	4	--	2	6	3	80	20	--	--	25	125
06	1206	Geotechnical Engineering	--	3	--	2	5	3	80	20	--	--	25	125
07	1207	Highway Engineering	--	3	--	2	5	3	80	20	--	--	25	125
08	1208	Railway and Bridge Engineering	--	4	--	-	4	3	80	20	--	--	--	100
09	1209	Basic Surveying	--	3	--	4	7	3	80	20	25	--	25	150
10	1210	Building Construction	--	4	--	4	8	3	80	20	--	25	25	150
Total			--	**29**	--	**26**	**55**	--	**720**	**180**	**25**	**100**	**250**	**1275**

Level: 2

Total Courses : 10
Total Credits : 55
Total Marks : 1275

Assessment of PR / OR / TW :

1) All orals & practicals are to be assessed by external & internal examiners.
2) * Indicates TW to be assessed by external & internal examiners.
3) Other TW are to be assessed by internal examiners.

PROGRAMME - DIPLOMA IN CIVIL ENGINEERING
PROGRAMME STRUCTURE
LEVEL – 3
ALLIED COURSES

Sr. No.	Course Code	Course Title	PRQ	TEACHING SCHEME				EXAMINATION SCHEME						
				TH	TU	PR	Total Credits	Theory Paper		Test	PR	OR	TW	Total
								Hrs	Mark					
01	1301	Applied Mathematics	--	3	--	--	3	3	80	20	--	--	--	100
02	1302	Construction Management	--	3	--	--	3	3	80	20	--	--	--	100
Elective I : Any **ONE** of the following														
03	1303	Project Management	--	3	--	--	3	3	80	20	--	--	--	100
	1304	Material Management	--	3	--	--	3	3	80	20	--	--	--	100
	1305	Supervisory skills	--	3	--	--	3	3	80	20	--	--	--	100
Elective II : Any **ONE** of the following														
04	1306	Entrepreneurship Development	--	1	--	2	3	--	--	--	--	--	50	50
	1307	Advanced Computer Applications	--	1	--	2	3	--	--	--	--	--	50	50
	1308	Life Skills	--	1	--	2	3	--	--	--	--	--	50	50
Total			--	**10**	--	**2**	**12**	--	**240**	**60**	--	--	**50**	**350**

Level: 3

Total Courses : 04
Total Credits : 12
Total Marks : 350

Assessment of PR / OR / TW :

1) All orals & practicals are to be assessed by external & internal examiners.
2) * Indicates TW to be assessed by external & internal examiners.
3) Other TW are to be assessed by internal examiners.

PROGRAMME - DIPLOMA IN CIVIL ENGINEERING
PROGRAMME STRUCTURE
LEVEL – 4
APPLIED TECHNOLOGY COURSES

Sr. No.	Course Code	Course Title	PRQ	TEACHING SCHEME				EXAMINATION SCHEME						
				TH	TU	PR	Total Credits	Theory Paper		Test	PR	OR	TW	Total
								Hrs	Mark					
01	1401	Advanced Surveying	--	3	--	4	7	3	80	20	50	--	25	175
02	1402	Computer Aided Drawing	--	--	1	4	5	--	--	--	--	--	50	50
03	1403	Estimating and Costing	--	4	--	4	8	4	80	20	--	25	50*	175
04	1404	Contracts and Accounts	--	3	--	2	5	3	80	20	--	25	25	150
05	1405	Theory of Structures	--	4	--	2	6	3	80	20	--	--	25	125
06	1406	Design of R.C.C. Structures	--	4	--	4	8	4	80	20	--	25	50*	175
07	1407	Design of Steel Structures	--	4	--	2	6	4	80	20	--	25	50*	175
08	1408	Environmental Engineering	--	4	--	2	6	3	80	20	25	--	--	125
09	1409	Irrigation Engineering	--	4	--	2	6	3	80	20	--	--	25	125
10	1410	Professional Practices	--	--	--	4	4	--	--	--	--	--	50	50
11	1411	Seminar	--	--	--	2	2	--	--	--	--	--	50	50
12	1412	Project	100 CR	--	--	4	4	--	--	--	--	50	50*	100
Total			--	**30**	**1**	**36**	**67**	**--**	**640**	**160**	**75**	**150**	**450**	**1475**

Level: 4

Total Courses : 12
Total Credits : 67
Total Marks : 1475

Assessment of PR / OR / TW :

1) All orals & practicals are to be assessed by external & internal examiners.
2) * Indicates TW to be assessed by external & internal examiners.
3) Other TW are to be assessed by internal examiners.

Note: In plant Training and Seminar

PROGRAMME - DIPLOMA IN CIVIL ENGINEERING
PROGRAMME STRUCTURE
LEVEL – 5
DIVERSIFIED COURSES

Sr. No.	Course Code	Course Title	PRQ	TEACHING SCHEME				EXAMINATION SCHEME						
				TH	TU	PR	Total Credits	Theory Paper		Test	PR	OR	TW	Total
								Hrs	Mark					
Elective III : Any **ONE** of the following														
01	1501	Building Maintenance	--	--	--	4	4	--	--	--	--	50	50	100
	1502	Advanced Construction Techniques	--	--	--	4	4	--	--	--	--	50	50	100
	1503	Building Supervision	--	--	--	4	4	--	--	--	--	50	50	100
Elective IV : Any **ONE** of the following														
02	1504	Construction Equipments	--	3	--	2	5	3	80	20	--	--	50	150
	1505	Plumbing Services	--	3	--	2	5	3	80	20	--	--	50	150
	1506	Architectural Practices & Interior design	--	3	--	2	5	3	80	20	--	--	50	150
	1507	Watershed Management	--	3	-	2	5	3	80	20	-	-	50	150
Elective V : Any **ONE** of the following														
03	1508	Earthquake Resistant Structures	--	3	--	2	5	3	80	20	--	--	50	150
	1509	Prestressed and Precast concrete	--	3	--	2	5	3	80	20	--	--	50	150
	1510	Advance Concrete Technology	1203	3	--	2	5	3	80	20	--	--	50	150
Total			--	**6**	--	**8**	**14**	--	**160**	**40**	--	**50**	**150**	**400**

Level: 5

Total Courses : 03
Total Credits : 14
Total Marks : 400

Assessment of PR / OR / TW :

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2) * Indicates TW to be assessed by external & internal examiners.
3) Other TW are to be assessed by internal examiners.

PROGRAMME - DIPLOMA IN CIVIL ENGINEERING
PROGRAMME STRUCTURE

NON-EXAMINATION CREDIT COURSES

(Any one course from each group is Compulsory for award of Diploma in Civil Engineering)

Sr No.	Course Code	Course Title	PRQ	Teaching Scheme			
				TH	TU	PR	Total Credits
Group : A : Any **ONE** of the following							
01	1001	Physical Fitness	--	--	--	2	2
02	1002	Aerobics	--	--	--	2	2
03	1003	Yoga	--	--	--	2	2
04	1004	Marshal Art	--	--	--	2	2
Group : B : Any **ONE** of the following							
05	1005	Personality Development	--	--	--	2	2
06	1006	Model Making	--	--	--	2	2
07	1007	Repair of Domestic Appliances	--	--	--	2	2
08	1008	Gardening	--	--	--	2	2
09	1009	Public speaking	--	--	--	2	2
10	1010	Computer Hardware Maintenance	--	--	--	2	2
11	1011	Mobile Repairing	--	--	--	2	2
12	1012	Foreign Language	--	--	--	2	2
13	1013	Video graphy	--	--	--	2	2
14	1014	Two-Wheeler Maintenance	--	--	--	2	2
15	1015	Youth Empowerment and Skills	--	--	--	2	2
Total			**--**	**--**	**--**	**04**	**04**

Total Courses : 02
Total Credits : 04

PROGRAMME - DIPLOMA IN CIVIL ENGINEERING
Courses for Award of Class

Sr. No.	Course Code	Course Title	PRQ	TEACHING SCHEME				EXAMINATION SCHEME						
				TH	TU	PR	Total Credits	Theory Paper		Test	PR	OR	TW	Total
								Hrs	Mark					
01	1204	Hydraulics	--	4	--	2	6	3	80	20	--	25	25	150
02	1302	Construction Management	--	3	--	--	3	3	80	20	--	--	--	100
03	1403	Estimating and Costing	--	4	--	4	8	4	80	20	--	25	50*	175
04	1404	Contracts and Accounts	--	3	--	2	5	3	80	20	--	25	25	150
05	1405	Theory of Structures	--	4	--	2	6	3	80	20	--	--	25	125
06	1406	Design of R.C.C. Structures	--	4	--	4	8	4	80	20	--	25	50*	175
07	1407	Design of Steel Structures	--	4	--	2	6	4	80	20	--	25	50*	175
08	1408	Environmental Engineering	--	4	--	2	6	3	80	20	25	--	--	125
09	1409	Irrigation Engineering	--	4	--	2	6	3	80	20	--	--	25	125
10	1411	Seminar	--	--	--	2	2	--	--	--	--	--	50	50
11	1412	Project	100 CR	--	--	4	4	--	--	--	--	50	50*	100
Any **ONE** From Elective														
12	1504	Construction Equipment	--	3	--	2	5	3	80	20	--	--	50	150
	1505	Plumbing Services	--	3	--	2	5	3	80	20	--	--	50	150
	1506	Architectural Practices & Interior design	--	3	--	2	5	3	80	20	--	--	50	150
	1507	Watershed Management	--	3	--	2	5	3	80	20	--	--	50	150
Total			**--**	**37**	**--**	**28**	**65**	**--**	**800**	**200**	**25**	**175**	**400**	**1600**

Total Courses : 12
Total Credits : 63
Total Marks : 1600

Assessment of PR / OR / TW :

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LEVEL -1

FOUNDATION COURSES

Programme : Diploma Programme in CE / ME / PS / EE / IF / CM / EL / AE
Course : Communication Skills **Course code :** 1101
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme								
Hrs / week			Credits	TH Paper Hrs.	Marks							
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
03	--	02	05	03	Max.	80	20	100	--	--	50	150
					Min.	32	--	40	--	--	20	--

Rationale:

Students of Engineering and technology must learn to express through English. **Communication skills** are required for all round development of a student as an individual & as a leading technician in industry. Communication skills (reading, writing, speaking and listening) help him in his/her both educational and professional career as well as in society to become efficient communicators in English & a successful engineer & entrepreneur. Therefore the assignments included the syllabus to enhance their language and communication abilities.

Objectives:

The student will be able to

1. Comprehend language at an intended level.
2. Increase vocabulary.
3. Develop the ability of writing & maintaining reports on maintenance, accident & survey reports, memos, notice, business letters, complaint letters, quotation etc.
4. Application of grammar in practical use (oral as well as written purpose)
5. Pronounce English sounds correctly.
6. Communicate with industries/industry professionals.
7. Give positive feedback in various situations, to use appropriate body language.
8. Compress the passage into 1/3 of its length.
9. Make students the effective users of the language.
10. Overcome communication barriers.
11. Make communication more effective.

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Communication** 1.1. Definition of communication, Need, importance, features, objectives, functions of communication. 1.2. Types of communication- 1.3. Components of communication system 1.4. Communication Process 1.5. Nonverbal Communication- I) Nonverbal Codes-a)Kinesics b)Proxemics c)Hepatics d)vocalic e)physical appearance f)Chronomics g)Artifacts II) Graphical Communication. 1.6. Barriers of communication and ways to avoid it 1.7. Principles of effective communication.	12	20
2	**Vocabulary building** 2.1. Word Formation Process 2.2. Affixation. 2.3. Synonyms/antonyms, homophones, homonyms 2.4. Units of expressions 2.5. Idioms and phrasal verbs	07	06
3	**Language Grammar**. 3.1. The sentence Elements-Parts of Speech 3.2. Tenses 3.3. Voices-Active, Passive 3.4. Transformation-Affirmative, Negative, Assertive 3.5. Prepositions 3.6. Degree-Comparative, positive, superlative 3.7. Modal Auxiliary 3.8. Article	12	20
4	**Formal Written Skills** 4.1. **Types of business letter** Letter of inquiry, reply to an inquiry, placing orders, Letter of application for job, Complaint letter, sales letter. 4.2. **Report Writing**- Project report, Progress report, Survey report, Accident report, Maintenance report 4.3. **Office Drafting**- Notices, Circulars, Memorandum	12	24
5	**Paragraph writing** 5.1. Types of paragraph, Comprehension 5.2. Dialogue Writing, Situational Writing 5.3. Speech Writing 5.4. Writing Organized Paragraphs.	05	10
	Total	**48**	**80**

Laboratory Work/Assignments

1. Lab experiments in language lab.
2. Pronunciation of correct sounds-Reading given text.
3. Communication –(Given Situations)
4. Vocabulary Building-Practicing words often confuse.
5. Grammar Application.
6. Letter Writing and Office Drafting
7. Report Writing and Job Application
8. Paragraph Writing.
9. Comprehension and Precise Writing.
10. Presentation Skills-Role Play.
11. Differentiating between notice, memo and circular writing.
12. Mini Project on given topic (the teacher will give a topic and each student will collect information on it)

Suggested Instructional Strategies:

Lecture Method, Improved Lecture Method, Industrial Visit, Demonstration, Expert Lecture.

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1.	R. C. Sharma and Krishna Mohan	Business correspondence and Report writing	Tata McGraw Hill Publishing
2.	Krishna Mohan and Meenakshi Raman	Effective English Communication	Tata McGraw Hill Publishing Co. Ltd.
3.	Z. N. Patil	English for practical purpose	Macmillan
4.	Wren & Martin	Grammar by Wren & Martin	
5.	David Green	Contemporary English Grammar	Macmillan
6.	Basal and Harrison	Spoken English	Orient Longman
7.	R. C. Jain	Contemporary English Grammar	Macmillan

Manuals - Testing Procedures.

Chart- 01(ASTM Standards)

Websites:

1. www. communicationskills. co. in
2. www. mindtools. Com
3. www. communication. skills 4 confidence
4. www. goodcommunication skills. net

Programme : Diploma Programme in CE / ME / PS / EE / IF / CM / EL / AE
Course : Development of Generic skills **Course code :** 1102
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
01	--	02	03	--	Max.	--	--	--	--	--	50	50
					Min.	--	--	--	--	--	20	--

Rationale:

This subject will develop the student as an effective member of the team in the organization. It will develop the abilities and skills to perform at highest degree of quality. It enhances his capabilities in the field of searching, assimilating information, handling people effectively, and solving challenging problems.

Objectives:

The student will be able to

1. Learn effective performance through Soft skills and life skills.
2. Apply the techniques of enhancing the memory power.
3. Set the goal for personal development.
4. Develop good habits to overcome stress.
5. Make self evaluation about needs & self development.
6. Develop assertive skills.
7. Manage & perform Task.
8. Produce new things or improve existing things.
9. Enhance the ability of creativity.
10. Think, plan, practice, assess & improve in real life situations.
11. Learn to innovate new ideas.

Contents: Theory

Topic No.	Topic & Subtopic	Hours
1	**Importance of Development of generic skills**. 1.1. Introduction to course. 1.2. Basic Skills- Listening, Speaking, Reading, Writing. 1.3. Importance of various Soft Skills in present context application	02
2	**Self Learning Techniques (SLT**) 2.1. Need of SLT 2.2. Importance of SLT 2.3. Steps in SLT 2.4. Information source-Primary, secondary, tertiary 2.5. Enhancing Memory and concentration 2.6. Learning Practical Skills- 2.7. Types- Technical, Organisational, Human 2.8. Need of Practical Skills 2.9. Domains of learning 1)cognitive 2)Affective3)psychomotor	03
3	**Self Analysis / Self Awareness**	

Topic No.	Topic & Subtopic	Hours
	3.1. SWOT Analysis. 3.2. Motivation 3.3. Attitude – Types, How to build positive Attitude 3.4. Assertiveness 3.5. Confidence Building. 3.6. Goal Setting – Need, Importance, Concept setting smart goal 3.7. Creativity-Concept factors enhancing creativity.	03
4	**Self Development / Personality Development** 4.1. Importance and need of personality development. 4.2. Body Language – Codes, dress and appearance, Voice Modulations 4.3. Management of self - Stress Management-Concept, causes effects. Remedies to Avoid/Minimize stress. 4.4. Health Management-Importance, dietary guidelines and exercises. 4.5. Time management- Important process of time planning Vs important factors leading to time loss and ways to handle it. 4.6. Tips for effective time Management. 4.7. Effective Communication Skills	05
5	**Task Management**. 5.1. Defining Task/ Project 5.2. Drafting of Task – Activity, Events 5.3. Task Planning 5.4. Task Characteristics-Unique, Customised, risk and uncertainty, Involve teams. 5.5. Importance of Task management	03
	Total	**16**

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The term work Assignments/practical

1. Self Awareness.
2. Self Learning Technique (SLT) Independent study technique with the help of library.
3. Attending a seminar and preparing a report of the same.
4. SWOT analysis need and importance.
5. Maintaining Individual Diary: Planning of time, Thoughts collection, Importance, Data.
6. Oral Presentation on the topic given by the teacher.
7. Undergo the demonstration on Yoga meditation & Express own views, feelings, & experience.
8. Management of Self- Stress Management, Time Management, Health Management.
9. Mini Project on Personality Development.
10. Importance of Group Discussion – Does and Don'ts
11. Different types of motivation
12. Importance of task management- Planning of task

Suggested Instructional Strategies:

Lecture method, Transparencies, Question, Answer technique, Assignment, Demonstration.

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1.	Marion E Haynes	Make Every Minute Count	Kogan Page India
2.	Allen pease	Body language	Sudha Publication Pvt Ltd.
3.	Michael Hatton	Presentation Skills	ISTE New Delhi
4.	Pearson Education Asia	Organizational Behavior	Tata McGraw Hill
5.	Chakravaty, Ajanta	Working in Teams	Orient Longman
6.	Bishop, Sue	Develop Your Assertiveness	Kogan Page India

CD'S/Cassettes/Charts/Models/Transparencies/Information

Brochures/Periodicals:

Indian Standard:

Websites:

1. www. mindtools. com
2. www. selfesteem. com
3. www. motivation. com
4. www. successconsciousness. com
5. www. ethics. com

Programme : Diploma Programme in CE / ME / PS / EE / IF / CM / EL / AE
Course : Basic Mathematics. **Course code :** 1103
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme								
Hrs / week			Credits	TH Paper Hrs.	Marks							
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
03	01	--	04	03	Max.	80	20	100	--	--	--	100
					Min.	32	--	40	--	--	--	--

Rationale:

This course is classified under foundation course & intend to teach the students basic facts, concepts & principles of mathematics, as a tool to analyze the engineering problem & lay down the understanding of basic technology courses.

Objectives:

The student will be able to

1. Develop the process of logical thinking.
2. Comprehend the principles of the other courses.
3. Solve problems by using analytical & systematic approach.

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**ALGEBRA**	**20**	**32**
	1.1. Logarithm		
	1.1.1. Concept and definition of logarithm, conversion of exponential and logarithmic forms	03	06
	1.1.2. Laws of logarithms and change of base formula		
	1.1.3. Common logarithm and Naperian logarithm definition and notation only.		
	1.2. Matrix algebra:	08	12
	1.2.1. Definition of a matrix, types of matrix, algebra of matrices, equality of matrices, scalar multiplication, product of two matrices, transpose of matrix.		
	1.2.2. Minor, cofactor, and ad joint of matrix, Inverse of matrix by ad joint method, solution of linear equations in three variables by inverse method.		
	1.3. Partial Fraction	05	08
	1.3.1. Rational function, proper and improper rational Functions		
	1.3.2. Concept of partial fraction, partial fraction Case-1- the denominator contains linear non repeated factors. Case-2- the denominator contains linear but repeated factors Case-3- the denominator contains quadratic irreducible factors		

Topic No.	Topic & Subtopic	Hours	Marks
	1.4. Binomial Theorem: 1.4.1. Binomial Theorem for positive integral index, formula for T_{r+1}, middle term, particular term. 1.4.2. Binomial Theorem for rational and negative index (expansion up to four terms only), 1.4.3. approximation theorem, simple problems.	04	06
2	**TRIGNOMETRY**	**16**	**28**
	2.1. Measurement of Angles: 2.1.1. Measurement of angles, sexagesimal systems & circular systems, co-terminal angles, positive and negative angles, conversion of angle to radian to degree and degree to radians.	02	04
	2.2. Trigonometric Ratios 2.2.1. Trigonometric ratios of any angle, graph of trigonometric functions fundamental identities. 2.2.2. Trigonometric ratios of allied, compound, multiple and sub multiple angles, sum & product forms.	08	12
	2.3 Inverse trig. functions: 2.3.1. Concept and definition of inverse trig. fn 2.3.2. Relation between inverse trig. fns	02	04
	2.4 Properties of triangle and solution of triangle: 2.4.1 Sine rule, cosine rule & law of tangent (simple problems) 2.4.2 Solution of triangle	04	08
3	**CO ORDINATE GEOMETRY**	**12**	**20**
	3.1. Equation of straight line: 3.1.1. Slope and intercepts of straight line, various form of straight line, angle between two lines, condition for two parallel or perpendicular lines, perpendicular distance formula, distance between two parallel lines	06	10
	3.2. Equation of circle 3.2.1. Equation of std. circle, center radius form, diameter form, general form of circle, equation of tangent and normal to the circle	04	06
	3.3. Conic sections 3.3.1. standard parabola, std. ellipse, std. Hyperbola, cycloid formula & standard figure.	02	04
	Total	**48**	**80**

Laboratory Work & tutorials on (Batch wise)

1. Logarithms (8-10 problems).
2. Matrix algebra (8-10 problems).
3. Partial fractions (8-10 problems).
4. Binomial theorem (8-10 problems).
5. Measurement of angle(8-10 problems).
6. Trigonometric ratios (8-10 problems).
7. Inverse trig. Function (8-10 problems).
8. Properties and solution of triangle (8-10 problems).
9. Equation of line (8-10 problems).
10. Equation of circle (8-10 problems).
11. Conic sections (8-10 problems).

Suggested Instructional Strategies:

Lecture Method, Improved Lecture Method

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1.	S. P. Deshpande	Mathematics for polytechnic students(I)	Pune Vidyarthi Gruha
2.	S. L. Loney	Trigonometry	S. Chand
3.	B. S. Grewal	Higher Engineering Mathematics	Khanna
4.	TTTI Madras	Applied Mathematics	Tata MacGrowhill

Programme : Diploma Programme in CE / ME / PS / EE / IF / CM / EL / AE
Course : Engineering Mathematics. **Course code :** 1104
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
03	01	--	04	03	Max.	80	20	100	--	--	--	100
					Min.	32	--	40	--	--	--	--

Rationale:

The study of mathematics is necessary to develop in the students the skills essential for the new disciplines like Genetic Engineering, Biotechnology and Information Technology etc. The course is extension of basic mathematics and stepping to learn applied mathematics. Engineering mathematics lays down the foundation to understand and express principles and laws involved in other technology subjects.

Objectives:

The student will be able to

1. Acquire knowledge of mathematical terms concepts and different methods of differential calculus, vector algebra, statistics and probability and complex number.
2. Develop the ability to apply mathematical methods to solve engineering problems, to execute management plants with precision.
3. Acquire sufficient mathematical techniques necessary for daily and practical problems.

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**DIFFERNTIAL CALCULUS:**	**28**	**48**
	1.1. Function and limits:	10	16
	1.1.1. Definition of function, types of functions, Basic functions such as algebric, exponential, logarithmic, trigonometric, inverse trigonometric functions, explicit, implicit, composite, inverse, parametric, exponential and even and odd functions, simple problems		
	1.1.2. Definition of limit, limit of functions such as algebric functions, trigonometric functions, logarithm and exponential functions.		
	1.2. Derivatives	12	20
	1.2.1. Concept and definition of derivative, Notation standard Formulae and rules of derivative		
	1.2.2. Methods of differentiation, derivative of composite functions, implicit function. parametric function. Inverse function. Logarithmic differentiation.		
	1.2.3. Second order derivatives, simple problems.		

Topic No.	Topic & Subtopic	Hours	Marks
	1.3. Application of derivative: 1.3.1. Geometric meaning of derivative error theorem. 1.3.2. Related rates, radius of curvature 1.3.3. maxima & minima	06	12
2	2.1. **VECTORS** 2.1.1. Definition of vector, position vector, algebra of vector (equality, addition, subtraction, and scalar multiplication) 2.1.2. Dot (scalar) and vector (cross) product of two vectors. 2.1.3. Application of vectors, work done and moment of force about a point and line.	**10** 03 03 04	**16** 04 04 08
3	**(For CE, ME, PS & AE students only)** 3.1. **Statistics & Probability** 3.1.1. Measure of dispersion such as range, mean deviation, standard deviation, variation and coefficient of variation. 3.1.2. Definition of random experiment, sample space event, occurrence of events and types of events (impossible, mutually exclusive, exhaustive and equally likely) 3.1.3. Definition of probability, addition and multiplication theorems of probability.	**10** 03 03 04	**16** 06 04 06
	OR		
3	**(For EE, IF, CM &, EL students only.)** 3.1. **Complex Numbers** 3.1.1. Definition of complex number, Cartesian polar and exponential forms of complex number. 3.1.2. Algebra of complex no. (equality, addition, subtraction multiplication and division) 3.1.3. De–Moiver's theorem (without proof) and simple problems. 3.1.4. Euler's form of circular functions, Hyperbolic functions and relation between them.	**10** 03 02 02 03	**16** 04 04 04 04
	Total	**48**	**80**

Laboratory Work & tutorials on (Batch wise)

1. Functions (8-10 problems)
2. Limits (8-10 problems).
3. Derivative – rules and formulae (8-10 problems)
4. Derivative – various types of function (8-10 problems).
5. Derivative – of second order (8-10 problems).
6. Application of derivative (8-10 problems)
7. Vectors (8-10 problems)
8. Application of vectors (8-10 problems)
9. Statistics (8-10 problems)
10. Probability (8-10 problems)
11. Algebra of complex no (8-10 problems).
12. De-'Moiver's theorem & Euler's theorem (8-10 problems)

Suggested Instructional Strategies:

Lecture Method, Improved Lecture Method using OHP & LCD projector, tutorials, Demonstration, Expert Lecture.

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1.	S. P. Deshapande	Mathematics for polytecnic students (II)	Pune Vidyarthi Gruh
2.	B. S. Grewal	Higher Engineering Mathematics	Khanna
3.	TTTI Madras	Applied Mathematics	Tata MacGrowhill

Programme : Diploma Programme in CE / ME / PS / EE / IF / CM / EL / AE
Course : Applied Physics **Course code :** 1105
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme								
Hrs / week			Credits	TH Paper Hrs.	Marks							
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
04	--	02	06	03	Max.	80	20	100	--	--	50	150
					Min.	32	--	40	--	--	20	--

Rationale:

Physics is associated with our lives at every stage. A good scientific attitude is essential for every human being to increase his/her quality of life. Today learning **Physics** has become more challenging because it is no more a watertight compartment. The approach is now inter-disciplinary and integrated with emphasis on the principle with their application.

Objectives:

The student will be able to

1. Understand of the laws of physics and know how and when to apply them in various contexts.
2. Be able to think clearly and apply their knowledge of basic physics to solve simple problems and present the solution in a clear and concise manner.
3. Appreciate of some of the many application of physics in modern technology.
4. Acquire and develop experimental skills including the use of a variety of physics apparatus, the taking of data and their interpretation and analysis.
5. Develop skill in the presentation of clear and concise written accounts of laboratory work.

Contents Theory:

Topic No.	Topic & Subtopic	Hours	Marks
1	**Electrostatics** Coulomb's inverse square law, unit charge, electric field, intensity of electric field, electric lines of force and their properties, electric flux, electric flux density and relation between them, electric flux associated with a charge, Electric potential, potential difference, dielectric strength, breakdown potential, expression for pd between two points due to a point charge, expression for electric potential at a point due a point charge, potential due to a charged sphere, potential of earth, Numerical.	08	08
2	**Capacitance** Capacitor, capacitance and its unit, principle of Capacitor, charging & discharging of capacitor, Capacitor in series and parallel, expression for capacitance of parallel plate Capacitor, spherical and cylindrical condenser(eq^n only), energy of charged condenser(eq^n only), Numerical.	04	06

Topic No.	Topic & Subtopic	Hours	Marks
3	**Current electricity** Ohm's law, specific resistance, effect of temperature on resistance, temperature coefficient of resistance, Theory of shunt, Wheat stone's network(balancing condition), metre bridge, fall of potential along a wire, potentiometer, superconductivity, graph of Temperature versus resistively for mercury, superconductors, properties & application of superconductors, Numerical.	06	08
4	**Optics** Refraction of light, refractive index & its significance, refraction through prism, derivation of prism formula, dispersion of light and dispersive power (no derivation) principle of superimposition of waves, interference of light (constructive & destructive), application of interference of light, total internal reflection of light (TIR), critical angle of incidence, optical fibre-advantages & disadvantages, construction of optical fibre, types of optical fibre, application of optical fibre, Numerical.	08	08
5	**Laser** Laser, properties of laser, spontaneous absorption, spontaneous and stimulated emission, population inversion, types of laser, He-Ne laser construction, application of laser, Holography-recording & reconstruction of hologram, application of holography.	05	06
6	**Elasticity** Deforming force, restoring force, elasticity, plasticity & rigidity, stress & strain with their types, elastic limit, Hooke's law, moduli of elasticity (Y, ŋ, κ) & their significance, stress-strain diagram for ductile & brittle material, factor of safety, application of elasticity, Numerical.	04	06
7	**Surface tension** Cohesive and adhesive forces, surface tension, molecular theory of surface tension, surface energy & its relation with surface tension, angle of contact, capillary action, relation between surface tension, capillary rise & radius of capillary, effect of impurities & temperature on surface tension, application of surface tension, Numerical.	04	06
8	**Viscosity** Viscosity, velocity gradient, Newton's law of viscosity, coefficient of viscosity, Stoke's law, expression for relation between coefficient of viscosity & terminal velocity, types of flow-streamline & turbulent flow, advantages of streamline flow, critical velocity, Reynold's number, Bernoulli's principle(statement only) application of viscosity, Numerical.	04	06
9	**Gas laws and specific heats of gases** Statement of Boyle's, Charle's and Gay Lussac's law, concept of absolute zero, Kelvin scale of temperature, general gas equation, universal gas constant, Work done in expanding a gas at constant pressure, specific heats of gases and relation between them (eq^n only), isothermal, adiabatic, isobaric & isochoric	04	06

Topic No.	Topic & Subtopic	Hours	Marks
	processes and difference between these processes, thermodynamic system, types of thermodynamic system, I^{st} law of thermodynamics, Numerical.		
10	**Transfer of heat** Three modes of heat transfer-conduction, convection, radiation, molecular theory of conduction, law of thermal conductivity, coefficient of thermal conductivity, application of thermal conductivity, coefficient of linear, areal and cubical expansion and relation between them, Numerical.	04	06
11	**Communication** Electromagnetic waves and their characteristics, EM-spectrum, propagation of electromagnetic waves in atmosphere, communication system, types of communication-line and space communication, ground, sky and space wave propagation, satellite communication, different orbits of satellite, uses of communication satellite, Remote sensing, line communication-two wire transmission lines, co-axial cables, optical fibers.	08	08
12	**Photo electricity** Plank's quantum theory, photo electric effect, experiment to study photo electric effect, characteristics of photo electric effect, threshold frequency, threshold wavelength, photoelectric work function, stopping potential, Einstein's Photoelectric equation, photoelectric cell & types, application of photoelectric cell, Numerical.	05	06
	Total	**64**	**80**

Laboratory Work:

1. To determine the dimension of object using Vernier caliper and Screw gauge.
2. To determine the Young's modulus of material of wire using Searle's apparatus.
3. To determine the surface tension of water using capillary rise method.
4. To determine the coefficient of viscosity of liquid using Stoke's method.
5. To verify Boyle's law.
6. To determine the coefficient of thermal conductivity of material of good conductor by Searle's method.
7. To determine the coefficient of linear expansion of given material of rod using Pullinger's method.
8. To determine the refractive index of material of prism using Spectrometer
9. To verify total internal reflection (TIR) phenomenon for given glass slab & to calculate critical angle of incidence.
10. To verify Ohm's law & to determine the specific resistance of material of given wire using voltmeter-ammeter method.
11. To determine the effective capacitance of series & parallel combination of condensers by calculating their reactance.
12. To verify series and parallel law of resistance using metre bridge.
13. To determine the internal resistance of cell using potentiometer.
14. To calibrate voltmeter of required range by using potentiometer.
15. To determine permittivity of air by using Flat Condenser plates.

16. To study the discharging and charging of a capacitor through a resistor by measuring the voltage drop across the capacitor as a function of time

** Students are expected to perform at least 12 (twelve) experiments at the end of the course.

Suggested Instructional Strategies:

Lecture method, Transparencies, Question Answer technique, Assignments, Demonstration.

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1.	Prof. Arthur Beiser	Applied Physics	Tata McGraw hill Pub.
2.	R K Gaur & S L Gupta	Engineering Physics	Dhanpat Rai Pub.
3.	Prof. V Rajendran	Physics-I	Tata McGraw hill Pub.
4.	Prof. B G Bhande	Applied Physics for Diploma in Engineering	Pune Vidyarthi Graha
5.	Manikpure & Deshpande	Basic Applied Physics	S Chand & Co. New Delhi

Websites:

1. www. physicsclassroom. com
2. www. physics. org
3. www. physics. brown. edu
4. www. amazon. com/Basic-Physics
   http: //scienceworld. wolfram. com/physics/
5. http: //en. wikipedia. org/wiki
6. http: //hyperphysics. phy-astr. gsu. edu/hbase
7. www. msu. edu/~brechtjo/physics
8. www. answers. com/topic/list-of-basic-physics-topics
9. www. answers. com/topic
10. http: //www. rp-photonics. com/laser_applications. html
11. http: //webphysics. davidson. edu/alumni/jimn/He-Ne/Pages/Theory. htm
12. http: //physix_jun. tripod. com/fibres_4. htm
13. http: //www. suite101. com/content/optics-total-internal-reflection-a51310
14. http: //www. scribd. com/doc/32880277/Interference-of-Light-Waves
15. http: //hyperphysics. phy-astr. gsu. edu/hbase/optmod/holog. html
16. http: //teachers. web. cern. ch/teachers/archiv/HST2001/accelerators/superconductivity/superconductivity. htm
17. http: //missionscience. nasa. gov/ems/02_anatomy. html
18. http: //imagine. gsfc. nasa. gov/docs/science/know_l1/emspectrum. html
19. http: //www. eoearth. org/article/Remote_sensing
20. http: //hyperphysics. phy-astr. gsu. edu/hbase/mod2. html
21. http: //www. makingthings. com/teleo/teleo/cookbook/photocell. htm

Programme : Diploma Programme in CE / ME / PS / EE / IF / CM / EL / AE
Course : Applied Chemistry **Course code :** 1106
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme								
Hrs / week			Credits	TH Paper Hrs.	Marks							
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
04	--	02	06	03	Max.	80	20	100	--	--	50	150
					Min.	32	--	40	--	--	20	--

Rationale:

Chemistry is a basic science course which is essential to all engineering programmes. It gives knowledge of engineering material, their properties, related applications and selection of materials for engineering application.

Due to technological progress there are hazardous effects on environment and human life. The core knowledge of environmental effects will bring awareness in students about the precautions and preventions to be taken to reduce the ill effects. This course will generate curiosity of carrying out further development in engineering fields.

Objectives:

The student will be able to

1. Apply the principles of chemistry to engineering situations**.**
2. Understand applications of basic concepts in chemistry.
3. Appreciate effect of chemical changes.
4. Understand various chemical technology processes.
5. Suggest the appropriate use of metals, alloys & non-metallic surfaces.
6. Select lubricants for smooth running of machines.
7. Apply knowledge to enhance operative life span of construction material & structure by various protective methods.
8. Apply knowledge to correlate the properties of materials their engg. uses & protection.

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Atomic structure** Bohr's theory, fundamental particles of atom. Concept of atomic no. atomic mass no. Orbit, orbital, shapes of orbitals, Energy levels & Sub Energy levels, Hund's rule, Aufbau principle, Rules for arrangement of electrons in different energy levels, Electronic configuration of the elements from atomic no. 1 to 30, Valency & it's types Electrovalency, covalency, formation of electrovalent Compounds e. g. NaCl, $CaCl_2$, MgO, $AlCl_3$ & covalent compounds e. g. H_2O, CH_4, O_2, N_2, C_2H_4, C_2H_2.	06	08
2	**Electrochemistry** Defination of electrochemistry, atom, ion, Electrode, Cell,	08	10

Topic No.	Topic & Subtopic	Hours	Marks
	electrolytes & non electrolytes, ionization, Arrhenius theory of ionization, degree of ionization, electrolysis, mechanism of electrolysis, examples of electrolysis-electrolysis fused NaCl, Aqueous NaCl using pt. electrode, $CuSO_4$ solution using Cu electrodes, Faraday's Laws & Numerical, Application of electrolysis-1) electroplating 2)Electro refining Types of batteries-dry cell, Ni-Cd cell - construction, working and applications, Introduction to solar cell.		
3	**Water** Sources, impurities in water, properties of water. Hard & Soft water, hardness & cause of hardness of water, Units of hardness, disadvantages of hard water in domestic & industrial field, Methods of softening hard water 1) temporary – Boiling & Clark's Method. 2) permanent- Permutit's Method, Ion exchange Method. Treatments on drinking water-Screening, Sedimentation, Coagulation, Filtration, Sterilization- Boiling, Chlorination, UV rays, Ozonisation, Aeration, $p^{H,}$ p^{OH}– definition, p^{H} Scale numericals, Applications of pH in engineering-City water supply, Corrosion of bridges, Effluent treatment, Electroplating.	08	10
4	**Metals & Alloys** Definition of ore, mineral, gangue, Metallurgy, process of metallurgy along with flow chart, Physical characteristics of metals, Metallurgy of iron -concentration, smelting, refining. Physical properties & application of metals Fe, Cu, Al, Cr, Ni, Sn, Pb, Co. Definition, preparation, purpose of making alloys, classification of alloys-i)ferrous-alloy steel & their applications ii)Nonferrous alloys, Cu alloys-brass, bronze, gun metal, monel metal Al-alloys-duralumin Solder alloy and its types-Soft solders, Tinmann's solders, Plumber's solder.	10	14
5	**Corrosion** Definition, types of corrosion-atmospheric –mechanism of corrosion, nature of film & its role in corrosion process, Immersed corrosion –it's mechanism, galvanic & concentration cell corrosion, Methods of protection against corrosion- hot dipping, metal spraying, sherardizing, electroplating, metal cladding, organic coatings- Paints, lacquers, emulsion paint, Enamels.	08	12
6	**Lubricants** Definition, types, functions, classification of lubricants, types of lubrication, selection of lubricants, Physical test-viscosity, viscosity index, oiliness, flash & fire points, volatility, cloud & pour Point Chemical tests-acid value, saponification value, emulsification.	06	08
7	**Nonmetallic materials** Plastic- definition, formation by addition & condensation, polymerization, structure & types of plastic i. e thermosetting & thermo softening. Properties & uses of plastic. Rubber- definition, types & drawbacks of natural Rubber, Vulcanization of rubber, uses of rubber	08	08

Topic No.	Topic & Subtopic	Hours	Marks
	Dielectrics or insulators, Properties & applications of inert gases, N_2, CO_2, glass.		
8	**Pollution** Definition causes & types of pollution, Types of air pollutant, air pollution due to I. C. engine, Green House Effect, Ozone depletion and methods of prevention, Definition, Causes of water pollution, methods of preventing water pollution. Biomedical wastes – introduction, effect and controlling methods, E-waste- definition, Introduction, Sources & effects of e-waste.	10	10
	Total	**64**	**80**

Laboratory Work: Total 12 experiments

1. Introduction to Chemistry laboratory.
2. any **six** from the following.
   - 2.1. To determine strength of oxalic acid by using 0. 1 N NH_4OH.
   - 2.2. E. C. E. of Cu by using $CuSO_4$ solution.
   - 2.3. To verify Faraday's second Law of Electrolysis.
   - 2.4. Determination of chloride content in the given sample of water.
   - 2.5. Determination of pH by Lovi Bond comparator & Digital pH meter.
   - 2.6. Determination of hardness of water by E. D. T. A. method.
   - 2.7. Determination of % of iron in ferrous alloy by $KMnO_4$ method.
   - 2.8. Determination of Viscosity of given lubricating oil by Ostwald's viscometer
   - 2.9. Determination of acid value of plastic.
   - 2.10. To study effects of acidic & basic medium on Al strip.
3. Inorganic qualitative Analysis of any 5 solutions.

Suggested Instructional Strategies:

Lecture method, Question Answer technique, Assignments, Demonstration.

Learning resources:

Text Books:

SN	Author	Title	Publisher
1.	Jain &Jain	Engg. Chemistry	Dhanpat Rai & Sons
2.	S. S. Dara	Engg. Chemistry	S. Chand & Co.
3.	B. K. Sharma	Industrial Chemistry	Goel publication
4.	S. S. Dara	Environmental Chemistry & Pollution control	S. Chand & Co.
5.	V. P Mehta	A Text book of Polytechnic Chemistry	Jain brothers, New Delhi.
6.	Bansawat, Mahajan, Mehta	A text book of Applied Chemistry	----------
7.	M. M. Uppal.	Engg. Chemistry	Khanna Publisher, Delhi.
8.	----------	Laboratory manual.	Developed by G. P. Nasik.

Programme : Diploma Programme in CE / ME / PS / EE / IF / CM / EL / AE
Course : Engineering Graphics **Course code :** 1107
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
02	--	04	06	--	Max.	--	--	--	--	25	25	50
					Min.	--	--	--	--	10	10	--

Rationale:

Engineering Graphics is the language of engineers. The concepts of Engineering Graphics are used to develop & express the ideas, and convey the instructions, which are used to carry out jobs in the Engineering field. This preliminary course aims at building a foundation for the further course in drawing and other allied courses.

Objectives:

The student will be able to

1. Draw different engineering curves and knows 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.

Contents: Theory

Topic No.	Topic & Subtopic	Hours
1	**Drawing Instruments and their uses** 1.1 Letters and numbers (single stroke vertical) 1.2 Convention of lines and their applications. 1.3 Scale (reduced, enlarged & full size) plain scale and diagonal scale. 1.4 Sheet layout. 1.5 Geometrical constructions	02
2	**Engineering curves & Loci of Points.** 2.1 To draw an ellipse by 2.1.1. Directrix and focus method 2.1.2. Arcs of circle method. 2.1.3. Concentric circles method. 2.1.4. Rectangle method 2.2 To draw a parabola by: 2.2.1. Directrix and focus method 2.2.2. Rectangle method 2.3 To draw a hyperbola by: 2.3.1. Directrix and focus method 2.3.2. passing through given points with reference to asymptotes 2.4 To draw involutes of circle & polygon (up to hexagon) 2.5 To draw a cycloid, epicycloids, hypocycloid 2.6 Loci of Points:	08

Topic No.	Topic & Subtopic	Hours
	2.6.1. Loci of points with given conditions and examples related to simple mechanisms.	
3	**Projection of Straight Lines and Planes.** (First angle projection method only) 3.1 Lines inclined to one reference plane only and limited to both ends in one quadrant. 3.2 Projection of simple planes of circular, square, rectangular, rhombus, pentagonal, and hexagonal, inclined to one reference plane and perpendicular to the other.	06
4	**Orthographic projections** 4.1. Introduction to Orthographic projections. 4.2. Conversion of pictorial view into Orthographic Views (First angle Projection Method only) 4.3. Orthographic projections with sections 4.4. Dimensioning technique as per SP-46	08
5	**Isometric projection** 4.1 Isometric scale 5.1 Conversion of orthographic views into isometric view /isometric projection (Simple objects)	08
	Total	**32**

Laboratory Work:

List of Assignments
1. Engineering curves & Loci of points - (2 Sheets) i) Sheet containing ellipse hyperbola, parabola, involutes & cycloid ii) Sheet containing hypocycloid, epicycloids, diagonal scale locus of point on any one mechanism
2. Orthographic projections (Total 2 Sheets) i) Sheet containing two objects by first angle projection method (simple objects) ii) Sheet containing two objects by first angle projection method (objects having slots & inclined planes & curves)
3. Isometric projection - (Total 2 sheets) i) Sheet containing two objects one by true scale and another by isometric scale. (simple objects) ii) Sheet containing two objects one by true scale and another by isometric scale. (objects having slots & inclined planes & curves)
4. Projections of line and planes. i) Sheet containing four problems on projections of lines ii) Sheet containing four problems on projections of planes)

Suggested Instructional Strategies:

Lecture method & Assignments

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1.	N. D. Bhatt	Engineering Drawing	Charotar Publishing House
2.	K. Venugopal	Engineering Drawing and Graphics+ AutoCAD	New Age Publication
3.	R. K. Dhawan	Engineering Drawing	S. Chand Co.
4.	P. J. Shah	Engineering Drawing	Charotar Publishing House
5.	K. R. Mohan	Engineering Graphics	Dhanpat Rai and Publication Co.

Indian Standards: SP46-1988

Programme : Diploma Programme in CE / ME / PS / EE / AE
Course : Engineering Mechanics **Course code :** 1108
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme								
Hrs / week			Credits	TH Paper Hrs.	Marks							
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
04	--	02	06	03	Max.	80	20	100	--	--	50	150
					Min.	32	--	40	--	--	20	--

Rationale:

This course helps students in understanding correlation between different engineering and day to days problems with the knowledge of different laws and principles of mechanics. It helps in analytical and graphical solutions to problem related to forces acting on body. It also helps in understanding concept and application of Equilibrium, friction, centroid and Kinetics.

It helps in understanding concept of work, power and energy and their determination. Study of simple machines gives idea about input, output, efficiency and friction of machine.

Understanding of this course facilitates easy learning of higher level course like strength of materials, Mechanics of structures, Theory of structures and Reinforced concrete structures.

Objectives:

The student will be able to

1. Understand the basic facts of Forces, Equilibrium, Friction, Centre of gravity, Kinetics, Kinematics and simple Machines
2. Understand the basic concepts related to resolution and composition of forces, equilibrium condition, frictional force, centre of gravity, momentum, impulse energy, mechanism of machines.
3. Understand the basic principles of Lami's Theorem, Newton's law of motion, law of conservation of energy, law of machines, friction in machines.

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Fundamental concepts** 1.1 Mechanics and its relevance to Engineering, Fundamental concepts – scalar quantities, vector quantities, concept of rigid body. 1.2 Definitions of deformable body, mass, weight, particle 1.3 Statics and Dynamics – introduction 1.4 Reference frame of Axes a) Rectangular co – ordinate system b) Polar co-ordinate system 1.5 Fundamental units, derived units and different systems of units. 1.6 Newton's laws	04	04

Topic No.	Topic & Subtopic	Hours	Marks
2	**Force** 2.1 Concept of force and different force systems. 2.2 Law of transmissibility of a force, parallelogram law of forces, resolution and composition of forces, resultant, triangle law of forces, polygon law of forces. 2.3 Resultant of a coplanar concurrent force system (Analytical method) 2.4 Turning effect of force – couple, moment, nature of moment, characteristics of couple, principle– Varignon's theorem of moments and its application to coplanar parallel and non-concurrent force systems. (Analytical method) 2.5 Resultant of coplanar non concurrent force system (Analytical method)	14	16
3	**Equilibrium** 3.1 Concept of Equilibrium, Conditions of equilibrium, equilibrant. 3.2 Free body diagrams 3.3 Lami's theorem and its applications 3.4 Reactions at supports of beams - types of supports, types of beam, types of loadings 3.5 Determination of beam reactions - cantilever beams and simply supported beam with or without overhang subjected to concentrated loads, moments or couples and uniformly distributed loads (Analytical method only)	12	16
4	**Friction** 4.1 Introduction, frictional force 4.2 Laws of friction (static friction only), coefficient of friction, angle of friction, angle of repose. 4.3 Body resting on Horizontal plane, inclined plane and forces acting on the body in any direction	06	10
5	**Centroid and centre of gravity** (Analytical Method) 5.1 Definition and Concept of centre of gravity and centroid. 5.2 Centroid of line segment 5.3 Centroid of regular areas such as rectangle, square, triangle, circle, semicircle, quarter circle. Problems on location of centroid of composite area consisting of above mentioned regular areas. 5.4 Centre of gravity of regular solids such as cube, rectangular prism, sphere, hemisphere, cylinder, solid cone. Problems on location of centre of gravity of composite solids consisting of above mentioned regular solids.	08	10
6	**Kinematics** 6.1 Introduction to dynamics, types of motion of particle, motion curves- displacement - time curve, velocity – time curve (Motion with constant acceleration only). 6.2 Rectilinear motion with uniform velocity 6.3 Rectilinear motion with uniform acceleration 6.4 Rectilinear motion under gravity	06	08

Topic No.	Topic & Subtopic	Hours	Marks
7	**Kinetics** 8.1 Introduction, Newton's laws, Newton's second of laws motion, Numerical examples. 8.2 Impulse and momentum, definition and equation, law of conservation of momentum, problems 8.3 Work-power Energy, definitions, units, graphical representation of work, law of conservation of energy, work energy principle, Numerical examples.	06	08
8	**Simple Lifting Machines** 9.1 Basic concepts – load, effort, input, output, mechanical advantage, velocity ratio, efficiency of machine, Law of machine, friction in the machine, ideal machine, reversibility of machine 9.2 Study of machines- simple wheel and axle, wheel and differential axle, pulley blocks, simple screw jack, worm and worm wheel, winch crab (single & double purchase). 9.3 Numerical examples on above mentioned machines	08	08
	Total	**64**	**80**

Laboratory Work:

SN	List of practicals
A	**Laws of Mechanics (Any five):** 1. Verification of law of polygon of forces. 2. Verification of law of moments 3. Verification of Lami's theorem 4. Beam Reactions 5. Determination of coefficient of friction 6. Study of forces in the members of jib crane
B	**Simple Machines (Any five):** 1. Differential axle and wheel 2. Simple screw jack 3. Worm and worm wheel 4. Single gear crab 5. Double gear crab 6. Two sheaves & three sheaves pulley block 7. Differential pulley block 8. Geared pulley block

Suggested Instructional Strategies:

Lecture method, Use of teaching aids, Group discussion, Question Answer technique, Assignments.

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1.	Mclean and Nelson	Theory and problems of Engineering Mechanics- Schaum's outline series Statics and Dynamics SI Edition	McGraw Hill
2.	Singer	Engineering Mechanics statics and dynamics	Harper Collins Publisher, India.
3.	Ferdinand P. Beer, E Russell Johnson	Vector mechanics for Engineers(statics and Dynamics)	McGraw Hill
4.	P. S. Sawhney & Manikpure	Applied Mechanics for Polytechnics	S. Chand & Co. Ltd
5.	Ramamrutham	A text book of Applied Mechanics	Dhanpat Rai Pub. Co. (P) Ltd, New Delhi
6.	M. M. Malhotra, R. Subramanion, P. S. Gahlot	Text Book in Applied Mechanic	New Age International (P) Ltd. Publishers, New Delhi

Programme : Diploma Programme in CE / ME / PS / EE / AE
Course : Workshop Practice **Course code :** 1109
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme					Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks							
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
--	--	06	06	--	Max.	--	--	--	--	--	50	50
					Min.	--	--	--	--	--	20	--

Rationale:

Engineering diploma technician is expected to know conventional workshop practices like welding, Fitting, Drilling, Tapping, Plumbing and hot working processes. The students are required to identify, operate and control various power tools and machines. They should be able to select and use various tools and equipments for various operations and processes like welding, fitting, taping, Plumbing and forging.

Objectives:

The student will able to

1. Know basic workshop processes.
2. Read and interpret job drawing.
3. Identify, select and use various marking, measuring, holding, striking and
4. Cutting tools & equipments.
5. Operate, control different machines and equipments.
6. Inspect the job for specified dimensions
7. Produce jobs as per specified dimensions.
8. Adopt safety practices while working on the shop floor.

Topic No.	List of Experiments	Hours
1	**Carpentry Shop** 1.1. Demonstration of different wood working tools /machines 1.2. Demonstration of different working process like plaining marking chiseling Grooving Turning of wood. etc. 1.3. One simple job involving any one joint like mortise and tendon dovetail bridle half lap etc. **OR** Any one Job From the following allotted to a group of 4 to 6 student depending of volume work. involving different joints, Turning and plaining operation, surface finishing by emery paper, varnishing and polishing e. g. Electric switch board, pat, Chaurang etc. .	16
2	**Fitting Shop** 2.1. Demonstration of different fitting tools and drilling machine and power tools 2.2. Demonstration of different operations like chipping, filling, drilling, taping, Cutting etc. 2.3. One simple Fitting Job involving practice of chipping, filling, drilling, taping, cutting etc.	16

Topic No.	List of Experiments	Hours
3	**Fabrication shop (Welding)** 3.1. Demonstration of different welding tools/ Machines. 3.2. Demonstration on Arc, Gas, Welding, Gas Cutting, rebuilding of broken parts with welding. 3.3. One simple job involving "Butt", "lap" and "T" joint.	16
4	**Heat Treatment Shop (Smithy and forging)** 4.1. Introduction to tools and equipments. 4.2. Smithy and Forging operations 4.3. One job of J Hook or I Hook (Using round or square bar)	16
5	**Plumbing** 5.1. Demonstration of different plumbing tools. 5.2. Demonstration of different operation in plumbing observing different pipe joint and pipe Accessories Different samples of PVC pipe and PVC pipe fitting. 5.3. One job on Simple pipe joint with Nipple, Coupling for standard pipes. 5.4. Pipe threading using standard die set.	16
6	**Workbook** to be submitted comprising job drawing, Processes adopted for each job along with sketches of tools and equipments with specifications and applications	08
7	**Demonstration.** Demonstrations of advanced power tools and accessories.	08
	Total	**96**

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1.	S. K. Hajara Chaudhary	Workshop Technology	Media Promotors and Publishers, New Delhi
2.	B. S. Raghuwanshi	Workshop Technology	Dhanpat Rai and Sons, New Delhi
3.	R K Jain	Production Technology	Khanna Publishers, New Delhi
4.	H. S. Bawa	Workshop Technology	Tata McGraw Hill Publishers, New Delhi

Video Cassettes/ CDS:

Learning Materials: Transparencies, CBT Packages.

Programme : Diploma Programme in CE / ME / PS / AE / DD / ID
Course : Computer Applications **Course code :** 1110
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme								
Hrs / week			Credits	TH Paper Hrs.	Marks							
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
--	--	02	02	--	Max.	--	--	--	--	--	50	50
					Min.	--	--	--	--	--	20	--

Rationale:

This course imparts basic knowledge about computer, operating system, Microsoft Office to the students & develops competencies regarding effective presentation skills.

Objectives:

The students will able to

1. Use computer and operating system commands.
2. Conversant with Windows operating system.
3. Operate application packages and store, retrieve, arrange, print information through them.
4. Understand database management system.

Contents: Laboratory Work

Topic No.	Topic & Subtopic	Hours
1	**Introduction to Operating system** - Windows Operating System. - Concept of Windows-Arranging, Moving, Resizing, Opening, and Closing of windows, Windows Explorer - Folder/ File Management-Search, copy, delete and rename files and folders, Windows Desktop - Windows Accessories: Notepad, Word Pad, Paint	02
2	**Word processing software - MS-WORD** - Creating, editing document - Using various editing and formatting features. - Inserting objects (Clip Art etc.) - Printing - Using Word – Art, Mail - merge facility	01
3	**Data analysis software - MS-EXCEL**	01
	- Introduction to electronic spreadsheet - Creating, editing spreadsheet - Using formulas - Creating charts Pie and Bar Charts - Inserting Objects - Using various editing and formatting features	
4	**Presentations software - MS-POWER POINT** - Creating a slide - Adding various features to slide - Editing and formatting slide - Inserting clipart	02

Topic No.	Topic & Subtopic	Hours
	- Creating animation effects - Slide - show - Record narration	
5	**Database software - MS. ACCESS** - Data types and format - Working with Tables. o Concept of table. o Creating table by design view and wizard o Editing tables o Entering and editing data in table - Working With Query o Creating Query By Design View o Creating Query By Using Query Wizard - Working With Forms o Creating Form By Design View o Creating Form By Using Form Wizard - Working With Report o Creating reports Using Design View o Creating Report Using Report Wizard	04
	Total	**10**

Laboratory Assignments:

SN	List of Experiments	HRS
1.	Write a job application to HR Manager of an industry using MS - Word.	02
2.	Design a database using mail-merge in MS - Word for above letter.	02
3.	Implementation of features like auto correct, auto format, spell check, insert, table handling etc in Ms-Word.	02
4.	Design a worksheet in MS- Excel for a Student Mark sheet.	02
5.	Implementation of Excel Features like conditional formatting, Wizard, Data, Filter.	02
6.	Create Pie and Bar Charts in MS-Excel with Specific Example.	02
7.	Sort all records of a worksheet in ascending and descending order.	02
8.	Design a Slide show giving animation effects in Ms-PowerPoint.	02
9.	Creation of email account	02
10.	Design a query for selecting all records from table and also create report showing all records.	02
11.	Design a query to select a record having name "ABC" from student database.	02
	Total	**22**

Learning Recourses: Text Books:

SN	Author	Title	Publisher
1	Peter Norton	Introduction to Computers.	Tata McGraw Hill
2	Microsoft	Windows 95 / 9B / NT / 2000 Operating System	Microsoft Corp.
3	Microsoft	Microsoft Office	Tata McGraw Hill

Suggested Instructional Strategies: Demo lectures with power point presentations using LCD.

LEVEL-2

BASIC TECHNOLOGY COURSES

Programme : Diploma Programme in CE / PS / EE
Course : Computer Aided Graphics **Course code :** 1201
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
--	--	04	04	--	Max.	--	--	--	--	--	50	50
					Min.	--	--	--	--	--	20	--

Rationale:

This course provides the basic knowledge of the Computer Aided Drafting for Civil / Mechanical / Plastic / Electrical and Automobile Engineering.

This course gives basic foundation knowledge for advance computer based software like Pro-E, catia and unigraphics. Today the manufacturing industries needs the computer oriented man power for their global needs and to cope up the fast changing technology. Moreover, the conventional method of drafting of the objects has been replaced by computer-based drafting. Therefore this course is introduced in the present curriculum.

Objectives:

The student will be able to

1. Learn basic drawing command
2. Setting of drawing area
3. Various display drawing command
4. Use the various command for particular object
5. Generate different view of the object

Contents: Laboratory Work

Topic No.	Topic & Subtopic	Hours
1	Introduction to Computer Aided Drawing (CAD) Advantages of CAG, Components of CAG system	01
2	**Basic menus in CAG,** Opening of Drawing, commanding CAG, Command windows, windows text window, AutoCAD Command, Entering commands at command prompt, Pull down Menus, Screen menus, Entering command from dialog box. Using transparent command. Repeating and evelling command, System variables, **Co-ordinates system:** WCS, UCS, UCSICON. UNITS, Setting of drawing screen using limits and zoom all command, Display of co-ordinates on screen, **Entering the Co-ordinates:** Cartesian coordinate, polar coordinate, scale factor, limits setting, Grid setting, snap setting, Creating, saving and exiting / end drawing files,	06
3	**Drawing Display Command:** Zoom in and zoom out command & dynamic zoom, Size of windows, View command, PAN command, Redraw – Regen command, Blipmode & Redraw command, Viewres command, Regen & Regenauto command,	03

Topic No.	Topic & Subtopic	Hours
	Hide command, View ports command, Plan command, fill command, Drag Mode command	
4	**Entity Drawing Commands:** Point, Line, Circle, Arc, Ellipse, polygon, Pllne, Donut, Trace. Osnap Modes, Aperture command, Text and dtext command, style command, Shaoe command.	05
5	**Edit Commands:** Select, Erase, oops, move, copy, Array, Explode, List, Rotate, Break, trim, extend, Fillet, Chamfer, Divide, Offset, Change, Chprop, Pedit, Area, Measure, Mirror, Dlst, Stretch, U, Undo.	05
6	**Dimensioning Commands:** Linear Dimensioning concept, Dim – Continue, Dim – Baseline. Dim: - Angular, Dim – Diameter Dimension editing commands: - Dim: Newtext, Dim: Tedit, Dim –Trotate, Dim – Hometext, Dim – Update, Dimension Utility Commands	04
	Total	**24**

Laboratory Work:
For ME / PS / AE Only

SN	Name of Laboratory work	Hours
1	Sheet on Orthographic Projection	06
2	Sheet on Orthographic Projection with sections	06
3	Sheet on production drawing	06
4	Production drawing of one sheet	06
5	Assembly drawing sheet	08
6	Detailed drawing sheet	08
	Total	**40**

For Civil Only

SN	Name of Laboratory work	Hours
1	Draw 2 mm, 4 mm and 6 mm lettering	**02**
2	Symbol of civil engineering material i) Brick masoney ii) U. C. R. masonary iii) Concrete iv) Glass v) North direction	04
3	Drawing of an object with offset command	04
4	Section of load bearing wall	02
5	Plan and section of column footing	02
6	Orthographic projections with sections	06
7	Line plan for building	04
8	Plan and section for RCC dog log stair case	08
9	Plan and elevation of building	08
	Total	**40**

For Electrical Only

SN	Name of Laboratory work	Hours
1	Draw electrical symbols for various electrical devices.	06
2	Draw circuit diagrams for godown and staircase wiring	06
3	Draw Circuit diagram Vector diagram for conducting direct loading test on transformer or circuit diagram of any electrical experiment which is covered in curriculum.	06
4	Draw control and power circuit diagram for DOL Starter	04
5	Draw control and power circuit diagram for star! Delta starter	06
6	Draw transmission tower of single circuit or double circuit.	04
7	Draw electrical installation plan for small residential flat	04
8	Draw electrical installation plan for 3rd induction motor for small workshop	04
	Total	**40**

Suggested Instructional Strategies:

Lecture Method, Use of teaching aids, Industrial Visits, Demonstrations, Expert Lectures.

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1	George, Omura B. Robert Callori	Auto Cad 2005	BPB Publisher
2	George Omura B. Robert Callori	Auto Cad 2005 Instant Reference	BPB Publications
3	Famkline	Auto Cad 2007 Bible	Wiely Interscinre
4	Fred·Bery	Auto Cad 2007 L T	Wiely Ioterstince

Programme : Diploma Programme in Civil Engineering (CE)
Course : Building Drawing **Course code :** 1202
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme								
Hrs / week			Credits	TH Paper Hrs.	Marks							
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
01	--	04	05	03	Max.	80	20	100	--	25	25	150
					Min.	32	--	40	--	10	10	--

Rationale:

Drawing is basically the language of an engineer. It is a means of communication between owner, architect, engineer and contractor. Civil Engineering Diploma holder has to supervise various construction processes and execute civil engineering structures such as buildings, roads, railways, dams, bridges. Civil Engineer has to convert design parameters, process details into pictorial views. Therefore he is required to understand and prepare the drawings. He has to interpret the drawings, so that, he can execute the works. Civil engineer should be competent to convert his ideas into the drawing. This helps him to transfer his ideas, thoughts to his subordinates on the site. Drawing makes his job simple and effective. Drawing helps in detailing the structures processes with quality parameters. Drawings are essential for drafting specifications and tender documents.

The knowledge of this course is useful for building construction, estimating and costing, design of structure, surveying, projects.

Objectives:

The student will be able to

1. Read, interpret and draw the building drawings.
2. Prepare submission drawings for the building.
3. Prepare working drawings for the building.
4. Plan various types of buildings considering the functional requirements.
5. Apply the building rules, regulations and byelaws.

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Conventions** 1.1 Conventions as per IS: 962-1989 and other Refined as 2009 code practices. 1.2 Types of Lines – Visible line, Centreline, Hidden line, Section line, Dimension line, Extension line, Pointers, Arrow heads or dots. 1.3 Symbols – Materials used in construction, building components 1.4 Reading of available ammonia prints of residential buildings.	02	04
2	**Planning of Building**	06	16

Topic No.	Topic & Subtopic	Hours	Marks
	2.1 Principles of planning of Residential and Public building. 2.2 Space requirements and norms for various units of Residential and Public building. 2.3 Rules and byelaws of local governing authorities for construction. 2.4 Drawing of line plans for Residential and Public building.		
3	**Types of Drawing** 3.1 Development of line plan, Elevation, Section, Site plan, Location Plan, Foundation plan, Area statement and other details. 3.2 Measured Drawing and its significance 3.3 Submission Drawing and Working Drawing	06	50
4	**Perspective Drawing** 4.1 Definition, Necessity, Principles of Perspective Drawing, Terms used in perspective drawing 4.2 Two point perspective view of a small object like pedestal, step block, small single storied building with flat roof.	02	10
	Total	**16**	**80**

Laboratory Work:

SN	Following exercises should be drawn on full imperial size drawing sheets.
1	Drawing various types of lines, lettering and symbols of materials, doors and windows. Used in construction on Full Imperial size drawing sheet.
2	Drawing the lines plans of following buildings on Full Imperial size graph paper. Residential Building (Min. three rooms) Public Building – School building, Primary health center / Hospital building, Bank, Post Office, Hostel building. (At least four)
3	Measured Drawing of an existing residential Building (Load bearing/ Framed structure Type), showing Plan, Elevation, Sections, Construction notes, Schedule of openings, Site Plan.
4	Submission Drawing of two storied residential building (Framed structure type) showing Plans, Elevation, Sections, Foundation Plan, construction notes, Schedule of openings, Site Plan, Area statement, Area statement, Rain water harvesting. .
5	Working drawing of above drawing sheet preferably one plan, section through stair case to scale 1: 50
6	Two point perspective view of a small object/building drawn in submission drawing.
7	Tracing of a submission drawing prepared at Sr. No. 4 above.
8	Ammonia print of submission drawing prepared at Sr. No. 4 above.

Suggested Instructional Strategies:

Lecture Method; Use of teaching aids, Expert Lectures.

Learning Resources: Text Books:

SN	Author	Title	Publisher
1	Shah, Kale, Patki	Text Book of Building Drawing	Tata Mc Graw Hill
2	D. M. Mahajan	Elements of Building Drawing	Pune Vidyarthi Grih
3	Y. S. Sane	Planning and Design of Building.	Tata Mc Graw Hill
4	Malik & Mayo	Civil Engineering Drawing	New Asian Publisher New delhi

Programme : Diploma Programme in Civil Engineering (CE)
Course : Concrete Technology **Course code :** 1203
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme								
Hrs / week			Credits	TH Paper Hrs.	Marks							
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
03	--	02	05	03	Max.	80	20	100	--	25	25	150
					Min.	32	--	40	--	10	10	--

Rationale:

Various buildings like residential, commercial and industrial are constructed in cement concrete. So a civil engineer is supposed to be acquainted with the core knowledge of concrete. This course is intended to teach the students facts, concepts, principles of concrete. Students will also learn quality control of materials used for concrete before, during and after construction in Building Construction, Environmental Engineering, Irrigation Engineering, Transportation Engineering.

Objectives:

The student will be able to

1. Develop an over all understanding of concreting operations in civil engineering constructions.
2. Know the properties of concrete and properties of the ingredients of concrete and their importance in concrete manufacturing.
3. Apply the basic principles and procedures to know how to control the quality before, during and after the construction and the importance of quality control.
4. Develop supervisory skills in all concreting operations prior to, during and after concreting by making use of the knowledge acquired and practical tools developed by IS and I. R. C.

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Introduction To Concrete** 1.1 Definition of concrete 1.2 Importance of concrete & concrete technology 1.3 Concept of concrete chain & progress diagram of concrete 1.4 Specifications of concrete 1.5 Properties of concrete in plastic stage - workability, segregation, bleeding & harshness 1.6 Properties of concrete in hardened state-strength, durability, impermeability.	03	04
2	**Cement** 2.1 Chemical composition of ordinary Portland cement. 2.2 It's physical properties and characteristics, standard specification for Portland cement. 2.3 Various types of cement and their uses- ordinary Portland cement, low heat cement, rapid hardening cement,	06	10

Topic No.	Topic & Subtopic	Hours	Marks
	sulphate resistant cement, blast furnace slag cement, cement with fly ash, Portland pozzolona cement. 2.4 Standard specification for ordinary Portland cement 2.5 Effect of various properties of cement on concreting operations. 2.6 Adulteration of cement, tests on cement, selection of good cement.		
3	**Aggregates** 3.1 Properties of aggregates, size, shape, texture, strength, specific gravity, bulk density, water absorption, bulking of sand, soundness, durability. 3.2 Determination of aggregate grading, sieve analysis, fineness modulus, flakiness index, elongation index, bulking of sand, silt in sand. 3.3 Minimum void grading 3.4 Effect of aggregates properties on strength of concrete and durability of concrete 3.5 Selection of good aggregate.	05	10
4	**Water Cement Ratio** 4.1 Definition, Importance of water in concrete 4.2 Hydration of cement, water cement ratio law, conditions under which the law is valid, effect of water cement ratio on concrete strength 4.3 Strength of concrete and selection of water cement ratio 4.4 Quality of water	04	06
5	**Workability** 5.1 Definition of workability and factors affecting workability 5.2 Measurement of workability by slump test and compaction factor test. 5.3 Requirement of Workability for different conditions. 5.4 Factors causing segregation, honey combing & their remedies 5.5 Factors causing bleeding, harshness & their remedies.	05	08
6	**Concrete Mix Design** 6.1 Objectives of mix design and various methods 6.2 Principle of Mix design 6.3 Nominal mix	03	06
7	**Yield of Concrete** 7.1 Estimating yield of concrete 7.2 Estimating cement factor & water cement ratio.	02	04
8	**Quality Control During Concreting** 8.1 Storing of cement and aggregate 8.2 Effect of storing of cement on its strength 8.3 Batching of cement and aggregates 8.4 Mixing of concrete ingredients, types of mixers and their comparison. 8.5 Transportation of concrete 8.6 Placing of concrete	08	12

Topic No.	Topic & Subtopic	Hours	Marks
	8.7 Compaction - methods of compaction, care to be taken during compaction 8.8 Important factors to be checked during concreting		
9	**Quality Control After Concreting** 9.1 Finishing of concrete slabs- Screeding, Floating, trovelling 9.2 Purpose and importance of curing. 9.3 Methods of curing. 9.4 Types of construction joints. Method of joining -wrong practice followed on site, correct methods. 9.5 Importance of construction joints. 9.6 Care to be taken for constructions joints 9.7 Total quality control at all stages 9.8 Introduction of Non destructive test	06	10
10	**Special Concretes** Introduction to 10.1 Precast concrete 10.2 Prestressed concrete 10.3 Ready mix concrete 10.4 Ferro cement concrete 10.5 Air entrained concrete 10.6 Light weight concrete 10.7 Roller compacted concrete	06	10
	Total	**48**	**80**

Laboratory Work:

Any three of the following

1. Determination of fineness of cement
2. Determination of water for cement paste of normal consistency
3. Determination of initial & final setting time
4. Verification of soundness of cement
5. Determination of compressive strength of cement

Any five of the following

1. Determination of silt in aggregate
2. Determination of bulking of sand
3. Determination of specific gravity, Flakiness and elongation Index.
4. Determination of fineness modulus of fine aggregate and coarse aggregate
5. Determination of aggregate crushing value.
6. Determination of aggregate impact valued

Any two of the following

1. Slump Test
2. Compaction factor Test
3. Compressive strength of concrete using different W. C. ratio.

Suggested Instructional Strategies:

Lecture method, Use of teaching aids, Group discussion, Question Answer technique, Industrial visits, expert lecturers, Assignments.

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1	M. S. Shetty	Concrete Technology	S. Chand & Company
2	A. M. Neville	Concrete Technology	Oxphard & IBH Publisher co. Pvt. Ltd
3	R. S. Varshney	Concrete Technology	Oxphard & IBH Publisher co. Pvt. Ltd
4	P. D. Kulkarni	Concrete Technology	Oxphard &IBH Publisher co. Pvt. Ltd
5	M. L. Ohri & R. K. Aggrawal	Concrete Technology	India Publishing House

Video Cassettes

SN	Name of Cassette
1	Testing of Cement Part-I
2	Testing of Cement Part-II

Indian Standard Code:

Code No.	Name of Code
IS 269-1989	Ordinary Portland Cement 33 Grade
IS 383-1970	Coarse & Fine Aggregates From Natural Sources For Concrete
IS 2386-1963	Methods of Test For Aggregates For Concrete
IS 8112-1989	Ordinary Portland Cement 43 Grade
IS 10262-1982	Recommended Guidelines For Concrete Mix Design
IS 12269-1987	Ordinary Portland Cement 53 Grade

Web references:

nptel.ac.in

Programme : Diploma Programme in Civil Engineering (CE)
Course : Hydraulics **Course code :** 1204
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme								
Hrs / week			Credits	TH Paper Hrs.	Marks							
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
04	--	02	06	03	Max.	80	20	100	--	25	25	150
					Min.	32	--	40	--	10	10	--

Rationale:

Hydraulics is an important course of Civil Engineering. This is because the concept of hydraulics is required in different Civil Engineering courses like Irrigation Engineering, Environmental Engineering and Highway Engineering, Railway & Bridge Engineering.

Objectives:

The student will be able to:

1. Understand the properties of fluids.
2. Understand concept of hydrostatic pressure and its measurement.
3. Understand the fundamentals of fluid flow and its applications.
4. Understand the concept of flow measurement through pipes and open channels.
5. Know the various types of pumps and their working.

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Introduction** 1.1 Definition of fluid. 1.2 Definition of fluid mechanics and hydraulics. 1.3 Importance of learning hydraulics with special reference to Irrigation Engineering and Environmental Engineering.	01	02
2	**Physical Properties of Fluids** 2.1 Definition and S. I. units- specific weight, volume, mass, density, specific gravity, viscosity, surface tension, and compressibility. 2.2 Units of the physical properties. 2.3 Viscosity, surface tension and compressibility. 2.4 Problems on Properties of fluid.	02	04
3	**Pressure and its Measurements.** 3.1 Definitions – pressure, free liquid surface, pressure head. 3.2 Pressure at a point in static liquid. 3.3 Pascal's law, Variation of pressure in horizontal and vertical direction. 3.4 Atmospheric pressure, Absolute pressure, gauge pressure relation between them, problems on calculation of gauge pressures / absolute pressures.	05	06

Topic No.	Topic & Subtopic	Hours	Marks
	3.5 Measurement of pressure. 3.5.1 Different devices for measurement of pressure. 3.5.2 Manometers- Simple Manometers Piezometers, U Tube Manometers, Differential Manometers, Inverted U Tube Manometers, problems on Manometers. 3.5.3 Mechanical Gauges- Bourdon pressure gauge.		
4	**Total Hydrostatic Pressure** 4.1 Definition of total pressure and center of pressure. 4.2 Expression for total pressure and depth of center of Pressure on surface immersed in static liquid, Problems. 4.3 Pressure diagram- Definition and its use. 4.4 Total pressure on vertical and inclined faces of Gravity dam.	06	08
5	**Fundamentals of Fluid Flow** 5.1 Types of flow – steady and unsteady, uniform and non-uniform, laminar and turbulent, compressible and incompressible, various combination of flow with examples. 5.2 Discharge and its units. 5.3 Continuity equations for liquids. 5.4 Datum head, pressure head, velocity head, total head, Bernoulli's theorem, loss of head, modified Bernoulli's theorem, problems on Bernoulli's theorem.	08	10
6	**Flow Through Orifice** 6.1 Orifice, jet of flow, Vena contracta, use of orifice. 6.2 Classification of orifice according to size, shapes, and discharges condition. 6.3 Coefficient of contraction, coefficient of velocity, Coefficient of discharge. Derivation of relation Between them. Determination of Cc, Cv, Cd. 6.4 Discharge through small circular orifice, problems on calculation of hydraulic coefficient and discharge through small circular orifice.	04	06
7	**Flow Through Pipes** 7.1 Loss of head due to friction, Darcy weigh batch equation, common range of friction factor for different types of pipe material 7.2 Reynolds number and its significance, relative Roughness. 7.3 Determination of coefficient from Moody's diagram. 7.4 Minor head losses in pipe – loss of head due to sudden contraction, gradual expansion, gradual Contraction, loss of head at entrance, exit and loss of head in various pipe fittings such as bends, Valves, elbows. 7.5 Hydraulic gradient line and total energy line Problems on flow through pipes and drawing the HGL and EGL. 7.6 Flow through pipes in series and parallel, Compound pipe, equivalent pipe. 7.7 Water hammer- Causes effects and remedial Measures, surge tank.	14	12

Topic No.	Topic & Subtopic	Hours	Marks
	7.8 Use of nomograms for design of water distribution system.		
8	**Flow Through Open Channels** 8.1 Different shapes of artificial channels, wetted perimeter, wetted area, hydraulic mean depth. 8.2 Chezy's formula and Manning's formula for calculation of discharge through an open channel. 8.3 Common values of Chezy's constant and Manning's constant for different types of channel surfaces. 8.4 Most economical channel section, Expressions for most economical rectangular and trapezoidal Channel sections. 8.5 Hydraulic jump, situations where hydraulic jump occurs, uses of hydraulic jump.	08	10
9	**Flow Measurement** 9.1 Volumetric measurement of discharge by measuring tank. 9.2 Discharge measuring devices in closed conduits. 9.2.1 Venturimeter, principle, component parts, expression for discharge through Venturimeter, coefficient of discharge. 9.2.2 Orifice plate meter- Expression for discharge, situation where orifice plate meter is used. 9.2.3 Water meters- Principle and use. 9.3 Discharge measuring devices used in open channels. 9.3.1 Notches – types of notches, expression for discharge through rectangular and triangular notch. Francis formula, effect of end contraction and velocity of approach on discharge computation, cippolitte weir, Measurement of head over notches with gauges. 9.3.2 Weir- Broad crested weir, ogee shaped spillway. Expression for discharge. 9.3.3 Flumes- venturiflumes, standing wave flume, expression for discharge. 9.3.4 Situations where the above devices are used. 9.4 Velocity measuring devices. 9.4.1 Floats- surface floats. 9.4.2 Pitot tube – Principle, types, Expression for velocity. 9.4.3 Current meter –Types 9.5 Velocity, area measurement method for channel	10	14
10	**Pumps** 10.1 Definition of Pumps, Types of Pumps. 10.2 Centrifugal pumps – Principle of working, component parts, priming of pump, calculation of power required for pumps. 10.3 Reciprocating pumps – component parts and working. 10.4 Submersible pump and turbine pumps. 10.5 Selection and choice of type of pump. 10.6 Turbines- Definition and types.	04	06
11	**Applications of Principles of Hydraulics In Engineering** 11.1 Applications of principles of hydraulics in various fields of engineering such as Environmental Engineering, Irrigation Engineering & Transportation Engineering.	02	02

Topic No.	Topic & Subtopic	Hours	Marks
	Total	**64**	**80**

Laboratory work:

SN	Term work shall consist of a record of the following practicals.
1	Measurement of pressure by piezometer and pressure gauges. Use differential and Inverted U tube Manometer.
2	Verification of Bernoulli's theorem.
3	Determination of coefficient of venturimeter.
4	Determination of Cc, Cv, Cd, of a sharp edged circular orifice.
5	Determination of Cd of a triangular or rectangular notch.
6	Determination of coefficient of a friction of a given pipe.
7	Determination of minor losses in a pipe line – loss due to sudden Contraction, loss due to sudden expansion, loss due to valves or bents or elbows.
8	a) Study and use of Moody's chart No 1 & 2. b) Use of nomograms for Manning's equation.
9	Study of centrifugal pump, care to be taken in installation, selection of pump for designed discharge, Catalogues available from pump manufacturers.
10	Demonstrations a) Bourdon pressure gauge. b) Study of significance of Reynolds's number.

Suggested Instructional Strategies:

Lecture Method; Use of teaching aids, Demonstrations, Case studies, Assignments.

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1	Modi & Seth	Fluid Mechanics	Standard Book House
2	R. S. Khurmi	Hydraulics	S Chand
3	Jagadish Lal	Hydraulics	Khanna Pub
4	Streeter	Hydraulics	Mcgraw Hill

Programme : Diploma Programme in Civil Engineering (CE)
Course : Mechanics of Structures **Course code :** 1205
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme								
Hrs / week			Credits	TH Paper Hrs.	Marks							
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
04	--	02	06	03	Max.	80	20	100	--	--	25	125
					Min.	32	--	40	--	--	10	--

Rationale:

Concepts and principles involved in the design of various structures are covered in this course. It forms a core course. Analysis of structures needs the basic understanding of mechanical properties of materials and their behavior. The approach of teaching should be to develop critical thinking in students and integrate the knowledge and develop desired skills in students.

Objectives:

The student will be able to

1. Understand the basic principles of behavior of the material subjected to various loads.
2. Apply the principles to field situation.
3. Understand the procedure of testing the materials and develop the ability of interpreting results.

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Stress And Strains** 1.1 Concepts of elastic, plastic and rigid bodies, concepts of deformation, stresses and strains. 1.2 Axial tensile and compressive loads, axial stresses, axial strain, lateral strain, Poisson's ratio, volumetric strain, problems on bars of uniform cross section and different cross sections (stepped bars). 1.3 Behavior of mild steel under tensile loading, stress-strain curve, limit of proportionality, yield stress, Ultimate stress, breaking stress, factor of safety, safe stress, working stress. 1.4 Composite sections under axial load, modular ratio, simple problems on analysis of composite sections 1.5 Concept of biaxial stresses, triaxial stresses 1.6 Definition of temperature stress, nature of stresses. Simple problems on temperature stresses in homogeneous sections only 1.7 Concept of shear load, shear stress and shear strain, modulus of rigidity, simple shear, complementary shear stresses. 1.8 Elastic constants, relation between modulus of Elasticity,	18	22

Topic No.	Topic & Subtopic	Hours	Marks
	modulus of rigidity and bulk modulus. (No derivations of these relations)		
2	**Strain Energy.** 2.1 Concept of strain energy, types of loading-gradually, suddenly applied and impact loading, stresses due to these three types of loading. 2.2 Strain energy stored due to these three types of loading, Resilience, proof resilience, modulus of resilience.	05	08
3	**Moment of Inertia** 3.1 Concept of moment of inertia for plane areas, radius of gyration, expression for centroidal moment of inertia for regular plane areas such as rectangular, triangular, circular and semicircular sections. Section modulus 3.2 Parallel axes theorem, perpendicular axes theorem, polar moment of inertia. Moment of inertia of standard and built-up sections.	09	12
4	**Shear Force and Bending Moment** 4.1 Concept and definitions of shear force and bending moment, sign conventions, relation between bending moment, shear force and rate of loading. 4.2 Shear force and bending moment diagrams for simply supported, cantilever and overhanging beams subjected to concentrated loads, uniformly distributed load and couples, Point of contra-flexure	14	16
5	**Bending Stresses** 5.1 Concept of pure bending, theory simple bending. Assumption in the theory of pure bending, stress distribution, Equation of moment of resistance, flexure equation (Derivation not required). 5.2 Application of theory of bending, moment of resistance for symmetrical and unsymmetrical sections.	08	10
6	**Shear Stresses in Beams** 6.1 Shear stress equation (Derivation not required), meaning of terms in equation. 6.2 Shear stress distribution for solid and hollow rectangular section, solid and hollow circular section, I-section, T-section and numerical problems on these sections 6.3 Relations between maximum shear stress and average shear stress for rectangular and circular section.	07	08
7	**Thin Cylindrical Shells** 7.1 Stresses in walls of thin cylindrical shells under internal pressure, concept of circumferential stress (hoop stress) and longitudinal stress 7.2 Changes in dimensions due to internal pressure in thin cylindrical shells	03	04
	Total	**64**	**80**

Laboratory Work:

Term Work: Term work shall consist of following:

A) Practicals:

Journal shall consist of any 10 practicals as per the following list.

SN	List of practicals
1	Study of Universal Testing Machine.
2	Tension test on mild steel specimen.
3	Tension test on HYSD / TMT steel specimen.
4	Compression test on aluminium, brass, cast iron (any two)
5	Compression test on timber (Along the grains and across the grains)
6	Flexural behaviour of timber beam.
7	Izod Impact test on Aluminium, mild steel, brass
8	Charpy Impact test on Aluminium, mild steel, brass
9	Flexural test on floor tiles.
10	Compression test on bricks.
11	Abrasion test on flooring tiles.
12	Water absorption test on bricks or flooring tiles.
13	Shear test on mild steel, aluminium, copper, brass (any two)

B) Submission of Exercises:

1) Six problems on drawing shear force and bending moment diagrams on half imperial drawing sheets or graph papers / plates covering typical cases of simply supported beams, cantilever beams and over hanging beams.

Suggested Instructional Strategies:

Lecture method, Group discussion, Question Answer technique, Industrial visits, expert lecturers, Assignments, Case studies.

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1	Beer and Johnson	Mechanics of Materials	Mc Graw Hill
2	Singer and Pytel	Strength of Materials	Harper & Row
3	Ramamrutham	Strength of Materials	Dhanpat Rai and sons
4	Schaum's outline Series William Nash.	Strength of Materials	Mc Graw Hill
5	Timo Shenko and Young	Strength of Materials	CBS Publisher & distributors
6	Buchanan	Mechanics of structure	Holt Rinehart & Winston Inc.
7	Irving H. Shames & Titarress	Introduction To solid Mechanics	Eastern Economy Edition.
8	B. K. Sarkar	Strength of Materials	Tata McGraw Hill

Web references:

nptel.ac.in

Programme : Diploma Programme in Civil Engineering (CE)
Course : Geotechnical Engineering **Course code :** 1206
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
03	--	02	05	03	Max.	80	20	100	--	--	25	125
					Min.	32	--	40	--	--	10	--

Rationale:

Every structure such as building, bridges, dams, towers, monuments are supported by soil and rock. The stability of all structures depends upon behavior of soil and capacity of soil to carry loads under different environmental conditions.

The soil & rock are also used as construction materials for embankments, roads, dams, mud walls.

Thus it becomes mandatory to learn this course which includes knowledge of physical properties, classification of soil, its behaviors and various techniques to improve soil properties.

Objectives:

The student will be able to

1. Explain soil as three-phase system and establish relationship between properties of soil.
2. Determine properties of soil by following standard test procedure and plot particle size distribution curve.
3. Determine permeability by constant head and falling head test using Darcy's Law
4. Obtained OMC & MDD for any soil sample by performing Proctor Compaction test.
5. Calculate shearing strength of soil, using Coulomb's law

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Introduction** 1.1 necessity & importance of soil Mechanics, definition of soil, 1.2 Use of soil as a constructional material & foundation bed	03	04
2	**Physical properties of Soil** 2.1 Mass of soil, soil as a three phase system 2.2 Properties like void ratio, Porosity, degree of saturation, dry density, bulk density, water content. 2.3 Three phase diagram for dry soil, wet soil & saturated soil. 2.4 Typical values of these parameters for common type of soil 2.5 Mechanical sieve analysis, grain size distribution curves, characteristics & interpretation, effective size, uniformity coefficient & its significance, well graded, poorly graded & uniform soil	08	16

Topic No.	Topic & Subtopic	Hours	Marks
	2.6 Classification of soil based on Indian standard classification method.		
3	**Atterberg's Limits** 5.1 Consistency of soil, Atterberg's limits of consistency: Liquid limit, plastic limit & shrinkage limit, plasticity index, determination of Liquid limit, plastic limit & shrinkage limit, plasticity index 5.2 Plasticity chart and A- line diagram, soil classification Shown on plasticity chart	06	12
4	**Permeability of Soil** 4.1 Definition of permeability, coefficient of permeability, Darcy's law, typical values of coefficient of permeability for various soils. 4.2 Determining coefficient of permeability by constant Head & Variable head method, Factors affecting permeability of soil.	06	10
5	**Shearing Strength of Soil** 6.1 Constituents of shearing resistance of soil, definition of cohesion and internal friction 6.2 Purely cohesive and non-cohesive soil, Coulomb's law & failure envelope 6.3 Determination of shear strength of soil by direct shear test, tri-axial shear test & unconfined compression test. Vane shear test for drained and un-drained condition (no numerical problems)	08	12
6	**Bearing Capacity of Soil** 7.1 Concept of bearing capacity, ultimate bearing capacity, net ultimate capacity. Safe bearing capacity, allowable bearing capacity. 7.2 Typical values of bearing capacity for common soils from building code. 7.3 Introduction to plate load test, procedure & its limitation. (no numerical problems)	05	06
7	**Compaction of Soil** 8.1 Concept of compaction, consolidation, compression & Settlement. Characteristics of compaction. 8.2 Difference between compaction & consolidation 8.3 Relation between moisture content & dry density under constant compaction effort. 8.4 Purpose of compaction in field, compaction curve, Optimum moisture content, maximum dry density. Light & heavy compaction test. 8.5 Factors affecting Compaction, Common methods of compaction in the field-rolling, ramming & vibration type of rollers. 8.6 Measurement of field density by core cutter method & Sand replacement method.	06	12
8	**Soil Stabilization** 9.1 Concept of soil stabilization, need of soil stabilization.	06	08

Topic No.	Topic & Subtopic	Hours	Marks
	9.2 Different methods of soil stabilization: mechanical stabilization, lime stabilization, cement stabilization, Bitumen stabilization, fly ash & lime stabilization.		
	Total	**48**	**80**

Laboratory Work:

SN	Group-A: List of practical (Any seven)
1	Determination of water content of the given soil sample by oven dry method.
2	Determination of specific gravity by pycnometer method
3	Mechanical sieve analysis & grain size distribution curve for a given soil sample
4	Determination of liquid limit of given soil sample
5	Determination of plastic limit of given soil sample
6	Determination of shrinkage limit of given soil sample
7	To carry out field identification tests on soil
8	Determination of bulk density & dry density of soil by sand replacement method.
9	Determination of MDD & OMC by standard proctor test for a given soil sample
	Group-B: Viewing video cassettes of
1	Determination of permeability by constant head test
2	Determination of permeability by varying head test
3	Determination of shear strength of soil using Vane shear test
4	Determination of shear strength of soil using Unconfined compression test

Suggested Instructional Strategies:

Lecture method, Use of teaching aids, Group discussion, Question Answer technique, Industrial visits, expert lecturers, Assignments, Case studies.

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1	B. C. Punmia	Soil Mechanics & foundation Engineering	Standard Book House, New Delhi.
2	V. N. S. Murthy	Soil Mechanics & foundation Engineering	Tata McGrow Hill, New Delhi.
3	Dr. K. R. Arora	Soil Mechanics & foundation Engineering	Standard Publishers and Disributors
4	B. J. Kasmalkar	Soil Mechanics & foundation Engineering	Pune Vidhyarti Griha, Pune
5	Jorge F. Sowers	Soil Mechanics & foundation Engineering	Macmillan Publishing Co. INC, Newyork
6	Alam Singh, G. R. Chaudhari	Soil Mechanics & foundation Engineering	CBS Publishers And Distributors

Web references:

nptel.ac.in

Programme : Diploma Programme in Civil Engineering (CE)
Course : Highway Engineering **Course code :** 1207
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
03	--	02	05	03	Max.	80	20	100	--	--	25	125
					Min.	32	--	40	--	--	10	--

Rationale:

Transportation plays an important role in the development of country. Highways are the one of most important and easy mode of transportation in our country. The prosperity of the nation has directly based on development of communication network. The roads are easy and effective mode of communication. This course gives the knowledge and skills required to carry investigation, planning, design, construction, maintenance of different works related to roads and highways.

Objectives:

The student will be able to

1. Plan and align the road using available data.
2. Understand the geometric design.
3. Organize, supervise & co-ordinate construction activities of Roads
4. Maintain and repair of existing Roads.
5. Know basic principles of traffic engineering.

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Introduction** 1.1 Classification of Roads according to function, traffic and tonnage. 1.2 Development plan of roads, Nagpur plan & Third Road development plan, IRC classification. 1.3 Classification of Urban Roads. 1.4 Importance of highway network.	03	06
2	**Investigation for Road Project** 2.1 Reconnaissance survey, Preliminary survey and Location survey for a road project. 2.2 Fixing the alignment of road, factors affecting alignment of road. 2.3 Detailed survey for cross drainage- L-section and C/S sections. 2.4 Drawings required for road project- Key map, Index map, Preliminary survey plan and detailed location survey plan, L-section and C/S sections cross drainage work, land acquisition plan. 2.5 Survey for availability of construction material, location plan of quarries.	03	04

Topic No.	Topic & Subtopic	Hours	Marks
3	**Geometric Design of Highways** 3.1 Highway cross-section, right of way, carriage way, Road margin, shoulder, formation width. 3.2 Camber- definition, purpose, types, IRC Specification. 3.3 Gradient- Definition, Types, IRC Specification. 3.4 Sight distances- Definition, types. Widening of roads on curves. 3.5 Curves- Necessity, Types Horizontal, vertical, and transition curves, widening of road on Curves. 3.6 Super elevation- definition, object, formula for Calculating super elevation IRC Recommendations for super elevation and methods of providing super elevation. 3.7 Typical cross section of National and state Highways in cutting and embankment with dimensions. 3.8 Simple problems on geometric design of roads.	10	18
4	**Construction of Road Pavements** 4.1 Road pavements – objectives, classification-flexible & Rigid pavements, structure of pavements, function of pavements components 4.2 Earthwork and preparation of sub grade, borrow pits, spoil bank, lead and lift balancing of Earthwork, construction procedure. 4.3 Soil stabilization- Necessity objective and Methods of soil stabilization. 4.4 W. B. M. Road – Definition, IRC recommendation. For Materials and grading of aggregate construction Procedure and precautions. 4.5 Bituminous roads- Definition of asphalt, tar, Emulsion, cut back, prime coat, tack coat, seal coat, surface dressing, grouting and construction procedure. 4.6 Concrete pavements – Definition, construction Materials, method of construction, construction joints, joint filler, joint sealer, equipments used.	14	24
5	**Road on Hilly area** 5.1 Components of roads on hilly area curves, super Elevations, design speed and precautions, IRC permissible gradients, Hilly road formation. 5.2 Causes and prevention of landslides. 5.3 Cross drainages structures, safety structures in hilly areas.	04	06
6	**Traffic Engineering** 6.1 Study of traffic volumes. 6.2 Controlling of traffic-road signs, signals, and islands. 6.3 Road intersection- intersection of grade and Separation of grade. 6.4 Segregation of traffic- flyovers, over bridge, clover leaf.	05	08
7	**Highway Drainage and Arboriculture** 7.1 Highway drainage – Definition, necessity, surface drainage, cross drainage, sub-surface drainage Cross drainage, i. e Side gutter, catch water drains, longitudinal drain and cross drains. 7.2 Arboriculture- Necessity, selection of trees and Plants.	05	08

Topic No.	Topic & Subtopic	Hours	Marks
8	**Maintenance of roads** 8.1 Necessity of maintenance of roads. 8.2 Maintenance operations – ordinary, routine and periodic maintenance Maintains of W. B. M. bituminous concrete roads, materials required and procedure. 8.3 Carpeting of Road-Bituminous / Tar Carpeting Procedure	04	06
	Total	**48**	**80**

Laboratory work:

SN	List of practical
1	Road project for a road of minimum 0. 5 km. length having at least one small cross drainage work from the data available. Drawing sheet (full imperial) shall consist of Road plan, longitudinal section, and typical cross sections of the road in cutting and filling.
2	Visit to a road under construction/constructed to study the construction of (a) WBM road (b) flexible pavement (c) Rigid pavement roads for observing the type of construction and construction equipments.
3	Drawing of cross- section of National Highway, State Highway in cutting and embankment with detail dimensions.
4	Traffic volume study and its representation of for an important road intersection in your city.
5	Visit to a W. B. M. and Bituminous road for observing the different types of Defects in roads. Prepare a visit report. Which should consist of (a) List of Various defects observed b) Suggestions regarding the possible remedial Measure.
6	Visit to Hot mix plant
7	Visit to site for observing methods of maintenance of the road.

Suggested Instructional Strategies:

Lecture Method; Use of teaching aids, Industrial Visits, Demonstrations, Expert Lectures.

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1	Khanna & Justo	Highway Engineering	Khanna Publisher
2	N. L. Arora, S. P. Luthara	Transportation Engineering	I. P. H. New Delhi
3	Vazarani & Chandola	Transportation Engineering	Khanna Publisher
4	Birdie & Ahuja.	Road, Railway, Bridges	S. B. H. New Delhi
5	Kamala.	Transportation Engineering	T. M. H. New Delhi
6		P. W. D. hand book	P. W. D. Maharashtra

IS Codes.: IRC 36 – 1970, IRC 16 –1965, IRC 20 -1966

Programme : Diploma Programme in Civil Engineering (CE)
Course : Railway and Bridge Engineering **Course code :** 1208
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
04	--	--	04	03	Max.	80	20	100	--	--	--	100
					Min.	32	--	40	--	--	--	--

Rationale:

Railway and Bridges having most important part of transportation media in our country. Due to the longer distance between metropolitans and varying train, railway are most economical mode of transportation.

In this course students are acquainted with investigation planning, execution and maintenance of railway & Bridge Engineering

Objectives:

The student will be able to

1. Know various components parts of railway & bridges.
2. Method of survey & invention of alignments of railway & Bridge.
3. Geometric design of railway & Hydraulic design of bridge.
4. Know various types of stations and yards and maintenance procedure
5. Know various types of bridges, material of construction and maintenance process.

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Introduction** 1.1 Modes of transportation system- Road Railways, airways, waterways, importance of each mode. 1.2 Comparison and relative merits and demerits of each mode. 1.3 Gauges- Definition, and their width, Necessity and importance of uniform gauge. 1.4 Classification of Indian Railway, Zones of Indian Railway.	04	06
2	**Railway engineering** 2.1 Permanent way – requirement of ideal permanent way. Different components of permanent way, Cross-section of B. G. & M. G. line, single & Double line in cutting and embankment. 2.2 Rails- Types, functions dimension weight per meter Length, Type of rail joint, ideal joint, creep and causes of creep, welding of rails and it's advantage 2.3 Sleeper & Ballast- Functions and requirement types of sleepers-wooden, metal, Concrete, prestressed, Stability and sleeper density. Quality of ballast, Functions, and their	08	12

Topic No.	Topic & Subtopic	Hours	Marks
	properties. 2.4 Railway fixtures and fastenings – fixtures and fastenings of rails & sleepers, fishplate bearing plate, Spikes, bolts, keys, anchors elastic fastening & Bearing.		
3	**Geometric design of track** 3.1 Coning of wheels, canting of rails, super elevation of curves, cant deficiency, negative cant, grade compensation of curves. 3.2 Creep of rails- Definition, causes, effect and prevention of creep.	08	10
4	**Branching of tracks** 4.1 Definition of point and crossings, simple split, switch turn-out of points and crossing lines, Sketches of different components and their functions and working. 4.2 Line sketches of track joints, diamond crossing, cross over, triangle & their salient features.	06	08
5	**Station and Yards** 5.1 Station-types, purpose, location, layout facilities required at stations. 5.2 Yards- types of station yards, passenger yard, Good yards, locomotive yard & its requirements, marshalling yard.	04	08
6	**Track Maintenance** 6.1 Introduction, Necessity, importance of maintenance. 6.2 Types of maintenance, Tools required, daily maintenance, periodical maintenance, organisation required for maintenance.	04	06
7	**Bridge- Site selection and investigation** 7.1 Factors affecting site selection of bridge. Bridge alignment, collection of design data. 7.2 Classification of bridges according to function, material, span, Size alignment, position of HFL, I. R. C. loading.	06	08
8	**Types of Bridges** 8.1 Permanent Bridge- Sketches and description of culverts, causeway, masonry, arch, steel, marbles steel, RCC, girder bridge, pre-stressed steel bridge, cantilever, suspension bridge, flyover. 8.2 Temporary Bridge- timber, flying, floating bridge. 8.3 Selection criteria for suitable types of bridge.	10	08
9	**Component and parts of bridge** 9.1 Substructure- foundation, pier, abutments, wingwall, bearing, approaches in cutting and embankment- function of each components. 9.2 Different Terminology- such as effective span, clear span, economical span, waterway cutwater, afflux, scour, HFL, free board. 9.3 Plan and sectional elevation of bridge	08	08
10	**Inspection and maintenance of Bridge** 10.1 Inspection of bridges.	06	06

Topic No.	Topic & Subtopic	Hours	Marks
	10.2 Check list of Bridge inspection 10.3 Maintenance of Bridge- Routine and special purpose maintenance.		
	Total	**64**	**80**

Suggested Instructional Strategies:

Lecture Method; Use of teaching aids, Industrial Visits, Demonstrations, Expert Lectures, Assignments.

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1	Birdie & Ahuja.	Road, Railway, Bridges & Tunnel Engineering	Standard Book House, New Delhi
2	Rangwala	Railway Engineering	Charotar Publishing House
3	Rangwala	Bridge engineering	Charotar Publishing House
4	Ponnuswamy	Bridge engineering	Tata McGraw Hill, New Delhi

Programme : Diploma Programme in Civil Engineering (CE)
Course : Basic Surveying **Course code :** 1209
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme								
Hrs / week			Credits	TH Paper Hrs.	Marks							
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
03	--	04	07	03	Max.	80	20	100	25	--	25	150
					Min.	32	--	40	10	--	10	--

Rationale:

This is basic technology course, which is intended to teach the students' basic facts, concepts, principles, and procedures in surveying and levelling. With this knowledge and skill, he will be able to choose appropriate survey and levelling methods instruments and carry out survey work to prepare required plan/maps. This plan/maps will be further used for designing, estimating works. One should acquire knowledge and develop the skills in surveying.

Objectives:

The student will be able to

1. Carry out surveying and levelling operations independently on the field.
2. Acquire skill in use of various survey instruments, handling recording the data in field book and plotting the collected data.
3. Take linear and angular measurements, Measure area of land, Set out alignments for road, railway, canal, Pipelines. And prepare contour map.

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Introduction** 1.1 Definition of surveying 1.2 Objects of surveying 1.3 Principles of surveying 1.4 Uses of surveying 1.5 Classification of surveying 1.6 Primary-plane, Geodetic Secondary-Based on instruments, Methods, Object, Nature of field	04	06
2	**Chain Surveying** 2.1 Study and use of instruments for linear Measurements-Chain, Tape, Ranging rod, Arrows, pegs, line ranger, Cross staff, Optical Square. 2.2 Ranging – Direct and Indirect ranging. 2.3 Chaining on plain and sloping ground. 2.4 Principle of chain surveying survey lines-base line, tie line check line. 2.5 Taking offsets – types of offsets Recording field Book, obstacles in chaining. 2.6 Chain and cross staff survey for finding area of Field (Numerical	10	20

Topic No.	Topic & Subtopic	Hours	Marks
	Problems). 2.7 Errors in chain surveying and applying correction for distance measured by chain and Tape(Numerical Problems) 2.8 Conventional signs related to survey		
3	**Compass Survey** 3.1 Bearing of lines meridian-true, magnetic and arbitrary Bearing - fore bearing, back bearing, whole circle bearing and Quadrantal bearing system & reduced bearing. Finding included angles from bearings. 3.2 Prismatic compass-component, construction and use. 3.3 Local attraction-causes and detection of local attraction precautions to be taken to avoid local attraction. 3.4 Traversing by chain and compass by included angle method. Calculation of included angle and correction to them (Numerical Problems). Plotting of the traverse. Graphical adjustment of closing error. 3.5 Sources of errors in Prismatic compass. 3.6 Numerical problems on calculation of bearings, Angles and local attraction.	10	16
4	**Levelling** 4.1 Definition – level surface, level line, horizontal line, vertical line, datum surface, reduced level, Benchmark and its types. (Temporary, Permanent and GTS.) 4.2 Dumpy Level – Components, Construction, Line of Sight, Line of Collimation, axis of bubble tube. Terms- fore sight, Back sight, Intermediate Sight, Change point, Height of collimation. 4.3 Recording in level book. Temporary and permanent Adjustments of dumpy level. 4.4 Leveling staff- 4m, Telescopic and folding type. 4.5 Methods of Reduction of levels- Height of instrument Method and Rise and fall method, Arithmetical Checks, Numerical problems, computation of missing readings. 4.6 Classification of levelling – simple, differential, Profile Leveling and cross- sectioning, fly levelling. 4.7 Study and use of tilting and auto levels. 4.8 Sources of errors in levelling, precautions and difficulties faced in levelling.	16	22
5	**Contouring** 5.1 Definitions- Contour, Contour interval, Horizontal Equivalent. 5.2 Characteristics of contours. 5.3 Methods of contouring 5.4 Establishing grade Contours 5.5 Use of contour maps.	04	10
6	**Area & volume Measurement** 6.1 Construction and use of Amslar polar Planimeter. (simple Numerical Problems) 6.2 Study and use of Digital Planimeter.	04	06
	Total	**48**	**80**

Laboratory / Field Work:

SN	List of practicals	Hours
1	Measurement of distance with chain and tape on ground with direct and indirect ranging.	06
2	Setting out perpendicular and taking offsets with open cross staff and optical square.	02
3	Chain and cross staff survey for finding out area of given field.	02
4	Study and use of prismatic compass and Observing fore bearing and back bearing.	02
5	Measuring fore bearings and back bearings of 5-6 sided polygon, identifying stations affected by local attractions and calculation of corrected bearings.	04
6	Measuring fore bearings and back bearings for an open traverse (5 to 6 sided) calculation of direct angles between successive lines	02
7	Use of Dumpy level, temporary adjustments and taking reading on levelling Staff. Recording readings in field book.	04
8	Differential levelling practice, reduction of levels by Height of instrument method.	02
9	Differential levelling practice reduction of levels by rise and fall method	02
10	Carrying bench marks from one point to another point about 200 m away by fly Levelling with tilting level.	02
11	Use of auto level and taking observation.	02
12	Measurement of area of irregular figure by polar plani meter	02
13	Measuring area enclosed by closed contour on contour Map prepared Earlier by simple digital Plani meter	02
	Projects	
1	**Chain and compass traverse survey:** A simple closed traverse of 5-6 sided enclosing a building, Calculation of included angles. Locating details and plotting them on A1 size imperial drawing sheet.	10
2	**Profile leveling and cross sectioning survey:** Running a longitudinal section for a length of 500 m for road alignment, taking cross Sections. 20 m on either side, with staff reading at 10 m interval. Plotting plan, L-Section and cross section on A1 size imperial drawing sheet.	10
3	**Block Contouring:** A block of 100m x 100m with spot levels at 10m x 10m. Plotting the contours with contour interval 0. 5 to 1. 0 m by interpolation on A1 size imperial drawing sheet.	10
	Total	**64**

Instructions:

1) Group size for practical work should be limited to maximum 6 students.
2) Each student from the group should handle the instrument to understand the function of different components and use of the instrument.
3) Drawing plotting should be considered as part of practical.
4) One whole day per-project is required for carrying out project work which is to be Plotted on drawing sheet.
5) Term work should consist of record of all practical and projects indicated in the content (field book and Drawing sheets).

Suggested Instructional Strategies:

Lecture Method; Use of teaching aids, Industrial Visits, Demonstrations, Expert Lectures.

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1	N. N. Basak	Surveying and Leveling	Tata Mc Graw-Hill
2	T. P. Kanetkar & S. V. Kulkarni	Surveying and leveling	Pune Vidhayarthi Griha Proakashan
3	Dr. B. C. Punmiya	Surveying and leveling Vol-I & Vol-II	Laximi Publisher
4	S. K. Husain	Surveying	S. Chand and Company
5	S. K. Duggal	Surveying and leveling Vol-I & Vol-II	Tata Mc Graw-Hill

1. **Video and Audio cassettes:**
   a. Dumpy level B/W NITTTR Chandigadh
2. **Compact Discs:**
   a. Auto map Auto desk.
   b. Auto civil Auto desk.

Programme : Diploma Programme in Civil Engineering (CE)
Course : Building Construction **Course code :** 1210
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme								
Hrs / week			Credits	TH Paper Hrs.	Marks							
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
04	--	04	08	03	Max.	80	20	100	--	25	25	150
					Min.	32	--	40	--	10	10	--

Rationale:

Building construction is a core course in Civil engineering. This course is intended for gaining useful knowledge with respect to facts, Concepts, principles and procedures related to building construction system so that student can effectively plan, execute building construction work and carry out repairs and maintenance of existing building with quality in construction.

The course helps to learn building materials required for construction. It provides necessary knowledge about properties, uses and market rates of building materials. .

Objectives:

The student will be able to

1. Know construction material, Select good material, handle and use them with proper way.
2. Know construction method used in industry.
3. Know key resources of materials, plant & labours.

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Construction Materials** 1.1 Types of Material- properties of material, Market rates of stone, Brick, Sand, Metal, Steel, Timber, Aluminium, Cement, Concrete Block Marble, Granite, steel, kadappa. 1.2 Stocking of Material, Reduction in wastage of construction material, Use of material.	08	10
2	**Job layout and foundation** 2.1 Job layout Site clearance, Preparing job layout for load bearing structure and framed structure by centre line method and face line method. Precautions while marking layout on ground. 2.2 Foundation Definition, Purpose, Types of foundation. Shallow foundation- Wall footing, Isolated and combined column footing, Stepped foundation, Raft foundation. Deep Foundation-Pile foundation – Types, Bearing, sheet, anchor, batter, fender and under reamed piles.	10	12

Topic No.	Topic & Subtopic	Hours	Marks
3	**Stone Masonry** 3.1 Terms used in stone masonry (S. M.) 3.2 Method of placing & Setting stone. 3.3 Bonds in stone Masonry – Rubble & uncoursed 3.4 Rubble masonry & their details. 3.5 Construction procedure of S. M. 3.6 Supervisory Points of S. M. 3.7 Advantages of S. M. 3.8 Plinth construction by S. M	08	12
4	**Brick Masonry** 4.1 Definition, Terms Used in brick masonry (B. M.) 4.2 Bonds in Brick Masonry-English & Flemish Bond for 1 & 1. 5 brick thick 4.3 Construction Procedure of B. M. 4.4 Supervisory points of B. M. 4.5 Advantages of B. M. 4.6 Plinth constructions by B. M.	08	12
5	**Doors & Windows** 5.1 Doors 5.1.1 Types, Location, Use 5.2 Windows 5.2.1 Types, Location, Use 5.3 Types of material for Door/Window	08	08
6	**Staircase** 7.1 Technical Terms- Classification of staircase. 7.2 Types of Stairs- Material & geometrical shape 7.3 Construction procedure of R. C. C. doglegged Staircase. 7.4 Supervisory points of R. C. C. doglegged Staircase. 7.5 Lifts	04	04
7	**Plaster** 8.1 Definitions & introduction of finishing material. 8.2 Different types of plaster. 8.3 Construction procedure of plaster 8.4 Supervisory points of plaster	04	06
8	**Floors** 8.1 Types of floors finishing material 8.2 Construction procedure of floors - Mosaic, Ceramic & stone flooring 8.3 Supervisory points of floors 8.4 R. C. C. Slab - Definition, Types of slab- flat & slopping, 8.5 Construction procedure of slab. Supervisory points of slab.	06	08
9	**Plumbing** 10.1 Definition 10.2 Types of plumbing- Water Supply & Drainage 10.3 Construction Method 10.4 Supervisory points of plumbing 10.5 Inspection of plumbing system.	04	06
10	**Painting**	04	02

Topic No.	Topic & Subtopic	Hours	Marks
	11.1 Definition & need of painting 11.2 Types of painting		
	Total	**64**	**80**

Laboratory work:

SN	A)Students should prepare report based on following site visits.
1	Visit to site to study the various types of stone masonry.
2	Visit to site to study the different types of bonds in brick masonry.
3	Visit to site to observe procedure of plastering.
4	Visit to site to obtserve procedure of construction of mosaic/ceramic tile flooring.
5	Visit to site to study the procedure of construction of kitchen otta.
6	Visit to site to study the components of dog legged staircase.
7	Visit to site to observe the procedure of fixing door frames and shutters.
8	Visit to site to study the water proofing of RCC roof slab.
9	Visit to site to study the various types of paints and procedure of painting.
10	Visit to site to study the water supply and sewage system in a building.
11	Visit to site to study the electrification system in a building.
12	Collection of market rates of materials and labour and hiring charges of machinery and construction equipments.
13	Visit to site to study the foundation
	B) Students should prepare a report on the performance of following practicals.
1	To give line out of a framed structured residential building.
2	Checking line level and plumb for beam and column.

Suggested Instructional Strategies:

Lecture Method; Use of teaching aids, Industrial Visits, Demonstrations, Expert Lectures.

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1	S. C. Rangwala & K. S. Rangwala	Building Construction	Charotar Publishing House
2	S. K. Sharma & Kalul	Building Construction	S. Chand & Company LTD, Delhi.
3	Y. S. Sane	Building Construction	Pune Vidyarthi Griha prakashan
4	Sushilkumar	Building Construction	Standard Publisher Delhi-6

LEVEL -3

ALLIED COURSES

Programme : Diploma Programme in CE / ME / PS / EE / IF / CM / EL / AE
Course : Applied Mathematics **Course code :** 1301
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
03	--	--	03	03	Max.	80	20	100	--	--	--	100
					Min.	32	--	40	--	--	--	--

Rationale:

The study of Mathematics is necessary to develop in the students the skills essential for new technological development. This subject introduces some applications of engineering, through which the student can understand the line of Mathematics with engineering principles.

Objectives:

The student will be able to

1. Acquire knowledge of mathematical terms, concepts, principles and different methods.
2. Develop the ability to apply mathematical methods to solve engg. problems.
3. Solve problems, execute management plans with precision.

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Integration**	**22**	**36**
	1.1. Definition of integration, integral as anti- derivative, integration of standard functions.		04
	1.2. Rules of integration (Integral of sum or difference of functions, scalar multiplication)		12
	1.3. Methods of integration.		08
	1.3.1. Integration by method of substitution & by using trigonometric transformation		
	1.3.2. Integration of rational functions & by method of partial fraction		
	1.3.3. Integration by parts		
	1.4. Definite Integration		08
	1.4.1. Definition of definite integral		
	1.4.2. Properties of definite integral with simple problems		
	1.4.3. Application of definite integration Area under curve, area bounded by two curves. Volume generated by revolution of curve		
	1.5. Double integrals Introduction of double integration, simple problems of double integration		04
2	**Differential Equations**	**10**	**16**
	2.1 Definition of differential equation, order and degree of		04

Topic No.	Topic & Subtopic	Hours	Marks
	differential equation. Formation of differential equation for function containing single or double constant.		
	2.2 Solution of differential equations of first order and first degree such as i) Variable separable form ii) Reducible to variable separable iii) Homogeneous differential equation iv) Exact differential equation v) Linear differential equation vi) Bernoulli's differential equation.		08
	2.3 Applications of differential equations**.**		04
3	**Numerical Methods**	**08**	**16**
	3.1. Solution of algebraic equations using iterative method i) Bisection method ii) Regula-Falsi method iii) Newton-Raphson method.		06
	3.2. Solution of simultaneous equations containing three unknowns – iterative methods i) Gauss-Seidel method ii) Jacobi's method		06
	3.3. Interpolation i) Lagrange's interpolation formula ii) Newton's forward & backward difference interpolation formula		04
4	**Topics for EE/IF/CM/EL** **Laplace transform**	**08**	**12**
	4.1. Definition of Laplace transform and standard formulae of Laplace transform		04
	4.2. Properties of Laplace transform(linearity, first & second shifting, multiplication by tn, division by t)		04
	4.3. Inverse Laplace transform, using partial fraction. Laplace transform of derivatives. Application of Laplace transform for solving differential equation.		04
	OR		
4	**Topics for CE/ME/PS/AE** **Probability distribution**	**08**	**12**
	4.1. Binomial distribution		04
	4.2. Poisson's distribution		04
	4.3. Normal distribution (simple examples in Mechanical engineering)		04
	Total	**48**	**80**

Suggested instructional strategies:

Lecture method, improved lecture method using OHP & LCD projector, home assignments, demonstration & expert lecture.

Learning resources:

Text Books:

SN	Author	Title	Publication
1	S P Deshpande	Mathematics for Polytechnic students Semester III	Pune Vidyarthi Griha Pune
2	Kumbhojkar	Applied Mathematics Semester III	Phadke Prakashan
3	S S Sastry	Numerical Methods	Prentice Hall of India
4	P N Wartikar	Text book of Applied Mathematics volume I & II	Pune Vidyarthi Griha Pune
5	Robert T Smith	Calculus: single variable	Tata McGraw-Hill Publication
6	F Ayres	Schaum outline of differential & integral calculus	Tata McGraw-Hill Publication
7	F Ayres	Differential equations: I Metric	Schaum outline series
8	B S grewal	Engineering Mathematics	Khanna Publication

Programme : Diploma Programme in Civil Engineering (CE)
Course : Construction Management **Course code :** 1302
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme								
Hrs / week			Credits	TH Paper Hrs.	Marks							
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
03	--	--	03	03	Max.	80	20	100	--	--	--	100
					Min.	32	--	40	--	--	--	--

Rationale:

The Civil Engineer has to plan, Manage and execute Civil Engineering works. He has to manage different resources. He should have knowledge of basic management processes related to Civil engineering field.

Objectives:

The student will be able to

1. Understand management techniques.
2. Plan, Monitor and execute various types of construction work
3. Manage different resources (Men, Material, Money, Machines)
4. Read, draw & update bar charts, CPM and PERT.
5. Inspect & control quality of construction

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Construction Industry** 1.1 Importance of construction industry in National Development. 1.2 Special characteristics of Civil engineering works. 1.3 Classification and types of construction works. 1.4 Agencies associated with construction works. 1.5 Resources of construction industry, Material, Manpower, Money, Machinery. 1.6 Stages in construction- Planning stage execution stage. 1.7 Objectives of Construction Management.	04	06
2	**Scientific Management** 2.1 Definition of Management 2.2 Necessity of Scientific management. 2.3 Principles of Management 2.4 Functions of Management 2.5 Application of Principle and function of management to Civil Engineering works.	05	08
3	**Leadership and human relationship** 3.1 Leadership – styles of leadership 3.2 Desirable qualities of leadership for effective Execution of construction work 3.3 Functions of leadership 3.4 Human relation.	05	08

Topic No.	Topic & Subtopic	Hours	Marks
	3.5 Human Needs. 3.6 Motivation and its importance and need, functions of Motivation. 3.7 Hygiene and motivation factors.		
4	**Planning and scheduling of construction works.** 4.1 Levels and stages of planning-(Pre& Post tenders) 4.2 Necessity and importance of planning 4.3 Planning for owner/client and planning for contractor. 4.4 Site selection and orientation of building. 4.5 Study of Drawings, Design, Raw materials Equipments and human resources required 4.6 Methods of scheduling, Advantages of Scheduling. 4.7 Bar Chart. Preparing Construction schedule. Advantages and limitations of bar chart. 4.8 Planning and scheduling by Network Analysis, Terms used, Basic Network Construction, Logic, Determination of various timings EST, EFT, LST, LFT, total float preparation of activity table, Example on developing Critical path, Introduction to PERT. Terms used, simple examples, Introduction to PERT 4.9 Comparison between CPM and PERT. 4.10 Preparing Construction schedule comprising of items of work and duration. 4.11 Resource Aggregation for labour	12	24
5	**Communication at site** 5.1 Importance of communication at construction site. 5.2 Types of communication. 5.3 Barriers to effective communication. 5.4 Techniques to over come barriers of effective communication.	04	06
6	**Safety in Civil Engineering** 6.1 Importance of safety in construction works. 6.2 Common Causes of accident, types of accidents, Remedial measures. 6.3 Terms used- Injury frequency rate (IFR), Injury severity rate (ISR), Injury Index (II), Accident Cost. 6.4 Effective Safety Programme. 6.5 Introduction to Workmen Compensation Act and Minimum Wages act	05	08
7	**Site layout** 7.1 Storing and stacking of material at site. 7.2 Location of Machinery and equipment. 7.3 Factors on which site layout depend 7.4 Preparation of site layout.	04	04
8	**Inspection and quality control** 8.1 Concept of quality. 8.2 Supervision techniques to establish dimensional control such as line, Level Gradient, Slope, Plumb Camber. 8.3 Functions of Inspection Department. 8.4 Quality assurance and quality control.	04	08

Topic No.	Topic & Subtopic	Hours	Marks
	8.5 Sampling Techniques.		
9	**Work Study and productivity.** 9.1 Concept of productivity. 9.2 Objectives of work-study & its advantages and uses. 9.3 Method study (motion study), Objectives, Symbols used, Procedure of Method study. 9.4 Work Measurement.	05	08
	Total	**48**	**80**

Suggested Instructional Strategies:

Lecture Method, Use of teaching aids, Demonstration, Case Study.

Learning Resources:

Reference Books:

SN	Author	Title	Publisher
1	M. L. Dhir, Gehlot	Construction planning & Management	Wiley New Delhi.
2	Harpal singh	Construction Management and Accounts	Tata McGraw Hill
3	B. Sengupta and Guha	Construction management and Planning	Tata McGraw Hill
4	R. L. Peurifoy	Construction Planning equipment and methods	McGraw-Hill Co. Ltd.

Programme : Diploma Programme in CE / AE / DD
Course : Project Management **Course code :** 1303
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
03	--	--	03	03	Max.	80	20	100	--	--	--	100
					Min.	32	--	40	--	--	--	--

Rationale:

In all projects huge financial investments are made. It is therefore necessary to manage all the resources for effective project implementation & diploma technician has to acquire this knowledge as per the job requirement.

Objectives:

The student will be able to

1. Appreciate the importance of planning. Scheduling and controlling resources.
2. Understand the importance of cost-time analysis
3. Understand the quality management
4. Understand the concept of financial management in project

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Introduction** 1.1 What is Project Management. 1.2 Principles and functions of Project Management 1.3 Project life cycle 1.4 Major types of Projects. 1.5 Role of project manager 1.6 Various steps involve in completion of project	06	08
2	**Organizing for project management** 2.1 Organisation of project participants. 2.2 Types – Line, Line and staff, functional Organisation, Merits and demerits of each type. 2.3 Leadership and Motivation for the project team 2.4 Interpersonal behavior and communication – Its types, barriers in communication	10	16
3	**Project Planning** 3.1 Basic concepts in the development of project plans 3.2 Defining work tasks/activities 3.3 Defining precedence relationships among activities 3.4 Estimating activity durations 3.5 Estimating resource requirements for activities	10	16
4	**Cost –Time Analysis In Network planning** 4.1. Importance of Time – Cost analysis 4.2. Project cost, direct cost, Indirect cost.	06	12

Topic No.	Topic & Subtopic	Hours	Marks
	4.3. Variation of direct cost with time 4.4. Normal time, normal cost, crash time, crash cost. 4.5. Variation of indirect cost with time.		
5	**Quality Management** 5.1. Definition of Quality, concept of quality, Quality circle, Quality assurance 5.2. Introduction to TQM, kaizen, 5 sigma & 6 sigma.	06	12
6	**Financial Management** 6.1. Financial management – objectives and functions. 6.2. Capital generation and management Types of capitals Sources of raising capital 6.3. Budges and accounts Types of budgets Production budget (including variance report) Labour budget Introduction to profit and loss Account (only concept) balance sheet 6.4. Introduction to – Excise Tax, Service Tax, Income Tax, VAT, Custom Duty	10	16
	Total	**48**	**80**

Suggested Instructional Strategies:

Lecture Method, Use of teaching aids, Demonstration, Case Study.

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1	Chrus Hedrickson and Tung Au.	Project Management for Construction	Prentice Hall Englewood Chfts New Jersey
2	M. Spinner	Elements of Project Management	Prentice Hall Englewood Chfts New Jersey
3	Victor G. Hajek	Project Engineering, Bare Laws	McGraw- Hill Bock Company.

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Programme : Diploma Programme in CE / PS / DD
Course : Material Management **Course code :** 1304
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
03	--	--	03	03	Max.	80	20	100	--	--	--	100
					Min.	32	--	40	--	--	--	--

Rationale:

A diploma technician has to work in different areas like Research and Design, Tool Room, Production, Production planning, Industrial Engineering, Stores, Quality Control, Marketing, Purchase.

For expressing the ideas communicating & the instructions to shop level knowledge of material management is essential. This course aims to avoid bottleneck due to shortage of materials and excessive inventory by quantity and number of parts, which will lead to increase in cost and ultimate loss to the industry.

Objectives:

The student will be able to

1. Understand the importance of raw material planning according to production requirement.
2. Understand procedure for selecting and giving orders to the suppliers.
3. Understand the importance and procedure of inventory management.
4. Understand various techniques used for inventory management.
5. Understand importance of cost reduction while purchasing material.
6. Understand the importance of latest management technique.

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Material Management** Importance, scope and functions	02	04
2	**Purchasing** 2.1 Objective, scope & Functions of purchasing department 2.2 Responsibility of purchasing section 2.3 Purchasing procedure or purchasing cycle. 2.4 Material Requisition: Material Indent form, Travelling Requisition card, Bill of material 2.5 Quantity & Quality standards 2.6 Determining Right Quantity: Sales forecast, Production forecast, 2.7 Supplier section: Information sources, Evaluation of Potential suppliers, Evaluation of Suppliers, Methods of evaluation - categorical, weighted point, Cost ratio. CED cause effects diagram/failure analysis.	12	16
3	**Costing and purchase orders** 3.1 Determining Price: Price terms, Payment terms, cost comparative statement 3.2 Calling for bids or tender or quotation: Tender, Types of tenders, Invitation to BID or An Enquiry, Evaluation of bid. 3.3 Placing purchase order formats of indent/inquiry/P. O 3.4 Negotiations /Approvals/decision making units. 3.5 Follow up of order	06	10
4	**Receiving and Inspection** 4.1 Define inspection & their types, good receipt note 4.2 Inspection at vendor's work 4.3 Quality checking 4.4 Quantity checking 4.5 Rejected goods replacement procedure.	02	04
5	**Inventory Management** 5.1. Definition Inventory 5.2. Classification of Inventory 5.3. Need & function of inventory 5.4. Economic order quantity: Order quantity, Lead time, Safety stock, Re-order point. , numerical analysis. 5.5. Inventory Cost: Procurement cost, Inventory carrying cost 5.6. ABC analysis. 5.7. Inventory control system: Two Bin system, periodic inventory order system, combinations of two bin & periodic system. 5.8. Use of computer in inventory control system.	13	20

Topic No.	Topic & Subtopic	Hours	Marks
6	**Store Management** 6.1 Need 6.2 Functions of store management, duties of storekeepers 6.3 Types of stores, storage equipments/accessories 6.4 Location and layout of store 6.5 Receipt system inward good, stock items, direct purchase items. 6.6 Material issue system 6.7 Accounts of store OR store records 6.8 Valuation of Material issue from store 6.9 FIFO, LIFO. 6.10 Codification of material 6.11 Material handling in store, material handling equipments. 6.12 Stock verification, obsolete, surplus & scrap control. 6.13 Perpetual stock inventory and continuous stock taking system	10	20
7	**Emerging trends** 7.1. Concept of JIT (Just In Time) 7.2. Zero Inventory system 7.3. Introduction to supplier chain, SCM-flowchart 7.4. Developing supply chain to gain competitive advantage 7.5. Method of transportation air, rail, road, piping.	03	06
	Total	**48**	**80**

Suggested Instructional Strategies:

Lecture Method, Use of teaching aids, Industrial Visits.

Learning Resources:

Reference Books:

SN	Author	Title	Publisher
1	O. P. Khanna	Industrial Engineering & Management	S. Chand & Co.
2	Banga & Sharma	Industrial Organisation & Management Science	Khanna Publication
3	Amner Deans S.	Materials Management	Khanna Publication
4	Gopalkrishnan	Materials Management	Khanna Publication

Programme : Diploma Programme in CE / ME / PS / AE
Course : Supervisory Skills **Course code :** 1305
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
03	--	--	03	03	Max.	80	20	100	--	--	--	100
					Min.	32	--	40	--	--	--	--

Rationale:

A technician working in the industry has to co-ordinate and supervises a group of workers. A technician should have a leadership attitude. This course will help to develop requisite traits in the technician

Objective:

The student will be able to

1. Understand the importance of leadership
2. Develop ability to judge and make the decision
3. Take initiative and drive
4. Develop impartial attitude towards sub-ordinates
5. Understand and develop knowledge of industrial psychology and human relations
6. Understand importance of result consciousness

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Scientific Management and Management of Job.** 1.1. Introduction. 1.2. What is management of job? 1.3. Necessity of scientific management function & principles of Management 1.4. Handling complexity. 1.5. Optimization.	06	12
2	**Supervisory Management.** 2.1. Objectives of planning of technician job of budgeting level 2.1.1. Deciding mental & physical activities of work. 2.2. Controlling the performance of process & people in term of quantity / quality/ time cost. 2.3. Definition, objectives, use, quality mapping.	06	12
3	**Organizing, staffing and Training.** 3.1. Organizing effectively the department. 3.2. Staffing with the human Resources. 3.3. Appraisal of Employee performance or merit rating. 3.4. Training and development of employee(objectives & types)	06	10
4	**Activating the work force.**	08	10

Topic No.	Topic & Subtopic	Hours	Marks
	4.1. Motivating the people. 4.2. Art and science of leadership. Role of leadership, Team Building, Group Behavior. 4.3. Effective Employee communication		
5	**Managing problem performance.** 5.1. Counseling troubled employees, Awards/punishments. 5.2. Converting complaints and conflicts in to co-operation. (Industrial Dispute) 5.3. How and when to discipline.	06	12
6	**Employee Health and safety under OSHA** 6.1. Causes of accident. 6.2. Prevention of accident / Preparation of accident report / Investigation. 6.3. occupational hazards, first aids, safety aids(safety week) 6.4. Three 'E's of safety and accident prevention 6.5. Role of OSHA. (occupational safety & health administration)	06	10
7	**Supervisor's role in Labour Relation.** 7.1. Role of supervisor in labour matter/management/fellow Supervisor. 7.2. Labour union and employee.	04	06
8	**Moving up in your organization.** 8.1. Taking charge of career to know organization, Department & Worker etc. (Planning the day work). 8.2. Managing job related time. 8.3. Coping with stress. 8.4. organogram.	06	08
	Total	**48**	**80**

Suggested Instructional Strategy:

Lecture method, use of teaching aids, Industrial Visit.

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1	O. P. Khanna	Industrial Engineering and Management.	Danpat Rai & Son
2	Dr. S. Dalela Dr. Mansoor Ali	Industrial Engineering and Management.	Standard Publishers Distributors
3	Banga and Sharma.	Industrial organization and Engineering Economics.	Khanna Publication
4	Shrinivasan.	Industrial Management.	Danpat Rai & Son
5	R. S. Dwivedi	Human Relations & organizational Behavior.	
6	P. C. Tripathi/P. N. Reddy	Principles of Management.	

Programme : Diploma Programme in CE / ME / PS / EE / IF / CM / EL / AE / DD / ID
Course : Entrepreneurship Development **Course code :** 1306
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
01	--	02	03	--	Max.	--	--	--	--	--	50	50
					Min.	--	--	--	--	--	20	--

Rationale:

Globalization, liberalization & privatization along with revolution in Information Technology, have thrown up new opportunities that are transforming lives of the masses. On the global scenario we have abundant physical and human resources which emphasizes the importance and need of entrepreneurship. Talented and enterprising personalities are exploring such opportunities & translating opportunities into business ventures such as- BPO, Contract Manufacturing, Trading, Service sectors etc. The student community also needs to explore the emerging opportunities. It is therefore necessary to inculcate the entrepreneurial values during their educational tenure. This will help the younger generation in changing their attitude and take the challenging growth oriented tasks instead of waiting for white- collar jobs. This subject will help in developing the awareness and interest in entrepreneurship and create employment for others.

Objectives:

The student will be able to

1. Identify entrepreneurial opportunity.
2. Develop entrepreneurial skills, values and attitude.
3. Analyze business ideas- project selection.
4. Develop awareness about enterprise management.
5. Take help of support system.
6. Use the information to prepare preliminary project report.

Contents: Theory

Topic No.	Topic & Subtopic	Hours
1	**Entrepreneurship, Creativity & Opportunities** 1.1. Concept, Classification & Characteristics of an Entrepreneur 1.2. Creativity and Risk taking. 1.2.1. Concept of Creativity, brainstorming 1.2.2. Risk Situation, Types of risk & risk takers. 1.3. Trade Related opportunities 1.4. Business Idea -Methods and techniques to generate business idea. 1.5. Transforming Ideas in to opportunities 1.6. SWOT Analysis 1.7. Scanning Business Environment	04
2	**Business Terminology, Information and Support Systems** 2.1. Types of business and industries, forms of ownership, Franchisee,	02

Topic No.	Topic & Subtopic	Hours
	Export, Network/Multilevel Marketing 2.2. Sources of Information. Information related to project, support system, procedures and formalities Support Systems 1. Small Scale Business Planning, Requirements. 2. Statutory Requirements and Agencies. 3. Taxes and Acts	
3	**Market Assessment** 3.1. Marketing - Concept and Importance 3.2. Market Identification, Survey Key components 3.3. Market Assessment	02
4	**Business Finance** 4.1. Cost of Project 4.2. Sources of Finance 4.3. Assessment of working capital 4.4. Product costing 4.5. Profitability 4.6. Break Even Analysis 4.7. Financial Ratios and Significance 4.8. Various govt. /bank schemes of finance (long term and short term)	04
5	**Business Plan & Project Appraisal** 5.1. Preliminary project report preparation. 5.2. Project Appraisal & Selection Techniques 5.3.1. Meaning and definition 5.3.2. Technical, Economic feasibility 5.3.3. Cost benefit Analysis 5.3.4. Checklist	04
	Total	**16**

SN	Assignments
1	Assess yourself –are you an entrepreneur?
2	Report on -interview of successful entrepreneurs (minimum two) -interaction with the support systems -visit to small scale industry
3	Product survey - select one product and collect all it's related information i. e. specification, price, manufacturer.
4	List of identified opportunities

Laboratory Work:

SN	List of Practical/Exercises	Hours
1	Entrepreneurship Awareness- Who am I?/ EOI/Microlab Exercise	4
2	Creativity Exercises/games	4
3	Risk taking Exercises/games	2
4	Brainstorming/group discussion/problem solving exercises	4
5	Business Games and Related Exercises	4
6	Interview of an entrepreneur with a whole batch/class	2
7	Event/task/activity management-group of 4-6 students will work together	4
	AND/OR	
1-7	3 day Achievement Motivation Training workshop	24
8	Visit to DIC/Bank/MSSIDC/MIDC/MPCB/Industry	4
9	Prepare a preliminary project report and study its feasibility	4
		32

Learning Resources:

1. Reference Books:

SN	Author	Title	Publisher
1	E. Gorden K. Natrajan	Entrepreneurship Development	Himalaya Publishing, Mumbai
2	Preferred by Colombo plan staff college	Entrepreneurship Development	Tata Mc Graw Hill Publishing co. ltd. New Delhi.
3	J. B. Patel D. G. Allampally	A Manual on How to Prepare a Project Report	EDI STUDY MATERIAL Ahmadabad (Near Villaget, Via Ahmadabad Airport & Indira Bridge), P. O. Bhat 382428, Gujrat, India P. H. (079) 3969163, 3969153 E-mail: ediindia@sancharnet. in/olpe@ ediindia. org Website: http: //www. ediindia. org
4	J. B. Patel S. S. Modi	A Manual on Business Opportunity Identification & Selection	
5	S. B. Sareen H. Anil Kumar	National Derectory of Entrepreneur Motivator & Resource Persons.	
6	P. C. Jain	A Handbook of New Enterpreneurs	
7	V. G. Patel	The Seven Business Crisis & How to Beat Them.	
8	Poornima M. Charantimath	Entrepreneurship Development of Small Business Enterprises	Pearson Education, New Delhi
9	Vasant Desai	Entrepreneurship Development	Himalaya Publishing, Mumbai
10	J. S. Saini B. S. Rathore	Entrepreneurship Theory and Practice	Wheeler Publisher, New Delhi
11	--	Entrepreneurship Development	TTTI, Bhopal / Chandigadh
12	Aruna Kaulgad	Entrepreneurship Management	Vikas Publication

2. VIDEO CASSETTES

SN	SUBJECT	SOURCE
1	Five success Stories of First Generation Entrepreneurs	EDI STUDY MATERIAL Ahmedabad (Near Village Bhat, Via Ahmadabad Airport & Indira Bridge), P. O. Bhat 382428, Gujrat, India P. H. (079) 3969163, 3969153 E-mail: ediindia@sancharnet. in olpe@ediindia. org Website: http: //www. ediindia. org
2	Assessing Entrepreneurial Competencies	
3	Business Opportunity Selection and Guidance	
4	Planning for completion & Growth	
5	Problem solving-An Entrepreneur skill	
6	Chhoo Lenge Aasman	
7	Creativity	

Programme : Diploma Programme in CE / ME / PS / AE
Course : Advanced Computer Applications **Course code :** 1307
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
01	--	02	03	--	Max.	--	--	--	--	--	50	50
					Min.	--	--	--	--	--	20	--

Rationale:

'C' is the most widely used computer language, which is being taught as a core course. C is general-purpose structural language that is powerful, efficient and compact, which combines features of high-level language and low-level language. It is closer to Man and Machine both. Due to this inherent flexibility and tolerance it is suitable for different development environments. Due to these powerful features C has not lost its importance and popularity in recently developed and advanced software industry. C can also be used for system level programming. C is still considered as first priority programming language.

This course covers from the basic concept of C to pointers in C. This course will act as "programming concept developer" for students. It will also act as "Backbone" for courses like OOPS, VB, Windows Programming, JAVA, OOMD.

Objectives:

The student will be able to

1. Describe the concepts of constants, variables, data types and operators.
2. Develop programs using input and output operations.
3. Write programs using different looping and branching statements.
4. Write programs based on arrays and strings handling functions.
5. Write programs using user-defined functions and structures
6. Write programs using C pointers.

Contents: Theory

Topic No.	Topic & Subtopic	Hours
1	**Introduction to** C 1.1 History of C, Basics of Algorithm and Flowchart in C, Steps for executing a C program 1.2 Character set, Trigraph character tokens, constants, variables, keywords C operators, C expressions, data types in C, Basic Input and output	02
2	**Decision making** Decision making and branching: if statement (if, if-else, else-if ladder, nested if-else), Switch case statement, break statement.	04
3	**Control loop** Concept of control looping-type of looping conditional and unconditional while, do-while and for loop statements, break and continue statement, goto statement	04

Topic No.	Topic & Subtopic	Hours
4	**Arrays** Definition and initialization of Arrays Syntax and types of array. Examples of array	04
5	**Functions** Definition of function, Types of Function, Syntax of Function, categories of Function.	02
	Total	**16**

Laboratory Work:

SN	List of practicals	Hours
1	Implementation and concepts of Turbo C Editor	04
	Write a C program	
2	To find given days to month and day.	02
3	To find given year is leap year or not.	02
4	To find greatest and smallest of 3 numbers using branching statement.	04
5	To find whether given no. is 1. odd 2. even 3. Positive 4. Negative 5. Prime using menu driven with switch -case-default.	04
6	To display all odd numbers from 1-50 nos. using while loop.	02
7	To perform addition of 100 to 1 numbers using do-while loop.	02
8	To display 1 to 10 numbers their square and cube in tabular form using for loop	02
9	To find smallest / largest number from array elements.	04
10	To enter elements for two 3X3 matrix and display them in matrix form and perform addition of 2 matrices.	02
11	To calculate area of circle using function.	02
12	To calculate factorial of any given number using recursion.	02
	Total	**32**

Suggested Instructional Strategies:

Lecture Method, Use of teaching aids, Demonstration.

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1	Balgurusamy	Programming in 'C'	Tata Mc-Graw Hill
2	Vasant Kanetkar	Let's 'C'	BPB
3	Herbert Shildt	Complete reference C	Tata Mc-Graw Hill

Websites:

1. http: //cplus. about. com/od/beqinnerctutoriali/a/blctut. htm
2. http: //computer. howstuffworks. com/c. htm
3. Objective questions: http: //www. indiastudycenter. com/studyquides/sc/obitest/default. asp

Programme : Diploma Programme in CE / ME / PS / EL / AE / DD / ID
Course : Life Skills **Course code :** 1308
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
01	--	02	03	--	Max.	--	--	--	--	--	50	50
					Min.	--	--	--	--	--	20	--

Rationale:

In today's competitive world of globalization the responsibility of diploma holder is not unique. He has to perform individual skill, Social skill and as a effective member of team in the organisation.

This course will develop the student as an effective member of the team in the organisation. 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 skill will enhance his capabilities in the field of searching, assimilating information, handling people effectively, managing the given task and solving challenging problems.

Objectives:

The student will be able to

1. Use effective presentation technique.
2. Work in team.
3. Understand sources of conflict and to resolve conflict by appropriate method.
2. Apply problem solving skills for a given situation.
3. Enhance leadership traits.
4. Apply task management.
5. Face interview without fear.

Contents: Theory

Topic No.	Topic & Subtopic	Hours
1	**Presentation Skills** 1.1 Body Language-Posture, Gestures, Eye contact and facial expression. 1.2 Voice and language - Intensity, Pitch, Speed, Pause, Pronunciation, language, fluency. 1.3 Use of aids- OHP, LCD projector.	03
2	**SWOT analysis** 2.1 Concept. 2.2 Use of SWOT analysis.	01
3	**Interpersonal relation** 3.1 Sources of conflict. 3.2 Resolution of conflict 3.3 Ways to enhance interpersonal Relation.	03
4	**Team Work** 4.1 Stages of team development.	03

Topic No.	Topic & Subtopic	Hours
	4.2 Understand and work within dynamics of a group. 4.3 Ingredients of effective teams. 4.4 Leadership in teams. Handling frustration in-group.	
5	**Problem Solving** 5.1 Steps in problem solving. 5.2 Problem Solving Techniques- Trial & error, Brainstorming.	02
6	**Group Discussion** 6.1 Introduction of group discussion 6.2 Way to carried out the group discussion 6.3 Parameters – Contact, Body Language, Analytical and logical thinking, Decision making. .	02
7	**Interview Technique & Group Discussion** 7.1 Introduction 7.2 Tips for handling common question. 7.3 Introduction to group discussion 7.4 Way to carry out group discussion 7.5 Parameter – Contact, body language, analytical & logical thinking, decision making	02
	Total	**16**

Laboratory Work:

SN	List of Assignments	Hours
1	Deliver a seminar for 10 minutes using presentation aids on the social topic given by your teacher.	02
2	SWOT analysis for yourself with respect to your strength & weakness, opportunities & threats etc.	04
3	SWOT analysis for department/ institute.	04
4	Arrange an exhibition, displaying flow-charts, posters, paper cutting, photographs on the topic given by your teacher.	04
5	Case study for problem solving in an organisation.	04
6	Form a group of 5-10 students and do work for social cause i. e. tree plantation, blood donation, environment protection.	02
7	Refer the interview of any person selected in an organisation from magazine/ newspaper & make a report on it.	04
8	Do the task assigned to you by teachers and write a report considering various steps in managing/ completing the task.	04
9	Discuss a topic in group & prepare minutes of discussion, write through description of the topic discussed.	04
	Total	**32**

Suggested Instructional Strategies:

Lecture method, Use of teaching aids, Case Studies, Group discussions & Assignments

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1	Stephen P, Robbin	Organisational behavior	Prentice Hall of India Pvt. Ltd
2	E. H. Mc Grath, S. J.	Basic Managerial skills for All	Prentice Hall of India Pvt. Ltd.
3	Allen Pease	Body Language	Sudha Publications Pvt. Ltd.
4	Harding ham- A	Working in Teams.	Orient Longman
5	Steven L McShane and mary Ann Glinow	Organisational behavior	Tata McGraw Hill
6	John W. Newstrom, Keith Davis	Organisational behavior human behavior at work	Tata McGraw Hill

Web site:

1. http: // www. mindtools. com
2. http: //www. coopcomm. org/workbook. htm
3. http: //www. mapnp. org/library/grp_cnfl/grp_htm
4. http: //www. quickmba. com/strategy/swot/

LEVEL -4

APPLIED TECHNOLOGY COURSES

Programme : Diploma Programme in Civil Engineering (CE)
Course : Advanced Surveying **Course code :** 1401
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
03	--	04	07	03	Max.	80	20	100	50	--	25	175
					Min.	32	--	40	20	--	10	--

Rationale:

This is an applied technology Course which is intended to teach Students application of facts, Concepts, Principles, and procedures in surveying and Levelling. It is also intended to teach students theodolite traversing and Modern Surveying equipments. With this knowledge and skill, He will be able to choose appropriate survey and levelling methods depending on requirement to carry out survey works for various Civil engineering activities.

Objectives:

The student will be able to

1. Understand working Principles, construction, application and handling of various surveying instruments.
2. Acquaint the students with the principles and methods of different types of survey and Record the data in field book and plot the collected data.
3. Apply principles of surveying and levelling for Civil Engineering works.

Content: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Plane Table Survey** 1.1 Principles of plane table survey. Accessories required. 1.2 Setting out of plane table, Levelling, Centering and methods of orientation. 1.3 Methods of plane table surveying: Radiation, Intersection, and Traversing. 1.4 Merits and Demerits of plane table Surveying. Situations where plane table survey is used. 1.5 Use of Telescopic Alidade.	06	10
2	**Theodolite Survey** 2.1 Types of Theodolite, Vernier, Micrometer, Digital Components of Transit Theodolite and their functions. Technical terms used. Temporary adjustments of Transit Theodolite. 2.2 Measurement of Horizontal angle, method of Repetition, errors eliminated by method of repetition. 2.3 Measurement of Vertical angle. 2.4 Measurement of Deflection angle. 2.5 Measurement of magnetic bearing of a line by Theodolite.	16	26

Topic No.	Topic & Subtopic	Hours	Marks
	2.6 Prolonging a Straight line. 2.7 Sources of errors in Theodolite Surveying. 2.8 Permanent adjustment of transit Theodolite (only relationship of different axes of Theodolite.). 2.9 Traversing with Theodolite: Method of included angles, locating details, checks in closed traverse, Calculation of bearings from angles. 2.10 Traverse Computation - Latitude, Departure Consecutive Co-ordinates error of Closure, Distribution of angular error, balancing the traverse by Bowditch rule and Transit Rule, Gale's traverse table. Simple problems on above topic.		
3	**Tacheometric Survey** 3.1 Principle of Tacheometry. 3.2 Essential requirements of Tacheometer. 3.3 Use of Theodolite as a Tacheometer with staff held vertical and fixed hair method (No derivation). 3.4 Determination of tacheometric constants.	06	12
4	**Curves** 4.1 Types of curves used in road and railway alignments. Notations of simple circular curve. Designation of curve by radius and degree of curves. 4.2 Method of Setting out curve by offset from Long chord method and Rankine's method of deflection angles.	08	12
5	**Advanced Survey Equipments** 5.1. Micro Optic theodolite: Construction and use of one second Micro Optic theodolite. 5.2. Digital Theodolite**:** Construction and use of Digital theodolite. 5.3. Electronic Distance Meter (EDM): Principle of EDM, Components of EDM. And their functions, use of EDM. 5.4. Total Station: Introduction to Total station. Components and functions of total station. Determination of geographical parameters.	08	12
6	**Aerial Survey and Remote sensing** 6.1 Aerial Survey Introductions, definition, Aerial photograph. 6.2 Remote Sensing: Introduction, Electro-Magnetic Energy, Remote sensing system- Passive system, Active system. Applications: mineral, land use / Land cover, Natural Hazards and Environmental engineering system. 6.3 Introduction to GIS.	04	08
	Total	**48**	**80**

Laboratory Work:

SN	List of practicals
1	Temporary adjustments of plane table by using accessories of plane table. Locating details by method of Radiation.
2	Locating details with plane table by method of intersection. Orientation by back sighting.
3	Understanding the components of Theodolite and their functions, reading the Vernier and temporary adjustments of theodolite.
4	Measurement of Horizontal angle by method of Repetition.
5	Measurement of vertical angles by theodolite
6	Measurement of magnetic bearing of line by using transit theodolite.
7	To find the horizontal distance and R. L. using theodolite as a tacheometer
8	To find constants of a given tacheometer.
9	Measurement of deflection angle by theodolite.
10	Measurement of Horizontal and vertical angle by one second micro optic theodolite.
11	Study and use of Electronic Distance Meter(EDM).
12	Use of EDM for finding horizontal and vertical distances and elevations of points.
13	Study of Total Station and its components.
14	Finding horizontal, vertical distance and elevations of points with total station.

SN	List of Projects:
1	Plane table survey project for 5-6 sided traverse and locating details of buildings, Roads. by radiation and Intersection method, Sheet to be drawn by each student separately on full imperial drawing sheet.
2	Theodolite traverse survey for a closed traverse of 5-6 sides for a small area. Computation by Gale's traverse table. Plotting the traverse with details on full imperial drawing sheet
3	Setting out simple circular curve by Rankine's method of deflection angles for a given problem and plotting the details of curve on full imperial drawing sheet

Suggested Instructional Strategies:

Lecture method, Use of teaching aids, Demonstration, Expert lectures, Assignments.

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1	N N Basak	Surveying and Levelling	Tata Mc Graw-Hill
2	T. P. Kanetkar & S. V, Kulkarni	Surveying and Levelling Part I and II	Pune Vidhyarthi Griha Prakashan
3	Dr. B. C. Punmiya	Surveying and Levelling Vol. I and II	Laxmi Publication
4	S. K. Husain, M. S. Nagaraj	Text book of Surveying	S. Chand and company
5	S. K. Duggal	Surveying and Levelling Vol. I and II	Tata Mc Graw-Hill
6	A. M. Chandra	Plane Surveying	New Age International Publishers
7	A. M. Chandra	Higher Surveying	New Age International Publishers

Programme : Diploma Programme in Civil Engineering (CE)
Course : Computer Aided Drawing **Course code :** 1402
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
--	01	04	05	--	Max.	--	--	--	--	--	50	50
					Min.	--	--	--	--	--	20	--

Rationale:

It is the age of computer. Architect / Engineers prepares most accurate and descent presentation of plans to satisfy the clients. Use of computer software such as AutoCAD, Felix Cad, and Auto Civil enables Civil Engineers to prepare quality drawings in shortest possible time. This helps in reduction in the laborious, tedious work of draftsmanship. Working drawings are also prepared with the help of computer. In view of this computer aided drawing has been included in the present curriculum.

Objectives:

The student will be able to

1. Use different CAD commands for drawing.
2. Prepare line plans with CAD software.
3. Prepare submission drawing/working drawing for the buildings with CAD software.
4. Prepare drawings of Civil engineering structures.

Contents: Theory

Topic No.	Topic & Subtopic	Hours
1	**Basic** 1.1 Information about CAD 1.2 Uses of CAD 1.3 Information of various software's (CAD software available in the market AutoCAD, Felix Cad, Auto Civil, 3D Max; .)	02
2	**Creating Drawing** 2.1 Starting up of CAD 2.2 CAD Window, Tool bar, Drop down menu. 2.3 Opening, Saving, Making Change &Closing CAD	02
3	**Learning The CAD Commands** 3.1 WCS icon, UCS icon, 3.2 Setting Up a work area, specifying units, drawing limits, grid, Osnap, polar, ortho, LWT. 3.3 Drawing commands- line, circle, polyline, multiline, Ellipse, polygon, arc. 3.4 Modifying commands: Copy, move, offset, fillet, chamfer, trim, stretch, mirror, rotate, array, scale, hatch block. 3.5 Format commands: text style, dimension style, point, Line weight	09

Topic No.	Topic & Subtopic	Hours
	line type, line type scale. 3.6 Setting layers, layout& paper space.	
4	**Application of CAD** 4.1 line plan, Detailed Plan, elevation, section, site plan, rea statement. 4.2 Generation of 3D view, plotting & printing Commands.	04
	Total	**16**

Note: Above theoretical aspects shall be demonstrated in tutorial hours.

Suggested Instructional Strategies:

Lecture method, Use of teaching aids, Demonstration & Assignments

Laboratory Work:

A)	**Building Drawing:**
Following exercises shall be completed with CAD software and Print of all the drawings should be prepared on A3 / A4 size paper	
1	Preparation of line plan of a Public building.
2	Preparation of submission drawing of residential building: showing Plan, Elevation, Section, Schedule of openings, Site Plan and Area Statement
B)	**Civil Engineering Drawing.**
Preparation of Drawings with CAD software for the following exercises (Any Four) and Print of all the drawings should be prepared on A3 /A4 size paper.	
1	Cross Section of Retaining wall.
2	Plan and Section of K. T. Weir.
3	Section of an Earthen Dam.
4	Plan, Cross Section and Longitudinal section of a Culvert (Pipe culvert/Box Culvert).
5	Plan and section of a septic tank.
6	Cross section of a National Highway in Cutting or embankment.
7	Layout of house drainage.
8	Sectional elevation of a bridge.

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1	George Omora	AutoCAD-2006	BPB Publication
2	Autodesk	Reference Manual of AutoCAD	Autodesk Inc.
3	Felix CAD	Reference Manual of Felix cad	FelixCAD IntliCAD Inc.
4	InteliCAD	Reference Manual of Inteli CAD	Autodesk Inc.
5	Autodesk	Reference Manual of Auto Civil	Autodesk Inc.
6	Autodesk	Reference Manual of 3D-Max	Autodesk Inc.

Programme : Diploma Programme in Civil Engineering (CE)
Course : Estimating and Costing **Course code :** 1403
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
04	--	04	08	04	Max.	80	20	100	--	25	50*	175
					Min.	32	--	40	--	10	20	--

* Indicates TW to be assessed by external and internal examiners.

Rationale:

Diploma student will acquire knowledge of finding the quantity of material required for each item of Civil Works through this course. The student can prepare estimates and find costs & also able to find rates from schedule of rates, use of specification, measurement of quantities during construction and after construction for necessary payments and also prepare estimate of repairs, maintenance & should be able to interpret construction drawing.

Objectives:

The student will be able to

1. Know the methods of procedure of estimating.
2. Know the mode & units of measurement for estimating & payment.
3. Know the use of Specification in construction.
4. Know the calculation of Rate Analysis.
5. Develop skills of reading and interpreting construction drawing.

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Introduction** 1.1 Meaning of the terms: Estimating, Costing and valuation. 1.2 Purpose of Estimating and Costing 1.3 Types of Estimates: Approximate, Detailed, revised, Supplementary, annual repairs and maintenance estimate.	02	04
2	**Approximate estimate** 2.1 Use of approximate estimate. 2.2 Methods of approximate for building: plinth area Method, cubical content method, service unit Method, Typical bay method, approximate Quantity method. 2.3 Methods of approximate estimate for roads, railways, bridges, irrigation works, water supply and sanitary work.	04	04
3	**Modes of Measurement** 3.1 Fixing units of measurement for items Works. 3.2 Modes of measurement of items of work as per P. W. D. and IS-1200 3.3 Desired accuracy in taking measurements.	02	04

Topic No.	Topic & Subtopic	Hours	Marks
4	**Detailed estimates** 4.1 Uses of detailed estimate 4.2 Types of detailed estimates. Units quantity method, Total quantity method. 4.3 Data required for preparing detailed estimates, Drawing, specifications, rates, mode of Measurements. 4.4 Steps in Preparation of detailed estimates-taking out quantities, squaring-out, abstracting. 4.5 Main items of work for detailed estimates and their Units.	04	04
5	**Procedure for preparing detailed estimate** 5.1 Procedure for taking out quantities for various items of works. 5.1.1 Long wall & short wall method. 5.1.2 Center line method. 5.1.3 IS method of taking out quantities (Introduction Only) 5.1.4 Quantities for earthwork in roads, dams, canal & railway embankments: mid sectional area method, mean sectional area method, trapezoidal method, and prismoidal formula method. 5.1.5 Taking out quantities for R. C. C. structural Members such as column footing, columns. Beams & slab. 5.2 Entering the quantities of items of work in standard measurement sheet. 5.3 Abstracting in standard abstract sheet. 5.4 Provisions in detailed estimates for contingencies. Work charged establishment, water charges, water Supply & sanitary works. Electrification, tools & Plants, quality control. 5.5 Check list for estimates. 5.6 Provisional sum, prime cost, day work. 5.7 Preparing bar bending schedule for R. C. C. work. 5.8 Preparing bill of materials for various items of work.	28	34
6	**Specifications** 6.1 Necessity & importance of specifications. 6.2 Points to be observed in framing specification of an item. 6.3 Types of specification: general & detailed, Standard & special. 6.4 Preparing detailed specifications of items in Civil Engineering works. 6.5 Standard specifications book.	06	08
7	**Rate Analysis** 7.1 Meaning of the term. 7.2 Necessity of rate analysis. 7.3 Factors affecting rate analysis. 7.4 Market rates for material and labour. 7.5 Requisites for preparing rate analysis. 7.6 Definitions of task work, task work for items, Factors affecting. 7.7 Vehicles for transporting construction materials and their	08	10

Topic No.	Topic & Subtopic	Hours	Marks
	capacities. Transportation charges. 7.8 Quantity of materials required for different items of works. 7.9 Methods of employing labours and making Payment. 7.10 Preparing rate analysis for items in Civil Engineering works. 7.11 District schedule of rates. (DSR).		
8	**Valuation** 8.1 Definition and necessity of valuation 8.2 Definition of cost, price and value and differences between them 8.3 Types of values - book value, scrap value salvage Value speculation value, distress value, factors Affecting value 8.4 Definition of depreciation and obsolescence, Sinking fund 8.5 Methods of calculating depreciation - straight line Method, sinking fund method, constant Percentage method, quantity survey method 8.6 Computation of capitalized value, gross income, Outgoing, net-Income, year's purchase. Types of outgoings and their percentage. 8.7 Valuation of lands and buildings factors affecting Their valuation, Book value method, replacement Value method & comparison method. 8.8 Use of valuation tables. 8.9 Differed value of land. 8.10 Fixation of rent as per P. W. D. Practice 8.11 Land acquisition act and its basic principle 8.12 Lease hold property, free hold property, types of Lease 8.13 Mortgage, Mortgage deed precautions making mortgage.	10	12
	Total	**64**	**80**

Laboratory Work:

SN	List of practicals
1	Taking out the quantities of load bearing residential building, for following items of work (two room & sanitary block with flat roof) a) Earthwork in excavation for foundation b) Bed concerting for foundation c) UCR masonry in foundation & plinth d) D. P. C. at plinth level. e) Brick masonry in super structure. f) R. C. C. for lintel, chhaja & slab. g) Plastering. h) Flooring.
2	Detailed estimate of a single storeyed residential R. C. C. building.
3	Preparing detailed estimate of W. B. M. Road.
4	Preparing detailed estimate of septic tank.
5	Study of detailed specification for one important item of work from each of the following engineering system & writing a report on it.

SN	List of practicals
	a) Building construction system. b) Irrigation engineering c) Transportation engineering d) Environmental engineering
6	Preparing rate analysis for following items of building work, (any five) a) Earthwork in excavation for building- b) U. C. R. Masonry in foundation plinth c) Brick masonry in supper structure d) 12 mm thick cement plastering e) R. C. C. Work for slab & beams. f) Flooring. g) Doors & window frames
7	Calculation of quantities of RCC (steel reinforcement) for small hall and preparing bar bending schedule.

Suggested Instructional Strategies:

Lecture method, Use of teaching aids, Group Discussion, Case studies & Assignments

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1	B. N. Dutta	Estimating & costing,	UBS Publishers & Distributors Ltd. Ansari Road, Delhi.
2	G. S. Birdie	Estimating & Costing	Dhanpat Rai & sons Delhi
3	S. C. Rangawala	Elements of Estimating & Costing	Charotar Publishers House Anand
4	B. S. Patil	Contracts and Estimates	Orient Longman Ltd. Delhi
5	Chakraborty	Estimating & costing Specification & Valuation	M. Chakraborty Calcutta.
6	- - -	District Schedule of rates	PWD, Nashik

Programme : Diploma Programme in Civil Engineering (CE)
Course : Contracts and Accounts **Course code :** 1404
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme								
Hrs / week			Credits	TH Paper Hrs.	Marks							
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
03	--	02	05	03	Max.	80	20	100	--	25	25	150
					Min.	32	--	40	--	10	10	--

Rationale:

This course is intended to learn concepts, principles and procedures of contracts and accounts. By this course the student will learn P. W. D. procedure of execution and accounting of Civil Engineering works, administrative procedure to be followed for preparing tender documents, allotment of works to contractors and supervision at time of construction.

Objectives:

The student will be able to

1. Know procedure of execution in P. W. D. and by builders contractors.
2. Understand the Administrative procedure to be followed at the time of execution of the project.
3. Know how to maintain accounts of expenditures of the project.

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Tender and Tender Documents.** 1.1 Definition of tender, classification of tenders, tender form, types of tender forms. 1.2 Invitation of tenders, Method of preparing and submitting tenders, Comparative-Statement, scrutiny of tenders, Rejection of tenders, Acceptance of tenders, work order. 1.3 Tender documents: - Tender notice, information to be given in tender notice, Drafting- tender notice. Preparation of tender documents for building, road and Irrigation works. 1.4 Corrigendum to tender notice and its necessity, unbalance tender, Ring formation.	10	18
2	**Contract** 2.1 Definition, object and requirement of valid contract Documents. 2.2 Types of contracts: - Lump sum, Item rate, percentage, cost plus percentage rate contract, labour contract, target contract, demolition contract, negotiated contract, sub contract and BOT type contract.	08	14
3	**Conditions of contract** 3.1 Earnest money, security deposit, time limit and its Importance.	10	12

Topic No.	Topic & Subtopic	Hours	Marks
	3.2 Conditions of contract- Defect liability period, liquidated damages, Escalation price, and extra items. 3.3 Arbitration, Termination of contract, Subletting of Contract. 3.4 Indian contract act.		
4	**Methods of execution of works** 4.1 PWD organisation: - structure, duties of personnel's, Fundamental principles of execution of work in PWD. 4.2 Administrative approval, Technical sanction Expenditure sanction, Budgets provision. 4.3 Methods of execution: - departmental method, nominal muster roll, piece work method, rate list method, day work method, procedure of Execution of work by contractors. 4.4 Class of contractor. 4.5 Procedure of Registration as contractor in PWD. 4.6 Procedure of execution of works by appointing contractors in private sector. 4.7 Various no-objection certificates required from local bodies such as corporation and Zilla Parishad in connection with construction.	08	18
5	**Payments of works** 5.1 Procedure of measurement of works and recording in measurement book, Measurements book. 5.2 Inspection and checking the measurements. 5.3 Method of measurement of work payment in private Sector. 5.4 Interim payment, secured advance, advance payment, petty advances. 5.5 Running Bill and final bill, Mobilization advance, bill form.	06	10
6	**Accounts** 6.1 Classification of accounts, Heads of Accounts 6.2 Importance of maintaining accounts of works and stores, Daily diary, Imprest, Indent, bin card, Work Abstract 6.3 Computerization of accounts in office and store.	06	08
	Total	**48**	**80**

Laboratory work:

SN	List of assignments
1	Collection of tender notices from news papers/website (at least five)
2	Drafting a tender notice for a) Building construction b) Highway engineering c) Irrigation engineering d) Environmental engineering
3	Collection of tender document set from PWD and writing a report on it.
4	Preparation of following tender documents as per PWD norm for building works. i) Tender notice ii) Tender agreement iii) Schedule A & Schedule B
5	Assignment on contract
6	Assignment on conditions of contract.
7	Assignment on payments of works and supplies.
8	Collection of various account forms used in PWD.
9	Visit to PWD organisation to observe procedure of execution of works and write visit report.

Suggested Instructional Strategies:

Lecture method, Use of teaching aids, Case Studies, Group discussions & Assignments

Learning resources:

Text Books:

SN	Author	Title	Publisher
1	B. N. Dutta	Estimating & Costing	UBS Publishers and distribution Ltd, Ansari, Road Delhi.
2	G. B. Birdie	Estimating & Costing	Dhanpat Rai & Sons.
3	S. C. Rangwala	Elements of Estimating and Costing	Charotar publishers house Anand
4	B. S. Patil	Contracts & Estimates	Orient Longman Ltd Delhi.

Reference Books:

SN	Author	Title	Publisher
1	Schedule of Rates (D. S. R.)	Superintendent Engineering P. W. D. Nashik Circle, Nashik	Govt. of Maharashtra
2	Standard specification book	Superintendent Engineering P. W. D. Nashik Circle, Nashik	Govt. of Maharashtra

Programme : Diploma Programme in Civil Engineering (CE)
Course : Theory of Structures **Course code :** 1405
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
04	--	02	06	03	Max.	80	20	100	--	--	25	125
					Min.	32	--	40	--	--	10	--

Rationale:

Concepts and principles involved in the design of various structures are covered in this course. The application of theoretical principles to practical field situations would help the students in understanding the concepts.

Objectives:

The student will be able to

1. Know various elements of structures.
2. Understand basic principles.
3. Analyse the given problem
4. Apply the basic principle in solving the problems.

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Principal planes & principal stresses** 1.1 Concepts of simple shear, Complementary shear, Normal stress, tangential stress and resultant stress, Definition of principal planes and stresses. Maximum shear stresses its position, stress on oblique plane of an element subjected to complex state of stresses. 1.2 Graphical method: - Use of Mohr's circle method for an element subjected to normal stresses and complex State of stresses. (No problems on Mohr's circle in theory examination.)	08	08
2	**Direct and Bending Stresses.** 2.1 Concept of direct and eccentric loads 2.2 Eccentricity about one principal axis only, stress distribution, nature of stresses. 2.3 Condition for no tension, limits of eccentricity, maximum and minimum stresses, core of section for solid rectangular & circular sections, middle third rule. 2.4 Columns, walls, pillars and chimney of uniform section subjected to lateral wind pressure. Coefficient of wind resistance. Stress distribution at base (No problems on non uniform sections)	08	10
3	**Slope and deflection** 3.1 Concept of slope and deflection.	10	12

Topic No.	Topic & Subtopic	Hours	Marks
	3.2 Slope and deflection of members subjected to pure bending moment. 3.3 Relation between slope, deflection and Radius of curvature, differential equation (no derivation) 3.4 Double integration method (Macaulay's Method) for slope and deflection, derivation of standard formulae for maximum slope and deflection for simply supported and Cantilever beams (derivations not to be asked in theory examination.) 3.5 Application of Macaulay's method to simply supported, cantilever and overhanging beam subjected to Concentrated, uniformly distributed load. (Calculations involving solutions of cubical Expressions for maximum deflection are not expected) 3.6 Propped cantilevers, Reaction of prop, simple numerical problems on cantilever & Propped cantilever-involving point Load, uniformly Distributed load.		
4	**Fixed Beams** 4.1 Concept of fixity, effect of fixity, Advantages and disadvantages of fixed beams, fixed end moments, principle of superposition. 4.2 Derivation of formula for fixed beams for calculating fixed end moments from first principle for fixed beam subjected to concentrated load at mid span, other than mid span and uniformly distributed load over entire span. 4.3 Application of standard Formulae for finding end moments and drawing Shear force and bending moment diagrams for fixed beams subjected to concentrated and uniformly distributed loads over entire span, drawing S. F. and B. M. Diagrams.(No Problems involving application of applied Moment or couple & partial UDL)	08	10
5	**Continuous Beams** 5.1 Definition, effect of continuity, practical examples, and nature of moments induced due to continuity, concept of deflected shape. 5.2 Clapayron's theorem of three moments (no derivation) application of the theorem up to three spans only. Support at same level, spans equal or unequal, moment of inertia same or different, span subjected to concentrated and uniformly distributed loads over entire span. (No problems involving application of applied moment) Drawing shear force and bending moment diagrams. The cases of fixed ends and overhangs are included in application.	08	12
6	**Moment Distribution Method** 6.1 Introduction, sign convention, carries over factor, Stiffness factor, relative stiffness, distribution factor, moment distribution theorem. Application of moment distribution method to various types of continuous beams with supports at same levels and subjected to concentrated and uniformly distributed loads over entire span (problems up to three	10	12

Topic No.	Topic & Subtopic	Hours	Marks
	spans and two unknown support moments only), shear force and bending moment diagrams (supports rigid and at same level) (No problems involving application of applied moment or couple) 6.2 Application of Moment distribution method to single bay, single storey symmetrical Portal frames, S. F. and B. M. diagrams (without sway action) 6.3 Application of moment distribution method to propped cantilever with or without overhang.		
7	**Columns** 7.1 Definition, types of end conditions for columns, classification of columns 7.2 Buckling of axially loaded compression Member, effective length, radius of gyration, slenderness ratio. 7.3 Euler's theory, assumptions, buckling loads, factor of safety, safe load, application of Euler's theory in analysis and design of solid circular or hollow circular, rectangular, I- section, T- section. 7.4 Rankine's formula, application of Rankine's formula in analysis and design of solid circular or hollow circular rectangular, I- and T Sections.	06	10
8	**Simple Frames** 8.1 Definition of frame, classification of frames-perfect, imperfect, redundant, relation between members and number of joints. Assumptions in analysis of frames. 8.2 Method of joints, method of sections and graphical method of analysing simply supported or cantilever perfect frame, nature of forces in members. (No problems on graphical method in theory examination.)	06	06
	Total	**64**	**80**

Laboratory Work:

SN	List of Exercises: (Submission of Term Work)
1	Graphical solution of six problems on principal planes and principal Stresses
2	Solving four problems on direct and bending stresses and drawing resultant stress distribution diagrams.
3	Solving six problems on Fixed beam, continuous beam, moment distribution (two each) and drawing shear force and bending moment diagrams for these problems.
4	Four problems on solution of frames by graphical method.

Suggested Instructional Strategies:

Lecture method, Group discussion, Question Answer technique, Industrial visits, expert lecturers, Assignments, Case studies,

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1	Singer and Pytel	Strength of Materials	Harper & Row
2	Ramamrutham	Theory of Structures	Dhanpat Rai publishing Co. (P) Ltd
3	Schaum's outline Series, William Nash.	Strength of Materials	McGraw Hill
4	Timo Shenko and Young	Strength of Materials	CBS Publishers & distributers
5	R. S. Biyani	Theory of Structures	Vrinda Publications
6	C. S. Reddy	Basic Structural Analysis	Tata McGraw Hill

Web references:

nptel.ac.in

Programme : Diploma Programme in Civil Engineering (CE)
Course : Design of R. C. C. Structures **Course code :** 1406
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
04	--	04	08	04	Max.	80	20	100	--	25	50*	175
					Min.	32	--	40	--	10	20	--

* Indicates TW to be assessed by external and internal examiners.

Rationale:

Reinforced Cement Concrete is used for almost all types of structures, e. g. residential buildings, public buildings, bridges etc. It is essential for Civil engineer to study the properties & behavior of RCC.

The diploma students should be aware of the basic concepts of RCC design & should be able to prepare, read & interpret structural drawings. The students should be familiar with the relevant IS codes & be aware of the standard requirements, while executing the construction work. He should also be capable of designing simple structures.

Objectives:

The student will be able to

1. Estimate various loads coming on the structures.
2. Refer the various I. S. codes for R. C. C. design.
3. Design various components of R. C. C. structure.
4. Prepare the detailed drawings of the designed structural components

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Introduction Of Reinforced Cement Concrete** 1.1 Reinforced cement concrete, Advantages and limitations of RCC, Various grades of Concrete and Steel, Methods of design - Working stress method, ultimate load method and limit state method. 1.2 I. S. Requirements-Loading on Structures as per I. S. 875, I. S. 456 code specifications regarding spacing of reinforcement, cover, max. & min. reinforcement, lapping & anchoring, effective span for beams and slabs. 1.3 Introduction to Working stress Method-Allowable stresses, Stress distribution diagram, factors of safety, modular ratio, neutral axis, balanced, under-reinforced and over-reinforced sections, design coefficients for balanced section, Moment of resistance for rectangular section only.	08	12

Topic No.	Topic & Subtopic	Hours	Marks
2	**Introduction To Limit State** 2.1 Definition, various limit states, characteristic strength, characteristic load, design values and partial safety factors. 2.2 Limit state of Collapse: Flexure Assumptions, stress-strain curve for concrete and steel, stress block parameters, neutral axis, maximum percentage of reinforcement and M. R. constants for singly reinforced balanced section. 2.3 Analysis and design of simply supported singly reinforced rectangular sections. 2.4 Analysis and design of simply supported doubly reinforced rectangular sections. 2.5 Introduction to flanged section, Width of flange, Neutral axis and moment of resistance for N.A.lie in flange only.	12	16
3	**Limit State Of Collapse: Shear And Bond** 3.1 Necessity of shear reinforcement, Nominal shear stress, design shear strength of concrete, maximum shear stress in concrete. 3.2 Minimum shear reinforcement, forms of shear reinforcement, maximum spacing of stirrups. 3.3 Design of shear reinforcement, 3.4 Concept of bond, types of bond, Check for bond stress and development length.	08	08
4	**Design Of Slab** 4.1 Design of one-way simply supported slab, check shear 4.2 Design of two way simply supported slab without torsion reinforcement at corners as per IS. 4.3 Design of cantilever slab/chajja with uniform thickness for flexure, check for development length. 4.4 Design of dog-legged stair: General information- rise, tread, live load, etc., effective span, design of stair.	12	18
5	**Limit State Of Collapse: Compression** 5.1. Assumption, Minimum Eccentricity, Short Column, Long Column, Reduction Factor, Effective Length Of Column. 5.2. Reinforcement Requirements As Per Is Provisions 5.3. Design Of Axially Loaded Short Columns With Lateral Tie And Spiral Reinforcements**.**	08	08
6	**Design Of Footing** 6.1. Types Of Footings, 6.2. Design Of Axially Loaded Isolated Square Footing With Uniform Depth For Square, Rectangular And Circular Columns 6.3. Depth Of Footing: Check For Shear And Bending Moment.	10	12

Topic No.	Topic & Subtopic	Hours	Marks
7	**Introduction Of Prestressed Concrete** 7.1. Basic Concept, Terminology: Tendon, Anchorage, Pre-Tensioning And Post-Tensioning, Bonded And Unbounded Prestressing, Full And Partial Prestressing, Axial And Eccentric Prestressing, Linear And Circular Prestressing 7.2. Need Of High Strength Concrete And Steel 7.3. Advantages And Disadvantages, Tensioning Devices, Prestressing Methods, Prestressing Systems. 7.4. Stress Distribution Diagrams. (No Numerical Problems)	06	06
	Total	**64**	**80**

Practical Work:

1. **Structural design and drawing of any one of two storied building using IS 456-2000, reference handbooks.**
   Design and drawing includes details of: -
   a) Architectural drawing (Data for structural design)
   b) Key plan at foundation level with schedule & details.
   c) Key plan at plinth level with schedule & details.
   d) Key plan at Roof level with schedule & details.
   e) Details of Lintel & Dog-legged stair case.
   Note: - **Drawing shall be prepared on A1 size drawing sheet.**
2. **Preparation of neat-labeled free hand sketches of the following.**
   a) Stress block parameters in L. S. M. for singly reinforced section.
   b) Systems of prestressing (Freyssinet system/ Magnel Blaton System/Lee Mc-call system)
   c) Reinforcement detailing for joints- beam to beam, beam to column
   d) Reinforcement detailing of slabs, beams, columns and footings based on curriculum contents.
3. **Visit to construction Site**
   Preparation of sketches, showing reinforcement details from the field observations.
4. **Interpretation of given reinforcement schedule (any two)**
   a) Slab b) Beam c) Column d) Footing

Suggested Instructional Strategies:

Lecture method, improved lecture method, Group discussion, Question Answer technique, Industrial visits, expert lecturers, Assignments, Mini Projects, Case studies,

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1.	V. L. Shah & S. R. Karve	Illustrated RCC Design	Structures Publishers.
2.	B. C. Punmia, Ashok Kumar Jain, & Arun Kumar Jain	Design of R. C. C. Structures	Laxmi Publications (P) LTd
3.	H. J. Shah	Reinforced Concrete	Charotar Pub. House.

Reference Books :

SN	Author	Title	Publisher
1.	Purushothaman P.	R. C. Struct. Elements, Behaviour, analysis & Design	TMH Pub. Co. Ltd. ,
2.	V. L. Shah & S. R. Karve	Limit State Theory & Design of R. C.	Structures Publication
3.	N. Krishna Raju & R. N. Prakash.	Reinforced Concrete Design	New Age International.

Indian Standard Code:

Code No.	Name of Code
IS 875 1987 (Part I to Part V)	Code of practice for design load
IS 456-2000	Plain and reinforced concrete -Code of practice

Web references:

nptel.ac.in

Programme : Diploma Programme in Civil Engineering (CE)
Course : Design of Steel Structures **Course code :** 1407
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
04	--	02	06	04	Max.	80	20	100	--	25	50*	175
					Min.	32	--	40	--	10	20	--

* Indicates TW to be assessed by external and internal examiners.

Rationale:

Steel is extensively used as a construction material in the construction of Civil engineering works such as high-rise buildings, industrial buildings, transmission towers, railway bridges, overhead tanks, chimney, bunkers, silos.

Construction in steel is to be supervised by Civil Engineering Technicians. For effective supervision and quality control, technicians must have good knowledge of design of steel structures.

The design of steel structures involves the planning of structure for specific purpose, proportioning and selection of members to carry loads in most economic manner and erection of structure at site. This can be achieved by proper functional planning and providing adequate strength to withstand direct and induced forces, which may act on the structure during its lifetime. The knowledge of material properties and behaviors of structural member, methods of structural analysis, determining design loads and method of design by using latest IS codes, hand books and design aids is essential.

Objectives:

The student will be able to

1. Analyse the steel structure and its members for determining the forces acting on the member.
2. Select proper material and sections from steel table.
3. Calculate design values for members.
4. Use IS 875 Part 1, 2 & 3 provisions for dead load, live load and wind load.
5. Design the tension member, compression member, beam, purlin and column bases and their connections.
6. Use of IS 800: 1984 for designing member and IS 800:2007 for introduction to Limit State Design.
7. Read and interpret the structural drawings.
8. Prepare the detailed working drawing of steel roof truss, showing sections and connections.

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Introduction to structural Steel** 1.1 Various types of rolled steel sections used, types of structural steel, I. S. code specifications, strength characteristics,	04	04

Topic No.	Topic & Subtopic	Hours	Marks
	ultimate and yield stresses for different types of steel. 1.2 Advantages and disadvantages of steel as construction material. 1.3 Use of steel table and relevant I. S. Code. 1.4 Types of loads on steel structure and their I. S. code specifications.		
2	**Riveted Connections** 2.1 Types of rivets, types of riveted joint. 2.2 Failures of riveted joint. 2.3 Strength of riveted joint and its efficiency. 2.4 Assumptions in theory of riveted joint. 2.5 Permissible stresses in rivets. 2.6 Design of riveted joint for axially loaded member.	07	08
3	**Welded connections** 3.1 Introduction 3.2 Types of welding materials. 3.3 Types of weld and their symbols. 3.4 Permissible stresses in weld. 3.5 Strength of weld. 3.6 Advantages and disadvantages of welded joint. 3.7 Design of fillet weld and butt weld subjected to axial load.	07	08
4	**Design of Tension Member** 4.1. Types of sections used 4.2. Permissible stresses in axial tension 4.3. Slenderness ratio 4.4. Gross and net cross- sectional area of tension member 4.5. Design of tension member with welded and riveted connections. 4.6. Introduction to Lug Angle and Tension splice.	08	12
5	**Design of Compression Member** 5.1. Typical cross section of compression members 5.2. Effective length of columns and angle struts 5.3. Radius of gyration, 5.4. slenderness ratio and its limits, 5.5. Permissible compressive stresses. 5.6. Design of axially loaded angle struts with welded and riveted connections. 5.7. design of axially loaded stanchion, columns- simple and built-up sections, 5.8. Introduction to lacing and battening, I. S. requirements. (No numerical problems on Lacing and Battening)	10	12
6	**Steel Roof Truss** 6.1. Types of steel roof truss & its selection criteria 6.2. Calculation of panel point load for Dead load; Live load and wind load as per I. S. 875-1987 6.3. Analysis and Design of steel roof truss (Design of support connection: not expected). 6.4. Design of Angle purlin as per I. S.	09	10

Topic No.	Topic & Subtopic	Hours	Marks
	6.5. Arrangement of members at supports.		
7	**Beams** 7.1. Different steel sections used; Simple and built-up sections 7.2. Permissible bending stresses. 7.3. Design of simple beams, check for shear and deflection only. 7.4. Design of built-up beams (Symmetrical I Section with cover plates only), check for shear and deflection only. 7.5. Riveted framed connection - beam to column and beam to beam. (No numerical problems.) 7.6. Introduction to Plate Girder: Various components and their functions. (No numerical Problems)	08	12
8	**Column Bases** 8.1. Types of column bases 8.2. design of slab base & concrete block 8.3. Introduction to gusseted base (no numerical problems on gusseted Base)	07	10
9	**Introduction to limit state of design** 9.1 Introduction, Advantages and limitations 9.2 Limit state- Definition and classification : Strength and serviceability. 9.3 Action (Loads) and load combinations. 9.4 Partial safely factors for load and material strength	04	04
	Total	**64**	**80**

Laboratory work:

Term work shall consist of sketchbook and design report of steel roof truss for an industrial building; two full imperial size sheets shall be used for drawings.

1. **Sketch Book:**
   Sketch book shall consists of any **ten** plates covering the below mentioned
   1. Important information of clauses of IS-800-1984 and IS-875 (Part-1, 2 & 3)
   2. Riveted and welded connections for axially loaded member.
   3. Typical sketches of sections of tension member, determination of net effective cross sectional area of tension member.
   4. Typical sketches of sections of compression member, determination of effective length for different end conditions.
   5. Type of trusses for different spans.
   6. Column section and slab base

2. **Design of Steel roof truss:**
   The student should draw two full imperial size sheets covering design of steel roof truss for span from 8 to 24 meters. The design shall cover calculations for the dead load, live load, wind load with design of the various elements. The drawing shall include
   a. Key plan at tie level
   b. Analysis of truss for D. L, L. L, W. L.
   c. Detailed layout of steel roof truss.
   d. Detailing of joint at ridge and any one of intermediate joints.
   e. Showing arrangement of connection at end support.

Suggested Instructional Strategies:

Lecture method, Use of teaching aids, Case Studies, Group discussions & Assignments

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1	S. K. Duggal	Design of steel structure	Tata Macgraw Hill Publication Company ltd. New Delhi
2.	S. K. Duggal	Limit state design of structure	Tata Macgraw Hill Publication Company ltd. New Delhi
3.	M. Raghupati	Design of steel structure	Tata Macgraw Hill publication Company ltd. New Delhi
4.	L. S. Negi	Design of steel structure	Tata Macgraw Hill publication Company ltd. New Delhi
5	Ramchandra	Design of steel structure	Dhanpatrai & Sons publication Company ltd. New Delhi
6	S S Bhavikatti	Limit state design of structure	Charotar Publication, Anand.

IS Codes / Handbooks:

SN	Code	Title
1	IS 800-1984	Indian Standard code of practice for use of structural steel in general building construction, BIS New Delhi.
2	IS 800-2007	Indian Standard code of practice for use of structural steel in general building construction, BIS New Delhi.
3	IS-875 Part-1, 2, & 3- 1987	Indian Standard code of practice for design loads
4	IS hand book No. 1	Properties of structural steel rolled section
5		Steel table.

Web references:

nptel.ac.in

Programme : Diploma Programme in Civil Engineering (CE)
Course : Environmental Engineering **Course code :** 1408
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme								
Hrs / week			Credits	TH Paper Hrs.	Marks							
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
04	--	02	06	03	Max.	80	20	100	25	--	--	125
					Min.	32	--	40	10	--	--	--

Rationale:

Environmental Engineering is the study of interdependence of natural agencies and surroundings like land, water, air, plant, and animal life. For the convenience and use of mankind water and air are the basic needs of every living being. Therefore maintaining supply of these basic needs in adequate quantity and desired quality is very important. A huge quantity of waste products in solid, liquid, and gaseous form are generated by living beings after the use of food, water, air If these are not disposed off in scientific and hygienic manner, the environmental balance gets disturbed which ultimately leads to health hazards, The job of Civil engineer is to conduct surveys, collect data, prepare drawing, estimate and supervise construction of water supply and drainage schemes of village/town / city for these aspects while constructing houses and buildings.

This course is intended to teach the students the facts, concepts, principles and procedures related to water supply and sewage disposal projects for a medium size town, so that they can apply the principles of supervision of construction/ execution of new medium size environmental engineering projects.

Objectives:

The student will be able to

1. Know various water demands and demands of water to village/city
2. Know standards of purity of water.
3. Understand different methods of water treatment & design, construction and
4. maintenance aspects of treatments
4. Understand methods of distribution of water.
5. The student will be able to know the methods of collection and disposal of dry refuse
5. in villages and cities,
6. He will understand significance, use and maintenance of various sanitary fittings used
6. for house drainage
7. Understand different methods of sewage treatment.
7. Understand simple design, construction and maintenance of water carriage System of sewerage.

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Introduction** 1.1. General importance of environmental engineering. 1.2. Need for protected water supply Water borne diseases, 1.3. Need for disposal of waste.	02	02
2	**Estimation of Demand of Water** 2.1. Water requirement for domestic, public and Industrial needs fire demands, losses and wastage, Rate of demand, Factors affecting rate of demand, Minimum requirements as per IS 1172. 2.2. Variation in rate of demand. 2.3. Design period for water supply scheme. 2.4. Forecasting population, methods of forecasting 2.5. Estimation of total quantity of water for a town	04	06
3	3.1. **Sources of Water** 3.1.1. Classification of sources- Surface, Subsurface Adequacy of source. 3.1.2. Intakes- Canal Intake, reservoir intake, river intake, lake intake. Factors governing location and construction of intakes. 3.2. **Quality of Water** 3.2.1. Meaning of potable water, impurities present in Water And its classification. Need for analysis of water. 3.2.2. Tests on water- Physical tests for colour, taste and odour and turbidity. Chemical tests for total solids, hardness, chlorides, dissolved gases, pH, Nitrogen and its compounds. Bacteriological tests, E Coil Index, MPN. 3.2.3. Water sampling for tests, precautions to be taken for Collection of sample. Standards for potable water as per I. S. Specifications	08	10
4	**Treatment of Water** 4.1. Screening- Types of screens, 4.2. Aeration- objects and methods of aeration, plain sedimentation, Sedimentation with coagulation, principles of coagulation, types of coagulants, Jar Test, process of coagulation, types of sedimentation tanks. 4.3. Filtration: Objects of filtration, theory of filtration, filter media, depth and grading of sand bed, classification of filters- slow sand, rapid sand filters, construction, working and design aspects, suitability, merits and demerits, loss of head and negative head, Back washing of rapid sand filters. 4.4. Disinfection: - objects of disinfection, methods of disinfection, chlorination- different forms of chlorination, points of chlorination, residual chlorine, ortho-tolodine test. 4.5. Flow diagram of water treatment plant, components of a water treatment plant.	08	10

Topic No.	Topic & Subtopic	Hours	Marks
5	**Conveyance of Water and Distribution of Water** 5.1. Types of Pipes used for conveyance of water, choice of pipe material, 5.2. Types of joints & Types of valves- their use, location and function on a pipeline. 5.3. Methods of distribution of water- Gravity, pumping, and combined system 5.4. Service reservoirs: functions and types, 5.5. Layouts of distribution of water- Dead end system, grid iron system, circular system, radial system; their suitability, advantages and disadvantages.	08	10
6	**Introduction To Sanitary Engineering** 6.1. Necessity of building sanitation. 6.2. Terms: sewage, sludge, refuse, garbage, rubbish, storm water sanitary sewage, domestic sewage. **Building Sanitation** 6.3. Terms: water pipe, rainwater pipe, Antisiphonage pipe, waste pipe, drains 6.4. Building sanitary fitting, watercloset, flushing cistern, wash basin, sinks, urinals, Traps-Nhani trap, Gully trap P, Q, S Traps, their function, use and location. 6.5. systems of plumbing: Single stack system, one pipe system, two pipe system, choice of system, 6.6. Principles governing design of building drainage, layout plan for building sanitary fittings (Drainage Plan) Minimum size of drains and their slopes, inspection and junction chambers, their necessity, location, size and shape. 6.7. Estimation of sanitary fittings for a building. 6.8. Maintenance of sanitary units. 6.9. Sanitary Plumbing, Layout, Details of water supply arrangement for residential and public building Rainwater and sewage collection systems	07	10
7	**Types of Sewerage System** 7.1. Systems of sewerage- separate system, combined system, partially separate system, comparison and their suitability. 7.2. Types of sewers- Shapes and materials used, their suitability and selection. 7.3. Design of sewers, quantity of sewage, self cleaning velocity, gradient of sewers, Size of sewers, use of tables in design of sewers. 7.4. Laying of sewers. 7.5. Testing of sewers. 7.6. Maintenance of sewers. **Sewer Appurtenances** 7.7. Man hole, component parts, location, spacing and construction Drop man holes. 7.8. Sewer inlets- street inlets.	05	08

Topic No.	Topic & Subtopic	Hours	Marks
	7.9. Flushing tanks.		
8	**Analysis of Sewage** 8.1. Characteristics of sewage. 8.2. BOD and its significance, strength of sewage. 8.3. Aerobic and Anaerobic process. **Sewage Treatment** 8.4. Objects of sewage treatment. 8.5. General layout flow diagrams of sewage treatment plant for a small town including primary and secondary treatment. 8.6. Introduction and Function of grit chamber, skimming tank, sedimentation tank, sludge digestion tank and trickling filters, Activated sludge process. 8.7. Disposal of sewage: Digestion of sludge and its disposal (Only brief knowledge) Oxidation pond: Principle, working, design and layout. Principles of septic tank, its design and working, soak pit	10	12
9	**Solid Waste And Its Disposal** 9.1. Definitions: Refuse, Rubbish, Garbage, Ashes, 9.2. Constituents of solid wastes. Sources of solid wastes, Collection of Solid Wastes. Methods of collection of solid wastes. Methods of treatment and disposal of solid waste. 9.3. Hazardous Wastes Introduction, Types of hazardous wastes. Characteristics of hazardous wastes. Treatment and disposal of hazardous wastes.	05	06
10	**Industrial Waste** 10.1. Types of industrial waste Hazardous and non hazardous waste, 10.2. Major characteristic of waste from the following industries: textile, sugar, leather, dairy paper and pulp and food. 10.3. General idea regarding disposal of waste from above industries.	03	02
11	**Rural Sanitation** 11.1. Necessity and importance, Rural sanitation- Types of Privies: Aqua privy and Bore Hole Latrine	02	02
12	**Environmental Pollution** 12.1. Air Pollution and Noise Pollution Sources, Effects and Control of Air Pollution, Sources, 12.2. Effects and Control of Noise Pollution (only brief idea) 12. 3 Global warming, Acid Rain	02	02
	Total	**64**	**80**

Laboratory Work:

SN	List of practicals
1	To determine pH of the given sample of water.
2	To determine the turbidity of the given sample of water.
3	To determine residual chlorine in a given sample of water.
4	To determine the total solids of the water sample.
5	To determine the optimum dose of coagulant in the given sample by jar test.
6	To determine the total solids of the waste water sample.
7	Design of septic tank for a public building such as hostel or hospital
8	Draw details of septic tank(plan & section) with location of soak pit.
9	Visit to residential and public buildings to study the different systems of plumbing and sanitary fittings.

Suggested Instructional Strategies:

Lecture method, Use of teaching aids, Case Studies, Group discussions & Assignments

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1	Kamala, A& Kanthrao. d. l.	Environmental Engineering	Tata MC Graw Hill-Newyork
2	Gharpure v. l.	Water supply Engineering	Engineering book publishing co. Pune
3	Gurucharan singh	Water supply and sanitary Engg. Part-I	Standard Publisher Distributors:New Delhi
4	Rangwala s. c.	Water supply and sanitary Engg.	Anand charotar-Delhi
5	Santosh Garg	Water supply and sanitary Engg.	Khanna publisher, New Delhi
6	Hussain. s. k.	Water supply and sanitary Engg.	Oxford and IBH New Delhi
7	G. S. Birdie	Water supply and sanitary Engg.	Dhanpat Rai and Sons, New-Delhi

Programme : Diploma Programme in Civil Engineering (CE)
Course : Irrigation Engineering **Course code :** 1409
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
04	--	02	06	03	Max.	80	20	100	--	--	25	125
					Min.	32	--	40	--	--	10	--

Rationale:

India is an agricultural country where majority of persons live in villages. Agricultural industry is the backbone of Indian economy. India being the tropical country, rainfall is available only for three to four months and is not uniform. To increase the yield of the farmers, assured uniform supply of water throughout the year is essential. This is possible only with enhancing the irrigation facilities in the country.

Irrigation is an age-old art. The aim of the course is to present the science and practice of irrigation engineering in a concise form comprising practically all the modern development.

The input to the course is the knowledge of survey for investigation, hydrology for calculation of yield from rainfall records and hydraulics for designing the storage, conveyance and outlet structures.

Objectives:

The student will be able to

1. Collect the data for irrigation system.
2. Calculate the yield from catchments.
3. Calculate the capacity of Canals.
4. Calculate the storage capacity of reservoirs.
5. Find out and fix the control levels of reservoirs.
6. Decide the section of Dams, Weirs and Barrages.
7. Classify the Canals and design the Canals.
8. Classify different irrigation systems.

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Introduction** 1.1 Definition and necessity of Irrigation in India 1.2 Benefits of Irrigation, possible ill effects of over Irrigation. 1.3 Methods of irrigation 1.4 Types of Irrigation projects	04	04
2	**Hydrology** 2.1 Precipitation, measurement of rainfall, rain gauges - Non-automatic and automatic rain gauge	08	08

Topic No.	Topic & Subtopic	Hours	Marks
	2.2 Average rainfall calculations - Arithmetic average method, Thiessen polygon method, Isohyetal method 2.3 Catchments - Definition, types. 2.4 Runoff - Definition, factors affecting runoff Computation of runoff by runoff coefficient, Inglis Formula, Strange's table & curves, Binnie's Percentage. 2.5 Maximum flood discharge: Definition uses, factors affecting MFD, Methods of estimation of MFD. 2.6 Yield, dependable yield and calculation of yield.		
3	**Water Requirements of Crops** 3.1 Cropping seasons and crops in Maharashtra 3.2 Definitions of terms - Crop season, crop period, base period, crop rotation, Intensity of Irrigation, command area, Gross command area, Cultivable command area, Irrigable command Area, Crop pattern. 3.3 Duty & Delta, Relation between duty & delta, factors affecting duty, Methods of improving duty. 3.4 Time factor, capacity factor. 3.5 Determination of water requirements & capacity of canal 3.6 Assessment of irrigation water.	08	10
4	**Investigation And Reservoir Planning** 4.1 Selection of site for a reservoir 4.2 Investigation for reservoir planning 4.3 Data collection for irrigation project. 4.4 Area capacity curves- Construction and uses. 4.5 Reservoir sedimentation - factors affecting silting, reservoir sediment control, evaporation from reservoir, method of reducing evaporation. 4.6 Fixing control levels of reservoir.	06	10
5	**Gravity Dams** 5.1 Classification of dams according to use, hydraulic design & material 5.2 Gravity dams - Forces acting on gravity dam, Conditions of stability, theoretical and practical profile, High & low dams. 5.3 Construction details of gravity dam, Joints, keys and water seals in gravity dams. 5.4 Galleries- Function, Types size and shape 5.5 Control of cracking in gravity dams. 5.6 Outlets in gravity dams.	08	10
6	**Earthen Dams** 6.1. Types of earthen dams, materials used 6.2. Components of earthen dam & their functions 6.3. Typical cross-section of an earthen dam 6.4. Seepage through earthen dams, methods to reduce seepage through embankment & foundation. Phreatic line & its characteristics.	08	10

Topic No.	Topic & Subtopic	Hours	Marks
	6.5. Slope protection, Downstream drainage system 6.6. Criteria for safe design of earthen dam 6.7. Causes of failure of earthen dam and condition of Stability. 6.8. Construction of earthen dam. 6.9. Outlets through earth dams.		
7	**Spillways** 7.1. Definition, purpose, components parts, types of spillways - with & without gates, ogee spillway, bar spillway Conditions favouring each type, length & flood lift required. 7.2. Energy dissipation below spillways, stilling basin. 7.3. Spillway crest gates - Radial and vertical lift gates	03	04
8	**Minor Irrigation Scheme** 8.1. Bandhara irrigation - Layout, component parts advantage and disadvantage of bandhara irrigation 8.2. Percolation Tank - Necessity, selection of site, component parts and construction 8.3. Lift Irrigation - Definition, Layout of lift Irrigation scheme, components of lift irrigation scheme 8.4. Micro Irrigation - types of micro irrigation: sprinkler and drip irrigation, component parts, layout, operation and maintenance of scheme, merits & demerits, precautions to be taken for efficient working.	06	08
9	**Diversion Headworks** 9.1. Layout of diversion headworks - component parts and their function - weir or barrage, divide wall, pocket, scouring sluices, silt excluder, silt Extractor, fish ladder. 9.2. Weirs - Functions, site selection, types - sloping weir, vertical drop weir, situation favoring its Construction, . 9.3. Barrage - Components and their functions, layout of typical barrage, situation favoring Construction of barrage, comparison between weir & barrage.	05	06
10	**Canals** 10.1 Definition, classification - based on the function and relative importance in the network of canals 10.2 Canal alignments - ridge canal, contour canal, side slope canal 10.3 Typical cross section of canals, balancing depth of canal, canal discharge, Design of cross section of canals. 10.4 Canal structures - Necessity location & function of Head regulators, cross regulators, canal falls, canal escapes, canal outlets. 10.5 Cross drainage works: definition, types. 10.6 Canal lining - Definition, materials used, advantages of providing canal lining, Types of canal lining. 10.7 Canal out-lets - location, function, requirement and types of canal outlets. 10.8 Maintenance of canals.	08	10
	Total	**64**	**80**

Laboratory Work:

Data should be collected from irrigation engineering department or irrigation project.

SN	List of practicals
1	Plotting catchment area, determination of catchment area by Planimeter.
2	Collection of information and prepare list of documents and drawings required for irrigation project.
3	Calculation of yield from given Topo sheet of a catchment area,
4	Canal capacity calculation from a given command area and cropping pattern.
5	Plotting of area capacity curve of a given contour map of irrigation project.
6	Fixation of control levels of reservoir from a given data.
7	Cross-section and Layout of drainage of earthen dam on A4 size plate.
8	Neat labeled sketch of ogee spillway with gate and energy dissipation arrangement.
9	Study of National Water Policy and Maharashtra Water Policy.
10	A report on drip irrigation and sprinkler irrigation
11	A report on visit to dam OR irrigation structures.
12	A report on water shed management.

Suggested Instructional Strategies:

Lecture method, Use of teaching aids, Case Studies, Group discussions & Assignments

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1	Punmia, B. C, Pande B. B. Lal	Irrigation and water Power Engineering	Standard Publishers & Distributors, Delhi.
2	Dahigaonkar J. G.	Text Book of Irrigation Engineering	Wheeler Publishing, Allahabad
3	Garg S. K.	Irrigation and water Power Engineering	Khanna Publishers, Delhi - 6.
4	Priyani V. B.	Irrigation Engineering	Charotar Book Stall, Anand

Programme : Diploma Programme in Civil Engineering (CE)
Course : Professional Practices **Course code :** 1410
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
--	--	04	04	--	Max.	--	--	--	--	--	50	50
					Min.	--	--	--	--	--	20	--

Rationale:

Most of the diploma holders join industries. Due to globalization and completion 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. Attitude and ability to communicate and attitude in addition to basic technological concepts.

The purpose of introducing professional practice is to provide opportunity to students to undergo activities which will enable them to develop confidence. Industrial visits, expert lectures, case study and group discussion will increase participation of students in learning process.

Objectives:

The 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.

Contents:

Topic No.	Topic & Subtopic	Hours
1	**Industrial Visit** 1.1 Industrial visits to be arranged and report of the same should be submitted by the students to from a part of the term work. - **Any TWO** a. Construction site for residential / public building b. Architect/ Structural design office /NMC office c. Visit to observe the procedure of RMC Plant	12
2	**Information search, data collection and writing a report on the topic.** (**Any Six**) 2.1 Collection of information regarding subdivision of land, list of documents required to be submitted for sanction of layout/ N. A. permission from competent authorities like municipal corporation / Nagarpalika / collection office. 2.2 Preparing proposal for sanction of plan of residential building on a piece of land, collect documents required for plan sanctioning. Including rain water harvesting data)	34

Topic No.	Topic & Subtopic	Hours
	2.3 Collection of information regarding procedure of registration of contractor in PWD/facilities given to diploma holders, documents required. 2.4 Collection of information regarding procedure of registration as consulting Engineer/Supervisor in Municipal Corporation / Nagarpalika, documents required 2.5 Collection of information for valuation of an old building and calculating market value of an old building 2.6 Collection of information regarding different software's used in Civil Engineering and detailed study of any one of them. 2.7 Market survey for pumps, pipes and peripherals required for multistorey building.	
3	**Case study (any one)** 3.1 Study of different types of cracks in the building and suggested remedial measures. 3.2 Study of leakages in structure (e. g. toilets, bathrooms, basement, water tank.) & suggestions regarding prevention of leakages. 3.3 Plumbing layout of building.	08
4	**Expert lectures** 4.1 The lectures from professionals/ industries expert to be organized (2 hrs. duration) on any 2 topics of following suggested areas or any other suitable topics. a. Pollution control b. Software for Civil Engineering. c. Rules and building bye laws / Towns planning act/ Development & control rules d. Green technology. 4.2 The brief report to be submitted on the expert lecture by each student as a part of term work.	10
	Total	**64**

Suggested Instructional Strategies:

Lecture method, Use of teaching aids, Case Studies, Group discussions & Assignments, Industrial visit, expert lectures.

Learning Resources:

Magazines: National & international, Journals: National & international:

New building construction world, Inside outside, Better interior, Architecture and design, Indian concrete journal, Civil engineering and construction review.

Programme : Diploma Programme in Civil Engineering (CE)
Course : Seminar **Course code :** 1411
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
--	--	02	02	--	Max.	--	--	--	--	--	50	50
					Min.	--	--	--	--	--	20	--

Rationale:

An engineering technician has to face number of problems / situations in his professional life and he has to convey his ideas through presentation.

The involvement of student in the seminar work will help him to plan and execute the related work of searching information from various sources, interact with others, analyze the information, document the content and present.

Objectives:

The student will be able to

1. Develop abilities to search for information.
2. Develop planning, execution skills.
3. Develop skill to communicate the problems and solutions.
4. Develop skill to prepare reports
5. Develop presentation skills.

Contents:

Activity No	Activities	Hours
1	Search from various locations and select at least three seminar titles	--
2	**Review: 1: Selection of Topic for Seminar: Discussion in class as class group**	02
3	Preparation of Seminar Diary for noting progress	--
4	Collection of data for seminar from: internet / visit / Journals / Literatures	06
5	**Review: 2**	02
6	Preparation of document: Initial Draft: prints from various soft sources / Xerox from various hard sources	04
7	**Review: 3**	02
8	Organisation of data collected (draft)	--
9	**Review: 4: Approval by Guide**	02
10	Preparation of document (Printed)	--
11	**Review: 5: Approval by Guide**	02
12	Seminar Planning	--
13	Preparation of presentation document: Use of various methods	04
14	**Review: 6**	02
15	Submission of Seminar and presentation document: Hard copy & Soft copy	06
16	Presentations of Seminar	--
	Total	**32**

Areas for selection of seminar:
Programme: Civil Engineering:

SN	Areas For Selection
1.	Green Technology
2.	Computer application in Civil Engineering
3.	New Emerging Technology in Civil Engineering
4.	Advanced materials used in Civil Engineering industries.
5.	Advanced machineries and equipment used.
6.	Repair & Maintenance of Civil Engineering Structures.
7.	Advanced treatment to structure and materials.
8.	Topics related to Civil Engineering / Structural Engineering / Rural Engineering.

Suggested Instructional Strategies:

Classroom Teaching, Industrial visit, Library Assignment, Home Assignment, Group Discussion, Case Studies.

Learning Resources:

Magazines, Journals, Papers: National & international: New building construction world, Inside outside, Better interior, Architecture and design, Indian concrete journal. Reference Books, Internet, Previous seminars, Text Books, IS Codes, Video Cassettes, Audio Cassettes, Compact Discs, Charts, Transparencies, Software, Models, Industrial visits

Guidelines for Seminar:

1. **Selection of topic for seminar:**
   a. The student shall search various resources and get the topic approved in class.
   b. Topic of seminar should not be from programme curriculum
   c. Topic of seminar should not be from the project taken by the group or by individual.
   d. Selection of topic should be finalised in consultation with teacher guide allotted for the seminar.

2. **Submission of Seminar Document:**
   a. The student shall get the seminar draft approved from Guide and complete final document.
   b. Each student shall prepare three copies of final seminar document and retain one copy with student and submit two copies to the institute stating on one copy "For Library" and on another copy as for "Civil Engineering Department".
   c. The structure of the seminar document shall be as per the following format: Certificate / Acknowledgement / index / introduction / detailed content / conclusion / references. The photos, charts, animations, certificates from supporting agencies.
   d. Modify format suitably as per requirement of the seminar.
   e. The seminar report shall be of minimum 10 pages and max. 20 pages with 1.5 line spacing. Font: Tahoma, left margin 3 cm, right margin 1.5 cm, top margin 2 cm, bottom margin 2 cm, header & footer 1.5 cm, page numbers, size of font 12 pt, paragraphs left and right justified. It should be certified by seminar guide and head of department.

3. Evaluation of Seminar:
Evaluation of seminar will consist of Progressive Assessment, Presentation

i. Progressing Assessment:

1. Progressive assessment will be based on attendance, searching of various seminar topics, selection of title, collection of data from internet, Journals, Literatures, organization of data and preparation of document.
2. The student has to get seminar document assessed from guide regularly.
3. Head of department will sign once in a month.
4. The attendance of the student shall carry 05 marks as follows
    a. Below 75 % : 00 marks
    b. 75 % and below 80 % : 02 marks
    c. 80 % and below 85 % : 03 marks
    d. 85 % and below 90 % : 04 marks
    e. 90 % and above : 05 marks

ii. Presentation of Seminar:

1. The time for presentation shall be 7 to 10 minutes per student
2. the question answer session time shall be 2 to 3 minutes per student
3. Evaluation of presentation of seminar will be carried out by a panel of at least three teaching staff from institute based on the following point
    a. Confidence and courage
    b. Technical knowledge achieved
    c. Presentation skill
    d. Use of AV aids, PPT, Models, Charts, OHP, Cutouts

iii. Marking scheme for Seminar.

Progressive assessment	Confidence and courage	Technical knowledge achieved	Presentation skill	Use of AV aids	Total
25	05	05	10	05	50

Programme : Diploma Programme in Civil Engineering (CE)
Course : Project **Course code :** 1412
Prerequisite : 100 Credits

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
--	--	04	04	--	Max.	--	--	--	--	50	50*	100
					Min.	--	--	--	--	20	20	--

* Indicates TW to be assessed by external and internal examiners.

Rationale:

An engineering technician has to face number of problems / situations in his professional life.

Knowledge of scientific way of solving the problems and increased ability to apply it to find alternative solutions for solving such problems will help a technician in his professional life.

The involvement of the student in the project work will help the student to develop this competency, combine the theoretical and practical concepts studied into useful applications, develop planning and execution skills and perform analysing and trouble shooting of their respective projects, develop skills in interacting with others, to work in team, search for obtaining the information and materials from number of sources and present the work in neatly documented report.

Objectives:

The student will be able to

1. Develop the skill to identify the problem and develop the attitude to take scientific steps to find solutions to the problems.
2. Develop skill to communicate the problems and solutions.
3. Develop abilities to work in team and act as leader of project
4. Develop planning, execution skills.
5. Develop analyzing and trouble shooting abilities.
6. Develop skill to prepare reports for presentation.
7. Understand and Implement recent developments in engineering fields.

Contents:

Activity No	Activities	Hours
1	Formation of Group	02
2	Selection of Project: Individual Group discussions	02
3	Submission of synopsis: by each group	02
4	Project activity plan	02
5	Preparation of Project Content in Diary	02
6	Visits to Industries / Institutions / Market	00
7	Collection of Data / Survey / Analysis and Presentation	14
8	Design of Components and preparation of drawing: its checking	14
9	Progressive presentation of work completed should be noted in Project Diary	16
10	Presentation of initial draft: pre submission draft	06
11	Final Project Report: Printed: Submission: soft copy & Hard copy	04
	Total	**64**

Areas for selection of project:

Programme: Civil Engineering:

SN	Areas For Selection
1.	Environmental Engineering
2.	Green Technology.
3.	Irrigation Engineering
4.	Building Construction.
5.	Equipments & Machine
6.	Structural Engineering
7.	Housing project.
8.	Computer application
9.	Interior Decoration
10.	Campus Development
11.	Any other topics related to Civil Engineering

Suggested Instructional Strategies:

Classroom Teaching, Industrial visit, Library Assignment, Home Assignment, Group Discussion, Case Studies.

Learning Resources:

Magazines, Journals, Papers: National & international: New building construction world, Inside outside, Better interior, Architecture and design, Indian concrete journal. Reference Books, Internet, Previous projects, Text Books, Codes of Practices e. g. IS Codes, Video Cassettes, Audio Cassettes, Compact Discs, Charts, Transparencies, Software, Models, Industrial visits

Guidelines for Project:

A. Group Formation:

1. The department Head / Incharge should make sure that the project groups are formed within **one week** of the beginning of academic term and assign a faculty as project guide.
2. The students may be asked to work individually or in groups of five students. The group size may be varied in accordance with the effective compliance of project work.
3. The group can decide the leader and distribute work and prepare the group management structure.

B. Finalization of Project Title:

1. The students are expected to take up a project with the guidance of a Project Guide from the institute / Industry Expert / Sponsored by industry, Institute, society, self.
2. The project shall be as far as possible industrial project useful to society.
3. The students can seek help from TPO / HOD / Guide.
4. The group of students / Project guide / authority shall see the viability / feasibility of project over the duration available with the students and capabilities and setup available.

C. Note:

1. The group / student shall prepare Project Diary with Name of Project, Name of Students in group, their attendance, and daily progress and get assessed from guide from time to time during project hours.
2. Each student shall maintain individual progressive assessment sheet and get assessed from guide from time to time during project hours.
3. The title of the project should be finalized within **two weeks** after the group formation and a synopsis of the project should be submitted to the HOD & guide.
4. The format of the synopsis shall be as follows: The synopsis should include project title, aim, and block diagram, list of components required and working.
5. Head of department will sign once in a month.
6. Modify format suitably as per requirement of the project.

D. Project Execution:

1. Guide shall monitor the work and help the students from time to time.
2. The progress shall be presented before the guide every week during project hours. The group shall take the signature of guide on Project Diary and Individual Progressive Assessment Sheet.
3. The students shall design parts, prepare their drawing showing all details, and manufacture within the institute / sponsoring industry / workshop in local areas.
4. The guide should maintain a record of progressive / continuous assessment of project work and observe the progress of each group member on weekly basis.
5. The same shall be kept ready for submission to the external examiner before the final examination.

E. Evaluation of Project:

1. The evaluation of individual progress shall be followed as per the chart given.
2. External examiner and guide shall jointly evaluate the project.
3. The project can be evaluated on site if it is difficult to bring or demonstrate the trials in the institute
4. The attendance of the student shall carry 05 marks as follows
    i. Below 75 % : 00 marks
    ii. 75 % and below 80 % : 02 marks
    iii. 80 % and below 85 % : 03 marks
    iv. 85 % and below 90 % : 04 marks
    v. 90 % and above : 05 marks

F. Project Report:

1. The student shall get the initial draft copy of the project approved from the Project Guide.
2. Structure: It shall be as follows
    - First page, Institute Certificate, acknowledgment, Certificate from industry, Index, Introduction, objectives of the project, scope of the project, methodology used, Design Drawing of the part and assembly, Costing, Advantages Disadvantages, Bibliography / sources of data collected / Industries visited / Experts interviewed.
    - Various designed part and assembly drawings, photographs, charts, statistical data, result data and conclusions.
    - Future developments possible.
    - CD of video clips / photos / Power Point presentation / expert's comments
3. Each group has to submit one copy of project report to the library and one copy to the department apart from the individual copy.
4. The project report will be of 40 to 50 pages with 1.5 line spacing. Font: Tahoma, left margin 2 cm, right margin 1.5 cm, top margin 2 cm, bottom margin 2 cm, header & footer 1.5 cm, page numbers, size of font 12 pt, paragraphs left and right justified.
5. Each student from group shall have one copy with individual certificate only.
6. The project report and progressive assessment sheets are to be submitted before the end of term declared in the Academic Calendar of the institute.

LEVEL -5

DIVERSIFIED COURSES

Programme : Diploma Programme in Civil Engineering (CE)
Course : Building Maintenance **Course code :** 1501
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme								
Hrs / week			Credits	TH Paper Hrs.	Marks							
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
--	--	04	04	--	Max.	--	--	--	--	50	50	100
					Min.	--	--	--	--	20	20	--

Rationale:

Maintenance of building is an inevitable process because deterioration of building due to natural and artificial forces. Maintenance of building is essential not only to extend life of building but for proper functioning of building through entire life of building.

Objectives:

The student will be able to

1. Understand principles of maintenance management.
2. Investigate and diagnose defects in building.
3. Carryout repair and maintenance of buildings.

Contents:

Laboratory Work:

Students should prepare a report based on following assignments and visits.

SN	List of assignments
1.	Carry out investigation defects in existing building.
2.	Assignment on preventive maintenance of buildings.
3.	Visit to observe repair of R. C. C. elements.
4.	Repair flooring of building.
5.	Visit to observe repair of building joints.
6.	Diagnosis of cracks in building
7.	Finding approximate strength of structural members in a existing building
8.	Visit to site to observe repair of cracks in building.
9.	Collect information about materials used for repair and Maintenance.
10.	Site visit to observe repair of waterproofing /damp roofing.
11.	Determine load carrying capacity of slab, beam, column by using rebound hammer.
12.	Case study of old monuments /building regarding defects in building and deciding suitable method of retrofitting.

Suggested Instructional Strategies:

Lecture method, Use of teaching aids, Group discussion, Industrial visits, Assignments, Case studies.

Learning Resources:

Reference Books:

SN	Author	Tittles	Publications
1	P. S. Gahlot, Sanjay Sharma	Building Repair and Maintenance Management	CBS
2	A. C. Pachdhari	Maintenance of Buildings	New Age International
3	Patil Suhas	Plumbing Engineering	--

Programme : Diploma Programme in Civil Engineering (CE)
Course : Advanced Construction Techniques **Course code :** 1502
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
--	--	04	04	--	Max.	--	--	--	--	50	50	100
					Min.	--	--	--	--	20	20	--

Rationale:

Good infrastructure supports national development economically, Advanced construction techniques deals to develop good infrastructure system related to road, railways & airports, It enables quality construction with economy & durability. It is also useful for development along with employment, area.

Objectives:

The student will be able to

1. Know advanced construction techniques
2. Select proper construction technique
3. Key resources of construction technique

Contents:

Laboratory Work:

Students should prepare a report based on following assignments and visits.

SN	List of assignments
1.	Collection of Specifications/properties of at least five advanced materials of construction.
2.	Layout of footing formwork.
3.	Layout of column formwork.
4	Layout of beam & slab formwork.
5.	Design of staircase formwork.
6	Study of thermal power station to observe constructional features.
7.	Visit to a fly over bridge/railway over bridge.
8.	Study of rehabilitation methods for an old structure.
9.	Visit to a retaining structure.
10	Visit to industrial building to observe constructional features.
11	Preparing detailed account of type, numbers and drawing of steel form work required for a two storied frame structured residential building.
12	Finding effect of size of fibers and aspect ratio (l/d ratio) of steel fibers on strength of steel fiber reinforced concrete.

Suggested Instructional Strategies:

Lecture method, Use of teaching aids, Group discussion, Industrial visits, Assignments, Case study.

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1	Mantri	Practical Building construction & its Management	Mantri institute of Development & Research, Mantri house, F. C. Road, Pune-411004
2	Jack Bowyer	Building Technology-Vol-I & Vol-II	(The Butterworth group)
3	Richard Patrick Maher	Introduction to Construction operations	OPERATIONS-WILEY- INTERNATIONAL PUBLICATION
4	S. Seetharaman	Construction Engineering & Management	Umesh Publications, 5-B, Nath Market, Navi sarak, Delhi-110006
5	Ponnuswamy	Bridge Engineering	Tata McGraw Hill co. Delhi
6	Roy Piltcher	Professional Construction Management	Tata McGraw Hill co. Delhi
7	S. W. Nunnally	Construction methods & Management	Prentice Hall Publication

Programme : Diploma Programme in Civil Engineering (CE)
Course : Building Supervision **Course code :** 1503
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
--	--	04	04	--	Max.	--	--	--	--	50	50	100
					Min.	--	--	--	--	20	20	--

Rationale:

Supervision is a personal art of an Engineer. Through his art, dialogue, manage and Supervise with different types of labour, development of skills of handling & management of material & equipment on site by studying this course. Also same time he has to supervise the different construction activities of field with the skills & solution.

Objectives:

The student will be able to

1. Supervise all items of building work.
2. Manage the problem of labour, material & equipment with the skills.
3. Manage the construction work technically & best quality of Competencies to be developed.
4. Develop supervision competency in building works.
5. Supervise multi-storey building project.

Contents:

Laboratory Work:

SN	List of assignments (Any Twelve)
1	Managements of materials, labours and finance for a small residential building.
2	Preparation of job layout for public building. (A3 size paper)
3	List of construction equipments & their application.
4	List of various safety measures adopted in building works.
5	Report on supervisory skills of building works.
6	List of supervisory points for brick and stone masonry works.
7	List of supervisory points for construction of R. C. C. Columns and beams.
8	List of supervisory points for construction of RCC dog- legged staircase
9	Report on visit to multi-storeyed building to observe constructional aspects.
10	Report on water proofing & chemical compounds used for slab.
11	Preparing detailed list of plumbing materials required for small residential building.
12	Preparing detailed check list of activities for concreting of a RCC slab.
13	Visit to multi-storey building to study erection process of lift.
14	Visit to study rain water harvesting in multi-storey building.
15	Visit to study green building concept applicable to residential building.

Suggested Instructional Strategies:

Lecture method, Use of teaching aids, Industrial visits, Case study.

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1	Mantri Constructions	Practical Building Construction & its Management	Mantri institute of Development & Research, Mantri house, F. C. Road, Pune- 411 004
2	Jack Bowyer	Building Technology – Vol-I & Vol-II	(The Butter worth group)
3	Richard Patrick Maher	Introduction to construction	operations wiley- International Publication
4	S. Seetharaman	Construction Engineering & Management	Umesh publication. 5-B, Nath Market Navi sarak Delhi-110006

Programme : Diploma Programme in Civil Engineering (CE)
Course : Construction Equipments **Course code :** 1504
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
03	--	02	05	03	Max.	80	20	100	--	--	50	150
					Min.	32	--	40	--	--	20	--

Rationale:

This is a diversified technology course, which is intended to teach the students working, types of construction equipments required for different types of construction processes**.**

Objectives:

The student will be able to

1. Know different types of construction equipments.
2. Understand working of various construction equipments.
3. Select a particular type of equipment for the construction process.

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Introduction** 1.1 Necessity of construction equipments 1.2 Advantages and disadvantages of construction equipment 1.3 Selection of construction equipment 1.4 Planning of construction equipment.	04	08
2	**Excavation and Hauling Equipment** 2.1 Introduction, types of excavation equipments. 2.2 Power shovels Basic parts and operation of shovel Selecting the type and size of power shovel Optimum depth of cut, Output of power shovels, Factors affecting output 2.3 Draglines Types of draglines, Basic parts and operation of dragline, Optimum depth of cut, Factors affecting output 2.4 Clamshells General information, Clamshell buckets 2.5 Hoes General Basic parts and working Working ranges of hoes 2.6 Trenching machines - types, Selection of suitable equipment for trenching 2.7 Scrapers Types of scrapers and working of scraper,	10	16

Topic No.	Topic & Subtopic	Hours	Marks
	Cycle time for a scraper. 2.8 Tractor - types and factors affecting selection, crawler & wheeled tractors. 2.9 Bulldozers - crawler mounted & wheel mounted bulldozers, Output of bulldozers. 2.10 Trucks and wagons, dumpers, their capacity		
3	**Hoisting Equipments** 3.1 Introduction 3.2 Hoisting equipment – Pulleys, Jacks 3.3 Chain hoist – types, Hoist winches, fork trucks 3.4 Cranes – types, Derrick crane, mobile crane, whirled crane, tower crane, hydraulic crane, gantry crane, Safety in crane operation	06	06
4	**Conveying Equipments** 4.1 Introduction 4.2 Conveyer belt – types & uses. 4.3 Cable way, ropeway	06	06
5	**Compacting Equipments** 5.1 Necessity of soil compaction 5.2 Equipment for soil compaction, Roller-Sheep foot rollers vibration rollers, pneumatic rollers, vibrating plate/shoes	04	10
6	**Concreting Equipments** 6.1 Concrete mixers- Types, working and selection under different conditions. 6.2 Vibration- Types, working and selection under different conditions. 6.3 Concrete pumps 6.4 Equipments for Tremix concreting 6.5 Portable concrete batching plants.	06	12
7	**Crushers** 7.1 Necessity of crushers 7.2 Types, capacities and working of Jaw, Gyratory, Hammer mills, Roll crushers 7.3 Necessity and types of screens. 7.4 Necessity and types of washers.	04	10
8	**Tunnelling equipments** Drill bits, Drifters, Rotary percussion drill, Jumbo drill, Blast hole drill, diamond drill, Fusion, piercing, Factors affecting selection of drilling methods and drilling patterns.	08	12
	Total	**48**	**80**

Laboratory Work:

1. A report on important construction equipment used in Civil Engineering works.
2. A report on necessity & selection of construction equipment.
3. A report on excavation equipment
4. Study of hauling equipment and matching of equipment.
5. A report on hoisting equipment
6. Study of every types of cranes
7. A report on conveying equipment.
8. Study of soil compacting equipment.
9. Study of concreting equipment and concreting techniques.
10. A report on tunneling equipment and methods.
11. A report on visit to stone crusher plant
12. A report on visit to Ready Mix Concrete plant.

Suggested Instructional Strategies:

Lecture method, Use of teaching aids, Industrial visits, Case study.

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1	By R. L. Peurifoy	Construction planning and equipment	McGraw Hill Publication
2	By Dr. Mahaesh Varma	Construction equipment its planning and application	Metropolitant book Company
3	V. N. Vazirani and S. P. Chandola	Transportation Engg. Volume - I	Khanna Publisher

Programme : Diploma Programme in Civil Engineering (CE)
Course : Plumbing Services **Course code :** 1505
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
03	--	02	05	03	Max.	80	20	100	--	--	50	150
					Min.	32	--	40	--	--	20	--

Rationale:

A properly structured course in plumbing is not available in India. Plumbing, though crucial, has so far remained as neglected course. As a good plumbing enhances life of building, there is a great importance to the well trained plumbing professionals in the building industry.

As the buildings are becoming more complex and more and more modern plumbing materials and systems are available in India, it is necessary to include the same in the Civil Engineering curriculum.

Indian Plumbing Association (IPA) had adopted, reviewed and revised the Uniform Plumbing Code of International Association of Plumbing and Mechanical Officials to suit Indian practices, customs and laws. The code is published as 'Uniform Plumbing Code – India' (UPC-I).

Students who opt for code based education and training in plumbing will have better job opportunities and improved income. The formal education in plumbing will improve the plumbing system design and installation standards, thereby, ensuring health and safety of people and structures.

Objectives:

The student will be able to

1. Read and interpret plumbing drawings. .
2. Select proper plumbing materials and systems.
3. Supervise code based plumbing installations.
4. Understand methods to conserve water and energy.
5. Coordinate Plumbing Works with architects & structural Engineers
6. Follow safety at site.
7. Follow dos and don'ts in plumbing.
8. Inspect the plumbing system
9. Correct the plumbing system

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Introduction to Plumbing, Architectural and Structural Coordination planning** 1.1 Definition, Architectural Planning for W. C. Bath. & Toilets strudural Planning for vent shafes**.** sewers required, damage to drainage system, improper location, workmanship, prohibited fittings and practices, engineered systems, water	06	08

Topic No.	Topic & Subtopic	Hours	Marks
	conservation, protection of pipes and structures, waterproofing, rat proofing.		
2	**Plumbing Terminology** Definitions, use/purpose of the following. 2.1 Plumbing Fixtures: accessible/readily accessible, aerated 2.2 fittings, AHJ, bathroom group, carrier, flood level rim, floor sink, flush meter valve, flush tanks, lavatories, macerating toilet, plumbing appliances, plumber. 2.3 Traps, indirect waste, vent: blow off, developed length, dirty arm, FOG, indirect waste, receptors, slip joints, trap, and vent. 2.4 Drainage: adapter fitting, adjusted rood area, AAV, air break, air gap, area drain, base, bell and spigot joint, building drain, branch, DFU, grease interceptor, joints, roof drain, smoke test, stack. 2.5 Water supply: angle valve, anti-scald valve, backflow, bypass, check valve, cross connection, ferrule, gate valve, gray water, joints, PRV. hot water line system.	10	16
3	**Plumbing Fixtures and Fixture Fittings** 3.1 Difference between plumbing fixtures, fittings and appliances, water conserving fixtures, water closets, toilets urinals, flushing devices, lavatories, bath/shower, kitchen sinks, water coolers, drinking fountain, clothes washer, mop sink, overflows, strainers, prohibited fixtures, installation standards, strainers, floor drains, floor slopes, location of valves, and hot water temperature, installation standard dimensions in plan and elevation.	08	12
4	**Traps, Interceptors, Indirect Waste and Vents** 4.1 Traps required, trap arms, developed length, trap seals, venting to traps, trap primers, prohibited traps, building traps. 4.2 Two forms of discharge for indirect waste piping, nature of contents or systems, proper methods to install indirect waste piping, air gap and air break, sink traps, dish washers, drinking fountains, waste receptors, sterile equipment, appliances, condensers, point of discharge, venting. 4.3 Vent requirement, purpose of venting, trap seal protection, materials, vent connections, flood rim level, termination, vents tacks, water curtain and hydraulic jump, cleanouts, venting of interceptors, introduction to vent sizing.	12	20
5	**Sanitary Drainage** 5.1 Preamble on single and two pipe systems, different pipe materials and jointing methods, special joints, hangers and supports, protection of pipes and structures, alternative materials, workmanship, prohibited fittings and practices, hydraulic jump, change in direction of flow, T and Y fittings, cleanouts, pipe grading, fixtures below invert level, suds	04	08

Topic No.	Topic & Subtopic	Hours	Marks
	relief, testing, building sewers, trenching, testing, sumps and pumps, introduction to dfu and sizing of horizontal and vertical pipes.		
6	**Plumbing Lay out** 6.1 Planning of water supply lines & cocks to W. C. bath & kitchen for G + 2 stuttered building 6.2 Arrangement of drainage plan for sewage System from Rendentional units to corporation main sewer line.	08	16
	Total	48	80

Practical:

SN	List of Assignments:
1	Draw sketches of installation in details of plumbing fixture and fitting in plan elevation, and section, with standard dimension and heights (minimum 4)
2	Interpretation of sample plumbing drawing for a multistoried building
3	Draw toilet layouts, plans, elevation and section of a selected case for study Give dimension based as site visit
4	Prepare layout of drain pipes & chambers for carrying sewage to septic tank & NMC sewer line for building visited in practical no 3
5	Site visit report: visit any plumbing site and submit a report on observation on plumbing system. arcitechrul and struchral provision, pipe material, work method, Reporting, safety and recommendation based on the provision of UPC -1 and ITM
6	Installation of W. C, commode, nani traps to bath/ toilet
7	Installation of drainage pipes to drain out sewage, to septic tank / NMC sewer lines
8	Rainwater harvesting of the building

Programme : Diploma Programme in Civil Engineering (CE)
Course : Architectural Practices & Interior Design **Course code :** 1506
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
03	--	02	05	03	Max.	80	20	100	--	--	50	150
					Min.	32	--	40	--	--	20	--

Rationale:

Keeping in view the fact that the civil Engineering technicians are to work under certain architectural firms and interior decorators. He should be able to draw working drawing and supervise the building works effectively. He should be able to prepare innovative and economic plans considering the functional utility as per the requirements of the customer.

He should able to prepare required interior drawings for presentation to customers.

Objectives:

The student will be able to

6. Use the basic architecture principles for working drawings.
7. Prepare working drawings of buildings.
8. Design landscape for a institutional / commercial campus.
9. Use the basic principles of interior design for drawing interior plans.
10. Prepare innovative sketch plans for presentation to customer as per requirements.
11. Design interior for a commercial buildings or flats.

Contents: Theory

Section A – Architectural Practice

Topic No.	Topic & Subtopic	Hours	Marks
1	**Architectural Design:** 1.1 Review of principles of Architecture. 1.2 Site selection, climatic conditions, sun control, orientation of building & site. 1.3 Building by laws & its applications.	02	05
2	**Building Aesthetics:** 2.1 Feeling for aesthetics and utility, composition, unity, mass composition, order, expression, proportion, scale, accentuation & rhythm, contrast, balance, pattern. 2.2 Character of Building.	02	05
3	**Design of Projects**: 3.1 A case study of residential building. 3.2 A case study of public / commercial building. 3.3 Aspect of working drawing – plan, elevation section	12	20

Topic No.	Topic & Subtopic	Hours	Marks
4	**Landscaping**: 4.1 Soft and Hard landscaping. 4.2 Basic Principle of landscaping. 4.3 Assessment of land. 4.4 Design procedure. 4.5 A case study of land scape for public/ commercial building campus.	08	10
	Total	24	40

Section – B: Interior Design

Topic No.	Topic & Subtopic	Hours	Marks
1	**Elements and principles of design**. 1.1 Elements such as form, texture, light, colour, effect of light on colour and texture, space organization of space in design, space pattern. 1.2 Importance of colour as art element. Various colour scheme.	04	05
2	**Anthropometrics Data:** 2.1 Relation of human measurement to furniture and movement and to circulation patterns.	02	05
3	**Interior Materials:** 3.1 Different interior materials, paneling, partitions, finishing materials, furniture. 3.2 False ceiling, flooring, paints. 3.3 Eco-Friendly Material	06	05
4	**Interior of Residential building:** 4.1 Use of space, circulation, standard size of furniture. 4.2 Plans and elevation of interior with furniture for living space, dining space, kitchen, bed room, guest room etc.	08	20
5	**Interior of small commercial building:** 5.1 Planning of interior for small commercial units such as offices, consulting chambers, shops etc. 5.2 Furniture details such as executive table, architectures table etc. used in commercial units.	04	05
	Total	24	40

Term Work: (Any Four)

1. Study of plan sanctioning document.
2. Design a landscape for any existing public building campus
3. Prepare interior plan for 1 BHK residential bunglow / flat.
4. Prepare interior plan of any one commercial unit such as office, bank, restaurant, shop etc.
5. Prepare a report of market survey for different materials required for interiors.

Learning Resources:
Text Books:

SN	Author	Title	Publisher
1	M. G. Shah, C. M. Kale S. Y. Patiki	Building construction	Tata McGraw Hill
2	Joseph De Chiara, Julins Panch, martin Zelnik	Time saver standard for interior design & space planning	MC Graw Hill
3	Albert O. Halse	The use of colours in interiors	MC Graw Hill
4	Bousmaha Baiche & Nicholes Walliman	Nwtert – Architects	Black Well Science

IS/International codes – National building codes.

Journals / Periodicals:
1. Inside out side
2. A + D Journal on architecture.
3. Indian Architects and builders.
4. Design & Interiors.

Software:
1. Auto CAD
2. 3 D Max.
3. 3 D Home

Programme : Diploma Programme in Civil Engineering (CE)
Course : Watershed Management **Course code :** 1507
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme								
Hrs / week			Credits	TH Paper Hrs.	Marks							
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
03	--	02	05	03	Max.	80	20	100	--	--	50	150
					Min.	32	--	40	--	--	20	--

Rationale:

The problem of scarcity of water will be a serious issue in filter. The only solution to this problem is to go for optimum utilization of natural resources though concept of sustainable development. The different techniques of soil & water conservation through the concept of watershed management are required to be highlighted.

Objectives:

The student will be able to

1. Know concept of water shed management.
2. Know design of watershed management scheme.
3. Know implementation of water management schemes.
4. Know assessment of water management Projects.

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Introduction:** 1.1 Definition of watershed, concept of watershed, definition of watershed management, need of watershed management. 1.2 Characteristics of watershed, objectives of watershed management, benefits of watershed development 1.3 Causes and effects of degradation 1.4 Integrated multidisciplinary approach for watershed, steps in watershed management. 1.5 Ill effects of urbanisation on watershed management.	06	10
2	**Soil and Water Conservation**: 2.1 Soil erosion- definition of erosion, problems of erosion, types of soil erosion. 2.2 Land classification for watershed management 2.3 Soil conservation, need of soil conservation, soil conservation technology. 2.4 Engineering measures for erosion control such as contour cultivation, contour bunding, graded bunding, bench terracing, trenching, construction of grade stabilization structure, retention of detention reservoirs, agronomical measures (names only) 2.5 Contour bunds, design of contour bunds, drainage of	14	22

Topic No.	Topic & Subtopic	Hours	Marks
	excessive water to protect contour bunds, maintenance of contour bund. 2.6 Graded bunding, design of graded bunding, alignment and construction, maintenance, advantages and limitations of graded bunding. 2.7 Bench terracing, types, design. 2.8 Grassed waterways, shape, planning, construction and vegetation, maintenance, diversion drains. 2.9 Control of gullies and their reclamation for various land use.		
3	**Water Harvesting:** 3.1 Definition, need of rainwater harvesting, advantages of rainwater harvesting, techniques of rainwater harvesting roof water harvesting and surface water harvesting (definition). 3.2 Traditional methods of rainwater harvesting in deccan plateau-cheruva, kohli tank, phad, kere, the ramtek model and bhandaras (short description with neat sketch). 3.3 Roof water harvesting- techniques as storage and ground water recharge, components- catchment, coarse mesh, gutters, conduits, first flushing, filters, storage facilities, Recharge structures pit, trench, dug well, hand pump, Recharge well, lateral shaft with borehole, percolation pitwith borehole. Types of filters 3.4 Reuse of domestic water	14	20
4	**Water Harvesting Structures:** 4.1 Types of watershed structures- such as small weir, banchara, K. T. weir, percolation tank, jalbandh, farm pond and check dam. 4.2 Details of watershed structure with neat sketch.	06	14
5	**Socio Economic Aspects:** 5.1 People's awareness, participation and response. 5.2 State and integrated approach. 5.3 Sustainable society for economical upliftment. 5.4 Economics.	06	10
6	**Maharashtra state policies for watershed management**.	02	04
Total		**48**	**80**

Laboratory Work:

1. To study Rain Water Harvesting of a building
2. Preparation of complete water shed management plan for small area identified from toposheet.
3. Report on visit to watershed management programme.

Suggested Instructional Strategies:

Lecture method, Use of teaching aids, Industrial visits, Case study.

Learning Resources:
Text Books:

SN	Author	Title	Publisher
1	V. V. Dhruvanarayana G. Sastry, U. S. Patnaik	Watershed management	Indian Council for Agricultural Research, Krishi Anusandhan Bhawan, Pusa, New Delhi.
2	V. S. Murty	Watershed management in India Wiley Estern Ltd.	Wiley Estern Ltd.
3	Directorate of water shed development	The Booklet from Directorate of water shed development- Soil & water conservation- Pune	Directorate of water shed development
4	Raj Vir Singh	Watershed planning and Management.	Yash publishing House
5	--	Field manual on watershed management	Central Research Institute For Dry Land Agriculture, Hydrabad- 500659
6	E. M. Tideman	Watershed management	Omega Scientific Publications, New Delhi
7	N. D. Mani	Watershed management	Saujanya Books, 165-E, Kamla Nagar, Delhi-110007
8	Robert J. Reimold	Watershed management: practice, policies and coordination	BOSS International US ISBN0070522995

Programme : Diploma Programme in Civil Engineering (CE)
Course : Earthquake Resistant Structures **Course code :** 1508
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme								
Hrs / week			Credits	TH Paper Hrs.	Marks							
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
03	--	02	05	03	Max.	80	20	100	--	--	50	150
					Min.	32	--	40	--	--	20	--

Rationale:

Himalayan region, Indo-Gangetic plain, Western India, Kutch & Kathiawar regions are geologically unstable parts of the country. A major part of the peninsular India experienced strong Earthquakes. Therefore the design of earthquake resistant structures taking into account seismic data from studies of these Indian Earthquakes has become essential particularly in view of the intense construction activity all over the country. To serve this purpose, the course "Earthquake Resistant Structures" is being introduced.

Objectives:

At the end of this course student will be able to

1. Understand causes of Earthquake and principles of seismic waves.
2. Understand the factors affecting damage to the Building.
3. Design Earthquake resistant non-engineered structure.
4. Use Ductile detailing for structures.
5. Retrofit the damaged/old structures.

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Terminology** 1.1 Focus, Epicenter, Focal depth, foreshocks, aftershocks, magnitude & intensity of Earthquake. Seismic waves, Body waves, P waves, S waves. 1.2 Natural period, fundamental natural period, nodal natural period, response spectrum, seismic mass, seismic weight, structural response factor, time history analysis, earthquake zones, zone map, zero period acceleration. 1.3 Terminology for EQ - Building—Base, base dimensions, centre of mass, centre of stiffness, design eccentricity, design seismic base shear (Vb), diaphragm, dual system, height of floor, height of structure, joint, lateral force resisting element, moment resisting frame, number of storeys (n), principal axes, P-Δ effect, shear wall, soft storey, static eccentricity, storey drift, storey shear, weak storey.	05	08

Topic No.	Topic & Subtopic	Hours	Marks
2	**Causes, Measurement And Effects Of Earthquake** 2.1 Formation of earth & its cores. Formation, types & movement of tectonic plates, Elastic rebound theory, Types of earthquake & Faults. 2.2 Measurement of earthquake shaking & its working principle, Richter scale, Intensity, Modified Mercalli Intensity (MMI) scale, MKS scale, isoseismals, Accelerogram & its significance 2.3 Ground shaking, Ground failure, Tsunami and fire	05	10
3	**General Planning & Design Aspects** 3.1 Plan of Building- symmetry, regularity, separation of blocks, simplicity, enclosed area, separate building for different functions, soft storey effect 3.2 Choice of site- Stability of slopes, loose sand 3.3 Requirement of structural design and safety	05	10
4	**Damage And Collapse Of R. C. C. Building** 4.1. Sliding of roof off support, falling of infill walls, crushing of column ends, short column effect, diagonal cracking of column beam joint, pulling out of reinforcing bars, foundation sinking and tilting 4.2. Care in concrete construction- measuring materials, mixing materials, formwork, placing of reinforcement, casting and compacting concrete, curing of concrete, construction joints	06	10
5	**Ductile Detailing** 5.1. Sketches with reinforcement details of columns, Beams & Beam- Column connection showing longitudinal steel, splicing of steel, transverse steel, stirrups 5.2. Requirements of IS 13920 – 1993	06	08
6	**Brick And Stone Masonry Building** 6.1 Introduction 6.2 Typical damage and failure of brick masonry, causes of damages in brick masonry 6.3 General construction aspect of brick masonry: mortar, wall enclosure, openings in walls, masonry bond, horizontal bands, section of bands, dowels at corners and junctions, vertical reinforcement in walls 6.4 Typical damage and failure of stone masonry, causes of damages in stone masonry	05	10
7	**Earthquake Analysis Of R. C. Building** 7.1 Introduction 7.2 Concept of seismic design philosophy, Introduction of various seismic analysis Methods 7.3 Determination of design base shear using code based equivalent static lateral force method, distribution of design base shear	04	06

Topic No.	Topic & Subtopic	Hours	Marks
8	**Evaluation Of Earthquake Resistance Of Buildings** 8.1 Evaluation steps of earthquake resistance of New building, evaluation of existing building. 8.2 Repairs, Rehabilitation, retrofitting 8.3 Earthquake resistant building codal provisions.	06	10
9	**Lesson from previous earthquakes** 9.1 Prominent past earthquake in India: Koyna, Latur, Jabalpur, Bhuj etc. 9.2 Post earthquake handling of building, Lifelines, Roads and Bridges 9.3 Guidelines for Earthquake preparedness: 9.4 Individual, Home and community planning	06	08
	Total	**48**	**80**

Laboratory Work:

Term Work:

Term work shall consist of following:

1. Four plates on ductile detailing.
2. Six plates on Retrofitting of structures.
3. Study of IS 13828 (1993) Indian standard guidelines for improving earthquake resistance of low- strength masonry building.
4. Write & Study recent development and techniques of earthquake resistant structure and repairs of earthquake affected non-engineered buildings
5. Write a report of visit given at the seismological center

Suggested Instructional Strategies:

Lecture method, Group discussion, Question Answer technique, Industrial visits, expert lecturers, Assignments, Case studies,

Learning Resources:

Text Books:

SN	Author	Title	Publisher
8.	Pankaj Agarwal & Manish Shrikhande	Earthquake Resistant Design of Structures	Prentice-Hall of India
9.	S. K. Duggal	Earthquake Resistant Design of Structures	Oxford University Press
10.	Jai Krishna, A. R. Chandrashekharan and B. Chandra	Elements of Earthquake Engineering	South Asian (Publisher) Pvt Ltd

Indian Standard Code:

Code No.	Name of Code
IS 13920: 1993	Ductile detailing of reinforced concrete structures subjected to seismic forces – code of practice
IS 1893: 2002 (Part I)	Criteria for earthquake resistant design of structures

Web references:

www.nicee.org

Programme : Diploma Programme in Civil Engineering (CE)
Course : Prestressed and Precast concrete **Course code :** 1509
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme								
Hrs / week			Credits	TH Paper Hrs.	Marks							
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
03	--	02	05	03	Max.	80	20	100	--	--	50	150
					Min.	32	--	40	--	--	20	--

Rationale:

As various Civil Engineering Structures are constructed using prestressed concrete technique e. g. bridges, pre-cast panels, Electric poles, Railway sleepers, a civil engineer is supposed to know the principles, techniques and design procedures of prestressed concrete. So this course is intended to learn core facts, concepts, principles & procedure of designing the simple prestressed concrete structures by using standard design methods & codes.

Objectives:

The student will be able to

1. Understand difference between RCC & Prestressed concrete.
2. Understand the principles used in construction of Prestressed concrete structures.
3. Design the simple Prestressed beam.
4. Understand the design principals of other simple prestressed concrete structures.

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Basic Concepts in pre-stressing** 1.1 Advantages of prestressed concrete over RCC, definition & types of prestressing 1.2 Terminology – Tendon, Anchorage, pre-tensioning, post-tensioning, bonded & non-bonded prestressed concrete. Full prestressing, limited or partial pre-stressing, moderate pre-stressing, axial pre-stressing, eccentric prestressing, concordant pre-stressing, non distortional pre-stressing, uni, bi & tri-axial pre-stressing, circular prestressing, transfer, supplementary or untensioned reinforcement, transmission length, Cracking load, Creep & shrinkage in concrete, relaxation in steel, cap-cable, Degree of prestressing, debonding. 1.3 Applications of prestressed concrete.	05	08
2	**Materials for prestressed concrete** 2.1 High strength concrete mixes 2.2 Strength requirements 2.3 Permissible stresses in concrete	04	10

Topic No.	Topic & Subtopic	Hours	Marks
	2.4 Shrinkage & creep in concrete 2.5 Types of High tensile steel, Strength requirements & permissible stresses 2.6 Relaxation of stress in steel		
3	**Prestressing system** 3.1 Introduction 3.2 Tensioning devices. 3.3 Pretensioning system, Hoyer's method 3.4 Post tensioning system – Freyssinet, Gifford Udall, Mangel – Blaton & Lee – Mc Call. 3.5 Application of pre & post tensioning.	06	12
4	**Analysis of prestress & bending stresses** 4.1 Basic assumptions. 4.2 Analysis of prestress (Stress diagram) 4.2.1. Concentric tendon 4.2.2. Eccentric tendon 4.3 Resultant stresses at a section. 4.4 Pressure line or thrust line & internal resisting couple, Problems 4.5 Concept of load balancing.	12	16
5	**Losses of Prestress** 5.1. Nature of losses of prestress. 5.2. Losses due to elastic deformation of concrete. 5.3. Loss due to relaxation of stress in steel. 5.4. Loss due to shrinkage of concrete. 5.5. Loss due to creep of concrete. 5.6. Loss of stress due to friction. 5.7. Loss due to anchorage slip. 5.8. Total losses allowed for in design. 5.9. Problems on above.	12	16
6	6.1. Advantages & disadvantages of precast framed structure. 6.2. Quality control, cladding materials and their sizes & grading proportions, durability of concrete. 6.3. Different precast unit such as – Hollow and solid blocks, Hollow tile slabs, heat insulation, Precast walls, Precast slabs, Large precast slab, Pipes, Water storage tanks, Sills, Sun shades, Jallies, Shaft Slabs, I-Joist, T-Joist, Floor tiles, Paver block, Poles	05	12
7	7.1. Pre-cast pre- stressed concrete products such as poles, sleepers, pipes, water tanks, floors, (Theory only) 7.2. Modular coordination and prefabrication.	04	06
	Total	**48**	**80**

Laboratory Work:
Students should write the following assignments.

SN	List of Assignments
1	Writing the basic concepts of prestressing and various terminologies.
2	Writing the strength requirements, permissible stresses of the prestress materials.
3	Observe and draw the sketches of various pre and post tensioning systems, Also write short notes on them.
4	Problem on analysis of stresses and resultant stress at a section.
5	Problem on thrust line and internal resisting couple and concept of load balancing.
6	Various losses of prestressed and total losses allowed for in design and problems.
7	Details sketches of any five moulds of precast units.
8	Site visit and report writing of prestressed construction work site.

Suggested Instructional Strategies:

Lecture method, Use of teaching aids, Group discussion, Question Answer technique, Industrial visits, expert lecturers, Assignments, Mini Projects, Case studies,

Learning Resources:
Reference Books:

SN	Author	Title	Publisher
1	R. S. Ramamrutham	Prestressed concrete design	
2	N. Krishana Raju	Prestressed concrete design & analysis	Tata McGraw Hill Pub. Co. Ltd
3	T. Y. Lin, Ned H. Burns	Design of Prestressed concrete structures	John Wiley and sons.
4	G. S. Pandit & Gupta	Prestressed concrete	CBS Publishers and Distributors, New Delhi

Codes of Practices: (BIS, BS, ASTM.)

SN	Code Number	Title
1	I. S. 1343: 1980	IS code of practice for prestressed concrete.
2	I. S. 456: 2000	Plain and Reinforced Concrete Code of Practice

Programme : Diploma Programme in Civil Engineering (CE)
Course : Advanced Concrete Technology **Course code :** 1510
Prerequisite : 1203

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
03	--	02	05	03	Max.	80	20	100	--	--	50	150
					Min.	32	--	40	--	--	20	--

Rationale:

In the recent past, it is the need to study the advanced concrete as due to high rise, heavily loaded, long span structures and ground shaking due to earthquake excitation. Recent development in infrastructural facilities has become more advanced and also complexity has been reached to higher degree. Supervision of concreting work has become a modern state of art and demands at higher level in addition to higher strength along with specific requirements by the user. Repairs and rehabilitation of existing concrete building is important aspect in construction of advanced structures and increasing pressure challenge for higher speed of construction. This course aimed at giving overview of behaviour of different types of concrete mixes and also, detailing of structural elements of advanced concrete structures.

Objectives:

The student will be able to

1. impart the importance and understanding of advanced concrete mixes and its employability in civil Engineering constructions.
2. know the function and its importance of various admixtures and mineral additives added in the fresh concrete mix.
3. understand the basic principle and procedure to know the control over fresh concrete before, during and after construction.
4. develop supervisory skills in all concreting operations prior to, during and after concreting by making the use of knowledge acquired and practical tools developed by IS and I. R. C.

Contents: Theory

Topic No.	Topic & Subtopic	Hours	Marks
1	**Introduction.** 1.1 Components of concrete 1.2 Strength developments. 1.3 Specification of concrete, grades of concrete as per IS 456-2002 code. 1.4 Advanced concrete: concept, necessity and importance 1.5 Challenges faced by concrete industries.	04	04
2	**Admixtures and Mineral additives** 2.1 Introduction. 2.2 Functions of admixtures.	06	12

Topic No.	Topic & Subtopic	Hours	Marks
	2.3 Classification of admixtures. 2.3.1 Accelerators: Purpose, effects, dosage used. 2.3.2 Retarders: Purpose, effects, soluble carbohydrate derivative, inorganic retarders, brand names. 2.3.3 Plasticizers: Purpose, basic products, action of plasticizers, types of, brand names. 2.3.4 Super-plasticizers: Purpose, brand names, classification, Effects on fresh concrete, dosages. 2.4 Introduction of Mineral Admixtures: Fly ash, silica fume, rice husk ash, Metakaoline 2.5 Pigments: Purpose, classification, brand names.		
3	**Proportioning of Concrete mix** 3.1 Introduction: Nominal Mix and Design Mix. 3.2 Factors influencing the selection of Mix proportions. 3.3 Minimum cement content, characteristic strength, target mean strength, standard deviation as per IS 456-2002 code. 3.4 Method of proportioning of concrete. 3.4.1 Various methods of Mix design. 3.4.2 Detailed Mix design by IS Code. 3.4.3 Detailed Mix design by American Concrete Institute method.	07	14
4	**Hardened Concrete Test** 4.1 Purpose and Quality Control. 4.2 Classification of Tests. & Non-destructive tests. 4.3 Destructive Test: Standard test procedure of Cube Compression, flexural test, and split test. 4.4 Non-destructive test: concept, advantages and Limitations. 4.4.1 Schmidt's rebound hammer test: Rebound number and Strength of concrete, schematic diagram of rebound hammer, position of rebound hammer. 4.4.2 Ultra Sonic Pulse Velocity method: concept, techniques of measuring Pulse velocity through concrete, factors affecting the measurements, limitations.	07	14
5	**Ready Mix Concrete** 5.1 Introduction: Concept of Ready Mix Concrete, Historical development of RMC, Advantages and disadvantages. 5.2 RMC plant: Components, machinery used, schematic layout, processes adopted at RMC plants, work force. 5.3 Concrete specifications and Quality control. 5.4 Transportation, distribution, handling and placing.	06	08
6	**High Performance Concrete** 6.1 Introduction: Concept, Definition, requirements of high performance characteristics, 6.2 Advantages and disadvantages. 6.3 Classification, factors affecting high performance 6.4 Methods of achieving High performance concrete	06	08

Topic No.	Topic & Subtopic	Hours	Marks
7	**Special Concrete.** 7.1 Introduction: Importance of special concretes. 7.2 Applications, advantages. 7.3 Various special concretes: Light weight concrete, Ultra-light weight concrete, Mass concrete, Roller compacted concrete, high density concrete, Fiber reinforced concrete, Gap graded concrete, No-fines concrete.	06	08
8	**Repairs and rehabilitation of Concrete** 8.1 Difference between Repairs & rehabilitation, Diagnosis of strength of concrete 8.2 Causes of cracks in concrete: Types of cracks, crack patterns and its causes 8.3 Methods of repairing cracks: surface preparation, crack filling, epoxy grouting, short-creating, nailing, trapping, and meshing. 8.4 Methods of rehabilitation of concrete structural components: Beams, Columns, Column footing. Slabs, walls 8.5 Epoxy sheets and its uses 8.6 Health monitoring of structures, Structural auditing	06	12
	Total	**48**	**80**

Term work:

1. Comparative study of Admixtures and additives used with concrete mix
2. Proportioning the concrete mix by I. S. Code method using admixtures with cost detailing
3. Proportioning the concrete mix by I. S. Code method using mineral additives with cost detailing
4. Proportioning the concrete mix by I. S. Code method with admixture as well as mineral additives
5. Workability of fresh concrete with admixtures using V Funnel
6. Workability of fresh concrete with admixtures using L Box
7. Visit to RMC plant and writing report including various concreting operations, equipments and yielding cost of ready mix concrete and interpretation made with reference to conventional concrete.
8. Sketching of 04 plates showing details of (i) repaired of old concrete structures (ii) any two devices used in NDT
9. Report based on various construction sites of at least two concrete structures with advanced concrete construction

Suggested Instructional Strategies:

Improved lecture method, Group discussion, Question Answer technique, Industrial visits, expert lectures, Assignments, Mini Projects, Case studies

Learning Resources:

Text Books:

SN	Author	Title	Publisher
1	M. S. Shetty	Concrete Technology	S. Chand & Company
2	M. L. Gambhir	Concrete Technology	TATA McGraw Hill
3	A. M. Neville	Concrete Technology	Oxphard & IBH Publisher co. Pvt. Ltd
4	R. S. Varshney	Concrete Technology	Oxphard & IBH Publisher co. Pvt. Ltd
5	P. D. Kulkarni	Concrete Technology	Oxphard &IBH Publisher co. Pvt. Ltd

Indian Standard Code:

Code No.	Name of Code
IS 269-1989	Ordinary Portland Cement 33 Grade
IS 383-1970	Coarse & Fine Aggregates From Natural Sources For Concrete
IS 2386-1963	Methods of Test For Aggregates For Concrete
IS 8112-1989	Ordinary Portland Cement 43 Grade
IS 10262-1982	Recommended Guidelines For Concrete Mix Design
IS 12269-1987	Ordinary Portland Cement 53 Grade

Web references:

nptel.ac.in

NON EXAMINATION CREDIT COURSES

Programme : Diploma Programme in CE / ME / PS / EE / IF / CM / EL / AE / DD / ID
Course : Physical Fitness **Course code :** 1001
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
--	--	02	02	--	Max.	--	--	--	--	--	--	--
					Min.	--	--	--	--	--	--	--

Rationale:

To encourage the students in the field of physical & mental conditions.

Objectives:

The student will be able to

1. Enhance mental & physical potential to ensure social & community consciousness.
2. Produce adaptable & flexible coping strategies that are required in our diverse & ever changing society.
3. Understand the importance of exercise & its contribution in building the physical fitness.
4. Build / develop self-confidence in students.
5. Make students healthy.

Contents:

Topic No.	Topic & Subtopic	Hours
1	**Fitness** 1.1 Concept of fitness & its significance, 1.2 Dimension of fitness, Physical & Mental fitness, 1.3 Components of physical fitness-general and specific 1.4 Relationship with health & heredity. 1.5 Factors influencing fitness-age, sex, climate, diet, exercise, training.	04
2	**Muscular Fitness** 2.1 Running, body control and body exercise. 2.2 Marching and turning. 2.3 Physical training exercise (standing) No.1 to 8. 2.4 Physical training exercise (sitting) No.1 to 8.	24
3	**Fitness & Health** Medical fitness a) medical examination, b) hard step test c) stress test & d) general.	04
	Total	**32**

Suggested Instructional Strategies:

Lecture method, use of teaching aids, demonstration, assignments.

Learning Resources:

Reference Books:

SN	Author	Title	Publisher
1	Modak	Health & fitness for children	Sports Publication
2	Mishra	Health & Physical Education.	Sports Publication
3	Saini	Physical fitness and Sports	Sports Publication
4	Jain	Fielding in Physical Ecuation	Sports Publication

Programme : Diploma Programme in CE / ME / PS / EE / IF / CM / EL / AE / DD / ID
Course : Aerobics **Course code :** 1002
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
--	--	02	02	--	Max.	--	--	--	--	--	--	--
					Min.	--	--	--	--	--	--	--

Rationale:

Now a days, due to changed lifestyle, everyone of us feels stressed at workplace and even at home. This definitely affects our physical and mental fitness. Aerobics is a simple and easy way to overcome it without the need of space, jim, equipment etc. The course will encourage the students to improve their fitness in the field of physical & mental conditions.

Objectives:

The student will be able to

1. Enhance mental & physical potential to ensure social & community consciousness.
2. Understand the importance of exercise & its contribution in building the physical fitness.
3. Build self-confidence among them.
4. Make themselves healthy physically & mentally.

Contents:

Topic No.	Topic & Subtopic	Hours
1	**Warm up** Low intensity rhythmic aerobic exercise involving major muscle groups (legs) that prepares the body for more intense exercise.	16
2	**Ball Exercise** A firm, very large, usually inflatable ball used in various exercises, chiefly to strengthen the back, pelvis, and abdominal muscles.	
3	**Mat Exercise** Mat exercises in Pilates are performed using the floor and a rubber mat.	
4	**Basic yoga** Yoga is a Sanskrit word meaning union or joining. In reality it's a very general term that encompasses many different disciplines, from the purely physical to the purely spiritual.	
5	**Stepper** Aerobics performed in a choreographed routine by stepping up onto and down from a portable platform.	
6	**Aerobic dance** A system of exercises combining aerobics with dance steps and usually done with music.	

Topic No.	Topic & Subtopic	Hours
7	**Isometric** Muscle-building exercises (or a system of muscle building exercises) involving muscular contractions against resistance without movement (the muscles contracts but the length of the muscle does not change) done in excess.	16
8	**Stretching** Low intensity rhythmic aerobic exercise involving major muscle groups (legs) that prepares the body for more intense exercise.	
9	**Cardio** Constant moderate intensity work that uses up oxygen at a rate in which the cardio respiratory system can replenish oxygen in the working muscles. Examples of such activity are exercises like stationary bike riding or walking. It is a good activity for fat loss when done in the right amounts but highly catabolic if done in excess.	
10	**Cool down** Low intensity rhythmic aerobic exercise involving major muscle groups (legs) that helps the body recover back to normal	
	Total	**32**

Requirement:

Students shall bring with them Mat, ball, exercise cloths and sport shoes.

Suggested Instructional Strategies for Practicals:

Class 1

Time	Mode
20mins	Warm up
20mins	Stretching
20mins	Exercise
20mins	Cardio
15mins	Basic Yoga
15mis	Aerobic Dance
10mins	Cool Down

Class 2

Time	Mode
20mins	Warm up
20mins	Stretching
20mins	Exercise
20mins	Cardio
15mins	Ball
15mis	Isometric
10mins	Cool Down

Class 3

Time	Mode
20mins	Warm up
20mins	Stretching
20mins	Exercise
20mins	Cardio
15mins	Mat
15mis	Muscular
10mins	Cool Down

Class 4

Time	Mode
20mins	Warm up
20mins	Streching
20mins	Excerise
20mins	Cardio
15mins	Basic Yoga
15mis	Aerobc D
10mins	Cool Down

Class 5

Time	Mode
20mins	Warm up
20mins	Stretching
20mins	Exercise
20mins	Cardio
15mins	Ball
15mis	Isometric
10mins	Cool Down

Class 6

Time	Mode
20mins	Warm up
20mins	Stretching
20mins	Exercise
20mins	Cardio
15mins	Stepper
15mis	Basic Yoga
10mins	Cool Down

Class 7

Time	Mode
20mins	Warm up
20mins	Stretching
20mins	Exercise
20mins	Cardio
15mins	Mat
15mis	Muscular
10mins	Cool Down

Class 8

Time	Mode
20mins	Warm up
20mins	Streching
20mins	Excerise
20mins	Cardio
15mins	Basic Yoga
15mis	Aerobc D
10mins	Cool Down

Class 9

Time	Mode
20mins	Warm up
20mins	Stretching
20mins	Exercise
20mins	Cardio
15mins	Ball
15mis	Isometric
10mins	Cool Down

Class 10

Time	Mode
20mins	Warm up
20mins	Stretching
20mins	Exercise
20mins	Cardio
15mins	Stepper
15mis	Basic Yoga
10mins	Cool Down

Class 11

Time	Mode
20mins	Warm up
20mins	Stretching
20mins	Exercise
20mins	Cardio
15mins	Mat
15mis	Muscular
10mins	Cool Down

Class 12

Time	Mode
20mins	Warm up
20mins	Streching
20mins	Excerise
20mins	Cardio
15mins	Basic Yoga
15mis	Aerobc D
10mins	Cool Down

Class 13

Time	Mode
20mins	Warm up
20mins	Stretching
20mins	Exercise
20mins	Cardio
15mins	Ball
15mis	Isometric
10mins	Cool Down

Class 14

Time	Mode
20mins	Warm up
20mins	Stretching
20mins	Exercise
20mins	Cardio
15mins	Stepper
15mis	Basic Yoga
10mins	Cool Down

Class 15

Time	Mode
20mins	Warm up
20mins	Stretching
20mins	Exercise
20mins	Cardio
15mins	Mat
15mis	Muscular
10mins	Cool Down

Class 16

Time	Mode
20mins	Warm up
20mins	Streching
20mins	Excerise
20mins	Cardio
15mins	Basic Yoga
15mis	Aerobc D
10mins	Cool Down

Learning Resources:

Reference Books:

SN	Author	Title	Publisher
1	Mishra	Health & Physical Education.	Sports Publication
2	Saini	Physical fitness and Sports	Sports Publication
3	Jain	Fielding in Physical Education	Sports Publication

Programme : Diploma Programme in CE / ME / PS / EE / IF / CM / EL / AE / DD / ID
Course : Yoga **Course code :** 1003
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
--	--	02	02	--	Max.	--	--	--	--	--	--	--
					Min.	--	--	--	--	--	--	--

Rationale:

To facilitate the development of physical, mental, intellectual, moral & spiritual powers amongst the students.

Objectives:

The student will be able to

1. Develop memory & intelligence of the students through various Yogic techniques.
2. Protect the health of the students & help them to develop vital force & will power through the practice of Yogasana & Pranayama.

Contents:

Topic No.	Topic & Subtopic	Hours
1	**Introduction** to Yoga, importance, rules & classification.	02
2	**Types of Yogasanas**	24
	A) Sitting postures 1. Padmasana 2. Badha Padmasana 3. Parvatasana 4. Utthita Padmasana 5. Kukutasana 6. Garbhasana 7. Siddhaasana 8. Simhaasna 9. Mandukasana 10. Gomukhasana 11. Padangusthasana 12. Kandapeedanasana 13. Veerasana 14. Pashchimottanasana 15. Janu Shirasana 16. Ardha Matsyendrasana 17. Purna Matsyendrasana 18. Ardha Vakrasana 19. Vakrasana 20. Akarna Dhanurasana.	
	B) Supine postures 1. Shavasana 2. Ekapada Uttanasana 3. Uttanapadasana 4. Pavanamuktasana. 5. Setubandhasana 6. Tolangulasana 7. Matsyasana 8. Katiasana 9. Suptabhadrasana 10. Viparitakarani Mudra 11. Sarvangasana 12. Halasana 13. Vartulasana.	
	C) Abdominal postures 1. Ardha Shalabhasana 2. Purna Shalabhasana 3. Bhujangasana 4. Dhanurasana 5. Makarasana 6. Viparita Matsyasana.	

Topic No.	Topic & Subtopic	Hours
	D) Hand postures 1. Mayurasana 2. Virshchikasana 3. Bakasana 4. Tolasana 5. Uttshita dwihastabhujasana 6. uttamangasana 7. Utthita ekapadashirasana 8. Konasana.	
	E) Kneeling postures 1. Vajrasana 2. Supta Vajrasana 3. Bhoo-namana-Vajrasana 4. Ushtrasana 5. Vurshasana.	
	F) Leg postures 1. Garudasana 2. Vrukshasana 3. Vatayanasana 4. Santulasana 5. Natarajasana 6. Utkatasana 7. Tarasana 8. Trikonasana 9. Padahastasana 10. Chakrasana.	
	G) Head postures 1. Shirshasan 2. Urdhva Padmasana 3. Urdhva Samyukta Padmasana	
3	Suryanamaskara	02
4	Types of Pranayama	04
	Total	**32**

Suggested Instructional Strategies:

Lecture method, Use of teaching aids, Demonstration, Assignments.

Learning Resources:

Reference Books:

SN	Author	Title	Publisher
1	Gopal Usha	Yogasan (Hindi)	Sports Publication
2	Gopal Usha	Yoga and Sharir Rachana (Hindi)	Sports Publication
3	Lyengar	Light on Yoga	Knopf Publication Group
4	George Feuerstein	The Yoga Tradition	Hohm press

Programme : Diploma Programme in CE / ME / PS / EE / IF / CM / EL / AE / DD / ID
Course : Marshal Art **Course code :** 1004
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
--	--	02	02	--	Max.	--	--	--	--	--	--	--
					Min.	--	--	--	--	--	--	--

Rationale:

This non examination credit course is introduced to encourage the student learn and habituate certain marshal arts for self protection.

Objectives:

The student will be able to

1. Know the basic necessary steps for marshal art
2. Known the basic punch

Contents:

Topic No.	Topic & Subtopic	Hours
1	**Yellow belt:** Exercise, Basic kick punch, block, fight tans, kanta first	02
2	**Orange Belt:** Basic kick, punch block and power, tans long and short fight, kanta first	06
3	**Blue belt:** kick and punch block in one count multiple action, speed kick and fast movement kanta 1, 2, 3	06
4	**Green Belt:** kick punch block four to five action kick punch fight point technique, three to four minutes round to play	06
5	**Brown belt:** non chock training brick breaking ice breaking and yellow belt to green total training and kanta	06
6	**Black Belt:** Hammer punch, breaking bricks in stomach, eyes, ice breaking, point to point fight, to show the total revenge, knockout fight	06
	Total	**32**

Suggested Instructional Strategies:

Lecture method, Use of teaching aids, Demonstration.

Learning Resources:

Reference Books:

SN	Authors	Title	Publisher
8.	Bruce Miller	The meaning of forms and kat's	Fighting Arts
9.	Harry crews	Karate is a thing of sprit	Quill Books

Programme : Diploma Programme in CE / ME / PS / EE / IF / CM / EL / AE / DD / ID
Course : Personality Development **Course code :** 1005
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
--	--	02	02	--	Max.	--	--	--	--	--	--	--
					Min.	--	--	--	--	--	--	--

Rationale:

There is always a gap between existing and what expected to exist. This is with everybody. The gap is widening day by day. The gap affects personality, physique, health, ethics, emotions, ego, esteem and/or motivation. The gap of difference between existing self and imagined self can be bridged up by gradual development in physical, psychological and sociological areas related to self. This is Personality-development.

Objectives:

The student will be able to

1. Understand the concept Attitude.
2. Identify various threats
3. Know the various Steps to build a Positive Personality
4. Understand the concept Motivation

Contents:

Topic No.	Topic & Subtopic	Hours
1	**Attitude:** Importance How to build a positive Attitude Interview techniques – Necessity, Tips for handling common questions, Group discussion.	06
2	**Motivation:** Internal and External Difference between Inspiration and Motivation De-motivating factors Motivation Techniques	06
3	**Steps to build a positive personality,** Areas of personality development self analysis	04
4	**SWOT Analysis** Strength, Weaknesses, Opportunities & Threats	04
5	Introduction stress physiology & Health counteracting stress & yoga	06
6	Introduction ways to get most out of time management. How to plan your time. Process of time planning	02
7	Ethics – Introduction Basic of ethics code of ethics.	02
8	Group discussion on any one emerging topic.	02
	Total	**32**

Suggested Instructional Strategies:

Lecture method, Use of teaching aids, Group discussion, Demonstration, Case study

Learning Resources:

Reference Books:

SN	Author	Title	Publisher
1	Kenneth a kiewra Nelson F. dubols	Learning to learn	Allyn and Bacon
2	E. H. Megrath	Basic managerial skills for all	Prentice Hall of India Ltd.
3	P. D. Kulkarni & B. B. Sharma	Independent study techniques	T.T.T.I, Chandigarth
4	Patrick Forsyth	How to motivate people	Kogan page
5	Shiv Khera	You can win	Macmillan India
6	Philips Covey	7 habits of people	Parragon, Simon

Programme : Diploma Programme in CE / ME / PS / EE / IF / CM / EL / AE / DD / ID
Course : Model Making **Course code :** 1006
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
--	--	02	02	--	Max.	--	--	--	--	--	--	--
					Min.	--	--	--	--	--	--	--

Rationale:

Model of structure enables clear & complete idea of the structure before construction Progress of construction achieved qualitatively with the help of model. It attracts visitors, experts, users, engineers, architect & costumers. It contributes beauty of the structure It provides self-employment for engineers who has interest in the field.

Objectives:

The student will be able to

1. Understand purpose of models.
2. Know various types of models.
3. Know various materials and tools used for.
4. Develop skills of making models.

Contents:

Topic No.	Topic & Subtopic	Hours
1	**Introduction** 1.1 Introduction to model making. 1.2 Purpose of making models.	1
2	**Types of Models** 2.1 Topographic models 2.1.1 Site models 2.1.2 Landscape model 2.1.3 Garden Models 2.2 Building models 2.2.1 Urban models 2.2.2 Actual bldg models 2.2.3 Structural models 2.2.4 Interior models 2.3 Special models 2.3.1 Design models 2.3.2 Object models	1
3	**Essential components of a model.**	1
4	**Materials used** for various types of models such as Paper, card board, Mount board, Cork, Plastic, Acrylic, Glass, clay, Plaster of Paris, wood, timber items, Plywood. std. Sizes available, properties of all above materials.	1

Topic No.	Topic & Subtopic	Hours
5	Various tools & machinery used for making models	1
6	Use of Glues and adhesives for making models.	1
7	Scale of model. Various scales to be used for various model types.	1
8	Preparation of work for making of any model.	1
9	Procedure of drawing the model to a required scale.	1
10	Procedure of cutting of models	1
11	Extra items to be incorporated for a model such as trees & bushes, human figures, vehicle, street lights, railing, fences & other urban features especially to a 'building' model.	1
12	Presentation & painting procedure of a finished model.	1
13	a. One ' building' model for a 4 to 6 room frame structure bungalow to 1.50 scale using mount board. b. Same scale but showing furniture or 'Interior' model.	20
	Total	**32**

Suggested Instructional Strategies:

Lecture method, Use of teaching aids, Demonstration, Assignments.

Learning Resources:

Reference Books:

SN	Author	Title	Publisher
1	David Neat	Model making: Materials and methods	The Crowood Press Ltd.
2	Ray Gibson	The Usborne Book of Making Model	EDC Publisher
3	Martha Sutherland	Model making: A basic guide	WW Norton & Co.

Programme : Diploma Programme in CE / ME / PS / EE / IF / CM / EL / AE / DD / ID
Course : Repair of Domestic Appliances **Course code :** 1007
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme								
Hrs / week			Credits	TH Paper Hrs.	Marks							
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
--	--	02	02	--	Max.	--	--	--	--	--	--	--
					Min.	--	--	--	--	--	--	--

Rationale:

With increase in day to day need electrical domestic appliances e.g. food mixers, vacuum cleaner, room water heater, entertainment, electric iron, refrigerator, it is essential to know their functions and operating principal for their repair. This curse develops such skills in student.

Objectives:

The student will be able to

1. Acquire the knowledge of different electrical principles.
2. Trouble shoot the different probable faults
3. Carry out maintenance of domestic appliance at regular time interval
4. Repair minor and major faults

Contents:

Topic No.	Topic & Subtopic	Hours
1	**Motor pump set detail (Starter)** 1.1 constructional detail 1.2 testing and remedies	02
2	**Petrol generator set** 2.1 constructional detail 2.2 working principle 2.3 Amount of power output 2.4 fault and remedies	02
3	**Electric washing machine** 3.1 working principle 3.2 types of washing machines 3.3 possible faults and remedies	02
4	**Electric geyser** 4.1 working principle 4.2 types of geysers 4.3 possible faults and remedies	02
5	**Electric motor (Universal motor)** 5.1 working principle 5.2 constructional detail 5.3 Motors used in Fans and Mixers 5.4 faults and remedies	04

Topic No.	Topic & Subtopic	Hours
6	**Demonstration of all the parts and trouble shooting of:** 6.1 pump set 6.2 petrol generator set 6.3 electric water heater /geyser and trouble shoot the fault in iron 6.4 electric washing machine 6.5 electric motor (Fans and Mixers).	20
	Total	**32**

Suggested Instructional Strategies:

Lecture method, Use of teaching aids, Demonstration, Assignments.

Learning Resources:

Reference Books:

SN	Author	Title	Publisher
1	K. B. Bhatia	Study of Electrical Appliances	Khanna Publication
2	Arora	Testing, Commissioning & Maintenance of Electrical Appliances	Rainbow Publication
3	K. B. Bhatia	Electrical Appliances	New Height Publication

Programme : Diploma Programme in CE / ME / PS / EE / IF / CM / EL / AE / DD / ID
Course : Gardening **Course code :** 1008
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
--	--	02	02	--	Max.	--	--	--	--	--	--	--
					Min.	--	--	--	--	--	--	--

Rationale:

One of the environmental threats our planet faces today is the potential for long-term changes in earth's climate and temperature pattern. Hence management of open spaces is a must for creating good environment and for environment protection. Basic understanding of the functional and ecological aspects of planting which are must to restore balance between people and nature.

Objectives:

The student will be able to

1. Learn basic gardening principles including - Water needs, Selection of appropriate plants, Weed management, improve soil structure and feed the soil rather than plants, Managing insect pests.
2. Introduce students to the basic terms, concepts and practices associated with installing and maintaining a garden.

Contents:

Topic No.	Topic & Subtopic	Hours
1	**Getting to know garden**: garden basics- bed and box preparation, tools and equipment.	02
2	**General principles**: types of soils, plant food, manures and fertilizer, organic and inorganic, biofertilizer, liquid manures, method and time of fertilizer use	02
3	**Garden Stewardship**: watering, weeding, erosion and crop maintenance	02
4	**Applying academic course in practice for** 4.1 Selection of site for gardening and cleaning of unwanted material such as garbage, weeds. 4.2 Familiarization of horticultural tools and their uses. Handling and maintenance of gardening equipments. 4.3 Preparation of seedbed and box for different flowers and plants. 4.4 Culture of Annuels, shrubs, dalia, rose, palms, ferns and cacti 4.5 Selecting plants or seeds (flowering or ornamental) for planting and caring according to the season. 4.6 Watering, trimming, pruning and thinning of plants. 4.7 Practice in budding, cutting, layering and grafting of plants. 4.8 Identification of pests and diseases of flower plants and fruit trees. 4.9 Preparation of doses of insecticides, weedicites, fungicides and	26

Topic No.	Topic & Subtopic	Hours
	pesticides. 4.10 Preparation of composite mixture and manuring the plants. 4.11 Development and maintenance of lawns. 4.12 Visit to well known gardens and nurseries	
	Total	**32**

Suggested Instructional Strategies:

Lecture method, Use of teaching aids, demonstration, case study.

Learning Resources:

Reference Books:

SN	Author	Title	Publisher
1	Edmant, J.B	Fundamentals of Horticulture.	Tata McGraw Hill
2	Chaudhari H.K	Elementary principles of plant breeding.	Oxford & IBH
3	David Laneashire	Gardening - How to grow things	Penguin Books
4	Mel Bartholomew	Square Foot Gardening	Rodale
5	Alan Titchmarsh	How to be Gardener	Hylas Publication

Programme : Diploma Programme in CE / ME / PS / EE / IF / CM / EL / AE / DD / ID
Course : Public speaking **Course code :** 1009
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
--	--	02	02	--	Max.	--	--	--	--	--	--	--
					Min.	--	--	--	--	--	--	--

Rationale:

Public speaking is an 'Art'. For good leadership qualities, it is must. Therefore, this course has been kept in non examination credit courses for all diploma programme.

Objectives:

The student will be able to

1. Formulate- Specific purpose statement
2. Analyze & adopt to audience
3. Organize ideas & constructing out line
4. Use language effective & so forth
5. Formulate all above, based on creative thinking & take decisions there on.

Contents:

Topic No.	Topic & Subtopic	Hours
1	**Speaking & Listening** 1.1 Speaking in public 1.2 Listening, specify the skill of listening 1.3 Creative thinking & decision making 1.4 Write report on evaluation of your major strength & weakness as a speaker & listener.	4
2	**Speech Preparation** 2.1 Selecting a topic purpose 2.2 Analysis of the audience 2.3 Supporting your ideas 2.4 To plan to conduct interview for class room speeches & hold the interviews afterward. 2.5 To make two possible specific purpose statement suitable for the speech assignment.	5
3	**Speech preparation, Drafting the outline** 3.1 Structuring the body of the speech 3.2 Beginning & ending the speech 3.3 Outlining the speech 3.4 For your next speech design & circulate among your classmates audience analysis.	5
4	**Presenting the speech** 4.1 Using language	5

Topic No.	Topic & Subtopic	Hours
	4.2 Delivery 4.3 Using visual Aids 4.4 Deliver a speech prepared by you, Hear the speech deliver by you. (After recording & reply) & improve.	
5	**Varieties of Public Speaking** 5.1 to inform 5.2 to persuade 5.3 on special occasions 5.4 in small groups. 5.5 Address through media 5.6 Analyze the given speech fully & record. 5.7 Attend a speech arranged in campus. Prepare on brief report on the speakers introduction conclusion & non-verbal communication.	7
6	**Group Discussion** 6.1 Group discussion on characteristics of an effective Public Speaking & ineffective Public Speaking. 6.2 Using the methods of brain storming in a group of 8 to 15 students by selecting three topics for classroom speech.	6
	Total	**32**

Suggested Instructional Strategies:

Lecture method, Use of teaching aids, Case study, Group discussion.

Learning Resources:

Reference Books:

SN	Author	Title	Publisher
1	Stephen E –Lucas.	The art of public speaking	McGraw hill
2	Dale Carnegie	Public speaking &Influencing Men Business	Taraporwada Sons & Co
3	Lyman MacInnis	The elements of Great Public Speaking	Ten Speed Press
4	Sporty King	Public Speaking	Aspatore

Programme : Diploma Programme in CE / ME / PS / EE / IF / CM / EL / AE / DD / ID
Course : Computer Hardware Maintenance **Course code :** 1010
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme								
Hrs / week			Credits	TH Paper Hrs.	Marks							
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
--	--	02	02	--	Max.	--	--	--	--	--	--	--
					Min.	--	--	--	--	--	--	--

Rationale:

The aim of the course is to teach the basic working of the computer motherboard, peripherals and add--on cards. The course helps the students to do the maintenance of the Computer, peripherals and its add--on cards. The students will be able to select the proper peripheral as per their specification and requirement. This is the core course. The course is practical oriented and will develop the debugging skills in the students.

The student will be able to do assemble a computer and also he/she will be able to install software like Operating System, Application Packages, Device Drivers.

The main aim of this course to make a student having well known knowledge of all Hardware devices and their functions, Troubleshooting & Repairing of Faults.

Objectives:

The student will be able to

1. Debug and repair the faults in system.
2. Assemble the system.
3. Load the operating system and device drivers in the system.
4. Handle all the trouble shootings and use solution to repair it.

Contents:

Topic No.	Topic & Subtopic	Hours
1	**Motherboard And Its Components'** – Chipset basic, chipset Architecture: North / South Bridge – Architecture of Intel chipset. – Overview and features of System Bus – Memory types & interfacing, SDRAM, DDR, DDR2, DDR3 – Concept of cache memory: Internal cache, External cache (L1, L2, L3 cache) – Features & Structure of processors: Pentium, P2, Celeron, P3, P4,Dual Core,C2D,I3.,Processor Socket – Bios Basics, main functions – Motherboard Selection criteria – OS Installation	06
2	**Storage Devices And Its Interfacing** – Hard disk construction and working – FAT basics, Introduction to file system FAT 16, FAT 32, NTFS – Hard disk drive interface: features of parallel AT attachment (PATA),	06

Topic No.	Topic & Subtopic	Hours
	Serial ATA (SATA), ATA devices – jumper selections: Master, slave, cable select, ATA cables – ATA RAID: RAID 0, RAID – CD/DVD ROM drive: Construction	
3	**Display Devices & Interfacing:** – CRT colour monitor – LCD monitor	04
4	**Input & Output Devices:** Construction and Working – Keyboard: Types & working of internal Components. – Mouse: Mechanical, Opt mechanical, optical – Scanner: Types & working (Flat bed, sheetfed, Handheld etc) – Modem: Internal and External: Types, working & interfacing. – Printer: Dot matrix, Inkjet, Laser: working & Structure. – USB – Basics of LAN Devices i.e. NIC,HUB,SWITCHES,ROUTERS,CABELS, Blue Tooth,WiFi etc.	04
5	**Power Supplies** – Block diagram and working of SMPS. – Signal description and pinot diagram of AT and ATX connectors – Symptoms of power problems & troubleshooting.	06
6	**Pc Troubleshooting, Maintenance and Tools** – Preventive Maintenance: Active, Passive, periodic maintenance procedure – Preventive maintenance of peripherals of PC – Fault finding and troubleshooting of the above peripherals – Diagnostic software – Virus infection symptoms, precautions to prevent a virus infection	06
	Total	**32**

List of Practical:

a. Mother Board Component.
b. CMOS setup of Pentium.
c. Hard Disk Partitioning & O.S. Installation
d. Study of HDD: Identify various components of HDD and their functions
e. Study and installation of Cards: VGA, Sound, LAN cards.
f. Installation of Scanner, Printers and Modems.
g. Study of SMPS (ATX)
h. Study of Diagnostic Software's. (Any one)
i. Assembling of PC and Installation of Operating System.
j. Fault Finding & Repairing.

Suggested Instructional Strategies:

Lecture method, Use of teaching aids, Group discussion, Demonstration, Case study

Learning Resources:

Reference Books:

SN	Author	Title	Publisher
1	Mike Meyers, Scott Jernigan	Managing & Troubleshooting PCs	Tata McGraw Hill
2	Bigelow	Bigelow's Troubleshooting, Maintaining & Repairing PCs	Tata McGraw Hill
3	Mark Minasi	The Complete PC Upgrade & Maintenance Guide	BPB Publication
4	D. Balasubramanian	Computer Installation & Servicing	Tata McGraw Hill
5	Scott Muller	Upgrading & Repairing PCs	Techmedia

Programme : Diploma Programme in CE / ME / PS / EE / IF / CM / EL / AE / DD / ID
Course : Mobile Repairing **Course code :** 1011
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
--	--	02	02	--	Max.	--	--	--	--	--	--	--
					Min.	--	--	--	--	--	--	--

Rationale:

Life today offers much convenience which involves the use of electronic gadgets. Nowadays, Electronics plays a major role in the field of communication & entertainment. This course is introduced to develop preliminary essential skill of mobile repairing.

Objectives:

The student will be able to

1. How to repair & service minor & major handset problem.
2. Study of basic parts of mobile
3. Understand operation of different mobiles.
4. Use of software, multimedia.

Contents:

Topic No.	Topic & subtopic	Hours
1.	**Introduction to Mobile and repairing** 1.1 Basic of mobile communication. 1.2 Use of tools & instruments used in mobile phone repairing. 1.3 Details of various components used in mobile phones. 1.4 Basic parts of mobile phones (mike, speaker, LCD, antenna) 1.5 Sim card, power supply, battery, mobile spare part, soldering & disordering. 1.6 Assembling & disassembling of different types of mobile phones. 1.7 Different IC's used 1.8 Fault finding & trouble shooting e.g. – Network problem, no recharging, no vibration.	10
2.	**Advance mobile repairing** 2.1 Operating system 2.2 Software Applications 2.3 Networking faults 2.4 Multimedia 2.5 Flashing 2.6 Formatting 2.7 Unlocking 2.8 Use of secret code 2.9 Downloading 2.10 Card reader	10

Topic No.	Topic & subtopic	Hours
	2.11 Bluetooth	
3	**Mobile Testing Methods** 3.1 Track checking in mobile by multimeter 3.2 Fault finding testing related to software e.g – sim locked, sim rejected, field visit.	12
	Total	**32**

Suggested Instructional Strategies:

Lecture method, Use of teaching ideas, Demonstration, Assignment, Hands on work with related equipment.

Learning Resources:

Reference Books:

SN	Author	Title	Publication
1	K.C.Agrawal	Mobile phone training and Solution	Micro publication
2	Manohar Lotia	Modern mobile repairing	BPB publication

Programme : Diploma Programme in CE / ME / PS / EE / IF / CM / EL / AE / DD / ID
Course : Foreign Language **Course code :** 1012
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
--	--	02	02	--	Max.	--	--	--	--	--	--	--
					Min.	--	--	--	--	--	--	--

Rationale:

An engineering technician is likely to come in contact with a representative from / documents in / get employed abroad Japan, France, German. In such situation he must have the background of such languages so that they can understand the related information.

This course is introduced to create facilities at the institute level as the faculty for the same is locally available.

Objectives:

The student will be able to

1 Understand at least conversation with foreigners
2 Write in foreign language to some extent
3 Read the language.

Contents:

Topic No.	Topic & Subtopic	Hours
A	**French Language:**	
	1. Alphabets	02
	2. Months / Days / Numbers	05
	3. Vocabulary	07
	4. Constructing simple sentence	10
	5. Speaking	08
B	**Japanese Language**	
	1. Alphabets in Hiragana	03
	2. Alphabets in Katakana	03
	3. Words in Hiragana Writing and pronouncing	05
	4. Word using both Hiragana and Katakana writing and pronouncing	08
	5. Simple Sentences	08
	6. Lessons 1 to 4	08
C	**German Language**	
	1. Alphabets	02
	2. Months / Days / Numbers	05
	3. Vocabulary	07
	4. Constructing simple sentence	10
	5. Speaking	08
	Total	**32**

Note:

1. Students shall select any one language from above languages

Suggested Instructional Strategies:

Lecture method, Use of teaching aids.

Learning Resources:

Reference Books:

SN	Author	Title	Publisher
1	Walter Grauberg	The elements of foreign language	Multilingual Matters
2	Carl Eduard Aue	Grammer of the German Language	Chambers
3	de Roussy de Sales	Easy French reader	McGraw Hill
4	AJALT	Japanes for young peoples-I Student Book	Kodansha International Ltd.
5	Christopher Kendris, Theodore Kendris	501 French verbs: with CD ROM	Barron's Best Selling

Programme : Diploma Programme in CE / ME / PS / EE / IF / CM / EL / AE / DD / ID
Course : Videography **Course code :** 1013
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
--	--	02	02	--	Max.	--	--	--	--	--	--	--
					Min.	--	--	--	--	--	--	--

Rationale:

To learn about the concept of video shooting this course is introduced in the curriculum as non-credit course. This course gives the knowledge about the principals of video shooting.

Objectives:

The student will be able to

1. Concept about Arts and aesthetics.
2. Study of different camera.
3. Study of quality and quantity of light required.
4. Difference between the still and video camera.

Contents:

Topic No.	Topic & Subtopic	Hours
1	**Arts and Aesthetics** 1.1 Introduction to Art, Visual art and Audiovisual art 1.2 Communication History and Theory 1.3 Narrative History and Theory 1.4 Film History 1.5 Film Appreciation 1.6 Visit to Museums and Galleries 1.7 Types of Films – Fiction, Documentary, Music Video, Talk Show, Live Show.	02
2	**Camera** 2.1 Basics of Photography 2.2 Pinhole camera 2.3 Study of Different types of cameras 2.4 Study of lenses, Depth of Field, Angle and Composition 2.5 Detailed study of still camera and the mechanism 2.6 Use of shutter speed and aperture to get the desired picture. 2.7 Study of Camera Support	03
3	**Lighting** 3.1 Study of quality and quantity of Light and Shadow 3.2 Natural and Artificial lights 3.3 Study of flashlight, filters and exposure meter 3.4 Three point lighting 3.5 Creative lighting	02

Topic No.	Topic & Subtopic	Hours
	3.6 Introduction to basic video camera 3.7 Detailed study of video camera and the mechanism 3.8 Stop Block technique	
4	**Programming** 4.1 Television Vs Cinema 4.2 Intro to Various Television Program Formats 4.3 Creative Content Writing 4.4 Introduction to Video Camera 4.5 Computer application Skills 4.6 Difference between the still and the video camera 4.7 Aspect ratio and systems of recording PAL, SECAM and NTSC	04
5	**Sound** 5.1 Introduction to Sound. 5.2 Principles and quality of sound. 5.3 Microphones, cables and connectors. 5.4 Responses of sound and selection of Mikes.	02
6	**Editing** 6.1 Introduction to Editing 6.2 Concepts of Editing – travelling through time and space 6.3 Montage Theory 6.4 Principles of Editing and patterns – Linear, Parallel and Rhythmic	03
7	**Preparation of video documentary** on processing, process, construction operation, mechanical operations.	16
	Total	**32**

Suggested Instructional Strategies:

Lecture method, Use of teaching aids, Hands on work with related equipments.

Learning Resources:

Reference Books:

SN	Authors	Title	Publisher
1	Eric Deblackmere	Video production Handbook	Dfocus Production
2	Eric Deblackmere	Picture composition for film and televison	Dfocus Production
3	Jason Moser & Others	Digital Videography, recording, preserving, & disseminating archaeological	Anne Arundel Country Department

Programme : Diploma Programme in CE / ME / PS / EE / IF / CM / EL / DD / ID
Course : Two-Wheeler Maintenance **Course code :** 1014
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
--	--	02	02	--	Max.	--	--	--	--	--	--	--
					Min.	--	--	--	--	--	--	--

Rationale:

The use of Two Wheelers is being increasing tremendously. It becomes essential to know the Introduction, Operation and minimum maintenance by every user. The students of this institute, if desires, a facility to learn this course is made available through the Non Exam Credit Course.

Objectives:

The student will be able to

1. Understand operation of different two wheelers.
2. Understand various sub systems.
3. Understand maintain them on periodical basis.
4. Understand various setting points of carburetor, brakes, clutches, chains.
5. Use of various tools provided in tool kit received with vehicle.
6. Understand removal of wheels and refitting, pressures to be maintained in wheels.

Contents:

Topic No.	Topic & Subtopic	Hours
1	**The Engine** 1.1 Basic Engine Cycle, 1.2 Engine Lay outs, Cylinder head for two stroke engine & four stroke engines, valves, valves spring, valve gears, Cylinder barrels for two stroke engine & four stroke engine, connecting rod & crankshafts, gaskets.	03
2	**Engine cooling systems.**	01
3	**Engine Lubrication** 3.1 Function of lubrication system, components of lubricating system. 3.2 Characteristics of lubricants, Criteria for periodic replacement of lubricant / greasing. 3.3 Comparison of lubricating systems used for two wheeler.	04
4	**Clutch:** 4.1 Clutch location, Arrangements, Constructional features 4.2 Clutch operating mechanisms 4.3 Types of clutches	04

Topic No.	Topic & Subtopic	Hours
5	**Transmission:** 5.1 Gear Box, gear box necessity 5.2 Construction & layout 5.3 Gear selection & mechanisms. 5.4 Final drive.	05
6	**Carburetor:** 6.1 Basics carburetor, its necessity and requirement of carburetor. 6.2 Carburetor circuits & controls 6.3 Component of carburetor. 6.4 Cleaning of carburetor and its setting 6.5 Cleaning air passages.	04
7	**Chassis:** 7.1 Chassis structure & layout, Chassis for motorcycle & racing bikes. 7.2 Frame structure, types of frame structure used in different models, Front forkes, steering dampers, attachment to frame 7.3 Wheels & spokes, arrangement of spokes, tyres, tyre specification, castor provision, steering operation 7.4 Mudguards 7.5 Exhaust systems 7.6 Accessories & safety provision viz. stands, footrests, handle bars, seats, instrument panel.	04
8	**Brakes:** 8.1 Necessity and requirements of brake system 8.2 Brake operating mechanism in two wheeler 8.3 Brake setting 8.4 Types of brakes used. 8.5 Requirement of brake fluid	02
9	**Electrical System & Accessories:** 9.1 Starting mechanism 9.2 Charging system, battery & wiring 9.3 Ignition system, electronic ignition, Spark plugs & suppressers, hours, light & alignment, flashers, switches. 9.4 TFI system, electronic control unit.	03
10	**Trouble shooting & servicing:** of various engine components, problems with transverse engine. Prevention of leakages	02
	Total	**32**

Suggested Instructional Strategies:

Lecture method, Use of teaching aids, Demonstration, Assignment, Case study.

Learning Resources:

Reference Books:

SN	Author	Title	Publisher
1	Chilton	Chilton's Motorcycle repair manual	Chilton Book Co.
2	Terry Meany	The Complete Idiots guide to bikes maintenance and repair	Alpha Books
3	Darwin Holnstron	The Complete Idiots guide to motor cycles	Alpha Books

Programme : Diploma Programme in CE / ME / PS / EE / IF / CM / EL / AE / DD / ID
Course : Youth Empowerment and Skills **Course code :** 1015
Prerequisite : Nil

Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme							
Hrs / week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
--	--	02	02	--	Max.	--	--	--	--	--	--	--
					Min.	--	--	--	--	--	--	--

Rationale:

Education has five aspects – information, concepts, attitude, imagination and freedom. The purpose of education is to prepare a person for life. It is well known fact that the age group of 16-30 years is extremely crucial. This is the age where issues of career, relationships, sex, peer/parental pressures and anxiety about the future all come for the fore simultaneously. For a well-rounded education, it is vital to develop mental clarity on the subject matter. For the youth bogged down by these issues, academic/professional performance and development to their full potential suffers. Youth Empowerment and Skills educates and empowers youth to life challenges as a student and creates professionalism and excellence in their work.

Objectives:

The student will be able to

1. Develop sense of belongingness amongst the students.
2. Develop presentation and communication skills.
3. Develop leadership skills and Work in a team.
4. Develop negotiation and decision making skills.
5. Manage the stress and keep physically fit.

Contents:

Topic No.	Topic & Subtopic	Hours
1	Methodology of group discussions and role-playing to inculcate life-skills.	06
2	Team games to develop public speaking and interpersonal communication skills.	08
3	Talks and Presentations to bring out attitudinal and behavioural changes.	04
4	Breathing techniques (like the world-renowned and well-researched Sudarshan Kriya) to flush out stresses and toxins.	08
5	Aspects of Asanas and Pranayama to increase concentration and clarity of mind.	06
	Total	**32**

Suggested Instructional Strategies:

Group discussions, Role play, case study, Team games, demonstrations, lecturers

Learning Resources:

Audio/video cd's such as YES+ Video, Love moves the world, 5-H programme, communication, pranayama count

Reference Books:

SN	Author	Title	Publisher
1	Sri Sri Ravishankar	Celebrating Silence	Sri Sri Publications
2	Kishanji Varma	Sri Sri Yoga	Sri Sri Publications
3	Sri Sri Ravishankar	Punarnava	Sri Sri Publications
4	Sri Sri Ravishankar	Secret of relationship	Sri Sri Publications

ANNEXURES

Annexure – I.

PROGRAMME - DIPLOMA IN CIVIL ENGINEERING
SAMPLE PATH
ENTRY LEVEL- 10+

Nature of Course	First Year		Second Year		Third Year		Total
	Odd Term	Even Term	Odd Term	Even Term	Odd Term	Even Term	
Compulsory	1102 (03)	1101 (05)	1202 (05)	1204 (06)	1403 (08)	1404 (05)	
	1103 (04)	1104 (04)	1203 05)	1206 (05)	1405(06)	1407 (06)	
	1106 (06)	1105 (06)	1205 (06)	1208 (04)	1406 (08)	1408 (06)	
	1108 (06)	1107 (06)	1207 (05)	1302 (03)	1409 (06)	1410 (04)	
	1109 (06)	1201 (04)	1209 (07)	1401 (07)	1411 (02)	1412 (04)	
	1110 (02)	1210 (08)	1301 (03)	1402 (05)	--	--	
	--	--	--	--	--	--	
Total credits (Compulsory)	**27**	**33**	**31**	**30**	**30**	**25**	**176**
Elective	--	--	--	I) Any **ONE** from Elective : III 1501, 1502, 1503 : (**04**)	I) Any **ONE** from Elective :I 1303, 1304, 1305 : (**03**) II) Any **ONE** from Elective : II 1306, 1307, 1308 : (**03**)	I) Any **ONE** from Elective : IV 1504, 1505, 1506: 1507(**05**) II) Any **ONE** From Elective : V 1508, 1509 1510 :(**05**)	
Total Credits (Elective)	Nil	Nil	Nil	**04**	**06**	**10**	**20**
Total Courses	**06**	**06**	**06**	**07**	**07**	**07**	**39**
Total Credits (Compulsory + Elective)	**27**	**33**	**31**	**34**	**36**	**35**	**196**
Non Examination Credit Courses	The student has to complete any **TWO** non examination credit courses, one from each group of non examination credit courses before the completion of programme.						04
Grand Total of Credits							**200**

Note : Figures in bracket indicates total credits.

Annexure : II

Rules for Registration and Examination

Important Rules of Registration for courses.

1. An eligible student must register to minimum three courses and maximum seven courses during each term.
2. While registering for a course at the beginning of a term, a student shouldn't have backlog of more than seven courses of any term as carried over due to failure or any other reason.
3. A student can register for a Project work only after acquiring minimum 100 credits.
4. A student will have to re - register for a course/s if he / she is detained from the course/s for any reason.

Important Rules regarding Registration for Examination

1. A student can register for examination of only those courses for which he has registered and kept term.
2. A student can register for examination for not more than 10 courses in one examination.
3. A student will have to re-register for examination of theory or Practical / oral of a course if he / she fails in examination.
4. A student will be allowed to re-register for examination in accordance with rules if he / she was eligible to appear for last Examination but he/ she failed to appear last examination for any reason.
5. A student will not be able to cancel his registration after he / she is Registered for examination

Other Important Rules

1. A candidate will be eligible for the award of diploma when he / she acquires the required number of credits for a Programme and complete two - non examination credits courses.
2. No candidate will be allowed to appear for examination of any course unless the Head of the Department certifies that
   2.1 Attended at least 75% of the prescribed lecture hours, tutorial hours, practical hours or any other kind of work and or assignment for the course as the case may be in conformity with the provision laid down in the course contents.
   2.2 Satisfactorily completed specified laboratory practical, term work prescribed in curriculum for the course.
3. No candidate will be permitted to reappear to any course of any examination in which he has once passed.

Standard of Passing

1. Theory, total of theory and periodic test, practical, oral and termwork examination shall be separate head of passing.
2. To pass examination of any course, a candidate must obtain a minimum of 40% marks in each head of passing prescribed for that course taken separately.

Periodic Test

1. Two periodic tests will be conducted during each term for the courses as per their examination scheme.
2. Average marks of the two period tests will be considered for each course separately.
3. Reappearing for the periodic test for improvement of marks is not allowed.

Term Work

1. Term work is a document submitted by the candidate consisting of report of site / field visit and / or laboratory work and / or drawing sheets / sketch books / jobs / model. Such term work shall be submitted before the end of academic term and it shall be satisfactory in the opinion of concern faculty member, Head of the Department and Principal of Institute.

Grace Marks

1. Grace marks shall be applicable if the rules of "standards of passing" are fulfilled.
2. The grace of maximum three marks will be given in either in "Theory marks", or "Periodic test" or "total of theory and periodic test marks", if it falls short by maximum three marks to pass a course.
3. The grace of maximum three marks shall not be applicable twice for the same course. i.e. for "theory" and "total of theory and periodic test" of same course.
4. The grace marks are not applicable to practical, oral, term work examination.

Award of Class

First Class with Distinction	:	70% or more
First Class	:	60% and above but less than 70%
Second Class	:	50 % and above but less than 60%
Pass Class	:	40% and above but less than 50 %

Annexure : III

Evaluation Scheme for Project

Term Work : Max. Marks : 50 Min. Marks : 20.
Oral : Max. Marks : 50 Min. Marks : 20.

Progressive Assessment

Name of the student: Enrollment No. :
Term : II / III ODD / EVEN
Programme: Civil Engineering
Course : Project **Code :** 1412 **Project Guide :**

Title of Project :

SN	Project Activities	Date / Week	Leader ship	Understanding	Observation &Accuracy	Contribution	Timely Completion	Total	Signature of Student	Signature of Guide	Signature of HOD
			5	5	5	5	5	25			
1	Formation of team & finalization of project	1									
2	Submission of synopsis : by each group	2									
3	Project activity plan	3									
4	Maintenance Project Diary	6									
5	Visits to Industries / Institutions / Market	7									
6	Collection of Data / Survey	9									
7	Analysis and Presentation of data.	10									
8	Pre submission seminar	13									
9	Presentation of Rough Work : hand written	14									
10	Final Project Report : Submission	15									
	Total by Internal : out of 250										

The Term Work : Convert the total given by internal to "out off 25".

Signature of Project Guide

Project assessment :

Term Work			**Oral**		
Internal	External	Total	Internal	External	Total
25	25	50	25	25	50

Annexure : IV

Programme Wise Committee (PWC) – Civil Engineering

The structure of PWC consists of following members

Sr. No.	Particulars	PWC Post
1	Head of the Department of Civil Engineering Programme, Government Polytechnic, Nashik	Chairman
2, 3	Two Senior Lecturers from Civil Engineering Programme, Government Polytechnic, Nashik	Member
4	One expert in the Programme from the neighbouring Institution	Member
5	Nominee of the Maharashtra State Board of Technical Education, Mumbai	Member
6	One expert from the local Industry	Member
7	In Charge of Curriculum Development Cell	Member Secretary

Meetings of PWC for approval of Curriculum - 2011 Contents :

The contents of Curriculum - 2011 of Diploma Programme in Civil Engineering are approved in the various meetings of PWC held on 27-06-2011 & 04-01-2012.

Annexure : V

Board of Studies (BOS)

The structure of BOS consists of following members

Sr. No.	Particulars	BOS Post
1	Representative of the Industry	Chairman
2 to 11	Head of Department of each Programmes CE/ME/PS/EE/IF/CM/EL/AE/DD/ID	Member
12 to 21	Local experts of each Programmes CE/ME/PS/EE/IF/CM/EL/AE/DD/ID	Member
22	Nominee of the Maharashtra State Board of Technical Education, Mumbai	Member
23	In Charge of Curriculum Development Cell	Member Secretary

Meetings of BOS for approval of Curriculum - 2011 Contents :

The contents of Curriculum - 2011 of Diploma Programme in Civil Engineering are approved in the various meetings of BOS held on 02-07-2011 & 25-04-2012.

Annexure : VI

Governing Body (GB)

The structure of GB consists of following members

Sr. No.	Particulars	GB Post
1	Joint Director of Technical Education, Nashik Region, Nashik	Chairman
2	Nominee from Western Regional Committee. Govt. of India.	Member
3	Coordinator, NITTTR, Extension Centre, Pune	Member
4	Representative from Nashik Industrial Manufacturing Association (NIMA).	Member
5	Representative from District Industries Centre, Nashik	Member
6	Principal, Government Polytechnic, Aurangabad.	Member
7	Chairman of the Local Centre Institute of Engineers (India)	Member
8 to 12	Representative from Industry	Co-opted Members
13	Principal, Government Polytechnic, Nashik	Member Secretary

Meetings of GB for approval of Curriculum - 2011 Contents :

The contents of Curriculum - 2011 of Diploma Programme in Civil Engineering are approved in the various meetings of GB held on 29-07-2011 & 25-05-2012.