SYLLABUS

DIPLOMA IN CIVIL ENGINEERING

Academic Regulation: 2016-2019

E- SCHEME

Academic Year (w.e.f): 2017 - 2018

SESHASAYEE INSTITUTE OF TECHNOLOGY
(Autonomous)
ISO 9001:2008 certified Institute
Tiruchirappalli–620010.

CONTENTS

PREFACE

The wave of liberalization and globalization has created an environment for free flow of information and technology through fast and efficient means the world over. This has lead to shrinking of world, bringing people from different cultures and environment together, giving rise to a global village. A shift has been taking place in India from closed economy to knowledge based and opens economy. In order to cope-up with the challenges of handling new technologies, materials and methods, we have to develop human resources having appropriate knowledge, professional skills and attitudes. Technical education system is one of the significant components for human resource development. Polytechnics play in important role in meeting the requirements of trained technical manpower for industries and field organizations. The initiatives being taken by the Directorate of Technical Education of revise the curriculum of existing diploma programmes as per the needs of the industry are laudable.

In order to meet the requirements of future technical manpower, constant efforts have to be made to identify new employment opportunities, carry out activity analysis and design need based curricula of diploma programmes. This curriculum document has been designed by identifying job potential and competency profile of diploma holders leading to identification of curriculum areas for the course. It is needless to emphasize that the real success of the diploma programme depends upon its effective implementation. This will require harnessing and effective utilization of resources. In addition to acquisition of appropriate physical resources, the availability of competent and qualified faculty is essential. It is time for the managers of technical education system to reorganize the system to accept the challenges of both quantitative and qualitative expansion of technical education.

There are various online training facilities created by the Government of India through MHRD for the benefit of both the Teaching and Student community. Facilities like Spoken-Tutorial, NPTEL, e-Yantra must be exploited to its fullest extent to reap the benefits of interactive electronic media for teaching-learning process. It is hoped that polytechnics will carry out job market research on a continuous basis to identify the new skill requirements and develop innovative methods of course offering and thereby infuse dynamism in the system.

Principal & Chairman.

ACKNOWLEDGEMENTS

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1. i) Commissioner and Principal Secretary, Directorate of Technical Education, Govt. of Tamil Nadu.
2. Principal & Chairman, Seshasayee Institute of Technology, Trichy for initiating this project on designing of curriculum.
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Coordinator

DEPARTMENT VISION, MISSION, PEOs and PO

Vision And Mission Of Department Of Civil Engineering

VISION :

- To achieve excellent standard of quality education by keeping with rapidly changing technologies.
- Attaining global recognition in Civil Engineering education, and training to meet the growing needs of the industry and society.

MISSION:

- To import quality education in civil engineering through well designed curriculum to raise satisfaction level of all stake holder.
- To serve society and the nation by providing provisional civil engineering leadership to find solution to community, regional and global problems and accept new challenges in rabidly changing technology.
- To create competent provisnals who are trained in the design and development of civil engineering systems and contribute towards need of industry requirements.

Program Educational Objectives (PEO):

The educational objectives of the civil engineering programmed are designed to produce skilled engineering who are ready to contribute effectively to the civil engineering profession and ready to handle challenge of the profession .The civil engineering department committed to produced civil engineers who:

PEO1: Shall apply fundamental technical knowledge and skills to find create solutions to technological challenges and problems in various areas of basic science and engineering.

PEO2: Shall be able to analyze design and use skills in order to formulate and solve civil engineering problems.

PEO3: Shall be able to practice civil engineering in a reasonable, professional and ethical manner and implement eco-friendly sustainable technologies for the benefit of industry and society

PEO4: To take up higher education and to engage in civil engineering research and development and allied area of science and technologies.

Program Outcomes (PO):

The programmed targeted and develop the following list of competencies, skills and abilities among students. They shall be able to

PO1	Apply knowledge of mathematics, basic science and core civil engineering to the defined and applied engineering students.
PO2	Identify, formulate and analyze in reaching substantiated solutions using analytical tools.
PO3	Conduct investigation of problems, locate, search and select relevant data from data sheet and literature to provide valid conclusions.
PO4	Design civil engineering structures, components are process to meet desired to meet with appropriate consideration for the public health and safety, cultural, societal, sustainability and environmental considerations.
PO5	Use the current trends and techniques in civil engineering, skills and modern engineering tools. Necessary for professional engineering practice.
PO6	Understand professional and ethical responsibility concerning legal, contemporary, environmental and cultural issues and consequent responsibility relevant to the professional engineering practices and norms are civil engineering practice code and are codes of ethics.
PO7	Function effectively and as a member or leader in diverse teams and in multidisciplinary environment.
PO8	Communicate effectively with engineering community with society at large such as being able to comprehend and write effective repot, prepare documentation, make effective presentations give and receive clear instructions.
PO9	Function as a member of multidisciplinary teams and to understand engineering management's principles and finance to manage projects under multicultural environments.
PO10	Recognize the need for and to engage in life-long learning in civil engineering allies domains as relevant to rapidly changing technology.

DIPLOMA COURSES IN ENGINEERING
(TERM PATTERN)
(Implemented from 2016- 2017)
E – SCHEME
(Common to all Programmes)

R E G U L A T I O N S

1. Description of the Programme:

a. Full Time (3 years)

The Programme for the Full Time Diploma in Engineering shall extend over a period of three academic years, consisting of 6 terms* and the First Year is common to all Engineering Programmes.

The Curriculum for all the 6 Terms of Diploma Programmes have been revised and revised curriculum is applicable for the candidates admitted from 2016 - 2017 academic year onwards.

b. Sandwich (3½ years)

The Programme for the Diploma in Paper Technology (Sandwich) shall extend over a period of three and half academic years, consisting of 7 terms* and the First Year is common to all Engineering Programmes. The courses of diploma Programmes being regrouped for academic convenience.

During 4th and 7th terms, the students undergo industrial training for six months. Examination will be conducted after completion of every 6 months of industrial training

2. Condition for Admission:

The candidates shall be required to have passed in the S.S.L.C Examination of the Board of Secondary Education, Tamil Nadu.

(Or)

The Anglo Indian High School Examination with eligibility for Higher Secondary Course in Tamil Nadu

(Or)

The Matriculation Examination of Tamil Nadu.

(Or)

Any other Examinations recognized as equivalent to the above by the Board of Secondary Education, Tamil Nadu.

Note: In addition, at the time of admission, the candidate will have to satisfy certain minimum requirements, which may be prescribed from time to time.

3. Admission to Second year (Lateral Entry):

A pass in HSC (Academic)# or (Vocational) courses mentioned in the Higher Secondary Schools in Tamil Nadu affiliated to the Tamil Nadu Higher Secondary Board with eligibility for University Courses of study or equivalent examination, & should have studied the following Courses

Sl. No	**Programmes**	**# H.Sc Academic**	**H.Sc Vocational**	
		Courses Studied	**Courses Studied**	
			Related courses	**Vocational courses**
1	All the Regular and Sandwich Diploma Programmes	Maths, Physics & Chemistry	Maths, Physics & Chemistry (any one)	Related Vocational Courses - Theory & Practical

. # Subject to the approval of the AICTE

- For the Diploma Programmes related with Engineering/Technology, the related / equivalent courses prescribed along with Practicals may also be taken for arriving the eligibility.
- Programmes will be allotted according to merit through counseling by the Principal as per communal reservation.
- Candidates who have studied Commerce Courses are not eligible for Engineering Diploma Programmes.

4. Age Limit:

No Age limit.

5. Medium of Instruction:

English

6. Eligibility for the Award of Diploma:

No candidate shall be eligible for the Diploma unless he/she has undergone the prescribed course of study for a period of not less than 3/3 ½ academic years (Full Time/Sandwich), affiliated to the State Board of Technical Education and Training, Tamil Nadu, when joined in First Year and 2/2 ½ years (Full Time/Sandwich), if joined under Lateral Entry scheme in the second year and passed the prescribed examination.

The minimum and maximum period for completion of Diploma Programmes are given below:

Diploma Programmes	Minimum Period	Maximum Period
Full Time	3 Years	6 Years
Full Time (Lateral Entry)	2 Years	5 Years
Sandwich	3½ Years	6½ Years
Sandwich (Lateral Entry)	2½ Years	5½ Years

7. Programmes of Study and Curriculum outline

The Programmes of study shall be in accordance with the syllabus prescribed from time to time, both in theory and practical courses.

8. Examinations:

Autonomous Examinations in all Programmes of all the terms under the scheme of examinations will be conducted at the end of each term for 75 marks.

The internal assessment marks for all the courses will be awarded on the basis of continuous assessment earned during the term concerned. For each course, 25 marks are allotted for internal assessment and 75 marks are allotted for Autonomous end Examination.

9. Continuous Internal Assessment:

A. For Theory Courses:

The Internal Assessment marks for a total of 25 marks, which are to be distributed as follows:

i) Course Attendance- 5 Marks

Award of marks for attendance to each Theory/Practical course will be as per the range given below

% of Attendance	Marks
80% - 83%	1 Mark
84% - 87%	2 Marks
88% - 91%	3 Marks
92% - 95%	4 Marks
96% - 100%	5 Marks

ii) Tests # - 10 Marks 2 Tests each of 2 hours duration for a total of 50 marks are to be conducted and the marks so obtained will be reduced to 5 marks. A Model exam covering all the five units is to be conducted and the marks will be reduced to 5 marks

TEST	UNITS	WHEN TO CONDUCT	MARKS	DURATION
Test I	In 2 Units	End of 5th week	50	2 hours
Test II	In 2 Units	End of 10th week	50	2 hours
Test III	**Model Examination - Compulsory** Covering all the 5 Units. (Autonomous Examinations-question paper pattern).	End of the term	100	3 hours

Question Paper Pattern for the Periodical Test :(Test - I & Test- II)

PART-A: 4 Questions X 2 marks - 8 marks
PART-B: 4 Questions X 3 marks - 12 marks
PART-C: 3 Questions X 10 marks - 30 marks

Total 50 marks

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iii) Assignment / Online test - 10 Marks

- From the Academic year 2016-2017 onwards.

For each Course, Three Assignments/ On line tests are to be given/ conducted each for 20 marks and the average marks scored should be reduced for 10 marks.

All Test Papers and Assignment note books after getting the signature with date from the students must be kept in the safe custody in the Department for verification and audit. It should be preserved for 2 Terms and produced to the inspection team at the time of inspection/verification.

Total : 25 marks

B. For Practical Courses:

The Internal Assessment marks for a total of 25 marks are to be distributed as follows:-

a) Attendance	5 Marks (Procedure for the Award of marks is the same as theory courses)
b) Procedure / Observation and tabulation/ Other Practical related Work	10 Marks
c) Record writing	10 Marks
TOTAL	**25 Marks**

- All the Experiments/Exercises indicated in the syllabus should be completed and the same to be given for final Autonomous examinations.
- The Record for every completed exercise should be submitted in the subsequent Practical classes and marks should be awarded for 20 for each exercise as per the above allocation.
- At the end of the Term, the average marks of all the exercises should be calculated for 20 marks and the marks awarded for attendance is to be added to arrive the internal assessment marks for Practical.
- The students have to submit the duly signed bonafide record note book/file during the Practical Autonomous Examinations.
- All the marks awarded for assignments, tests and attendance should be entered in the Personal Log Book of the staff, who is handling the subject. This is applicable to both Theory and Practical courses.

10. Life and Employability Skills Practical:

Life and Employability Skills Practical with more emphasis is being introduced in IV Term for Circuit Branches and in V Term for other branches of Engineering.

Much Stress is given to increase the employability of the student

Internal Assessment Mark: 25 Marks

11. Project Work:

The students of all the Diploma Programmes have to do a Project Work as part of the Curriculum and in partial fulfillment for the award of Diploma by the State Board of Technical Education and Training, Tamil Nadu. **The Project work must be reviewed twice in the same semester.**

a) Internal assessment mark for Project Work:

Project Review I	**10 marks**
Project Review II	**10 marks**
Attendance	**05 marks** (Procedure for the Award of marks is the same as theory courses)
Total	**25 marks**

Proper records are to be maintained for the two Project Reviews, and they should be preserved for 2 Semesters and produced to the inspection team at the time of inspection/verification.

b) Allocation of Mark for Project Work & Viva Voce in Board Examination:

Viva Voce	**30 marks**
Marks for Report Preparation, Demonstration	**35 marks**
Written Test Mark $ (from 2 topics for 30 minutes duration)	**10 Marks**
Total	**75 marks**

Written Test Mark $:

i) Entrepreneurship: 2 questions X 2 ½ marks = **5 marks**

ii) Disaster Management: 2 questions X 2 ½ marks = **5 marks**

Total = 10marks

Selection of Questions should be from Question Bank, by the External Examiner.

No choice to be given to the candidates.

12. Scheme of Examinations:

The Scheme of examinations for courses is given in **CURRICULAM OUTLINE.**

13. Criteria for Pass:

1. No candidate shall be eligible for the award of Diploma unless he/she has undergone the prescribed course of study successfully in an institution approved by AICTE and affiliated to the State Board of Technical Education & Training, Tamil Nadu and pass all the courses prescribed in the curriculum.

2. A candidate shall be declared to have passed the examination in a course if he/she secures not less than 40% in theory courses and 50% in practical courses out of the total prescribed maximum marks including both the Internal Assessment and the Autonomous Examinations marks put together, subject to the condition that he/she secures at least a minimum of 30 marks out of 75 marks in the Autonomous Theory Examinations and a minimum of 35 marks out of 75 marks in the Autonomous Practical Examinations.

14. Classification of successful candidates:

Classification of candidates who will pass out the final examinations from April 2019 onwards (Joined in first year in 2016-2017 / Joined in second year in 2017-2018) will be done as specified below.

First Class with Superlative Distinction:

A candidate will be declared to have passed in **First Class with Superlative Distinction** if he/she secures not less than 75% of the marks in all the courses and passes all the terms in the first appearance itself and passes all courses within the stipulated period of study 3/ 3½ years (Full Time/Sandwich) without any break in study.

First Class with Distinction:

A candidate will be declared to have passed in **First Class with Distinction** if he/she secures not less than 75% of the aggregate of marks in all the terms put together and passes all the terms except the I and II terms in the first appearance itself and passes all the courses within the stipulated period of study 3/3½ years (Full Time/Sandwich) without any break in study.

First Class:

A candidate will be declared to have passed in **First Class** if he/she secures not less than 60% of the aggregate marks in all terms put together and passes all the courses within the stipulated period of study 3/3½ years (Full Time/Sandwich) without any break in study.

Second Class:

All other successful candidates will be declared to have passed in **Second Class.**

15. Duration of a period in the Class Time Table:

The duration of each period of instruction is 1 hour and the total period of instruction hours excluding interval and Lunch break in a day should be uniformly maintained as 7 hours corresponding to 7 periods of instruction (Theory & Practical).

16. Library:

During the library hours, students have to read newspaper, current scenario and relevant to the department subjects and also prepare the power point and present the same at the end of the semester. Submit the materials to respective staff members.

17. Seminar:

A topic from subjects or current scenario is given to the students. During the seminar hours, students have to present the paper and submit seminar materials to respective staff member

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SALIENT FEATURES OF THE DIPLOMA PROGRAMME IN CIVIL ENGINEERING

1. Name of the Programme : Diploma in Civil Engineering

2. Duration of the Programme : Three years

3. Entry Qualification : S.S.L.C or prescribed by Directorate Technical Education and Lateral Entry in Second Year Admission for Plus-two Students.

4. Intake : 60+12 for regular course and
   60 for Self supporting course

5. Pattern of the Programme : Term Pattern(I to VI)

6. Ratio between Theory &Practical : 50:50(Approx.)

EMPLOYMENT OPPORTUNITIES

Employment opportunities for diploma in Civil Engineering are visualized in following industrial at various levels / positions.

a. In Govt. Side -

PWD (Buildings, Irrigation),
Housing Board,
Highways,
Railways,
Water Board,
Environmental and Pollution Control &
Electricity Board, etc.,

b. Industrial Side- All Industries includes in Rebar detailing also.

c. Research Organizations like CSIR, ISRO etc.

d. Entrepreneurs in Design, and Civil Contractor, etc.,

COMPETENCY PROFILE

Keeping in view the employment opportunities of diploma holders in Civil engineering the course is aimed at developing following knowledge and skills in the students:

1. Basic understanding of concepts and principles of civil engineering so as to enable the students to apply the knowledge.

2. Development of communication and interpersonal skills for effective functioning in the world of work.

3. Ability to read and interpret drawings related to Civil Engg.

4. Knowledge of various materials used in Civil Engg., their properties and specifications.

5. Ability to prepare plan, section and elevation of a building, bridge drawing and structural drawing.

6. Ability to calculate the estimate of the Building & Bridges etc..

7. Ability to Design the R.C.C. Structures and Steel Structures.

8. Appreciation of the need of clean and green environment and its deterioration by various emissions from industry and preventive procedures and knowledge of safety regulations.

9. Development of generic skills of thinking and problem – solving, communication attitudes and value system for effective functioning in construction side.

10. Understanding of the basic principles of managing men, material and machines / equipment for construction of buildings and others.

11. Proficiency in the use of computers.

12. Basic manual and machining skills for maintaining the quality of materials.

13. Knowledge of properties of materials used for construction.

14. Development of good personality in order to have effective communication and business ethics

CURRICULUM AREAS AS DERIVED FROM COMPETENCY PROFILE

The following curriculum areas have been derived based on competency profile.

S.NO	Competency profile	Curriculum Areas / Subjects
1	Basic understanding of concepts and principles related to applied sciences like physics, chemistry and mathematics.	Applied physics Applied chemistry Applied mathematics
2	Development of communication and inter personal skill for effective functioning in the world of work.	Communication skills
3	Understanding of basic concepts and principles of mechanical, electrical and civil engineering.	Applied Mechanics General workshop practice
4	Ability to read and interpret drawings related to civil Engg. Etc,	Engineering drawing
5	Quality of construction and maintenance of buildings	Construction Practice Project Management with MIS
6	Quality of various materials used in Civil Engg.	Engineering materials
7	Knowledge of Civil Engg. Works in Transport(Road ways, Rail ways etc.,)	Transportation Engg.
8	Knowledge Of Planning Of Buildings And Other Structures.	Civil Engineering Drg.-I Cad in Civil Engg. Drg.-I Civil Engineering Drg.-II Cad in Civil Engg. Drg.-II
9	Proficiency in the use of computers	Computer Applications In Civil Engineering Cad in Civil Engg. Drg.I& II
10	Ability to Design the Structures(RCC & STEEL)	Analysis of structures(SOM& MOS) Structural Engineering Structural Design & Drawing
11	Knowledge of earth's surface and calculation of areas and volumes of land.	Surveying I &II including contours
12	Appreciation of the need of clean and green environment and its deterioration by various emissions from industries and traffics in roads of preventive procedures & impurities of water.	Environmental Engg. & Pollution control.
13	Development of generic skills of thinking and problem-solving, communication, attitudes and value system for effective recruitment in placement.	Industrial visits Project work Communication Skills & Aptitude class
14	Understanding of the basic principles of managing men, material and machines / equipment for optimum production	Entrepreneurship Management & Project Management with MIS

ABSTRACT OF CURRICULUM AREAS / SUBJECTS / CURRICULUM OUTLINE

a. Core coursed in engineering / technology

1. Engineering Mechanics
2. Construction Materials and Construction Practice
3. Surveying-I
4. Hydraulics
5. Civil Engineering Drawing I
6. Materials Testing Lab– I and Hydraulics Lab
7. Survey Practical – I
8. Estimating And Costing I

b. Applied coursed in engineering / technology

9. Mechanics Of Structures
10. Transportation Engineering
11. Surveying –II
12. Material Testing Lab-II
13. Survey Practical-II
14. Structural Engineering
15. Environmental Engineering & Pollution Control.
16. Elective Theory
    1. Water and Resource Management (EWRM).
    2. Remote Sensing &GIS (ERSG)
    3. Advanced Construction Technology (EACT).
17. Civil Engineering Drawing II
18. Environmental Engg. & Plumbing Lab
19. Project Engg. Management with MIS
20. Estimating and Costing-II
21. Elective Theory
    1. Building Services and Rehabilitation Structures (EBSRS).
    2. Steel Structures (ESS)
    3. Earth Quake Engineering (EEQE)
22. Structural Design &Drawing.
23. Construction Practice Lab

c. Diversified coursed in engineering / technology

24. CAD in Civil Engineering Drawing I
25. CAD in Civil Engg. Drawing II
26. Life and Employability Skill Practical
27. Computer Applications in Civil Engineering
28. Project Work with Entrepreneurship & Disaster Management

CURRICULUM OUTLINE

TERM III

Sl.No	Course Code	Course Title	Load Allocation			Mark Distribution		Total Mark
			T	P	C	Internal	External	
THEORY								
1	1E3201	Engineering Mechanics	5		5	25	75	100
2	1E3202	Construction Materials And construction Practice	5		5	25	75	100
3	1E3203	Surveying-I	4		4	25	75	100
4	1E3204	Hydraulics	5		5	25	75	100
PRACTICAL								
5	1E3205	Civil Engineering Drawing I	2	4	4	25	75	100
6	1E3206	Materials Testing Lab– I And Hydraulics Lab		4	2	25	75	100
7	1E3207	Survey Practical – I	1	4	3	25	75	100
8		Library	1					
		Total	23	12	28	175	525	700

TERM IV

Sl.No	Course Code	Course Title	Load Allocation			Mark Distribution		Total Mark
			T	P	C	Internal	External	
THEORY								
1	1E4301	Mechanics of structure	5		5	25	75	100
2	1E4302	Transportation Engineering	5		5	25	75	100
3	1E4303	Surveying –II	4		4	25	75	100
4	1E4208	Estimating And Costing I	5		5	25	75	100
PRACTICAL								
5	1E4304	Material Testing Lab-II		4	2	25	75	100
6	1E4305	Survey Practical-II		6	3	25	75	100
7	1E4401	Cad In Civil Engineering Drawing I	1	4	3	25	75	100
8		Library	1					
		Total	21	14	27	175	525	700

TERM V

Sl.No	Course Code	Course Title	Load Allocation			Mark Distribution		Total Mark
			T	P	C	Internal	External	
THEORY								
1	1E5306	Structural Engineering	6		6	25	75	100
2	1E5307	Evironmental Engg. & Pollution Control	5		5	25	75	100
3	1E5308	Elective Theory-I	5		5	25	75	100
PRACTICAL								
4	1E5309	Civil Engineering Drawing II	2	4	4	25	75`	100
5	1E5310	Environmental Engg. & Plumbing Lab		4	2	25	75	100
6	1E5402	Cad In Civil Engg. Drawing II	2	2	3	25	75	100
7	1E5403	Life And Employability Skill Practical		4	2	25	75	100
8		Seminar	1					
		Total	21	14	27	175	525	700

TERM VI

Sl.No	Course Code	Course Title	Load Allocation			Mark Distribution		Total Mark
			T	P	C	Internal	External	
THEORY								
1	1E6311	Project Engg. Mgt. With Mis	5		5	25	75	100
2	1E6312	Estimating And Costing-Ii	6		6	25	75	100
3	1E6313	Elective Theory-II	5		5	25	75	100
PRACTICAL								
4	1E6314	Structural Design & Drag.	2	4	4	25	75`	100
5	1E6404	Comp.Appls. In Civil Engg.	2	2	3	25	75	100
6	1E6315	Construction Practice Lab	2	2	3	25	75	100
7	1E6405	Project Work With Enterprenurship & Disaster Management		4	2	25	75	100
8		Seminar	1					
		Total	23	12	28	175	525	700

HORIZONTAL AND VERTICAL ORGANISATION OF THE SUBJECTS

SL. NOz.	COURSE CODE	SUBJECT	TERM	CREDITS				
				Foundation	Core	Applied	Diversified	Value added Course
	CORE							
1	1E3201	Engineering Mechanics	III		5			
2	1E3202	Construction Materials And Construction Practice	III		5			
3	1E3203	Surveying-I	III		4			
4	1E3204	Hydraulics	III		5			
5	1E3205	Civil Engineering Drawing I	III		4			
6	1E3206	Materials Testing Lab– I And Hydraulics Lab	III		2			
7	1E3207	Survey Practical – I	III		3			
8	1E4208	Estimating And Costing I	IV		5			
	APPLIED							
9	1E4301	Mechanics Of Structures	IV			5		
10	1E4302	Transportation Engineering	IV			5		
11	1E4303	Surveying –II	IV			4		
12	1E4304	Material Testing Lab-II	IV			2		
13	1E4305	Survey Practical-II	IV			3		
14	1E5306	Structural Engineering	V			6		
15	1E5307	Environmental Engg. & Pollution Control.	V			5		
16	1E5308	**Elective Theory** 1. Water resource management 2. Remote Sensing &GIS 3. Advanced Construction Tech.	V			5		
17	1E5402	Civil Engineering Drawing II	V			4		
18	1E5310	Environmental Engg & Plumbing Lab	V			2		
19	1E6311	Project Engg. Mgt With MIS	VI			5		
20	1E6312	Estimating And Costing-II	VI			6		

21	1E6313	**Elective Theory** 1.Building Services & Rehabilation Structures .(EBSRS) 2. Steel Structures(ESS) 3.Earth Quake Engineering(EEQE)	VI			5		
22	1E6314	Structural Design & Drg.	VI			4		
23	1E6315	Construction Practice Lab	VI			3		
DIVERSIFIED								
24	1E4401	CAD In Civil Engineering Drawing I	IV				3	
25	1E5402	CAD In Civil Engg. Drawing II	V				3	
26	1E5403	Life and Employability Skill Practical	V				2	
27	1E6404	Computer Applications In Civil Engineering	VI				3	
28	1E6405	Project Work With Ent..&dis.mgt.	VI				2	
TOTAL					**33**	**64**	**13**	

III SEMESTER

1E3201 - ENGINEERING MECHANICS

Rationale:

During design of any structural member, the analysis of structure is very important. The application of loads and its effect on the member is also equally important. The knowledge of physical property and its structural behavior is very essential. So these things are included in Strength of materials.

Course Objectives:

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

- Define Mechanical Properties of materials and different type of stress and strain.
- Understand the applications of stress and strain in engineering field.
- Analyze determinate beams and sketch S.F. and B.M. diagram.
- Locate the position of centroid of different geometrical section and Built up section and determine Ixx, Iyy, Zxx, Zyy of different geometrical section & built up sections.
- Derive simple bending eqn. and understand its applications.
- Derive Torsional equation and understand its applications.
- Analyze Pin Jointed Frames analytically and graphically.
- Solve simple problems in the course of study.

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
1E3201	5	75	5	Internal	External	Total	3 Hrs
				25	75	100	

UNITS –ALLOCATION OF HOURS AND MARKS			
Unit No.	Topics	No. of Hours	Marks
I	Simple Stresses and Strains - Introduction To Stresses And Strains & Application in Engineering Field Introduction To Stresses And Strains	12	20
II	Shear Force And Bending Moment	12	20
III	Geometrical Properties Of Sections &Moment Of Inertia	12	20
IV	Stresses In Beams And Shafts Principal Stresses And Strains	12	20
V	Pin Jointed Frames – Analytical & Graphical Method	12	20
	Cycle Tests, Model exams & Revision Classes (2+2+3+8)	15	--
	Total	75	100

1E3201 ENGINEERING MECHANICS
CONTENT DETAILS

UNIT-I SIMPLE STRESSES AND STRAINS

1.1 Introduction to Stresses and Strains

Definitions of: Force, Moment of force, Actions and reactions, Statics, Static equilibrium of bodies, Mechanics, Engineering Mechanics - Conditions of static equilibrium - Types of forces on structural members - Study of strength of material - Mechanical properties of materials - Rigidity, Elasticity, Plasticity, Compressibility, Hardness, Toughness, Stiffness, Brittleness, Ductility, Malleability, Creep, Fatigue, Tenacity, Durability -Definitions of stress and strain - Types of stresses, Tensile, Compressive and Shear stresses - Types of strains - Tensile, Compressive and Shear strains - Complimentary shear stress - Diagonal tensile / compressive stresses due to shear - Elongation and Contraction - Longitudinal and Lateral strains - Poisson's Ratio - Volumetric strain - Simple problems in computation of stress, strain, Poisson's ratio, change in dimensions and volume etc- Hooke's law - Elastic Constants - Definitions of Young's Modulus of Elasticity - Shear modulus (or) Modulus of Rigidity - Bulk Modulus (or) Modulus of Compressibility - Derivations for the relationship between elastic constants - Simple problems - Young's modulus values of few important engineering materials.

1.2 APPLICATION OF STRESS AND STRAIN IN ENGINEERING FIELD:

Behavior of ductile and brittle materials under direct loads - Load Extension curve (or) Stress Strain curve of a ductile material - Limit of proportionality, Elastic limit, Yield stress, Ultimate stress, Breaking stress, Actual / Nominal stresses - Working stress - Factor of safety – Percentage elongation - Percentage reduction in area - Significance of percentage elongation and reduction in area of cross section - Deformation of prismatic and stepped bars due to uni axial load - Deformation of prismatic bars due to its self weight - Numerical problems. Composite Sections - Examples of composite sections in Engineering field- Advantages - Assumptions made -Principles of analysis of Composite sections - Modular ratio – Equivalent area - Stresses in the materials - Problems on axially loaded composite sections like RC.C / Encased columns.

UNIT-II SHEAR FORCE AND BENDING MOMENT

2.1 TYPES OF LOADS AND BEAMS:

Definitions of: Axial load, Transverse load, Concentrated (or) Point load, Uniformly Distributed load (UDL), Varying load - Types of Supports and Reactions: Simple support, Roller support, Hinged support, Fixed support; Vertical reaction, Horizontal reaction, Moment reaction- Types of Beams based on support conditions- Diagrammatic representation of beams, loads and supports- Static equilibrium equations - Determinate and indeterminate beams.

2.2 SHEAR FORCE AND BENDING MOMENT IN BEAMS:

Definitions of Shear Force and Bending Moment - Conventional signs used for S.F. and B.M - S.F and B.M of general cases of determinate beams -S.F and B.M diagrams for Cantilevers, Simply supported beams and Overhanging beams - Position of maximum

BM - Point of contra flexure -Derivation of Relation between intensity of load,S.F and B.M. – Numerical problems on S.F and B.M.(Determinate beams with concentrated loads and udl only)sections – rectangular sections only – simple problems.

UNIT-III GEOMETRICAL PROPERTIES OF SECTIONS &MOMENT OF INERTIA

3.1 GEOMETRICAL PROPERTIES OF SECTIONS

Geometrical properties - Definitions and examples of Symmetrical, Anti Symmetrical, Asymmetrical shapes - Definitions of centre of gravity and centroid - Centroid of Symmetrical shapes(solid/hollow square, rectangular, circular, I Sections) - Centroid of Asymmetrical shapes(triangular, semi circular, quadrant, trapezoidal, parabolic sections)-Centroid of Anti Symmetric shapes (S,Z sections) - Built up structural sections – Problems.

3.2 MOMENT OF INERTIA

Definitions of: Inertia, Moment of Inertia, Polar moment of inertia, Radius of gyration, Section Modulus, Polar modulus - Parallel and perpendicular axes theorems - Derivation of expressions for M.I / Polar M I, Section modulus and Radius of gyration of regular geometrical plane sections (rectangle, circle, triangle) - M.I. about centroidal axis/base, Section modulus, Radius of gyration of symmetric, asymmetric, anti symmetric and built up section- Numerical problems.

UNIT-IV STRESSES IN BEAMS AND SHAFTS

4.1 STRESSES IN BEAMS DUE TO BENDING:

Types of Bending stresses - Neutral axis - Theory of simple bending - Assumptions- Moment of resistance - Derivation of flexure/bending equation $M / I = E / R = \sigma/y$ - Bending stress distribution - Curvature of beam - Position of N.A and centroidal axis - Stiffness equation – Flexural rigidity - Strength equation - Significance of Section modulus – Numerical problems.

4.2 STRESS IN SHAFTS DUE TO TORSION:

Definitions of: Shaft, Couple, Torque (or) Twisting moment - Types of Shafts (one end fixed and the other rotating, both ends rotating at different speeds) - Theory of Pure Torsion - Assumptions -Derivation of Torsione quation, $T / I_p = \lambda_{max} / R = G\Theta / l$ - Shear stress distribution in circular section due to torsion - Strength and Stiffness of shafts - Torsional rigidity -Torsional modulus - Comparative analysis of hollow and solid shafts -Power transmitted by a shaft - Numerical problems.

4.3 PRINCIPAL STRESSES AND STRAINS:

Introduction – Principal planes – Principal stresses – Principal strains – member subjected to direct stress in one plane – Two planes – mohr's circle - theory only.

UNIT-V PIN JOINTED FRAMES

5.1 ANALYSIS BY ANALYTICAL METHOD (METHOD OF JOINTS):

Definitions of: Frame / Truss, Pin Joint, Nodes, Rafters, Ties, Struts, Slings - Determinate and indeterminate frames -Classification of frames – Perfect and imperfect frames - Deficient / Instable and redundant frames -Formulation of a perfect frame - Common types of trusses – Support conditions - Resolution of a force - Designation of a

force - Nature of forces in the frame members - Analysis of Frames - Assumptions - Methods of analysis - Analytical methods - Method of Joints and Method of Sections - Problems on Analysis of cantilever and simply supported perfect frames(with not more than ten members) with vertical nodal loads by method of joints only. Identification of members with nil force in a determinate truss.

5.2 ANALYSIS BY GRAPHICAL METHOD:

Graphic statics - Advantages - Space diagram - Bow's notation-Resultant force (or) Equivalent force -Equilibrant force -Vector diagram -Determination of magnitude and nature of forces in the members of a cantilever / simply supported determinate trusses (with not more than ten members) with vertical nodal loads only.

Text Books:

Sl.No.	Title	Author	Publisher
1.	Strength of Materials- 2006	R.S. Khurmi & N. Khurmi	S. Chand & company Ltd.

Reference Book:

Sl.No.	Title	Author	Publisher
1.	Engineering Mechanics-2014	Dr.N.Kottiswaran	Sri Balaji publications.
2.	Engineering Mechanics-2010	Bansal .R.K	Laxmi Publications, New Delhi.
3.	Engineering Mechanics-4th edition	S.S. Bhavikatti	Vikas Publications Private Ltd.
4.	Strength of materials (2011)	B.C.Punmia	Laxmi Publications, New Delhi.

Online Source:

1. John P. Kottcamp (1919) Strength of Materials http://books.google.com/books?id=f580AAAAMAAJ&dq=strength%20of%20materials&pg=PP1#v=onepage&q&f=false
2. James E. Boyd (1911) Strength of Materials http://books.google.com/books?id=07w0AAAAMAAJ&dq=strength%20of%20materials&pg=PP1#v=onepage&q&f=false

Course outcome :

C01	Able to analyze the structural members subjected to tension, compression, torsion, bending and combined stress using the fundamental concepts of stress, strain and elastic behavior of materials
C02	Able to analyze the pin jointed frames graphically and statically.
C03	Perform engineering work in accordance with ethical and economic constraints related to the design of structures.
C04	Utilize appropriate materials in design considering engineering properties, sustainability ,

1E3202 – CONSTRUCTION MATERIALS AND CONSTRUCTION PRACTICE

Rationale:

Construction materials and construction practice is an essential course for all Civil Engineering students. The Civil Engineering technician should know methods of application of various building materials to fulfill the desired construction needs. These skills can be developed in students by this course. Major items of construction are covered in this course. Moreover, construction machinery and formwork in construction are also covered in this course. This course will be useful for the technicians to carryout construction works at the site as per given drawings and specifications and also select appropriate material for the given item of work on site. Scope for site visits is also included to strengthen the teaching learning process.

Course Objectives:

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

- State different construction materials and their properties.
- State and explain different types of modern building materials such as ceramic products, glass, metals, plastics, flooring materials, light roofing materials etc.
- Describe the different types of foundations, stone masonry, brick masonry of doors, windows, lintels & stairs, floors and roofs.
- Explain the methods of scaffolding, shoring, underpinning, form work, color washing and white washing.

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
1E3202	5	75	5	Internal	External	Total	3 Hrs
				25	75	100	

UNITS –ALLOCATION OF HOURS AND MARKS			
Unit No.	Topics	No. of Hours	Marks
I	Introduction- Rocks & Stones, Bricks, Lime, Pozzolanas &Gypsum, Cement, Water, Glass, Ceramic Products.	12	20
II	Mortar, Concrete, Paints &Varnishes, Metals &Plastics, Timber& Timber, Roof Coverings, Damp Proofing Materials, Geo-synthetics	12	20
III	Mortar, Concrete, Paints &Varnishes, Metals &Plastics, Timber& Timber Products, Damp Proofing Materials, Geo-synthetics	12	20
IV	Doors, Windows & Ventilators, Hollow Block Constructions, Stairs, Floors &Flooring, Roof, Weathering Course	12	20
V	Pointing, Plastering, Whitewashing, ColourWashing, Distempering Painting & Varnishing, Scaffolding, Shoring, Under pinning& Formwork.	12	20
	Cycle Tests, Model exams & Revision Classes(2+2+3+8)	15	--
	Total	75	100

1E3202 CONSTRUCTION MATERIALS AND CONSTRUCTION PRACTICE

CONTENT DETAILS

UNIT –I

1.1 INTRODUCTION:

Physical properties of materials – Density, Bulk density, Specific gravity, porosity, water absorption, permeability, Chemical resistance, fire resistance, weathering resistance, Thermal conductivity, Durability.(Definitions only)

1.2 ROCKS AND STONES:

Rocks – Classification of Rocks – Geological, Physical and Chemical classification – Uses of stones – Requirements of a good building stone – Natural stones for flooring – Cuddappa slabs, Kota stone, Sand stone, Shahabad stone , Granite, Marble –Artificial stones.

1.3 BRICKS:

Definition – Brick earth – Composition of good brick earth – Manufacturing process – classification of bricks – properties of bricks – special types of bricks and their uses – compressive strength of bricks –Tests on bricks - grade of bricks as per BIS

1.4 LIME, POZZOLANAS AND GYPSUM:

Sources of lime – classification lime – Fat, Hydraulic and Poor lime - uses of lime, Pozzolanic materials – Surki, Flyash, Ground blast furnace slag, Rice husk ash – Advantages of addition of pozzolanas. Gypsum-properties and its uses

1.5 CEMENT:

Definition – Composition of ordinary Portland cement – Functions of cement ingredients – Different types of cements – Grades of cement (33,43 and 53) –Storage of cement - Tests of cement – objects of each test – Test requirements/ BIS specifications of OPC - Admixtures – Definition –types and uses.

1.6 WATER:

General–Limits of deleterious materials allowed in the water for construction – Use of Brackish or Sea water for construction- Estimation of sulphates in ground water – Test results on water for construction.

1.7 GLASS:

Definition – Constituents of glass – Classification of glass – Functions and Utility – Types of glass – sizes and thickness – uses in buildings.

1.8 CERAMIC PRODUCTS:

Definition – Earthenware , Stoneware , Porcelain , Terracotta, Glazing, Tiles(Definitions only) – Types of Tiles – Clay Terracing tiles – Thermal care tiles – Glazed Ceramic tiles – Fully Vitrified tiles – Roof tiles special requirements for floor, wall and roof tiles– Sanitary appliances.

UNIT-II

2.1 MORTAR:

Definition – Properties and uses of mortar – Types of mortar – Cement and Lime mortar – Mix ratio of cement mortars for different works.

2.2 CONCRETE:

Definition – Constituents of concrete and their requirements – uses of concrete – Types of concrete: Lime concrete, cement concrete and light weight concrete.

2.3 PAINTS AND VARNISHES:

Definition – Functions of paint – Types of paints and their uses - Oil, Enamel, Emulsion, Distemper, Cement, Aluminium, Bituminous and Plastic paints - Varnishes – Definition – characteristics of a good varnish –Ingredients of varnish– Types of varnish and their uses –Oil, Turpentine, Spirit and water varnish.

2.4 METALS AND PLASTICS:

Types of metals used in construction – Cast Iron ,Steel, Aluminium, G I, Stainless steel – Market forms of steel – Steel for reinforced concrete – steel for pre stressed concrete – Hot rolled steel sections – cold formed light gauge section.- Plastics – Characteristics and Uses of plastics – Types –Thermoplastics and Thermosetting plastics – Various plastic products: pipes, taps, tubs, basins, doors, windows, water tanks, partitions – sizes, capacity and uses - Advantages of plastics – UPVC pipes and fittings - Asbestos - uses of asbestos.

2.5 TIMBER AND TIMBER PRODUCTS:

Types of Timber – Teak, Sal, Rosewood, Mango, and Jack – Defects in timber – seasoning of timber - objectives – Timber Products – Veeners, Ply woods , Particle Board , Fibre board, Hard board, Block board, Laminated board – Uses.

2.6 ROOF COVERINGS:

Definition – objectives and uses -Mangalore tiles – AC Sheets – FRB Sheets- G.I. sheets- Shell roof – R.C.C. roof – Advantages – Types.

2.7 DAMP PROOFING MATERIALS:

Materials used for damp proofing – Properties and functions of various types of water proofing materials commonly available – chemicals used for grouting / Coating porous concrete surfaces – Admixtures for cement mortar and cement concrete – Functions of Admixtures – Accelerators, Retarders, Air repelling chemicals.

2.8 GEOSYNTHETICS:

Introduction- uses in civil engineering-classification-properties of geo-textiles-uses in embankments.

UNIT- III

3.1 INTRODUCTION:

Permanent and temporary structures – Life of structures – Sub structure –super structure – load bearing structure – framed structure – concept of framed structure – advantages of framed structure.

3.2 FOUNDATION:

Definition – objectives of foundation – Bearing capacity of soil – Definition – maximum/ultimate and safe bearing capacity - Bearing capacity of different types of soils – Factors affecting bearing capacity – Requirements of a good foundation–Types of foundations – Shallow foundation: Spread foundation, Isolated column footing, combined footing, continuous footing, Raft foundation – Deep foundation : Pile, Stone columns – Types of piles : Bearing pile, Friction pile, under reamed pile – Causes of failure of foundation – Remedial measures.

3.3 STONE MASONRY:

Definition – Common terms used: Natural bed, sill, corbel, course, cornice, coping, weathering, throat, spalls, quoins, string course, lacing course, through stone, plinth, jambs – Classification of stone masonry – Rubble masonry: Coursed, un coursed & Random rubble masonry – Ashlar masonry– points to be considered in the construction of stone masonry – Tools used – Trowel, square, sprit level, plumb bob, chisel line & pins, spall hammer, punch, pitching tool.

3.4 BRICK MASONRY:

Definition – Common terms used – Header, stretcher, bed joint, lap, perpend, closer, king, queen& beveled, bat – permissible loads in brick masonry - Bond - Types – Header, stretcher, English bond & Flemish bond – one brick thick and one and a half brick thick– 'T' junction in English bond–Points to be considered in the construction of brick masonry – Cavity bond masonry- Defects in brick masonry – Maintenance of brick masonry.- Reinforced brick masonry – purpose – Reinforced masonry walls – Masonry reinforced columns - Advantage with respect to strength and Earthquake resistance.

3.5 PARTITION:

Definitions–Requirements of good partition walls – Types – Brick, Concrete, glass, Aluminum frame with Glass sheet, timber, straw board, wood wool, Asbestos Cement board and plastic board partitions.

3.6 WATER PROOFING AND DAMP PROOFING:

Dampness – Causes of dampness – Effects of dampness - Damp proofing –Damp proof courses (DPC) — Method of mixing – Bad effects of excessive Admixtures in RCC – Water proofing coats for sump / over head tank walls– Methods of grouting.

UNIT-IV

4.1 DOORS, WINDOWS AND VENTILATORS:

Standard sizes of doors and windows – Location of doors and windows –Different materials used – Doors – Component parts – Types – Framed and panelled – gazed, flush, louvered, collapsible, rolling shutter and sliding doors – Windows – Types –Casement, Glazed, Bay, Corner – pivoted Circular and Dormer windows – Ventilators – Definition – purpose – Types – Mosquito proof – Ventilator combined with windows / doors.

4.2 HOLLOW BLOCK CONSTRUCTIONS:

Hollow blocks – Advantages of hollow blocks – load bearing and non load bearing hollow blocks - – Open cavity blocks – face shells, web, gross area, nominal dimensions of blocks, minimum thickness of face shells and web, grades of hollow concrete blocks - Materials used, admixtures added –mixing, molding, lacing and compacting, curing, drying– Physical requirements – Use of light weight aggregates -Hollow concrete (Hollow Block) masonry –Construction of walls– Advantages of hollow concretes masonry.

4.3 STAIRS:

Definition – Terms used – Location of stair – types – Straight, Dog legged, open well, bifurcated and spiral stairs – Moving stairs (Escalators) – Lift –components – uses and advantage of lifts over stairs.

4.4 FLOORS AND FLOORING:

Floors - Definition – Types – Timber, Composite, RCC floors –Flooring -Definition- Materials used – Selection of flooring – types–Construction Methods(As per C.P.W.D. Specifications) Mosaic, Granolithic, Tiled, Granite, Marble, Pre cast concrete flooring, Plastic & PVC tile flooring- Carpet tile & Rubber flooring.

4.5 ROOF:

Definition –Types of roof – Flat roof – RCC roof – Pitched roof – Tile roof –Shell roof – Technical terms - Steel roof truss – Types: King post, Raised chord , Howe truss, Fan, fink , north light and Modified north light trusses.

4.6 WEATHERING COURSE:

Weathering course –Purpose-Materials Required- Brick Jelly Concrete preparation – Laying procedure- Preparation of mortar with Damp Proof materials for laying pressed clay tiles- Pointing and finishing of laid clay tiles.

UNIT-V

5.1 POINTING:

Objectives – Mortar for pointing – Methods of pointing(As per C.P.W.D. Specifications)–Types of pointing – Flush, recessed, weathered, keyed or grooved pointing.

5.2 PLASTERING:

Definitions – Objectives – Cement mortars for Plastering - Requirements of a good plaster – Methods of Plastering- Defects in plastering- Stucco plastering –Acoustic plastering – Granites silicon- plastering – Barium plastering – Asbestos marble plastering – Facde finishing(Structural Glazing)Sand faced – Pebble dash – Wall paper finishing–Wall tiling.

5.3WHITEWASHING,COLOURWASHING,DISTEMPERING,PAINTING& VARNISHING:

White washing – preparation of surface – Application of white wash – Color washing - Distempering – Preparation of surfaces – Application of distemper-Painting & Varnishing - Preparation of surface – Application of Painting & Varnishing.

5.4 ANTI TERMITE TREATMENT:

Definition – objectives and uses – Methods of termite treatment.

5.5 SCAFFOLDING, SHORING AND UNDER PINNING:

Scaffolding – Definition – Component parts – Types – Single, double & Steel scaffolding, Shoring – Definition – Types – Raking, flying and dead shores – Underpinning – definition – Purpose – Types – Pit Methods – Pile Method.

5.6 FORM WORK:

Definition – Materials used –Requirements of a good form work – Formwork for column, RC beams and RC slab.

Text Books:

Sl.No.	Title	Author	Publisher
1.	Building construction - 2015	S.C.Rangwala	Charotar Publishing House
2	Engineering Materials - 2015	S.C.Rangwala	Charotar Publishing House

Reference Book:

Sl.No.	Title	Author	Publisher
1.	Building construction - 2016	B.C.Punmia,	Laxmipublications(p)Ltd,New Delhi
2.	Building Materials - 2012	S.K.duggal	New age publication.
3.	Building Material and construction - 2014	S.S.Bhavikatti	Vikas publishing house
4.	Building Materials - 2015	P.C.Varghese,	Prentice hall of India, New Delhi.
5.	Materials of construction-2001	D.Ghose,	TataMcGraw-HillPublishers, NewDelhi

Online Source:

1. http://thebooksout.com/downloads/%20%20of%20building%20materials%20bc%20punmia%20%20ebook
2. https://sites.google.com/a/mitr.iitm.ac.in/iitmcivil/ce2330

Course outcome:

C01	Know the different construction materials and their properties
C02	Know the different types of footing, flooring, lintel, roofing, masonry works such as brick and stone masonry.
C03	Able to know the methods of pointing, plastering, scaffolding, shoring and underpinning, painting and colour washing
C04	Know the different types of doors and windows

1E3203 SURVEYING –I

RATIONALE

For preparing any map or drawing, the initial requirement is to conduct the survey. One can only survey when he understands the various steps involved in the survey work. For this he must be able to operate and handle various survey instruments/equipment like compass, level, plane table etc. In this course such desired performing abilities will be developed which may be expected of a Civil Engg. Technician. The Civil Engg. Technicians are often required to use survey instruments on site or on field and are also required to measure angle, length, area, elevation etc. Moreover, they are sometimes required to update or check the given details in the map or drawing.

OBJECTIVES

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

- Explain the principle of surveying
- Enumerate the instruments used in Surveying
- State different types of Levels and different methods of levelling
- Computation of Areas, Simple problems using Trapezoidal and Simpson's rule etc.
- Define contour and Explain different methods of contouring
- Explain Aerial Survey and Remote sensing

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
				Internal	External	Total	
1E3203	4	60	4	25	75	100	3 Hrs

UNITS –ALLOCATION OF HOURS AND MARKS			
Unit No.	Topics	No. of Hours	Marks
I	Introduction - Chain Surveying -Compass Surveying	09	20
II	Compass Surveying	09	20
III	Levelling	09	20
IV	Application of Levelling	09	20
V	Contour Surveying - Global Positioning System & Aerial Survey	09	20
	Cycle Tests, Model exams & Revision Classes (2+2+3+8)	15	--
	Total	60	100

1E3203 SURVEYING –I
CONTENT DETAILS

UNIT-I

1.1 INTRODUCTION

Definition of Surveying - uses of Surveying - Plane and Geodetic surveying - Classification of surveying - Principles of surveying.

1.2 CHAIN SURVEYING

Different types of chains and tapes - Terms commonly used in chain surveying in field work - Ranging and Chaining - chaining on sloping ground - Direct and indirect ranging - well conditioned triangle - Base line - Check line - Offsets - perpendicular and Oblique offset - cross staff - square prism and optical square - Probable obstacles met with in chain surveying - Errors and corrections in chain surveying - Errors and corrections in chains and tapes - Problems.

UNIT-II

COMPASS SURVEYING

Bearing of a line - Fore and Back bearing - True meridian - Magnetic meridian - Dip and declination - prismatic compass - Designation of bearings - Whole Circle Bearing and Reduced Bearing - Computation of included angles from Bearing - Local attraction - Detection and correction - problems. Plotting a Compass traverse - closing error and its adjustment – problems only.

UNIT-III

LEVELLING

Levelling - Definition - Level - Parts - Functions - Accessories - Types of levels - Dumpy level, Modern Tilting level, Quick setting level, Automatic and Laser level - Levelling staff - Types - Component parts of Levelling instrument - Definitions of terms used : Level surface, Horizontal and Vertical surfaces, Datum, Bench marks, Reduced level, Rise, Fall, Line of collimation, Axis of telescope, Axis of bubble tube, Station, Back sight, Foresight, Intermediate sight, Change point, Height of instrument, Focusing and Parallax - Temporary adjustment of a level -Balancing Back sight and Foresight - Principle of levelling - Simple levelling- Theory of Differential levelling (Fly levelling) -Levelling field book - Reduction of levels - Height of collimation and Rise and Fall method - Comparison of methods – Problems on reduction of levels - Missing entry calculations : Problems.

UNIT-IV

APPLICATIONS OF LEVELLING

Types of levelling - Check levelling : Definition, Field Procedure and use -Profile levelling or Longitudinal section(L.S) : Definition, use, field procedure and plotting the profile - Cross-sectional levelling(C.S) : Definition, use, field procedure and plotting the cross-section - Specimen field book for L.S and C.S - Reciprocal levelling : Definition, use and problems on difference in elevation - Curvature and Refraction : Effects,

correction and problems -Errors in levelling - Fundamental lines and desired relationship between them - Permanent adjustments of a dumpy level : Process

UNIT-V

5.1 CONTOUR SURVEYING

Definition of terms used in contouring - characteristics of contours - Methods of Contouring - Direct and indirect method - Interpolation of contours - Contour Gradient - uses of contour plans and maps. Use of Abney level and Planimeter.

5.2 GLOBAL POSITIONING SYSTEM & AERIAL SURVEY

Introduction of GPS – Need & purpose of GPS- GPS Frequency – Satellite constellation – GPS component– Uses and application of GPS. Aerial Survey - Introductions-definition-Aerial photograph- types-Application of aerial survey.

Text Books:

Sl.No.	Title	Author	Publisher
1.	Surveying and Levelling-2001	N.Basak	TataMcGrawHill Publishing co. Ltd. –New Delhi

Reference Book:

Sl.No.	Title	Author	Publisher
1.	Surveying(VOL.I).2006	B.C.Punmia	Laxmi Publications, New Delhi
2.	Text book of Surveying - 2000	S.K.Hussain and M.S.Nagaraj	S.Chand Co, New Delhi.
3.	Surveying (VOL.I) - 2013	S.K. Duggal	TataMcGraw-Hill Publishers, New Delhi

E Source:

1. https://docs.google.com/.../d/1Atk9lCphjpG6LG-VD_KuZKgSrG-1vxI1lyELR09C1pE.
2. http://www.a-zshiksha.com/forum/viewtopic.php?f=149&t=61476

Course outcome :

C01	Understand various methods and techniques of surveying and its applications(Levelling, Compass survey, contouring)
C02	Ability to use survey instruments in carrying out survey, collect data and write the reports
C03	Know the need and purpose of GPS and Application of Aerial Surveying

1E3204 HYDRAULICS

Rationale:

For understanding the behavior of water in various pipes, channels, notches, weirs etc., the study of this course is highly essential. The Civil Engg. Technicians must be able to measure flow of water in different situations and must be able to compute the discharge. And accordingly he can apply this ability while performing his job on the field, with ease and confidence.

Course Objectives:

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

- List different types of pressure and various pressure measuring devices.
- Calculate hydrostatic forces on plane surfaces immersed in water.
- Explain types of forces, energy and application of Bernoulli's theorem.
- Describe different types of Orifices, Mouthpieces, Notches, Weirs Channels-Discharge formula and their practical applications.
- State different Losses of flowing liquid in Pipes and their equations.
- Explain the procedure of Canal Linings.
- Explain the construction details, specifications and efficiency of Reciprocating Pumps and Centrifugal Pump.
- Solve Simple problems connected with the subject.

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
				Internal	External	Total	
1E3204	5	75	5	25	75	100	3 Hrs

UNITS –ALLOCATION OF HOURS AND MARKS			
Unit No.	Topics	No. of Hours	Marks
I	Properties of Liquids, Pressure And Measurement of Pressure& Hydrostatic Forces on Plane Surface Immersed in Liquid.	12	20
II	Flow of Fluids, Flow Through Orifices And Mouthpieces	12	20
III	Flow Through Notches, Flow Through Weirs	12	20
IV	Flow Through Pipes, Flow In Open Channels	12	20
V	Hydraulic Machines	12	20
	Cycle Tests, Model exams & Revision Classes (2+2+3+8)	15	--
	Total	75	100

1E3204 HYDRAULICS
CONTENT DETAILS

UNIT-I

1.1 PROPERTIES OF LIQUIDS

Introduction – Hydraulics – Definition – Classification – Properties Of fluid – Mass, Volume, Density, Specific weight, Specific gravity, Specific volume, Compressibility, Viscosity, Cohesion, Adhesion, Capillarity , Surface tension –Dimensions and units of Physical quantities.

1.2 PRESSURE AND MEASUREMENT OF PRESSURE

Pressure of a liquid at a point – Intensity of pressure – Pressure head of liquid – conversion from intensity of pressure to head and vice-versa – Formula and simple problems. Types of pressure – Atmospheric pressure – Gauge pressure-Vacuum pressure Absolute pressure – Relation among these – Simple problems. Measurement of pressure – Simple mercury barometer – Pressure measuring devices – Piezometer tube – Simple U-tube manometer – Differential manometer – Micrometer Problems.

1.3 HYDROSTATIC FORCES ON PLANE SURFACE IMMERSED IN LIQUID

Pressure on plane surfaces immersed in liquid – Horizontal, vertical and inclined surfaces – Total pressure – Centre of pressure – Depth of centre of pressure – Resultant pressure – Practical application (sluice gates, dams) – Problems.

UNIT-II

2.1 FLOW OF FLUIDS:

Types of flow – Laminar and turbulent of flow – Steady and unsteady flow – Uniform and Non-uniform flow – equation for continuity of flow. Energy – Definition – Types of energy – Pressure energy – Velocity energy – Total energy – Bernoulli's theorem – Assumptions- Statement only – Problems – Practical application of Bernoulli's theorem – Venturimeter –Orifice meter – Pitot tube (Derivation not necessary) – Problems.

2.2 FLOW THROUGH ORIFICES AND MOUTHPIECES:

Definitions – Types of orifices – Small and large – Vena contracta and its significance – Hydraulic co-efficients Cd, Cv and Cc – Formulae for Cd, Cv and Cc- Experimental determination of Cd, Cv& Cc- problems – Large orifices – Drowned orifice – definition – Discharge through fully and partially submerged orifice- simple problems – Practical application of orifices – Mouthpieces-Types of external and internal mouthpieces – Discharge through external cylindrical mouthpiece – Simple problems.

UNIT-III

3.1 FLOWS THROUGH NOTCHES:

Definition – Classification of notches and weirs – Discharge through Rectangular notch, V notch and Trapezoidal notch – Problems – Advantages of V notch over rectangular notch – Velocity approach.

3.2 FLOWS THROUGH WEIRS

Weir-Types of weir according to shape – End contraction in weirs – Discharge over a broad crested weir and narrow crested weir – Problems – Francis's and Bazin's formula Cippoletti weir – Problems- Narrow crested weir – Sharp crested weir with free over fall- Broad crested weir- submerged weir- Definition of terms – crest of sill, nappe or vein, Free

discharge, drowned or submerged weirs, suppressed weir Stepped weir – Velocity of approach - Spillways and Siphon spillway – Definition**.**

UNIT-IV

4.1 FLOWS THROUGH PIPES

Energy/head losses of flowing liquid due to friction, sudden enlargement, sudden contraction, obstruction in pipes (No Proof) – Losses in pipefitting and valves – Darcy's equation – Chezy's equation – Problems – Pipes in parallel – discharge formula and simple problems- transmission of power through pipes –efficiency –problems.

4.2 FLOWS IN OPEN CHANNELS

Definition – Classification of flow – Chezy's equation for velocity of flow Bazin's formula –Manning's formula –Hydraulic mean depth –problems –specific energy. Critical depth –Conditions of maximum discharge and maximum velocity-problems-Flow in venture flume -– Problems – Typical cross sections of irrigation canal – Lining of canals – Types cement concrete – Soil cement lining. LDPE lining.

UNIT-V

5.1 HYDRAULIC MACHINES

Pumps – Definition – Classification of pumps – Positive displacement pumps – Types – Single and double acting pumps-Component parts – Working of the pump-Discharge-Theoretical discharge – Actual discharge – Co-efficient of discharge – Slip theoretical discharge - efficiency of pump**.** Centrifugal pump – Definition – Types – Advantages and disadvantages over a reciprocating pump – Description –Classification - Installation layout of a centrifugal pump- Component parts – Working of the pump – Necessity of foot valve – Delivery valve – Non-return valve – Single stage and multi stage pump – Priming of centrifugal pump-characteristics of centrifugal pump-Discharge, power and efficiency – problems – specifications of Centrifugal pump- jet pump – Necessity – Cavitations – Effects and precaution to be taken-deep well pump -Hand pump –plunger pump- pump section – piping system.

Text Books:

Sl.No.	Title	Author	Publisher
1.	Text book of hydraulics -1988.	R.S.kurumi.	S.chand

Reference Book:

Sl.No.	Title	Author	Publisher
1.	Fluid mechanics & Hydraulic Machines-2016	R.K.Rajput	S.Chand and company.
2.	Fluid Mechanics & Hydraulic Machines-2017.	R.K.Bansal	Laxmi Publications
3.	Hydraulics 4th edition – 2009.	Dr.JagadishLal,	Metropolitan Book company,
4.	Fluid Mechanics – 1976.	K.L. Kumar	S. Chand, Ram Nager,

Online Source:

1. https://www.google.co.in/?gfe_rd=cr&ei=Ja8vWZrUDofy8AfByZKAAg#q=fluid+mechanics+and+hydraulic+machines+by+rk+bansal+ebook+download
2. https://www.google.co.in/?gfe_rd=cr&ei=Ja8vWZrUDofy8AfByZKAAg#q=fluid+mechanics+and+hydraulic+machines+by+r+k+rajput+pdf

Course outcome :

C01	Able to become familiar with different types of pressure and pressure measuring devices.
C02	Able to understand types of forces energy.
C03	Able to understand the construction details, specifications and efficiency of pumbs.
C04	Able to become familiar with open cross sections,hydro statics distribution and manning's law.
C05	Know the Losses of flowing liquid in Pipes and procedure of Canal Linings

1E3205 CIVIL ENGINEERING DRAWING-I

Course Objectives:

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

- Do effective planning.
- Prepare layout of buildings.
- Gain thorough knowledge of the rules, regulations and standards of buildings.
- Able to draw the line sketch and prepare plan, sections and elevations of buildings.

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
1E3205	6	90	4	Internal	External	Total	3 Hrs
				25	75	100	

SCHEME OF EVALUATION	
PART A - 1. Symbols	5
2. Sectional Elevations	10
PART B – 1. Plan	20
2.Section	25
3.Elevation	10
Viva -Voce	5
Total	**75**

INTRODUCTION:

Terms used in drawing as per NBC-Open space requirements as per NBC Building requirements-Minimum dimensions as per NBC-FAR and floor space index(FSI) for different buildings and zones-Function of local authority-Municipal bye-laws-List of documents to be submitted for building plan approval Drawing instrument and their uses –Scales-Selection of scales-French curves-Scanners and Plotters-Abbreviations used in civil engineering drawing.

PLANNING

Principles of planning-Orientation-Planning of residential building-Factors to be considered in planning-Minimum size requirements of living, Bed room, Kitchen & Toilet in a residential building-Standard sizes of doors, windows and ventilators-planning of rooms. Prepare Site Plan, Location Plan, Area statement(plinth and floor area) and other details.

PART -A

DRAFTING AND DETAILING:

1. Standard symbols used in civil engineering drawing
2. Elevation of
   - Steel roof truss
   - Lean to roof
   - Flush door

- King post truss
- Rain water harvesting methods by
  a. Shallow well method
  b. Percolation pit method

PART -B

BUILDING DRAWINGS

Students shall **DRAW THE LINE PLAN** for the given room size, plot size and specification then preparing detailed Plan(ground and first floor if necessary), Section and Elevation of buildings with suitable scale: -

1. A Residential building with single bed room and attached bathroom.(R.C.C. flat roof)
2. A residential building with two bed rooms(R.C.C Flat Roof)
3. A single roomed house with fully tiled roof with gable ends.
4. Library building with R.C.C. flat roof.
5. A Restaurant building in R.C.C. flat roof.
6. Single storied school building with R.C.C. flat roof.
7. Small workshop with north light steel roof truss over R.C.C. Columns.
8. Hospital Building of 300 m^2Plinth area.
9. Apartment- Framed Structure (Assignment purpose)

Note: All the Drawing should contain Title Block, Specifications and other details as per in practice.

Course outcome:

C01	Able to draw the line sketch with help of given room size and plot size.
C02	Develop the ability to draw the views of given building components.
C03	Know the knowledge of the rules, regulations and standards of buildings.
C04	Understand the concept of developing cross section for building components.
C05	Develop the plan and elevation of different buildings.

1E3206 MATERIAL TESTING LAB-I AND HYDRAULICS LAB

Course Objectives:

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

- Study of UTM, Torsion testing machine, Hardness tester, Compression testing machine.
- To determine the Material Properties- test conducted on steel, cement, aluminum, Brass and Timber.
- Test on Bricks- water absorption and compression.
- Test on tiles. Verify Bernoulli's theorem experimentally.
- Determine the Co-efficient of Venturimeter, Orifice meter, Orifice, Mouthpiece and Notches.
- Determine Friction factor for the given pipe.

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
1E3206	4	60	2	Internal	External	Total	3 Hrs
				25	75	100	

SCHEME OF EVALUATION	
Part- A (or) Part -B	
1. Writing Procedure	15
2. Conducting and performance	20
3. Tabulation & Calculation	25
4. Result	10
5. Viva Voce	05
Total	75

PART - A

A. TEST ON METALS:-

1. Tension test on mild steel specimen – To determine yield stress, ultimate stress, breaking stress, % elongation and % reduction in area.
2. Double shear test on steel rod to determine shear strength of steel.
3. Rockwell Hardness test on mild steel, Brass and Aluminium.
4. Brinell Hardness test on mild steel using Brinell microscope.
5. Torsion test on mild steel.
6. Izod / Charpy impact test on mild steel to determine toughness of the specimen
7. Deflection test on mild steel section to determine Young's modulus.

B. TEST ON BRICKS

8. Water absorption test.
9. Compression test

C. TEST ON CEMENT

10. Fineness test.
11. Normal consistency.
12. Initial setting time.
13. Compressive strength on Mortar cubes.

D. TEST ON TILES

14. Determination of flexural strength of Tiles.

E. TESTS ON TIMBER:

15. Deflection test on timber to determine modulus of rupture and Young's modulus.
16. Compression test – Parallel and Perpendicular to the fibres.

PART - B

HYDRAULICS ENGINEERING LAB

17. Determination of coefficient of discharge of orifice/mouthpiece by constant head method and draw a graph H Vs Qa.

18. Determination of coefficient of discharge of orifice/mouthpiece by variable head method and draw a graph T Vs ($\sqrt{H1} - \sqrt{H2}$).

19. Verification of Bernoulli's theorem and draw the hydraulic gradient line and total energy line.

20. Determine the co-efficient of discharge for the given venturimeter and draw a graph H VsQa.

21. Determine the friction factor for the given pipe and draw a graph h Vs Qa.

22. Determine the co-efficient of discharges of rectangular / triangular notch and draw a graph H Vs Qa

Equipments Required:

S.No..	List Of The Equipment	Quantity Required.
1	UTM	1 No.
2.	Rock well cum –Brinell Hardness testing machine	1 No.
3.	Torsion testing machine	1 No.
4.	Deflection test verification of max well theorem with magnetic stand, deflection guage, weights and sets of beam (floor type)	1 No.
5.	Spring testing machine (hand operate) or spring testing machine	1 No.
6.	Weighing balance digital 10kg capacity one gram accuracy with battery backup 8 hours / direct electrical	1 No.

	connection	
7.	Vicat needle apparatus(to conduct cement test)	4 No.
8.	Sieve test sets for cement IS sieve no 9 (90microns)made of brace 8 inches dia	2 No.
9.	Compression testing machine 100 tons capacity (electrical operated)	1 No.
10.	Impact testing machine for izod and charpy test	1 No.
11.	Flexural test apparatus	1 No.
12.	Bernouli's theorem apparatus(closed circuit)	1 No.
13.	Venturimeter /orificemeter apparatus (closed circuit) with all accessories	1 No.
14.	Pipe friction apparatus(closed circuit) with all accessories	1 No.
15.	Orifice / mouthpiece apparatus (closed circuit) with all accessories	1 No.
16.	Notch apparatus(closed circuits) with accessories	1 No.

Course outcome:

C01	Know the purpose of UTM, torsion, hardness and compressing testing machine.
C02	Know the quality control of the materials with standards.
C03	Know the co-efficient of Venturimeter, Orifice meter, Orifice, Mouthpiece and Notches.
C04	Able to Friction factor of pipe

1E3207 SURVEY PRACTICAL-I

OBJECTIVES

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

- Laying of chain and Exercise on chain survey.
- Study on compass and Exercise on compass survey.
- Study on Leveling Instrument and Exercise on Levelling.
- Selection of Routing using GPS.
- Reading of various maps

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
1E3207	5	90	3	Internal	External	Total	3 Hrs
				25	75	100	

SCHEME OF EVALUATION	
Part A - Chain (or) Compass by lot	
1.Writing Procedure	05
2. Conducting and performance	10
3. Tabulation , Calculation & result	10
Part B - Levelling	
1.Writing Procedure	05
2. Conducting and performance	15
3. Tabulation , Calculation & result	15
Part C - GPS	
1.Writing Procedure, Conducting and performance & result	10
Viva voce	05
External (Total)	75

PART-A

CHAIN SURVEY:

1. Study of chain, tape and accessories used for chain survey.
2. Ranging a chain line – taking offset.
3. Chain traversing (Field work-around a building and Plotting)
4. Obstacles to chaining but not ranging.
5. Area of a plot(One base line and at least two offsets on either side).

COMPASS SURVEY:

6. Study of prismatic compass – taking bearing of line.
7. Distance between the two stations by observation of bearings (accessible and inaccessible).
8. Closed traverse and finding the included angles.

PART-B

LEVELLING:

9. Study of leveling instrument and leveling staff- temporary adjustment- booking in a field book.
10. Fly levels – reduction of height of collimation.
11. Fly levels – reduction of rise and fall method.
12. Fly levels with inverted readings.

PART-C

GPS:

13. Study of GPS
14. Reading of various map like
    a.District Map
    b.Taluk Map
15. Measurement of latitude and longitude using **GPS.**

Equipments Required:

S.No.	List of the equipments	Quantity required
1.	Chain with arrows	6 Nos.
2.	Prismatic compass	6 Nos.
3.	Dumpy level	10 Nos.
4.	Leveling staff	10Nos.
5.	Cross staves	6 Nos.
6	Ranging rod	2Nos.
7.	Hand Held GPS	6Nos.

Course outcome:

C01	Know the purpose and handling of chain, compass & leveling.
C02	Able to handling of GPS and its uses.
C03	Able to read the various maps.

IV SEMESTER

1E4301- MECHANICS OF STRUCTURES

Rationale:

The properties and behavior of the components of the structure are very essential for the design purpose. It is covered in the subject of Mechanics of Structures - II as a guide line for decision making and checking ultimate capacity & serviceability of structure.

Course Objectives:

- At the end of this course, students will be able to determine the Slope and Deflection of determinate beams by area moment method.
- Analysis of propped cantilever, fixed beam, Continuous beam by Theorem of Three moment, and Continuous beams and portal frame by Moment Distribution Method and draw SFD, BMD.
- Define type of arches and analysis three hinged arch.
- Define different types of columns and to find critical load of columns.
- Analysis of columns and chimneys subject to eccentric loading and to find maximum,
- &minimum stresses. Calculation of maximum, minimum stresses & checking stability of masonry dams and retaining walls.
- Solving problems in the course of study.

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
1E4301	5	75	5	Internal	External	Total	3 Hrs
				25	75	100	

UNITS –ALLOCATION OF HOURS AND MARKS			
Unit No.	Topics	No. of Hours	Marks
I	Slope and deflection of beams & Propped cantilever	12	20
II	Fixed beam & Continuous beams- Theorem of three moment's method.	12	20
III	Continuous beams-Moment distribution method & Portal frames-Moment distribution method.	12	20
IV	Columns and Struts & Combined Bending and direct stresses	12	20
V	Masonry Dams &Earth pressure and Retaining walls	12	20
	Cycle Tests, Model exams & Revision Classes (2+2+3+8)	15	--
	Total	75	100

1E4301 MECHANICS OF STRUCTURES
CONTENT DETAILS

UNIT-I

1.1 SLOPE AND DEFLECTION OF BEAMS:

Deflected shapes / Elastic curves of beams with different support conditions – Definition of Slope and Deflection- Flexural rigidity and Stiffness of beams- Mohr's Theorems – Area Moment method for slope and deflection of beams – Derivation of expressions for maximum slope and maximum deflection of standard cases by area moment method for cantilever and simply supported beams subjected to symmetrical UDL & point loads – Numerical problems on determination of slopes and deflections at salient points of Cantilevers and Simply supported beams from first principles and by using formulae

1.2 PROPPED CANTILEVERS

Statically determinate and indeterminate Structures- Stable and Unstable Structure Examples- Degree of Indeterminacy- Concept of Analysis of Indeterminate beams - Definition of Prop –Types of Props- Prop reaction from deflection consideration – Drawing SF and BM diagrams by area moment method for UDL throughout the span, central and non-central concentrated loads– Propped cantilever with overhang – Point of Contra flexure.

UNIT-II

2.1 FIXED BEAMS – AREA MOMENT METHOD

Introduction to fixed beam - Advantages –Degree of indeterminacy of fixed beam- Sagging and Hogging bending moments – Determination of fixing end(support) moments(FEM) by Area Moment method – Derivation of Expressions for Standard cases – Fixed beams subjected to symmetrical and unsymmetrical concentrated loads and UDL – Drawing SF and BM diagrams for Fixed beams with supports at the same level (sinking of supports or supports at different levels are not included) – Points of Contra flexure –Problems- Determination of Slope and Deflection of fixed beams subjected to only symmetrical loads by area moment method – Problems.

2.2 CONTINUOUS BEAMS – THEOREM OF THREE MOMENTS METHOD

Introduction to continuous beams – Degree of indeterminacy of continuous beams with respect to number of spans and types of supports –Simple/Partially fixed / Fixed supports of beams- General methods of analysis of Indeterminate structures – Clapeyron's theorem of three moments – Application of Clapeyron's theorem of three moments for the following cases –Two span beams with both ends simply supported or fixed –Two span beams with one end fixed and the other end simply supported – Two span beams with one end simply supported or fixed and other end overhanging –Determination of Reactions at Supports- Application of Three moment equations to Three span Continuous Beams and Propped cantilevers –Problems- Sketching of SFD and BMD for all the above cases.

UNIT-III

3.1 CONTINUOUS B E A M S – M O M E N T D I S T R I B U T I O N METHOD

Introduction to Carry over factor, Stiffness factor and Distribution factor –Stiffness Ratio or Relative Stiffness- Concept of distribution of un balanced moments at joints - Sign conventions– Application of M-D method to Continuous beams of two / three spans and to Propped cantilever (Maximum of three cycles of distribution sufficient) –Finding Support Reactions- Problems - Sketching SFD and BMD for two / three span beams.

3.2 PORTAL FRAMES – MOMENT DISTRIBUTION METHOD

Definition of Frames – Types – Bays and Storey - Sketches of Single/Multi Storey Frames, Single/Multi Bay Frames- Portal Frame – Sway and Non- sway Frames- Analysis of Non sway (Symmetrical) Portal Frames for Joint moments by Moment Distribution Method and drawing BMD only– Deflected shapes of Portal frames under different loading / support conditions.

UNIT-IV

4.1 COLUMNS AND STRUTS

Columns and Struts –Definition– Short and Long columns– End condition Equivalent length / Effective length– Slenderness ratio – Axially loaded short column - Axially loaded long column – Euler's theory of long columns – Derivation of expression for Critical load of Columns with hinged ends –Expressions for other standard cases of end conditions (separate derivations not required) – Problems – Derivation of Rankine's formula for Crippling load of Columns– Factor of Safety- Safe load on Columns- Simple problems

4.2 COMBINED BENDING AND DIRECT STRESSES

Direct and Indirect stresses – Combination of stresses – Eccentric loads on Columns Effects of Eccentric loads / Moments on Short columns – Combined direct and bending stresses – Maximum and Minimum stresses in Sections– Problems – Conditions for no tension – Limit of eccentricity – Middle third rule – Core or Kern for square, rectangular and circular sections Chimneys subjected to uniform wind pressure –Combined stresses in Chimneys due to Self weight and Wind load- Chimneys of Hollow square and Hollow circular cross sections only – Problem

UNIT-V

5.1 MASONRY DAMS

Gravity Dams – Derivation of Expression for maximum and minimum stresses at Base – Stress distribution diagrams – Problems – Factors affecting Stability of masonry dams – Factor of safety- Problems on Stability of Dams– Minimum base width and maximum height of dam for no tension at base – Elementary profile of a dam – Minimum base width of elementary profile for no tension.

5.2 EARTH PRESSURE AND RETAINING WALLS

Definition – Angle of repose /Angle of Internal friction of soil– State of equilibrium of soil – Active and Passive earth pressures – Rankin's theory of earth pressure – Assumptions –

Lateral earth pressure with level back fill / level surcharge (Angular Surcharge not required)– Earth pressure due to Submerged soils – (Soil retained on vertical back of wall only) – Maximum and minimum stresses at base of Trapezoidal Gravity walls – Stress distribution diagrams – Problems – Stability of earth retaining walls – Problems to check the stability of walls- Minimum base width for no tension.

Text Books:

Sl.No.	Title	Author	Publisher
1.	Theory of structures - 2000	R.S.kurmi	S.Chand

Reference Book:

Sl.No.	Title	Author	Publisher
1.	Theory of structures – 9th edition - 2014	S.Ramamrutham	Dhanpatrai publishing company (p) Ltd.
2.	Theory of structures - 2017	P.C.Punmia	Laxmi publication
3.	Mechanics of structures - 2015	S.B.Junnarkar	Charotar publishing house pvt. Ltd.
4.	Structural analysis - II- 2013	S.S.Phavikatti	Vikas publishing house

Online Source:

1. **http://nptel.ac.in/courses/105106116/.**
2. **http://royalmechanicalbuzz.blogspot.in/2015/04/strength-of-materials-book-by-r-k-bansal.html.**

Course outcome :

C01	Know the analysis indetermine structure by moment distribution method and theorem of three moments.
C02	Able to understand slope and deflection of the structurual elements.
C03	Able to understand the columns and strut and know the combined stress (direct and bending)
C04	Know the structural effect on dams and retaining wall they also know the design of masonry dam.

1E4302 – TRANSPORTAION ENGINEERING

Rationale:

Transportation Engineering is an essential course of Civil Engineering programme. Diploma in Civil Engineering pass outs must have some basic knowledge of constructional aspects of various modes of transport structures. At the same time, they should be conversant with acceptability of constructional material used and maintenance of each mode of transport structure. To develop the required skill, along with classroom teaching, emphasis should be stressed on laboratory work, field visits, and study tour of different structures mentioned in the curriculum.

Course Objectives:

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

- Define the Highway planning, development, classification of roads and Traffic Signals.
- Study on sub grade soil, Road Arboriculture and Road Machinery.
- Construction procedures of Low cost, WBM. Bitumen, Concrete and Hil Roads.
- Define Railway, Development and study on Materials used in Railways.
- Study on fixtures used in Track, points and Crossing and Signaling.
- Introduction on Bridges, classification and IRC Loading.
- Study of foundation, substructure and superstructure of Bridges.

of study.

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
				Internal	External	Total	
1E4302	5	75	5	25	75	100	3 Hrs

UNITS –ALLOCATION OF HOURS AND MARKS			
Unit No.	Topics	No. of Hours	Marks
I	Highway Engineering	12	20
II	Highway Engineering - Continuation	12	20
III	Railway Engineering	12	20
IV	Railway Engineering - Continuation	12	20
V	Bridge Engineering	12	20
	Cycle Tests, Model exams & Revision Classes (2+2+3+8)	15	
	Total	75	100

1E4302 - TRANSPORTATION ENGINEERING

CONTENT DETAILS

UNIT-I

HIGHWAYENGINEERING:

1.1 INTRODUCTION:

General – Development of Roads in India - Modes of transportation -Nagpur Plan - Ribbon development -Advantages of Roads - Importance of roads in India - Requirements of an ideal road - Indian Road Congress - Objects of Highway planning - Classifications of Highways.

1.2 HIGHWAY PAVEMENTS:

Objectives – Types of Pavement – Flexible and Rigid Pavements - Comparative study of Flexible and Rigid pavements - Factors affecting the design of pavements - Other types of pavements (Description not reqd.)

1.3 GEOMETRICAL DESIGN OF HIGHWAYS:

General - Road structure - Right of way - Land width - Width of formation - Road Camber - Super elevation -Sight distances -Road gradient -Road Curves - Horizontal curves-Vertical curves -Types -Widening of pavement on horizontal curves.

1.4 TRAFFIC ENGINEERING:

Objectives -Traffic surveys- Road accidents-Causes of road accidents - Preventive measures - Parking – Methods of parking - Road junctions (Grade intersections and Grade separators) -Traffic signals - Advantages - Types of road sign -Expressways.

1.5 SUB GRADE SOIL:

Significance - Soil mass as a three phase system - Grain size-classification-Atterberg limit - Definition and description- IS Classification of soils- Compaction Definition - Objects of compaction - Standard Proctor Compaction test - Shear strength - Definition - importance - Direct shear test.

1.6 ROAD ARBORICULTURE AND LIGHTING:

Objects of Arboriculture - Selection of trees - Location of trees
- Highway lighting - benefits.

UNIT-II

HIGHWAYENGINEERING (Contd.):

2.1 HIGHWAY ALIGNMENT AND SURVEYS:

Definition –Principles for ideal highway alignment -Factors affecting highway alignment –Surveys-Engineering surveys -Reconnaissance, Preliminary and Location surveys - Project Report and Drawing -Highway Re-alignment projects

2.2 ROAD MACHINERIES:

Excavating equipments-Tractor, Bull dozer, Grader, Scraper, J C B - Compaction equipments -Road roller -Types and description - Equipment for Bituminous road.

2.3 LOW COST ROADS:

General-Classifications -Earthen road, Gravel road, Water Bound Macadam roads - Construction with sketches – Advantages and disadvantages - Maintenance - Soil stabilization - Methods.

2.4 BITUMINOUS ROADS:

General - Advantages and disadvantages - Bituminous materials used - Types of Bituminous roads-Surface dressing -Types-Bituminous Concrete - Maintenance of Bituminous roads.

2.5 CEMENT CONCRETE ROADS:

General - Advantages and disadvantages - Methods of construction of cement concrete roads with sketches - Construction procedure for concrete roads.

2.6 HILL ROADS:

Factors considered in alignment -Formation of hill roads- Hair pin bends -Retaining and Breast walls.

UNIT-III

RAILWAYENGINEERING:

3.1 INTRODUCTION:

Introduction to Railways -Classifications of Indian Railways -Rail Gauges - Types - Uniformity in gauges - Loading gauge- Construction gauge.

3.2 RAILS:

General-Functions of rails -Requirements of an ideal rail - Types of rail sections - Length of rails -Welding of rails - Wear of rails - Coning of wheels - Hogged rails - Bending of rails – Creep of rails - Causes and prevention of creep.

3.3 SLEEPERS AND BALLAST:

Functions of Sleepers - Types of sleepers - Requirements of sleepers - Materials for sleepers - Sleeper density – Ballast-Functions of Ballast – Requirements of ballast - Materials used as ballast.

3.4 RAIL FASTENINGS AND PLATE LYING:

Rail joints -Types –Rail fastenings -Fish plates -Fish bolts-Spikes – Chairs and Keys -Bearing plates -Blocks - Elastic fastenings –Anchors and anti-creepers - Plate laying-Methods of plate laying -PQRS method of relaying.

3.5 MAINTENANCE OF TRACK:

Necessity - Maintenance of Track, Bridges and Rolling stock**.**

UNIT-IV

RAILWAYENGINEERING (Contd.)

4.1 STATIONS AND YARDS:

Definition of station -Purpose of railway station - Types of stations - Wayside, Junction and Terminal stations -Platforms- Passenger and Goods platforms - Definition of Yard -Types of yard - Passenger yard, Goods yard, Marshalling yard and Locomotive yards - Level crossings.

4.2 STATION EQUIPMENTS:

General - Engine shed - Ash pits – Examination pits - Drop pits –Water columns - Triangles – Turn table - Traverse –Scotch Block – Buffer stops – Fouling marks - Derailing switch - Sand hump - Weigh bridges.

4.3 POINTS AND CROSSINGS:

Purpose – Some definitions – Turnouts – Right hand and left hand turnouts –Sleepers

laid for points and crossings - Types of switches - Crossings - Types of crossings.

4.4 SIGNALLING:

General – Objects of signaling - Types of signaling –Based on function and location – Special signals – Control of movement of trains –Different methods Following train system - Absolute block system – Automatic signaling - Pilot guard system - Centralized traffic control system.

4.5 INTERLOCKING:

Definition – Principles of interlocking - Methods of interlocking-Tappets and locks system –Key system - Route relay system - Improvements in interlocking and signaling.

4.6 RAPID TRANSPORTSYSTEM:

General - Underground railways - Advantages - Tube railways - Its features.

UNIT- V BRIDGE ENGINEERING

5.1 INTRODUCTION:

Bridge: Definition- Components of bridge- IRC loadings- Selection of type of bridge- Scour- Afflux- Economic span- Waterway- Factors governing the ideal site for bridge- Alignment of bridge -Factors to be considered in alignment.

5.2 FOUNDATIONS:

Functions of foundation- Types of foundations-Selection of foundations- Control of ground water for foundation-Caisson foundation -Coffer dam–Types.

5.3 CLASSIFICATION OF BRIDGES:

Classification according to IRC loadings, Materials, Bridge floor, Type of superstructure-Culverts and Cause ways- Classifications with sketches - Conditions to construct causeways.

5.4 SUBSTRCTURE:

Abutments – types – piers – types – wing walls – types.

5.5 SUPERSTRUCTURE

Types- Description-Simple bridge- Types according to bridge floor - Continuous bridge - Cantilever bridge - Balanced cantilever bridge - Arch bridge - Bow-string girder type bridge- Rigid frame bridge- Suspension bridge - Continuous steel bridges- Steel arched bridges.

5.6 BRIDGE BEARINGS:

Definition -Purpose-Importance of bearings - Types of bearings–Elastomeric bearings

Text Books:

Sl.No.	Title	Author	Publisher
1	Highway Engineering	Rangwala	Charator publishing (Edition 2010)

Reference Book:

Sl.No.	Title	Author	Publisher
1	Railway Engineering (Edition 2010)	Rangwala ,	Charator publishing
2	Bridge Engineering (Edition 2009)	Rangwala ,	Charator publishing
3	A Text Book Of Transportation Engineering (2008)	S.P.Chandola ,	S.Chand & company LTD.
4	Principles of Transportation & Highway Engineering	G.V.Rao ,	Tata McGraw-hill Publishing Company LTD.

Online Source:

1. http://www.civilenggforall.com/2016/12/highway-engineering-by-s.k.khanna-and-c.e.g.justo-free-download-pdf-civilenggforall.com.html.
2. http://www.faadooengineers.com/threads/3745-Transportation-Engineering-ebook-free-download.

Course outcome :

C01	Know the Highway planning, development, classification of roads and Traffic signals.
C02	Able to Construction procedures of Low cost ,WBM. Bitumen, Concrete and Hil Roads.
C03	Know the foundation, substructure and superstructure of Bridges.

1E4303 - SURVEYING-II

Rationale:

The elementary knowledge of survey will be dealt - in previous term , where as in this course, the knowledge & use of the adv. & precise equip. like Theodolite and Total station will be given. Some very quick precise and appropriate methods for conducting survey in odd terrains (like uneven, hilly, sloping) for any irrigation project, w.s. proj., road project, housing project; survey is the first & foremost requirement. Hence, this course is very important for the civil engg. Technicians.

Course Objectives:

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

- State the different types of curves and elements of a simple circular curve
- Identify the different components and their functions of a Theodolite.
- State and explain the principle of Tachometry and solve simple problems
- Features of Total Station
- Fundamental & components of GIS

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
1E4303	4	60	4	Internal	External	Total	3 Hrs
				25	75	100	

UNITS –ALLOCATION OF HOURS AND MARKS			
Unit No.	Topics	No. of Hours	Marks
I	Theodolite Surveying	9	20
II	Tacheometric Surveying	9	20
III	TrignometricalLevelling& Remote Sensing , Photogrammetric & Hydrographic Surveying.	9	20
IV	Curves	9	20
V	Total Station & GIS	9	20
	Cycle Tests, Model exams & Revision Classes (2+2+3+8)	15	--
	Total	60	100

1E4303 - SURVEYING-II
CONTENT DETAILS

UNIT-I

1. THEODOLITE SURVEYING:

Introduction-Types of Theodolites: Transit and non-transit Theodolite, Vernier and Micrometer Theodolites –Electronic Theodolite (Principles and description only)–Component parts of a transit Theodolite –Functions–Technical terms used in Theodolite surveying– Temporary adjustments–Fundamental lines and relationship between them – Measurement of horizontal angle by method of repetition and reiteration– Measurement of vertical angle and deflection angle–Reading bearing of a line – Theodolite traversing – Methods – Field checks in closed traverse - Latitude and departure – Consecutive coordinates-Independent coordinates–Problems on computation of area of closed traverse–Balancing the traverse- Omitted measurements–Problems.

UNIT-II

2. TACHEOMETRIC SURVEYING

Introduction– Instruments used in tachometry– Systems of tachometry :Stadia and Tangential tachometry–Principles– Fixed hair method of tachometry–Distance and Elevation formulae–Analectic lens (No proof) : Advantages and uses– Simple problems–Distomats(Description only)–Direct reading tachometers-Determination of constants of a tachometer: Problems – Tachometric traverse – Errors in tachometric surveying.

UNIT-III

3.1 TRIGONOMETRICAL LEVELLING:

Introduction–Finding elevation of objects–Base accessible- Base inaccessible: Single Plane and Double Plane methods– Problems on determination of elevation of objects.

3.2 REMOTE SENSING, PHOTOGRAMMETRIC SURVEYING AND HYDROGRAPHIC SURVEYING:

Remote sensing – Definition – Basic Process – Methods of remote sensing– Applications-Photogrammetric Surveying– Definition–Terrestrial and Aerial photographs–Applications- Hydrographic surveying – Definition-Uses – Sounding: Definition, Purpose, Instruments needed–Steps in hydrographic surveying

UNIT-IV

4.CURVES

Introduction – Types of curves – Designation of curves –Elements of simple circular curve–Setting out simple circular curve by: Offsets from long chords, Offsets from tangents, Offsets from chords produced and Rankin's method of deflection angles–Simple problems–Transition curves : Objectives–Vertical curves : Definition and types.

UNIT-V

TOTAL STATION AND GEOGRAPHICAL INFORMATION SYSTEM

5.1 TOTAL STATION

Introduction–Application of total station–Component parts of a Total Station– Accessories used– Summary of total station characteristics-Features of total station– Electronic display and data reading – Instrument preparation, Setting and Measurement (Distance, Angle, Bearing etc.)–Field procedure for co-ordinate measurement–Field procedure to run a traverse survey- Linking data files for Various Applications.

5.2GEOGRAPHICAL INFORMATION SYSTEM (GIS) I

Introduction–Geographical information–Development of GIS– Components of GIS – Steps in GIS mapping - Ordinary mapping to GIS – Comparison of GIS with CAD and other system–Fields of Applications: Natural resources, Agriculture, Soil, Water resources, Waste land management and Social resources –Cadastral survey and Cadastral records – Land Information System(LIS)

Text Books:

Sl.No.	Title	Author	Publisher
1	Surveying and Levelling (1994)	Basak .N.N,	TataMcGrawHill Publishing co. Ltd. –New Delhi

Reference Book:

Sl.No.	Title	Author	Publisher
1.	Surveying and Levelling (23rd Edition,(2008)	Kanetkar.T.P	Puna Vidhyathri Grigha prakashan
2.	Surveying (VOL.I&II) .(2004)	Duggal,	Tata Mc Graw Hill Publishing co.ltd
3.	Surveying (VOL.I&II). 15th Edition (2011)	Punmia .	B.C , Laxmi Publications Private Limited
4.	Advanced Surveying (2007).	Sthish Gopi Or sathikumar	N.Mathu,Pearson Education Chennai

Online Source:

1. **https://www.slideshare.net/TusharDholakia/total-station-and-its-application-to-civil-engineering.**
2. **http://nptel.ac.in/courses/105102015.**
3. https://docs.google.com/.../d/1Atk9lCphjpG6LG-VD_KuZKgSrG-1vxI1lyELR09C1pE.

Course outcome :

C01	Know the different components and their functions of a Theodolite.
C02	Able to the Features of Total Station
C03	Know the Fundamental & components of GIS

1E4208 - ESTIMATING AND COSTING – I

Rationale:

Estimating and costing is an essential course of Civil Engineering Programme. Civil Engineering technicians need to have some basic skills to interpret the drawing, to apply the methods of computing the quantities according to relevant I.S. So, in this Applied Technology course of Estimating & Costing, efforts have been made to familiarize and to know the provisions of I.S(IS:1200). for mode of measurement, preparation of specifications, carrying out rate analysis and also the approximate methods of estimation. These basic skills can be developed in the students through this course. The estimation of different type of building and its components as Civil Engineering structures including the skills of drafting detailed specifications, carryout rate analysis and approximate estimation.

Course Objectives:

- At the end of this course, students will be able to define various types of estimates.
- Differentiate between Group and Trade system.
- Appreciate duties & essential qualities of a Quantity Surveyor.
- Apply various Units of measurements for works & materials.
- Write specifications & reports for various items of works.
- Prepare data for various items of works using Standard data & Schedule of Rates.
- Prepare detailed estimate of various items of works for the given drawing by using Group System.
- Prepare detailed estimate of various items of works for the given drawing by using Trade System.
- Calculate the value of a building & fix rent for a building adopting suitable method.

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
1E4208	5	75	5	Internal	External	Total	3 Hrs
				25	75	100	

UNITS –ALLOCATION OF HOURS AND MARKS			
Unit No.	Topics	No. of Hours	Marks
I	Introduction & Approximate Estimates	12	20
II	Areas and Volumes , Embankment & Cuttings	12	20
III	Analysis of rates	12	20
IV	Taking off Quantities by trade system	12	20
V	Taking off Quantities by group system	12	20
	Cycle Tests, Model exams & Revision Classes (2+2+3+8)	15	--
	Total	75	100

1E4208 - ESTIMATING AND COSTING – I

CONTENT DETAILS

UNIT-I

1.1 INTRODUCTION:

Estimation- Definition of Estimate- Necessity of Estimates- Importance of fair estimation- Duties and requirements of a good Quantity Surveyor-Types of Estimates-Approximate and Detailed Estimates-Main and Sub Estimates-Revised Estimates-Supplementary Estimates–Maintenance/Repair Estimates-Taking off Quantities- Trade and Group Systems- Merits of Trade/ Group systems- Stages in Detailed Estimation-Units of measurements for materials and works-Degree of accuracy in measurements-Measurement Books-Deduction for openings in masonry/plastering/colour washing works- Painting Coefficients- Categories of Laborers- Material requirements for different items of works-Labour requirement for different items of works- Standard Data Book- Task or Out turn of labourers -Cost of materials and wages of labour- Schedule of Rates-Revision of rates-Market Rates- Lead- Cost of conveyance-Handling charges –Lump sum and Contingency provisions in Estimates- Abstract Estimates.

1.2 APPROXIMATE ESTIMATES

Necessity of Approximate Estimates- Types – Service Unit method- Plinth Area method- Carpet Area method- Cubical Content method- Typical Bay method- Rough Quantity method- Examples for each method- Problems on preparation of Preliminary/Approximate Estimates for building projects.

UNIT-II

2.1AREAS AND VOLUMES

Areas of regular and irregular sections- Computation of Areas of Irregular figures-End Ordinate rule, Mid Ordinate rule, Average Ordinate rule, Trapezoidal rule, Simpson's rule- Problems- Volumes of regular and irregular solids- Computation of Volumes of Irregular solids- End Area rule, Mid Area rule, Average Area or Mean Area rule, Trapezoidal rule, Simpson's or Prismoidal rule.

2.2EMBANKMENTS AND CUTTINGS

Areas of cross sections of embankments of roads, tank bunds etc – Level Section and Two level Section-Areas of cross sections of cuttings of canals, drains etc- Level Section and Two level Section- Determination of Volume of Earth work in Embankment / Cutting with level sections of varying heights/depths or with two level sections of uniform height/ depth.

UNIT-III

ANALYSIS OF RATES

Analysis of rates or preparation of data for the following building works using standard data book:1) Cement/Lime mortars; 2) Plain Cement Concrete in Foundation/ Leveling Course; 3) Flooring with cement concrete, plastered with cement mortar; 4) Flooring with PCC finished with ell is pattern cement concrete surface;5) Flooring with Cuddapa slabs;6)Mosaic/Ceramic tiled flooring; 7) Brick work in cement mortar in foundation; 8) Brick work in CM in super structure ;9)Brick work in CM in partition with plastering;10) Random rubble masonry in CM; 11) Coursed rubble masonry in CM; 12) Lime - surki concrete in weathering course finished with pressed tiles in CM ;

13) Reinforced Cement Concrete in slabs(per unit volume / unit area) ; 14) R.C.C in beams ; 15) R.C.C in columns ; 16) R.C.C in sunshades ; 17) Plastering brick masonry in CM ; 18) Pointing stone masonry with CM ; 19) Painting the wood work ; 20) painting steel work ; 21) white / color washing the plastered surfaces ; 22) Form works (strutting , centering , shuttering etc..) for slabs / beams / columns ; 23) Fabrication of steel reinforcement ; 24) A.C sheet roofing ; 25) Supplying and fixing rain water pipes – Exercises.

UNIT-IV

TAKING OFF QUANTITIES BY TRADE SYSTEM

General- Methods of taking off quantities-Individual wall method-Centre line method-Examples-Entering the dimensions-Standard forms for entering Detailed measurements and Abstract estimates- Rounding of quantities. Preparing Detailed Estimate using Trade System and Take off quantities for all items of works in the following types of Buildings

1. A reading room with RCC flat roof.
2. A small Residential building with single bed rooms with RCC flat roof.
3. A small Residential building with double bed rooms with RCC flat roof.
4. A small Residential building with single/double rooms with RCC sloped roof.
5. A single storey school building with RCC flat roof.

UNIT-V

TAKING OFF QUANTITIES BY TRADE SYSTEM

. Preparing Detailed Estimate using Trade System and Take off quantities for all items of works in the following types of Buildings

1. A community hall with R.C.C columns and T-beams.
2. A Two Storied shopping mall (framed structure)with RCC flat roof
3. A Library building with R.C.C flat roof
4. A small Industrial building with AC/GI sheet roof on Steel Trusses
5. A Bank building with R.C.C flat roof

(Note: The same drawings of unit-IV may be practiced and quantities and compared)

Text Books:

Sl.No.	Title	Author	Publisher
1	Estimating and Costing(2009)	S. C. Rangwala	Charotar Publication

Reference Book:

Sl.No.	Title	Author	Publisher
1.	Quantity Surveying & Valuation	N.A.Shaw	Khanna Publishers
2.	Estimating and Costing	L. N. Dutta,	DhanpatRai and sons

Online Source:

1. **http://www.nprcet.org/civil/document/CE702-ESTIMATION.pdf.**
2. **http://thebookee.net/es/estimating-costing-valuation-by-rangwala.**

Course outcome :

C01	Know the Units of measurements for works & materials.
C02	Know the duties & essential qualities of a Quantity Surveyor, Differentiate between Group and Trade system.
C03	Able to the various items of works for the given drawing by using Trade System.
C04	Able to the various items of works for the given drawing by using group System

1E4304 - MATERIAL TESTING LAB – II

Course Objectives:

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

- Test on properties of fine aggregate and coarse aggregate.
- Test on properties of soil.
- Test on Concrete.

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
1E4304	4	60	2	Internal	External	Total	3 Hrs
				25	75	100	

SCHEME OF EVALUATION			
	Single qtn.	Double qtn	
		I(a)	I(b)
1. Writing Procedure	15	10	5
2. Conducting and performance	20	10	10
3. Tabulation & Calculation	25	15	10
4. Result	10	05	05
5. Viva Voce	05		
Total	75		

LISTOF EXPERIMENTS:

1. Determination of Voids ratio and porosity of sand.
2. Determination of liquid limit and plastic limit of the given soil.
3. Determination of bulk density and specific gravity of Fine aggregates.
4. Determination of bulk density and specific gravity of coarse aggregates.
5. Proctor's compaction test on soil.
6. Direct shear test on sand.
7. Field Density of Soil by core cutter method / sand replacement method.
8. Attrition test on Aggregate.(demonstration)
9. Abrasion test on Aggregate. (Demonstration)
10. Aggregate crushing value test.
11. Aggregate impact value test.
12. Determination of Total solids present in the given sample of water.
13. Determination of Turbidity of water by “Jackson candle turbidity meter."
14. Determination of settleable solids present in the given sample of water/wastewater by "Imhoff cone."
15. Determination of Water absorption of coarse aggregate**.**
16. Determination of workability of concrete by slump cone test.
17. Determination of workability of concrete by compaction factor test.
18. Casting of concrete cube and compression test on concrete cube.

Equipments required:

S.No.	List of equipments required	Quantity required
1.	Pycnometer	4Nos.
2.	Liquit limit device with all accessories	2Nos.
3.	Field density of solid apparatus(sand pouring cylinder) with complete set	2Nos.
4.	Proctor compaction mould with accessories	2Nos.
5.	Direct shear machine with complete accessories	1No.
6.	Attrition testing machine	1No.
7.	Abrasion testing machine	1No.
8.	Aggregate impact testing machine with complete accessories	1No.
9.	Crushing strength apparatus.	1No.
10.	Jackson candle turbidity meter	1No.
11.	Imhoff cone	1No.
12.	Slump cone apparatus	2No.
13.	Compaction factor apparatus	1No.
14.	Concrete cube mould 150*150*150 3 sets	3 sets(9no)
15.	Concrete cube mould 100*100*100 3 sets	3 sets(9no)

Course outcome :

C01	Know the properties of fine aggregate and coarse aggregate.
C02	Know the properties of soil.
C03	Able to Test on Concrete.

1E4305 - SURVEY PRACTICAL – II

OBJECTIVES

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

- Study on Component parts of Theodolite.
- Exercises on measurement of Horizontal and Vertical angle by Theodolite.
- Determine the Height of an object by Single plane & Double plane Method.
- Study on Tachometer.
- Determination of Elevation of an object using Tachometer.
- Distance & Co-ordinates of the given points using Total Station.
- Study on Total Station.
- Measurement of distance and co-ordinates using Total Station.
- Traverse using Total Station.

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
1E4305	4	60	2	Internal	External	Total	3 Hrs
				25	75	100	

SCHEME OF EVALUATION	
Part A & B - Theodolite surveying/ Tacheometric Surveying	
1.Writing Procedure	05
2. Conducting and performance	15
3. Tabulation , Calculation & result	15
Part C - Total Station	
1.Writing Procedure, Conducting and performance & result	20
Survey camp	15
Viva voce	05
External (Total)	75

LISTOF EXPERIMENTS

PART A: THEODOLITE SURVEYING

1. Study of a Theodolite- Temporary adjustments–Reading horizontal angles.
2. Measurement of horizontal angle by:
   a)Reiteration method (not for Exam)
   b)Repetition method(not for Exam)
3. Determination of distance between two points when their bases are accessible,using Theodolite-Measuring Horizontal angles by repetition method and distances from a Thedolite Station.
4. Determination of distance between two points when their bases are inaccessible, Using Theodolite-Measuring Horizontal angles by reiteration method from a baseline.
5. Run closed theodolite traverse-Measuring length, included angles, and bearing at initialstation. Plot the traverse.
6. Measurements of vertical angles to different points.
7. Determination of Elevation of an object when the base is accessible.
8. Determination of Elevation of an object when the base is inaccessible by:
   a) Single plane method
   b) Double plane method.

PART B: TACHEOMETRIC SURVEYING

9. Determination of constants of a tacheometer.
10. Determination of distance and elevation of points by Stadia tacheometry.
11. Determination of gradient between two points(withdifferentelevations) by Stadia tacheometry.
12. Determination of distance and elevation of points by Tangential tacheometry.

PARTC: TOTAL STATION

13. Study of Total Station – General commands used - Instrument preparation and setting– Reading distances and angles.
14. Measurement of distances and co-ordinates of given points, using Total station.
15. Measurement of altitude of given elevated points, using Total Station.
16. Run closed traverse using Total Station and plotting the traverse.
17. Determination of area of a field/land/CollegeCampusetc.usingTotal station

SURVEYCAMP :(Outside the Campus) Duration: 7 days

The objective of the survey camp is to enable the students to get practical training in the fieldwork. Groups of not more than six members in a group will carry out each exercise in Survey camp. The camp must involve work on a large area of not less than 30 acres outside the campus. At the end of the camp, each student shall have mapped and contoured the area. The camp record shall include all original field observations, calculations and plotting.**15 marks to be allotted for Survey file in the Board Examination. Works to be conducted in survey camp :**

- L.S and C.S for a road /canal alignment
- Radial Tachometric contouring
- Contouring by block levels
- Curve setting by deflection angle
- Theodolite/Tacheometric traverse(Balancing the traverse by Bowditch rule)
- Total Station (Closed Traverse) -Plotting & Finding the area of the given field.

Equipments required:

S.No.	List of equipments required	Quantity Required
1.	Vernier theodolite	6Nos.
2.	Total station	3Nos.

Course outcome:

C01	Know the Component parts of Theodolite.
C02	Able to the handled Total Station.
C03	Know the Height of an object by Single plane & Double plane Method.Study on Tachometer

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1E4401- CAD IN CIVIL ENGINEERING DRAWING I

OBJECTIVES

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

- Study on the available Software packages for drafting.
- Thorough knowledge of available commands in the software packages for the preparation of drawing in the computer.
- Practice on Drawings, simple drawings to be drawn in the computer with the available software packages.
- Practice on drawing- Residential, School, Hospital Buildings and Submission (for approval) drawings in the computer.

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
1E4401	4	60	2	Internal	External	Total	3 Hrs
				25	75	100	

SCHEME OF EVALUATION	
Part A - by lot one question	
1.Writing Procedure	05
2. Conducting and performance	10
3. printout & result	15
Part B - by lot one question	
1.Writing Procedure	05
2. Conducting and performance	10
3. printout & result	25
Viva voce	05
External (Total)	75

LISTOF EXPERIMENTS

Preparation of drawing using CAD Software

Introduction of CAD software for Preparation of Drawings

1. Definition of various commands used in CAD software.
2. Simple Exercises for familiarizing the drawing commands in CAD software.

PART A

Draw the given drawings in Computer and take print out of all drawingsinA4 sheet using Inkjet / laser printer or plotter and produced in file forms as record.

3. Section of semicircular Arch.
4. Elevation of door, partly paneled and partly glazed

5. Preparation of Plan showing arrangement of furniture /fixtures and other featurewith standard sizes for the followings(Each room to be drawn separately-features and furniture may be pasted from the Blocks available in the packages)
   (i) Living (ii) Bed Room (iii) Kitchen (iv) Toilet
6. Steel Structures: Cross section of I, Channel, T, Angle and Tubular section, Compound Beams.
7. Section of Load bearing wall from parapet to foundation showing all the details across the section. (Single storey)

PARTB

Draw the building drawing using available CAD software

8. Plan, Section and Elevation of single bed roomed building (R.C.C. Roof)
9. Plan, Section and Elevation of Double bed roomed building (R.C.C. Roof)
10. Plan, Section and Elevation of a Primary School Building
11. Plan, Section and Elevation of a Hospital Building
12. Plan, Section and Elevation of a Workshop with steel columns, Steel roof truss and Metal sheet Roofing of about 300 sq.m area.
13. Preparation of approval drawing to be submitted to Corporation or Municipality showing required details in one sheet such as
    - SitePlan (Landboundary, Buildingboundary, CarParking, Passage, sanitary layout, septic tank location etc.
    - G.F. Plan, F.F. Plan, Section and Elevation (line diagram is enough).
    - Key Plan
    - Septic tank Plan and section (line diagram)
    - Rainwater harvesting pit (with all detail)
    - Typical foundation details(Column foundation or spread footing)
    - Title block showing– joinery details, Specification, Area statement, colour Index, Title of the property, space for owners Signature and License
    - Surveyor's Signature with address.

Equipments Required:

S.No..	List of the equipments	Quantity required.
1.	Computers	30Nos.
2.	Laser printer	3Nos.
3.	CAD Software	30 Users

Course outcome:

C01	Know the available Software packages for drafting.
C02	Able to the simple drawings to be drawn in the computer with the available software packages.
C03	Know the drawing- Residential, School, Hospital Buildings and Submission (for approval) drawings in the computer.

V SEMESTER

1E5306 - STRUCTURAL ENGINEERING

Rationale:

The R.C.C. & Steel structures are normally designed by the structural designers, but the execution work is attended by technicians for most of the time. Hence, it becomes absolutely necessary for the technicians to apply the knowledge of design fundamentals in explaining the details of design to the artisans. The structural designers are generally not engaged for routine structural work; hence the technician has to carry-out design of beams, slabs and columns as per layout of building using I.S.456-2000 and I.S. 800-2007 codes. The knowledge of structural design for stability of the structure is also necessary while attending maintenance and repair job. Keeping all these points in view the course S.E is highly essential to be included in Diploma program in Civil Engineering.

The knowledge of Construction of sheds has now a day increased tremendously due to vast expansion of industries. The steel structures viz. trusses, columns etc. have still kept their position in field. Though the components are designed by the structural engineers, they are erected at site under the supervision of technicians. The technicians are required to be well conversant with different Indian Standard sections, their placement and connections. For minor work, in absence of specific design by the designer, the technician shall be able to select certain sections after design for specific purposes. Thus, the course SE is highly essential to be included in Diploma Program in Civil Engineering.

Course Objectives:

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

- Design of beam including shear.
- Design of one way slab and two way simply supported slab and continuous slab .
- Design of column and column footing & simple beam in steel structures and Design of compression and tension members in steel structures

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
1E5306	6	90	6	Internal	External	Total	3 Hrs
				25	75	100	

UNITS –ALLOCATION OF HOURS AND MARKS			
Unit No.	Topics	No. of Hours	Marks
I	Reinforced Cement Concrete Structures.	15	20
II	Design of T-Beams and Lintels for flexure by LSM. Design of continuous beams for flexure and shear by LSM.	15	20
III	Design of one way slabs and stair cases by LSM. Design of two way slab by LSM.	15	20
IV	Design of column by LSM., Design of column footings.	15	20
V	Steel Structures	15	20
	Cycle Tests, Model exams & Revision Classes(2+2+3+8)	15	--
	Total	90	100

1E5306 - STRUCTURAL ENGINEERING

CONTENT DETAILS

UNIT-I

1.1INTRODUCTION

Reinforced Cement Concrete – Concept of Composite material – Purpose of providing reinforcement – materials used in R.C.C and their requirements – different grades of cement and steel – Characteristic strength and grades of concrete – modular ratio of R.C.C– types of loads on structures as per (IS: 875) Assumptions made in the working stress method – Permissible stresses (IS: 456-2000) – Flexural members – singly reinforced rectangular sections – strain and stress distribution due to bending. (No Design or Moment of resistance problems in working stress method)

1.2 INTRODUCTION TO LIMIT STATE METHOD

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

1.3 DESIGN OF BEAMS FOR FLEXURE BY L.S.M

Effective span of cantilever, and simply supported– breadth and depth requirements of beams –control of deflection – minimum depth requirement for stiffness – minimum concrete cover for durability and fire resistance – minimum and maximum reinforcement, spacing for main reinforcement and side face reinforcement as per IS 456-2000-design bending moments – Design of singly and doubly reinforced rectangular beams –cantilever, simply supported beams-Solving Problems using Design Aid Sp16 for practice (not for Exam) Design of Lintel simple problems(Flexure only).

UNIT-II

2.1 DESIGN OF T-BEAMS S BY L.S.M

Design of singly reinforced T-beams – simply supported beams – use of design aids (not for examination)

2.2 DESIGN OF BEAMS FOR SHEAR BY L.S.M

Limit state of collapse in shear – design shear strength of concrete – design strengths of vertical / inclined stirrups and bent up bars in shear –.principle of shear design – critical sections for shear – nominal shear stress – design of vertical stirrups, inclined stirrups and bent up bars for rectangular beams using limit state method –simple problems- use of design aids (not for exam).

2.3 STAIRCASES

Types of stairs according to geometry and structural behavior planning a staircase - Problems in arrangement of staircase.

UNIT-III

3.1 DESIGN OF ONE WAY SLABS BY L.S.M

Classification of slabs – Introduction of two way slab only - Effective spans - Imposed loads on slabs (IS: 875) – strength and stiffness requirements –minimum and maximum permitted size, spacing and area of main and secondary reinforcement as per IS 456 -2000 Design of cantilever, simply supported, slabs and sunshades by limit state method – check for stiffness – curtailment of tension reinforcement – use of design aids (not for exam).

3.2 DESIGN OF COLUMN BY L.S.M

Limit state of collapse in compression – assumptions - limiting strength of short axially loaded compression members - effective length of compression members – slenderness limits for columns – classification of column-minimum eccentricity for column loads – longitudinal and transverse reinforcement as per I S 456-2000-Design of axially loaded short columns with lateral ties / helical reinforcement – Use of design aid (not for exam).

3.3 DESIGN OF COLUMN FOOTINGS

Types of footings – Square Footings with uniform thickness – critical sections – minimum reinforcement ,distribution of reinforcement, development length, anchorage, cover, minimum edge thickness requirements as per IS 456-2000 – Design of isolated footing (square and rectangular) with uniform/ varying thickness by limit state method- For Examination (i) Problems on Design of Size of Footing and area of steel only. (i) For given sizes and other required details of the footing, check for Punching shear and Transverse shear only.(any one problem).

UNIT-IV

4.1 DESIGN OF SIMPLE BEAMS

Classification of beams – lateral buckling of beams – assumptions – permissible bending and shear stresses (IS: 800) –minimum thickness of elements – limiting deflection of beams – Design of lateral supported beams using single / double rolled steel sections (symmetrical cross sections only).

4.2 DESIGN OF WELDED CONNECTIONS:

Types of welds – size and effective area of welds – Permissible stresses – strength of fillet/butt welds – Lap and butt joints for plates and angles – Beam to beam and Beam to column connections(sketches only)- seat angle and web angle connections(sketches only)

UNIT-V

5.1 DESIGN OF TENSION MEMBERS

General- Permissible stress in tension – Net sectional area of tension members – Effective sectional area of Angles/T-sections connected by one leg/flange(welded connections only) – Design of ties using single/double angles, T-sections and channels.

5.2 DESIGN OF COMPRESSION MEMBERS

Effective length of compression members – slenderness ratio – Permissible stress – minimum thickness of elements – effective sectional area – Design of single angle and double angle struts – Design of steel columns using rolled steel sections(Symmetrical sections only) with or without cover plates.(Lacing and battens not included)

Text Books:

Sl.No.	Title	Author	Publisher
1.	Reinforced Concrete - (2009)	S. Unnikrishnan Pillai&Devadas,	Tata McGraw Hill Publishing Co. Ltd.

Reference Book:

Sl.No.	Title	Author	Publisher
1.	RCC Theory and Design - (1972)	M.G.Shah& C.M. Kale,	Macmillan Publishers India Ltd.
2.	Design of Reinforced Structures - (2011)	P.C. Verghese	Prentice Hall of India
3.	Design of Reinforced Structures - (2011)	P.C. Verghese,	Prentice Hall of India

Online Source:

1. **http://nptel.ac.in/downloads/105101085/.**
2. **http://nptel.ac.in/courses/105101086/.**
3. **http://nptel.ac.in/courses/105106050/.**
4. **http://nptel.ac.in/courses/105103094/.**

Course outcome :

C01	Know the Design of beams including shear.
C02	Know the Design of one way slab and Cantilever slab
C03	Know the Design of column and column footing.
C04	Able to the simple beam in steel structures.
C05	Know the compression and tension members in steel structures.

1E5307–ENVIRONMENTAL ENGINEERING AND POLLUTION CONTROL

Rationale:

Public Health Engineering is an essential course for Diploma Programme in Civil Engg. The diploma pass outs must have basic knowledge of water supply for domestic and industrial purposes and the disposal of waste water. The technician must know about the quality and quantity of domestic water to be supplied to the users. He must know the drinking water standards, testing methods, treatment and distribution of water etc. Similarly, the civil engg. Technician should be conversant with the collection, conveyance, treatment and disposal of waste water. All the above aspects have been covered in this course.

Course Objectives:

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

- State the quantity of water for various needs and fore-casting future population.
- Select suitable source of water supply and pipe materials used to convey water.
- Describe the quality of water and specifying BIS Standards.
- Describe various treatment process and different distribution system.
- Explain methods of collection and conveyance of sewage.
- Explain primary and secondary treatment of sewage and disposal.
- Explain industrial waste treatment methods and solid waste disposal methods.

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
1E5307	5	75	5	Internal	External	Total	3 Hrs
				25	75	100	

UNITS –ALLOCATION OF HOURS AND MARKS			
Unit No.	Topics	No. of Hours	Marks
I	Quantity and Conveyance of water	12	20
II	Treatment of water & Distribution System	12	20
III	Collection And Conveyance Of Sewage & Sewer Appurtenances	12	20
IV	Treatment And Disposal Of Sewage & Solid Waste Management	12	20
V	Environmental Pollution	12	20
	Cycle Tests, Model exams & Revision Classes (2+2+3+8)	15	--
	Total	75	100

1E5307– ENVIRONMENTAL ENGINEERING AND POLLUTION CONTROL

CONTENT DETAILS

UNIT-I

1.1 QUANTITY OF WATER:

Water Supply – Need For Protected Water Supply – Objectives Of Public Water Supply System – Demand – Types Of Demand – Per Capita Demand – Prediction Of Pollution – Problems In Arithmetical Increase Method, Geometrical Increase Method, Incremental Increase Method – Source Of Water – Surface And Subsurface Sources.

1.2 INTAKES AND CONVEYANCE:

Intakes – Types Of Intakes – Description Of Intakes – Infiltration Galleries And Infiltration Wells In River Beds – Necessity Of Pumps – Types Of Pumps – Pipes For Conveyance Of Water – Cast Iron, Steel, G.I., Cement Concrete, R.C.C., Hume And PVC Pipes – Pipe Joints –Laying And Testing Of Pipe Lines – Pipe Corrosion – Corrosion Control.

1.3 QUALITY OF WATER:

Impurities In Water –Testing Of Water – Collection Of Water Sample – Physical, Chemical, Bacteriological Tests - Standards Of Drinking Water –Water Borne Diseases And their Causes.

UNIT-II

2.1 TREATMENT OF WATER:

Object Of Water Treatment – Flow Diagram Of Treatment Plants – Sedimentation – Purpose - Types Of Sedimentation – Coagulation - Coagulants And Their Choice – Types Of Sedimentation Tanks – Filtration – Theory Of Filtration – Types And Description Of Filters – Disinfection Of Water – Methods – Water Softening – Miscellaneous Water Treatments (Names Only) – Mineral Water – Requirements – R.O Process.

2.2 DISTRIBUTION SYSTEM:

Distribution System–Methods Of Distribution–Gravity System, Pumping System, Combined System–Systems Of Water Supply –Continuous And Intermittent Supply Of Water –Layout Of Distribution–Dead End, Grid Iron, Radial And Circular Systems–Service Reservoirs – Types.

UNIT-III

3.1 COLLECTION AND CONVEYANCE OF SEWAGE:

Sanitation – Purpose – Terms – Systems Of Sanitation – Quantity Of Sewage Variation In Rate Of Flow Of Sewage – Estimation Of Storm Water – Problems – Minimum Size Of Sewer –Shapes Of Sewer(names only) – Materials Used For Sewer –Joints In Sewer Line –Laying And Testing Of Sewer Lines –Ventilation Of Sewers –Cleaning Of Sewer.

3.2 SEWER APPARTENANCES:

Sewer Appurtenances – Manhole – Lamp Hole – Catch Basin – Street Inlet – Grease And Oil Trap – Flushing Tanks – Drainage Arrangements In Buildings – Sanitary Fittings – Sewage Pumps – Necessity – Types Of Sewage Pumps (Names Only).

UNIT-IV

4.1 TREATMENT AND DISPOSAL OF SEWAGE:

Objects Of Sewage Treatment – Flow Diagram Of Sewage Treatment Plants-Treatment Of Sewage –Primary And Secondary Treatments- Screens – Skimming Tanks-Grit Chambers- Sedimentation Tanks-Filters-Types And Description Of Filters-Activated Sludge Process-Septic Tank For Isolated Building-Construction And Working Of Septic Tanks-Disposal Of Septic Tank Effluent-Soak Pits, Dispersion Trenches-Oxidation Ponds-Sludge-Types-Methods Of Sludge Disposal.

4.2 SOLID WASTE MANAGEMENT:

Solid Waste-Classification-Collection And Conveyance Of Solid Waste-Disposal Of Solid Waste –Necessity-Reduction And Reuse Of Solid Waste –Methods Of Solid Waste Disposal-Incineration, Dumping, Sanitary Land Fill, Composting-Energy From Waste

UNIT-V

5.1 ENVIRONMENTAL POLLUTION:

Environment-Definition-Water Pollution-Source Of Water Pollution –Effects Of Water Pollution –Control Of Water Pollution-Soil Pollution-Source Of Soil Pollution-Effects Of Soil Pollution-Control Of Soil Pollution –Noise Pollution-Sources Of Noise Pollution-Effects Of Noise Pollution-Control Of Noise Pollution –Air Pollution –Sources Of Air Pollution-Effects Of Air Pollution On Human Beings, Plants ,Animals, Materials-Air Pollution Control Equipment-Control Devices For Particulate Contaminants – Environmental-Degradation-Ozone Layer Depletion-Green House Effect-Acid Rain.

5.2 ENVIRONMENTAL IMPACT ASSESSMENT:

Environmental Impact Assessment (EIA)-Methodology Of EIA- Organizing The Job-Performing The Assessment –Preparation Of Environmental Impact Statements(EIS)-Review Of EIS-Environmental Risk Assessment-Limitation Of EIA.

Text Books:

Sl.No.	Title	Author	Publisher
1.	Environmental Engineering - (2003)	N.N.Basak,	Tata McGraw Hill Pub. Co., New Delhi

Reference Book:

Sl.No.	Title	Author	Publisher
1.	Water Supply and Sanitary Engg.(Volume –I&II)- (2006)	Gurcharansingh,	Standard publishers and distributors, Delhi
2.	Principles of environmental science and engineering -(2010)	P.VenugopalaRao	PHI learning PVT Ltd, New Delhi

Online Source:

1. **http://nptel.ac.in/courses/105104102/.**
2. **http://nptel.ac.in/courses/105104102/Domestic%20water%20treat.htm.**
3. **http://nptel.ac.in/courses/105106119/36.**

Course outcome :

C01	Able to the suitable source of water supply and pipe materials used to convey water.
C02	Know the industrial waste treatment methods and solid waste disposal methods.
C03	know the primary and secondary treatment of sewage and disposal.

1E5308.1- WATER RESOURCE MANAGEMENT
(Elective Theory – I)

Rationale:

In our country, more than 60 percent population is living in villages. Their prime occupation is farming. The uncertainty of rainfall and inconsistency of rainfall is the root cause of water crisis. Hence to provide water supply through irrigation network is most essential need for sufficient crop production. This Course is focusing the attention of student on various aspects incorporated in curricula e.g. hydrology, ground water, reservoir planning, dams, diversion head works, canals, water resource project planning & flood control etc. This course is helpful to prove the importance & management of available water economically, & encouragement to adopt advanced water application and conservation methods.

Course Objectives:

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

- ❖ understand the hydrology, ground water
- ❖ understand the components of the hydrological cycle
- ❖ Understand the distribution of ground water, evalution of aquifer development of ground water methods.
- ❖ understand the River basin
- ❖ Understand the Distribution system of canals.

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
1E5308.1	5	75	5	Internal	External	Total	3 Hrs
				25	75	100	

UNITS –ALLOCATION OF HOURS AND MARKS			
Unit No.	Topics	No. of Hours	Marks
I	Introduction& Hydrology	12	20
II	Ground Water & Management Of Ground Water	12	20
III	Rivers And River Training Works &Storage Works	12	20
IV	Distribution Works &Management Of Canal Irrigation	12	20
V	Water Shed Management & Water Harvesting And Recycling	12	20
	Cycle Tests, Model exams & Revision Classes (2+2+3+8)	15	--
	Total	75	100

1E5308.1- WATER RESOURCE MANAGEMENT(Elective Theory – I)

CONTENT DETAILS

UNIT-I

1.1 INTRODUCTION:

Water resources – world water inventory- Importance of water resources – Necessity for conservation and development of water resources water resources of India – water resources management-purpose-factors involved in water resource management.

1.2 HYDROLOGY:

Introduction – Definition – Application of Hydrology in engineering – Hydrological cycle – Precipitation – forms of Precipitation – measurements of rain fall – Rain gauge – types of rain gauges – rain gauge network – mean rainfall over a drainage basin – methods – Radar and satellite Measurements of rainfall – runoff – Estimation of runoff – losses – Hydrograph – Unit Hydrograph - uses.

UNIT-II

2.1 GROUND WATER:

Ground water resources – zones of Ground water – Aquifer – types – terms used – porosity, permeability, yield, specific yield, specific retention, coefficient of storage specific capacity – Darcy's law – measurement of yield of well - pumping test – recuperation test – ground water exploration – geo physical methods – Electrical resistivity method – seismic resistivity method – logs.

2.2 MANAGEMENT OF GROUND WATER:

Concept of basin management – Ground water basin investigations – data collection and field work – mining yield – perennial yield – salt balance – basin management by conjunctive use – artificial recharge of Ground water – recharge methods.

UNIT-III

3.1 RIVERS AND RIVER TRAINING WORKS:

Classification of river – Major rivers in India and Tamil Nadu – Inter linking of rivers in India and its importance – flood – flood forecasting – flood control in India. River training – objectives of river training – classification of river training – methods of river training levees – guide banks – spurs – types – artificial cut-offs – launching apron – pitching of banks – pitched islands – miscellaneous methods.

3.2 STORAGE WORKS:

Surfaced storage – purpose of surface storage – tanks – types – tank outlet – reservoirs – types storage capacity of reservoir – methods of determination of storage capacity of reservoir – reservoir losses – dams – classification of dams – selection of dam site – earth dam – types – methods of construction – causes of failure of earth dam – remedial measures – spillway – types – spillway crest gates-types – sluiceway – types.

UNIT-IV

4.1 DISTRIBUTION WORKS:

Irrigation Canal – Typical cross section of canal – components of canal section –

classification of canal – alignment of canal – canal head works – types – components of diversion head works – cross drainage works – types – canal losses – lining of canal – necessity – types of lining.

4.2 MANAGEMENT OF CANAL IRRIGATION:

Canal irrigation system – Need for canal irrigation management – objectives of canal irrigation management – methods of improving canal irrigation management – cropping pattern – need for crop rotation – crop water requirement – water delivery system – irrigation scheduling – frequency of irrigation – optimum sue of irrigation water – irrigation efficiencies – conservation of water on the field – farmer's participation – irrigation manager.

UNIT-V

5.1 WATER SHED MANAGEMENT:

Water shed – classification of water sheds – integrated approach for water shed management – role of remote sensing and GIS in water shed management – soil and water conservation – Necessity – soil erosion – causes – effects – remedial measures against erosion – contour bunding – strip cropping – bench terracing – check dams – vegetated water way – afforestation – crop residue – land drainage – surface drains – sub surface drains.

5.2 WATER HARVESTING AND RECYCLING:

Water harvesting – runoff collection – onsite detention basin – ponds – types – Seepage control – methods – evaporation control – Recycling of harvested water – waste water recharge for reuse – methods – water logging – remedial measures – soil reclamation.

Text Books:

Sl.No.	Title	Author	Publisher
1.	Irrigation and Water Power Engineering - (1992)	B. C. Punmia	Standard Publishers & Distributors

Reference Book:

Sl.No.	Title	Author	Publisher
1.	Hydrology and water resources engineering - (1985)	Santhoshkumar Garg	Khanna Publishers
3.	Irrigation and water Resources Engineering - (2006)	G.L.Asawa,	New age international(p) ltd. Publishers, New Delhi

Online Source:

1. **http://nptel.ac.in/downloads/105105110/.**
2. **http://nptel.ac.in/courses/105104103**

Course outcome :

C01	Know the source of water supply and pipe materials used to convey water.
C02	Able to the quality of water and specifying BIS Standards.
C03	Know the methods of collection and conveyance of sewage.
C04	Know industrial waste treatment methods and solid waste disposal methods.

1E5308.2–ADVANCED CONSTRUCTION TECHNOLOGY
(Elective Theory – I)

CONTENT DETAILS

Rationale:

This subject aims imparting knowledge and skill in the use of advanced construction technologies for low cost housing, Foundations, Pre-fabrication systems and Earthquake proof constructions

Course Objectives:

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

- Pile foundations
- Modified concrete.
- Prefabrication systems and methods.
- Fire protection in buildings.
- Earthquake proof construction.
- Maintenance and rehabilitation of buildings.
- To take precautionary measures to prevent cracks in buildings
- House modernization.
- Lift modernization.

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
1E5308.2	5	75	5	Internal	External	Total	3 Hrs
				25	75	100	

UNITS –ALLOCATION OF HOURS AND MARKS			
Unit No.	Topics	No. of Hours	Marks
I	Pile foundations & Modified concrete	12	20
II	Pre fabrication system and methods	12	20
III	Fire protection in buildings & Earthquake resisting construction	12	20
IV	Maintenance & Rehabilitation of buildings and precautions to prevent cracks in buildings	12	20
V	Housing Modernization & Lift Modernization	12	20
	Cycle Tests, Model exams & Revision Classes (2+2+3+8)	15	--
	Total	75	100

1E5308.2–ADVANCED CONSTRUCTION TECHNOLOGY
(Elective Theory – I)
CONTENT DETAILS

UNIT-I

1.1 PILE FOUNDATIONS

Definition-Uses Of Piles-Types Of Piles-Bearing Piles And Friction Piles-Classification Based On Material-Stone Piles-Encased Piles-Reinforced Cement Concrete Piles-Cast In Situ Pile And Precast Pile Description, Advantages And Disadvantages –Load Bearing Piles And Friction Piles-Purpose-Sheet Piles-Types –Description –Choice Of Type Of Pile –Factors To Be Considered-Pile Cap And Pile Shoe-Description-Load Test On Piles-Description-Pile Driving-Equipments-Types Of Hammer – Choice Of Hammer – Causes Of Failure Of Piles – Reinforcement Requirement For RC Piles.

1.2 MODIFIED CONCRETE

Admixtures – Definition – Function – Classification – Uses Of Different Types – Quantity To Be Used – Light Weight Concrete – Light Weight Aggregate – Protection Of Light Weight Aggregate – Shot Crete Or Guniting – Definition – Typical Arrangement For Gunite System – Special Concrete – Ferro Cement – Protection Process – Curing – Advantages And Limitations – Fiber Reinforced Concrete - Protection Process – Uses – Pre-Stressed Concrete – General Principle Of Pre Stressing – Advantages Of Pre Stressed Concrete – Materials Used – Methods Of Pre-Stressing – Steel Used – Pretension Method – Post Tension Method – System Of Pre Stressing - Freyssinet System – Magnel Blaton System – Lee-Mc-Call System – Causes For Losses In Pre Stress – Remedial Measures – Composite Member.

UNIT-II

2.1 PRE FABRICATION SYSTEM

Advantages And Disadvantages Of Prefabrication System – Terms Defined : Prefabricated Building, Module, Composite Member, Modular Co-Ordination System; Basic Module – Planning Module, Grid – Modules In Horizontal Plane For Residential Buildings And Industrial Buildings – Other Consideration – Module For Components :- Flooring Scheme, Beams, Columns, Walls; Staircase, - Inlet, Sunshade – Tolerance On Dimensions :- Length, Cross Sectional Dimension, Straightness, Squareness, Twist, Flatness.

2.2 PRE FABRICATION METHODS

Characteristics To Be Considered In Devising A System – Types Of Prefabricated Building – Load Bearing Wall – Frame Type; Design Consideration – Bearing For Precast Units, Joints; Requirements Of An Ideal Structural Joint – Manufacture Of Pre Cast Concrete Elements – Place – Process – Main, Auxiliary Subsidiary Process; Stages Of Pre-Casting – Preparation And Storage Of Materials – Moulding And Curing; Prefabrication Methods: Individual Method, Battery Form Method, Tilting Mould Method, Flow Line Production Method – Extension Method – Handling During Transport And Storage – Handling Arrangement – Transport – Inside The Factory – Stacking Yard To Erection Site, Erection Works To Be Carried Out – Equipment Required.

UNIT-III

3.1 FIRE PROTECTION IN BUILDINGS

General – Causes And Effects Of Fire – Precautionary Measures To Minimize Dangers Of Fire – Limiting Fire Spread – Factors To Be Considered – Fire Resisting Properties Of Common Building Material – General Rules For Fire Resisting Buildings – Alarm System – Protection Of Openings – Common Wall Stair – Floor Fire estinguishing Arrangement – Fire Protection Systems – Types – Emergency Exit Arrangements – Strong Room Construction.

3.2 EARTHQUAKE RESISTING CONSTRUCTION

Indian Seismicity – Earthquake History – Definition Terms Used – Behavior Of Structures In The Past Earthquake – Seismic Forces – Effect Of Seismic Forces On Buildings – Planning Of Earthquake Resistant Buildings – Roofs And Floors – Articulation Joints – Expansion Joints – I.S. Code Provision Of Alteration To Buildings – Foundation – Permissible Increase In The Allowable Bearing Capacity Of Soils – Seismic Coefficient For Different Zones – Construction Of Framed Buildings In Earthquake Zones – Walls – Beams Etc.

UNIT-IV

4.1 MAINTENANCE AND REHABILITATION OF BUILDINGS

Rehabilitation Of Buildings – Demolition Of Buildings – Safety Aspects –General – Precautions During Demolitions – Sequence Of Demolition Of Operation – Demolition Process Of Trusses, Girders And Beams, Walls, Flooring-Catch Platform-Lowering Removal And Disposal Of Materials –Mechanical Demolition-Repairs to the Building-Repairing Of Plastering Works –Fixing Doors In –Making-Opening In Masonry And Fixing Doors And Windows-Renewing Glass Panes With Wooden Fillets –Fixing Fan Clamps In Existing R.C.C Slab-Repair To Terrazzo(Mosaic) Flooring.

4.2 PRECUTIONS TO PREVENT CRACKS IN BUILDINGS.

Cracks –General-Hair Crack-Structural Crack-Horizontal Crack In Masonry-Vertical/Diagonal Cracks At Walls-R.C.C Beams Or Pillars –Transverse Cracks In R.C.C. Slab And Sunshade-Repairs-Methods-Materials Used For Filling Cracks

UNIT-V

5.1 HOUSING MODERNIZATION:

Housing modernization and management(building and construction safety, energy efficiencyinhousing ,Property refurbishment / upgrade /modernization/renovation-modular kitchens, bathrooms, new windows, doors and timber floors, roof insulation, dry lining and BER (building energy rating)/certificates-plumbing and electrical to heating efficiency landscaping and drive ways to portico and decking –Drafting AConstruction Contract - Transforming From Traditional To Modern Style- Case Studies -Strengthening Of Old Buildings -Energy-SavingHouses, GreenHouse,Passive House Construction,Low-Energy House,Zero-Energy House,Energy Consulting, Energy Efficiency:Passive House Standard, Quality-Tested Commercial Passive House Construction, Office Building Construction, Residential Building Construction

5.2 LIFT MODERNISATION

Independent Lifting Services–Mechanical Modernisation-Escalators Or Pathways-AestheticModernisation-LiftCarInterior-EcoFriendlyModernisation–LiftConstruction-InstallationAndModernization And Maintenance.

Text Books:

Sl.No.	Title	Author	Publisher
1.	Concrete Technology	M.S. Shetty,	Chand (S.) & Co Ltd,

Reference Book:

Sl.No.	Title	Author	Publisher
1.	Principles Fire safety standards for building Construction	M. YaRoytman	New Delhi Amerind Pub. Co.
2.	Fire Resistant Construction	S.P.Arora and S.P.Bindra,	DhanpatRai& Sons, New. Delhi.

Online Source:

1. http://nptel.ac.in/courses/105106144/.
2. http://nptel.ac.in/downloads/105106053/.
3. http://nptel.ac.in/courses/105104030/.

Course outcome :

C01	Able to the Pile foundations ,Modified concrete.
C02	Know the Maintenance and rehabilitation of buildings.
C03	Know the Lift modernization, House modernization.

1E5308.3–REMOTE SENSING AND GIS
(Elective Theory – I)
CONTENT DETAILS

Rationale:

In civil engineering projects RS and GIS techniques can become potential and indispensible tools. Various civil engineering application areas include regional planning and site investigations, terrain mapping and analysis, water resources engineering, town planning and urban infrastructure development, transportation network analysis, landslide analysis, etc.

Course Objectives:

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

- To understand the basic concepts of remote sensing.
- To know the applications of geographic information systems in civil engineering.
- Identify the basic remote sensing concepts and its characteristics.
- Implement the photogrammetric concepts and fundamentals of air photo interpretation.
- Use various analysis and interpretation of GIS results.

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
1E5308.3	5	75	5	Internal	External	Total	3 Hrs
				25	75	100	

UNITS –ALLOCATION OF HOURS AND MARKS			
Unit No.	Topics	No. of Hours	Marks
I	Fundamentals of remote sensing	12	20
II	Photogrammetric	12	20
III	Image interpretation and analysis	12	20
IV	Fundamentals of GIS	12	20
V	GIS – Data entry, storage and analysis	12	20
	Cycle Tests, Model exams & Revision Classes (2+2+3+8)	15	--
	Total	75	100

1E5308.3–REMOTE SENSING AND GIS
(Elective Theory – I)
CONTENT DETAILS

UNIT-I

FUNDAMENTAL OF REMOTE SENSING:

Basics Of Remote Sensing: Definition And Its Components – Energy Sources And Radiation Principles – Electromagnetic Radiation (EMR) – Spectrum – Wave Length Region Important To Remote Sensing – Atmospheric Scattering, Absorption – Atmospheric Windows – Spectral Signature Concepts – Typical Spectral Reflective Characteristics Of Water, Vegetation And Soil. Characteristics Of Real Remote Sensing System, Platforms, Orbit Types, Sensors, Resolution Concept Satellite, - Pay Load Description Of Important Indian Earth Resources And Meteorological Satellites**.**

UNIT-II

PHOTOGRAMMETRY:

Geometric Elements Of A Vertical Photograph – Stereoscopic Plotting Instruments, Ortho Photos, Flight Planning.

UNIT-III

IMAGE INTERPRETATION AND ANALYSIS:

Fundamentals Of Air – Photos Interpretation – Elements Of Image Interpretation, Concepts Of Digital Image Processing Image Rectification And Restoration, Image Enhancement, Image Classification, Application Of Remote Sensing In Civil Engineering.

UNIT-IV

FUNDAMETALS OF GIS:

Basic Concepts Of GIS – Basic Spatial Concepts – Co-Ordinate Systems : Definitions – History Of Development Of GIS – Components Of GIS: Hardware, Software, Data, People And Methods – Proprietary And Open Source Software – Types Of Data – Spatial, Attribute Data – Types Of Attributes – Scales / Levels Of Measurements – Data Base Management Systems (DBMS).

UNIT-V

GIS – DATA ENTRY, STORAGE AND ANALYSIS:

Data Models – Vectors And Raster Data – Data Compression – Data Input By Digitization And Scanning, Data Storage – Attribute Data Analysis – Integrated Data Analysis – Mapping Concept – Development Of Map Over Lay, Over Lay Operation – Errors And Quality Control. Land Information System (LIS) – Various GIS Application In Civil Engineering.

Text Books:

Sl.No.	Title	Author	Publisher
1.	Geographic information systems - (2005)	Lo &Yeung	Prentice of India

Reference Book:

Sl.No.	Title	Author	Publisher
1.	Elements of photogrammetric - (1998),	Wolf Paul	McGraw Hill, New Delhi.
2.	Principles of geographical information systems for land resources assessment - (2000),	Burrough P.A	Clarendon Press, Oxford.

Online Source:

1. **http://nptel.ac.in/courses/105104030/.**
2. **http://nptel.ac.in/courses/105107121/6.**
3. **http://nptel.ac.in/courses/105108077/module8/lecture36.pdf.**

Course outcome :

C01	Know the the basic concepts of remote sensing.
C02	Able to the photogammetry concepts and fundamentals of air photo interpretation.
C03	Know the various analysis and interpretation of GIS results.

1E5309 - CIVIL ENGINEERING DRAWING II

Course Objectives:

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

- Do effective planning.
- Prepare layout of buildings.
- Gain thorough knowledge of the rules, regulations and standards of buildings.
- Able to draw the line sketch and prepare plan, sections and elevations of buildings.

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
1E5309	6	90	4	Internal	External	Total	3 Hrs
				25	75	100	

SCHEME OF EVALUATION	
PART A	
Plan	30
Section	20
Elevation	20
Viva -Voce	05
Total	**75**

PUBLIC HEALTH ENGINEERING DRAWING

1. Infiltration gallery (one infiltration well)
2. Rapid Sand Filter.
3. Septic tank with dispersion trench/soak pit.
4. Bio gas plant with floating type.

BRIDGE DRAWING

5. R.C.C. slab Culvert with splayed wing walls.
6. Two span Pipe culvert.
7. Two span Tee Beam Bridge with square returns.

STEEL STRUCTURE DRAWING

8. Steel Column with Slab base.
9. Steel Beam to Steel Column Connection- Seat angle and Web angle connections.
10. Steel Beam to Steel Beam Connections – Web to Web connections.

Course outcome :

C01	Know the Bridge Drawings.
C02	Know the Steel Structure Drawing.

1E5310– ENVIRONMENTAL ENGINEERING & PLUMBING LAB

Course Objectives:

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

- Know estimation of residual chlorine, pH value, Turbidity of water, chlorides And sulphates, alkalinity
- Identify Pipe fittings and sanitary fittings.
- Make bathroom connection, Suction and Delivery pipe connection using

GI pipes/PVC pipes

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
1E5310	4	60	2	Internal	External	Total	3 Hrs
				25	75	100	

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SCHEME OF EVALUATION	
Part- A	**MARKS**
Aim, procedure	40
Tabulation	20
Calculation	10
Viva Voce	05
Total	75

I. TESTS ON WATER:

1) Estimation of residual chlorine by colour comparison disc
2) Determination of PH value Electrometric method using PH meter / comparison by paper method
3) Determination of Turbidity of water by Jackson's candle/Turbidity meter / Digital Turbidity meter
4) Estimation of chlorides by titration method
5) Determination of sulphates by titration method
6) Determination of alkalinity by titration method

II. PLUMBING:

7) Study of important plumbing tools types of pipes, pipe fittings, pipe joints, valves, taps and water meters
8) Cutting and threading of G. I pipes
9) G. I pipe connection to a bathroom from house main using the specials, couplings bends, Elbows, union joints etc,

10) Laying and joining of stoneware pipes

11) Laying and joining of rigid PVC pipes

12) Suction and Delivery connection for pumps using G.I pipes and specials (Demonstration only).

Equipments Required:

S.no	Equipment	Quantity
1.	**Burette**	
2.	**Pipette**	
3.	**Conical flask**	
4.	**Jacksons candle**	
5.	**Thread cutter machine**	**1**

Course outcome:

C01	Know the estimation of residual chlorine, pH value, Turbidity of water, chloride And sulphates, alkalinity
C02	Able to the Pipe fittings and sanitary fittings.
C03	Know the bathroom connection, Suction and Delivery pipe connection using GI pipes/PVC pipes.

1E5402 -CAD IN CIVIL ENGINEERING DRAWING II

OBJECTIVES

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

- Know the Public Health Engineering drawings using CAD.
- Know the Bridge Engineering drawings using CAD.
- Know the Steel Structures drawings using CAD.

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
1E4402	4	60	2	Internal	External	Total	3 Hrs
				25	75	100	

SCHEME OF EVALUATION	
Part A - by lot one question	
1.Writing Procedure	05
2. Conducting and performance	15
3. printout & result	15
Part B or C - by lot one question	
1.Writing Procedure	05
2. Conducting and performance	15
3. printout & result	15
Viva voce	05
External (Total)	75

PUBLIC HEALTH ENGINEERING DRAWING

1. Infiltration gallery (one infiltration well)
2. Rapid Sand Filter.
3. Septic tank with dispersion trench/soak pit.
4. Bio gas plant with floating type.

BRIDGE DRAWING

5. R.C.C. slab Culvert with splayed wing walls.
6. Two span Pipe culvert.
7. Two span Tee Beam Bridge with square returns.

STEEL STRUCTURE DRAWING

8. Steel Column with Slab base.
9. Steel Beam to Steel Column Connection- Seat angle and Web angle connections.
10. Steel Beam to Steel Beam Connections – Web to Web connections.

Equipments Required:

S.No..	List of the equipments	Quantity required.
1.	Computers	30Nos.
2.	Laser printer	3Nos.
3.	CAD Software	30 Users

Course outcome :

C01	Know the Public Health Engineering drawings using CAD.
C02	Know the Bridge Engineering drawings using CAD.
C03	Know the Steel Structures drawings using CAD.

1E5403 LIFE AND EMPLOYABILITY SKILL PRACTICAL

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
1E4403	4	60	2	Internal	External	Total	3 Hrs
				25	75	100	

Topics and Allocation of Hours:

Sl. No	Section	No. of Hours
1	**Part –A** **LISTENING ACTIVITY** **TOPICS:** Global Warming, Pollution, Environment and Communal harmony	15
2	**Part –B** **SPEAKING ACTIVITY** **TOPICS:** Communication; Behavioral Skills; Productivity , Descriptive skills, familiarizing FAQ in personal interview, situational dialogues and telephonic conversation, Occupational Safety, Health Hazard; Accident & Safety, First Aid;	15
3	**Part – C** **WRITING AND READING ACTIVITY** **TOPICS**: 1.Pre interview skills 2.while interview skills (Facing Interviews) 3.Post interview skills ; Entrepreneurship and Project Preparation	15
4	**Part – D** **GOOGLE SEARCH AND PRESENTATION in Record note** **(for Continuous Assessment as Assignments on any five topics)** (16 Topics enclosed separately)	15

RATIONALE:

Against the backdrop of the needs of the Industries, as wells as based on fulfilling the expectations of the Industries, the Diploma Level students have to be trained directly and indirectly in toning up their competency levels. Proficiency in Communication only, equips them with confidence and capacity to cope with the employment. Hence, there is a necessity to focus on these in the curriculum. At the end of the Course, the student is better equipped to express himself in oral and written communication effectively.

SPECIFIC INSTRUCTIONAL OBJECTIVES:

1. Emphasize and Enhance Speaking Skills
2. Increase Ability to Express Views & Opinions
3. Develop and Enhance Employability Skills
4. Induce Entrepreneurship and Plan for the Future
5. Expose & Induce Life Skills for Effective Managerial Ability

Sl.No	Section	Skills To Be Acquired	Activity	No, Of Hours
1.	**PART-A** LISTENING ACTIVITY TOPICS: 1. Global Warming, 2. Pollution, 3.Environment,Communal Harmony	Deductive/reasoning skills Cognitive Skills Retention Skills	Talking down notes/hints Answering question Fill in the blanks the exact words heard Brief the read out passage	04 04 02 02
2.	PART-B SPEAKING ACTIVITY TOPICS: COMMUNICATION: Behavioural skills; Productivity, Occupational safety, Health Hazards,Accident &safety,First-aid,descriptive skillsFAQ in personal interview Various situational dialogues and telephonic conversation	Personality/psychological skills Pleasing &Amiable Skills Assertive skills Expressive skills Fluency/compatibility skills Leadership/team Spirit skills Interview skills(FAQ)	Instant sentence making Say expression/phrases Self introduction/ another higher official in company Describe/explain products Dialogues on technical ground discuss &interact Group Discussion	02 02 04 06 06 08
3.	PART-C READING AND WRITING ACTIVITY TOPICS: Facing interviews; entrepreneurship and Project Preparation	Creative & Reasoning Skills Creative &Composing Skills Attitude& Aim Skills Entrepreneurship Skills	Frame New words with the given words/Phrases Prepare an outline of a project to obtain loan from bank in becoming an entrepreneurship	02 02 02 02

4	PART-D Google search and presentation in record note(for continuous Assessment on any five topics) (16 Topics enclosed separately)	Cognitive Skills Presentation Skills &Interactive Skills	Search in the website Prepare a presentation Discuss &Interact records as assignment	12

Assignment Topics:

1. Productivity in Industries
2. Quality Tools, Quality Circles and Quality Consciousness
3. Effective Management
4. House Keeping in Industries
5. Occupational Safety and Hazard
6. Occupational Accident and First Aid
7. Labor Welfare Legislations
8. Labor Welfare Acts and Rights
9. Entrepreneurship
10. Marketing Analysis, Support and Procurement
11. Constitutional And Legal Provisions For Women In India
12. The Harassment of Women at Workplace (Prevention and Prohibition and Redressal) Act, 2013
13. Guidelines and Norms laid down by the Hon'ble Supreme Court in Vishaka and Others
14. The National Commission for Protection of Child Rights (NCPCR)
15.. Protection of Children from Sexual Offences (POCSO) Act and Rule 6 of POCSO Rules, 2012
16. Importance of Communication in English

LABORATORY REQUIREMENTS:

1.An echo-free room
2. Necessary furniture and comfortable chairs
3. A Computer with internet access
4. English newspapers with equivalent Tamil news papers
5. A minimum of Three Mikes with or without cords
6. Color Television with DTH
7. DVD/VCD Player with Home Theatre speakers
8. Projector

Suggested Reading:

1. Production and Operations Management by S.N. Chary, TMH
2. Essentials of Management by Koontz & Weihrich, TMH
3. Modern Production / Operations Management by E.S. Buffa and R.K. Sarin, John Wiley & Sons
4. Production Systems: Planning, Analysis and Control by J.L. Riggs, 3rd ed., Wiley.
5. Productions and Operations Management by A.Muhlemann, J. Oakland and K. Lockyer, Macmillan
6. Operations Research - An Introduction by H.A. Taha, Prentice Hall of India
7. Operations Research by J.K. Sharma, Macmillan
8. Business Correspondence & Report Writing by R.C. Sharma and K. Mohan, TMH
9. How to prepare for Group Discussion & Interview (With Audio Cassette) by Prasad, TMH
10. Spoken English – A self-learning guide to conversation practice (with Cassette)
11. Introduction to Environmental Engineering by Mackenzie, L. Davis and A. David, Cornwell, McgrawHill, 3rd Ed.
12. Environmental Engineering by Peary, Rowe and Tachobanoglous, McgrawHill .
13. Total Quality Management – An Introductory Text by Paul James, Prentice Hall
14. Quality Control and Applications by Housen & Ghose
15. Industrial Engineering Management by O.P. Khanna

LEARNING STRUCTURE **100 Marks**

- **Focus more on Speaking & Listening Skills**
- **Attention less on Reading & Writing Skills**
- **Apply the skills in fulfilling the Objectives on Focused Topics**

a) Listening	**25 Marks**
1. Deductive Reasoning Skills (Note taking, summarizing**,**	**10**
2. Cognitive Skills (answering questions)	**10**
3. Retention Skills (filling in blanks with exact words heard)	**05**
b) Speaking Extempore/ Prepared	**30 Marks**
1. Coherence Skills (story telling)	**05**
2. Interview Skills (FAQ in interviews)	**05**
3. Assertive Skills (introducing oneself/others)	**05**
4. Expressive Skills (describe/explain things)	**05**

5. Fluency/Compatibility Skills (dialogue) **05**
6. Leadership/Team Spirit Skills (group discussion) **05**

20

c) Writing & Reading **Marks**

1. Creative & Reasoning Skills (frame questions on patterns) **05**
2. Creative & Composing Skills (make sentences on patterns) **05**
3. Attitude & Aim Skills (prepare resume) **05**
4. Entrepreneurship Skills (prepare outline of a project) **05**

25

d) Continuous Assessment (Internal Marks) **Marks**

(search, read, write down, speak, listen, interact & discuss)

1. Cognitive Skills (Google search on focused topics)
2. Presentation Skills& Interactive Skills (after listening, discuss)

100

Total Marks: **Marks**

Continuous Assessment (Internal Marks)

I	LISTENING (3 exercises), SPEAKING (6 exercises) and READING & WRITING (4 exercises). All activities shall be recorded in the Record note. 13 exercises x 10 marks = 130 marks. Reduced to 10 marks	10 Marks
II	Present in the Record Note on any 5 topics prescribed in syllabus as Assignments Topics 5 Assignments x 10 Marks = 50 marks. Average of 5 Assignments is 10 marks	10 Marks
III	Attendance	5 Marks
	Total	25 Marks

MODEL QUESTION PAPER

Time: 3 Hours **Maximum Marks: 75**

A. LISTENING 25 Marks

1. Listen to the content and take down notes/hints 05
2. Listen to the content and answer the following questions. 10
3. Listen to the content and fill in the blanks the exact words heard. 05
4. Write a brief of the read out passage 05 05

B. SPEAKING 30 Marks

1. Present a story orally , using the given keywords or the shown picture. 05
2. Answer a question from the FAQ in a personal interview 05
3. Imagine, a consultant has come to your department. Introduce him to your subordinates. 05
4. Explain/describe the product you are about to launch in the market. 05
5. Speak with your immediate boss about the progress you have made. (Dialogue) 05
6. Discuss within the group on the topic of focus prescribed in the syllabus. 05

C. WRITING & READING 20 Marks

1. Write five new words from the given word or phrase: Education 05

2. Frame new questions from the pattern given by changing sets of words with your Own. 05

a.	When	do	you	return?
b.	How	is	his performance?	
c.	Where	has	the manager	gone?
d.	What	is	the progress	today?
e.	Why	are	the machines	not functioning?

3. Prepare a resume for the post of department Manager. 05

4. Prepare an outline of a project to obtain a loan (Provide headings and subheadings) 05

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VI SEMESTER

1E6311–PROJECT MANAGEMENT WITH MIS

Rationale:

This is an applied engineering subject. The subject aims at imparting basics knowledge about construction planning and management, site organization, construction labour, control of work progress, inspection and quality control, accidents and safety and heavy construction equipment.

A good percentage of diploma engineers start working as small contractors. They require the knowledge of contractor ship, tendering and preparation of specifications for various types of jobs. Also diploma holders adopt values as their profession. To promote entrepreneurship amongst these engineers, knowledge and associated skills in above field becomes essential. Hence this subject is of great importance to diploma engineers**.**

Course Objectives:

- Describe the role of government and construction agencies in the field of housing
- Mention the construction activity and fixing the construction agency& organization set up of PWD
- Describe the aspects of inspection and quality control methods
- Describe the banking system & Carryout the feasibility study of a project.
- Explain the significance of CPM and PERT Techniques.
- Study the organization chart of a construction company.
- Understands the concepts and requirement of Entrepreneurship
- Perform the computation of Net present value

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
1E6311	5	75	5	Internal	External	Total	3 Hrs
				25	75	100	

UNITS –ALLOCATION OF HOURS AND MARKS			
Unit No.	Topics	No. of Hours	Marks
I	Construction sector in India , Feasibility study, Planning of civil engineering project, Contract management.	12	20
II	Construction organization and their superintendence, Departmental procedure and Accounting.	12	20
III	Scheduling and time management, Resource management.	12	20
IV	Quality management and safety, Construction disputes and their settlement, Construction labour and legislation, Ethics in engineering.	12	20
V	Entrepreneurship, Information management and computers, Financial management.	12	20
	Cycle Tests, Model exams & Revision Classes (2+2+3+8)	15	--
	Total	75	100

1E6311–PROJECT MANAGEMENT WITH MIS

CONTENT DETAILS

UNIT-I

1.1 CONSTRUCTION SECTOR IN INDIA

Unique features of a construction project- Life Cycle of a Construction project Pre-Project Project Phase and Post project phase. Need for Project Management and its relevance - Types of Construction - Public and Private - Participants /Stakeholders Construction project: Nature of construction industry from service and manufacturing- Architect, Client , the Constructor, the consultant, subcontractor/supplier/vendor, Lawyer, Insurer - their role and responsibilities.

1.2 PLANNING FOR CIVIL ENGINEERING PROJECT

Objectives of Planning -its advantage to Client and Engineer- its Limitations – Stages of planning by Owner & Contractor.

1.3 CONTRACT MANAGEMENT

Types of Contract - Contract Documents and its content - Possible Disputes while executing a Contract - Importance of Specification in a contract - Tender Notice - types – Content of Tender documents - Earnest Money Deposit (EMD) and Security Deposit (SD) - Retention Money- Scrutiny and acceptance of tender - Contract Agreement - Reasons for termination of a contract – Sub Contract - Classification of subcontractors -Guidelines for managing subcontractors.

UNIT-II

2.1 CONSTRUCTION ORGANISATION AND SUPERINTENDENCE*:

Forms of Business Organisations - Sole Proprietorship - Partnership - Limited Company - Joint Ventures - Co-operative Society - State Enterprise-Delegation - Decentralization - Functions of various departments in a construction company (Purchase /Finance / Personnel / Marketing and Sales / Legal / Engineering departments) - Insurance policies for a typical Construction site- Organisation Chart of a Construction Company.(broad outline only)

* The objective is to make the student to understand Private sector in construction industry.

2.2 DEPARTMENTAL PROCEDURE AND ACCOUNTING (BASIC TREATMENT ONLY):

Organization of P.W.D. - Responsibility of Officers – Accounting Procedures (administrative sanction, Technical Sanction, Payment of bills) - Imprest & Temporary advance account - Cash book - Works register - Accounting for Consumable materials – Importance of M-book and its entries – Work charged establishment – Nominal Muster Roll (N.M.R) – Daily Labour Reports (D.L.R)

UNIT-III

3.1 SCHEDULING AND TIME MANAGEMENT:

Scheduling - Definition of Scheduling -Uses and advantages – Classification – Methods of Scheduling – Bar chart - Job layout - Work breakdown chart (WBC) -Networks for Project Management – Activity – Event – Dummies – Basic assumptions in creating a

Network - Rules for drawing Networks - Fulkerson's rule for numbering the events - Critical Path Method - ES, EF, LS, LF, Floats - Significance of Critical path - PERT - Time estimates - Earliest Expected time - Latest allowable occurrence time – Slack- Standard Deviation and Variance – Simple problems.

3.2 RESOURCE MANAGEMENT:

Definition - Need for Resource Management - Optimum utilisation of resources, Finance, Materials, Machinery, Human resources. Resource Planning – Resource levelling and its objectives- Time - Cost trade off – Crashing – Need for crashing an activity – Methods & tips for crashing – Time Vs Cost optimization curve – Cost slope – its significance in crashing - A simple problem (like a case study, but not for examination) can be solved in Classroom for better understanding of "resource levelling" and "duration cost trade-off".

UNIT-IV

4.1QUALITY MANAGEMENT AND SAFETY:

Importance of quality – Elements of quality – Quality Assurance techniques (Inspection, Testing, Sampling) Importance of safety – Causes of accidents – Role of various parties (designer/ employer / Worker) in safety management – Benefits – Approaches to improve safety in construction.

4.2 CONSTRUCTION DISPUTES AND THEIR SETTLEMENT:

Introduction – development of disputes – Categories of Disputes – Modes of settlement – arbitration

4.3 HUMAN FACTORS IN CONSTRUCTION:

Traits of efficient construction managers - Team building/Contract implementation /project organisation skills - Ethics and integrity

4.4 CONSTRUCTION LABOUR AND LEGISLATION:

Need for legislation - Payment of wages Act - Contract Labour (Regulation and abolition Act) -Workmen Compensation Act – Employees Provident Fund (EPF) Act.

UNIT-V

5.1 INFORMATION MANAGEMENT AND COMPUTERS - :

Introduction - Definition of MIS - Requirements of MIS - Advantages of Computer in Fields of Construction Industry - Data Base approach- Benefits to Contractor and User - Popular Project Management Software - Common Functions of Project Management software- Construction Automation and Robotics.

5.2 CONSTRUCTION ECONOMICS :

Economic decision making - Elements of cash flow- Factors affecting cash flow – Time value of money – Interest rate of capital – Evaluating alternatives by Present worth comparison –Future worth comparison – IRR method - simple problems. Types of taxes - Introduction to – GST in construction, Income Tax, Customs Duty. Income expenditure statement (basic concept only)- balance sheet. Global banking culture- types of banks- their activities - types of accounts, Fund transfer RTGS, NEFT

Text Books:

Sl.No.	Title	Author	Publisher
1.	Construction Project Management Theory and Practice 2nd Edn. 2015	Kumar Neeraj Jha ,	Pearson

Reference Book:

Sl.No.	Title	Author	Publisher
1.	Modern Construction Management - 7th edn, 2013	Frank Harris and Ronald McCaffer, with FrancisEdum-Fotwe	Wiley-Blackwell, Chichester,
2.	Construction of Structures and Management of Works - (2013)	Rangwala.S	Charotar Publishing House, Anand 388 001
3.	Construction Management - (2010)	Sanga Reddy	Kumaran Publications, Coimbatore – 14.

Online Source:

1. **http://nptel.ac.in/courses/105103093/.**
2. **http://nptel.ac.in/courses/105103093/11.**
3. **http://nptel.ac.in/downloads/105103093/.**
4. **http://thebookee.net/co/construction-planning-and-management-by-punmia.**

Course outcome :

C01	Know the concepts and requirement of Entrepreneurship
C02	Know the banking system.
C03	Able to the concepts and requirement of Entrepreneurship

1E6312 - ESTIMATING & COSTING –II

Rationale:

Estimating and costing is an essential course of Civil Engineering Programme. Estimating and costing-I provide basic knowledge and skills of interpretation of the drawing, methods of computing the quantities according to Measurement units and its rules and relevant I.S. code. Now in this course of Estimating and costing-II, efforts have been made to familiarize and to do more and detail practice on various other major Civil Engineering Structures to enhance and enrich the knowledge and skill. Previous knowledge of this course will encourage the student in understanding drawings of structures and made easy to develop the skill in estimation. This will justify the importance of course and provide capability to do field work and self-confidence to the technician.

Course Objectives:

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

- Understand the estimate of different types of steps.
- Understand the estimate of structure of water supply and sanitary works.
- Understand the estimate of different types of bridges.
- Understand the valuation of land and buildings.
- Understand the rent calculation also.

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
1E6311	5	75	5	Internal	External	Total	3 Hrs
				25	75	100	

UNITS –ALLOCATION OF HOURS AND MARKS

Unit No.	Topics	No. of Hours	Marks
I	Specification Writing & Report Writing	12	20
II	Valuation & Rent Calculation	12	20
III	Analysis Of Rates For Sanitary And Water Supply Works & Analysis Of Rates For Bridge/ Road Works And Miscellaneous Items	12	20
IV	Taking Off Quantities Of P.H. Engineering Structures Using Trade System	12	20
V	Taking Off Quantities Of Road / Bridge Structures Using Trade System	12	20
	Cycle Tests, Model exams & Revision Classes (2+2+3+8)	15	--
	Total	75	100

1E6312 - ESTIMATING & COSTING –II

CONTENT DETAILS

UNIT-I

1.1 SPECIFICATION WRITING:

Specification–Necessity–Importance of specifications-Types Of specifications – General specification , Detailed specification and Standard specification - Essential requirements of specifications – General and Technical provisions of detailed specifications - Specifications for various materials like Cement, Sand, Brick, Timber, Stone aggregate, Reinforcement steel, Tiles, Bitumen, Water etc- General specification for a building – General specification for a Culvert - General specification for a Concrete / Tar Road project - Examples—Detailed specifications for works such as Earth work excavation, Foundation concrete, Stone /Brick masonry, Doors / Windows, RCC in columns / beams / slabs, Plastering, Flooring, Painting / Varnishing, DPC, A.C sheet roofing, Rain water pipes, Centering for roofing, Weathering course, Under reamed Piles, Water bound macadam / Tar roads, Surface dressing with bitumen, Revetments, etc- Examples – Steps involved in writing Standard specification – Advantages of Standard specifications - Writing standard specifications with reference to Tamil Nadu Building Practice / Indian Standards / NBC – Examples.

1.2 REPORT WRITING:

Definition of report – Types – Necessity - Documents to accompany the report - Points to be considered while writing technical reports Writing typical Technical reports for the proposed projects such as: Construction of Buildings (Residential / Hospital / School/ Community Hall)Laying a village road (WBM / Tar / Concrete road)Construction of a bridge/ culvert across a river Construction of a Pedestrian Sub-way/ Foot over bridge across a City road Water supply system for a village Sewage treatment plant for a residential colony in a sub urban area Construction of a new bus terminus in a developing town

UNIT-II

2.1 VALUATION:

Value - Difference between Cost and Value - Purpose of valuation – Definition of terms: Capital cost, Gross income and Net income, Outgoings, Capitalized value and Capital value, Scrap value, Salvage value, Obsolescence, Sinking fund, Depreciation, Years purchase, Book value, Market value, Rate able value, Deferred value of land, Lease, Mortgage, Annuity, Amortization-Factors affecting the value of a property – Classification of Properties – Types of Leases- Problems on determination of Sinking Fund - Problems on calculation of Depreciation-Methods of valuation of Buildings - Valuation based on Comparison / Rent / Profit / Present value –Methods of valuation of Lands - Mathematics of Valuation – Valuation Tables - Problems on Valuation of Buildings / Properties

2.2 RENT CALCULATION:

Fixation of rent– Definition of terms: Standard rent, Fair rent Or Reasonable rent, Economical rent, Market rent, Rent certificate – Rent control – Factors influencing the rent of a building - Problems on rent calculation – Fixing rent of a Private.)

UNIT-III

3.1 ANALYSIS OF RATES FOR SANITARY AND WATER SUPPLY WORKS:

Earth work in trenches - Timbering of trenches - Laying stone ware / RCC / GI pipes – Lead joint for cast iron pipes - Cutting and jointing G.I. Pipes, PVC Pipes and Stoneware Pipes - Constructing a man hole in the sewage line of a residence - Providing a dispersion trench for the septic tank of a residential flat – Supplying a Ferro cement circular ring for well sinking - Laying PVC Plumbing lines concealed in to brick masonry walls - Supplying and fixing Indian type water closets with flushing tanks - Supplying and fixing European type water closet with flushing tank - Supplying and fixing a wash basin with tap.

3.2 ANALYSIS OF RATES FOR BRIDGE/ ROAD WORKS AND MISCELLANEOUS ITEMS:

Random Rubble Stone masonry in Abutments and Piers - Providing form work for Deck slabs - R.C.C for Columns / Beams / Deck Slab – Parapets - Hand rails - Earth filling in embankments - Soling for a WBM road – Laying WBM road over the existing soling - Surface dressing - Surface Blinding -Providing Pre mix carpet - Laying Concrete roads - Apron and Revetment works in Canals -Wooden frames for doors - Paneled doors – Glazed windows - Steel Grill gates – Steel grills for windows - Supplying and fixing Aluminum partitions - Providing wooden shutters to lofts - Expansion joint in R.C roof (Exposure to use of software in Analysis of rates - not for examination).

UNIT-IV

4.1 TAKING OFF QUANTITIES OF P.H.ENGINEERING STRUCTURES USING TRADE SYSTEM:

Preparing detailed estimate using Trade system and Take off quantities for all items of works in the following P.H. Engineering Structures:

1. Septic tanks with dispersion trench / soak pit.
2. Open Well with Masonry Staining.
3. Rain water harvesting- Shallow Recharge Well.
4. Square RCC Over Head Tank on Four columns with Staging.
5. Man Hole

UNIT-V

5.1 TAKING OFF QUANTITIES OF ROAD / BRIDGE STRUCTURES USING TRADE SYSTEM:

Preparing detailed estimate using Trade system and Take off quantities for all items of works in the following Road / Bridge Structures:

1. Water Bound Macadam Road.
2. Cement Concrete Road with side drains.
3. Single span Slab Culvert.
4. Tee Beam Bridge.
5. Pipe culvert

Text Books:

Sl.No.	Title	Author	Publisher
1.	Estimating and Costing	S. C. Rangwala,	Charotar Publishing House, Anand

Reference Book:

Sl.No.	Title	Author	Publisher
1.	Practical Valuation Vol 1	B.KanakaSabapathy,	Prestige Flats, 11 A Reynolds Road, Trichy-1
2.	Estimating and Costing	S. N. Dutta	Khanna Publishers, New Delhi

Online Source :

1. **http://www.faadooengineers.com/threads/30024-Civil-Engg-notes-of-estimate-and-costing.**
2. **https://www.scribd.com/document/320541111/Estimating-and-Costing-in-Civil-Engineering-Free-Download-Bn-Dutta.**

Course outcome :

C01	Know the estimate of different types of steps.
C02	Know the estimate of different types of bridges.
C03	Able to the valuation of land and buildings.

1E6313.1-REPAIR &REHABILITATION STRUCTURE

Rationale:

One of the major concerns of a civil engineer is to take care of the building works,

Course Objectives:

- Describe the role of government and construction agencies in the field of housing
- Describe the organization set up of PWD
- Mention the construction activity and fixing the construction agency.
- Describe the aspects of inspection and quality control methods
- Describe the banking system.
- Carryout the feasibility study of a project.
- Understands the process of planning for civil engineering projects.
- Explain the significance of CPM and PERT Techniques.
- Understand the types of contract system
- Study the organization chart of a construction company.
- Understands the concepts and requirement of Entrepreneurship
- Perform the computation of Net present value

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
1E6313.1	5	75	5	Internal	External	Total	3 Hrs
				25	75	100	

UNITS –ALLOCATION OF HOURS AND MARKS			
Unit No.	Topics	No. of Hours	Marks
I	Introduction, Causes & Detection of Damages	12	20
II	Masonry Walls & Water Proofing	12	20
III	Concept of Repairs & Strengthening of RCC Structures, Materials for Repairs & Advanced Damage Detection Techniques.	12	20
IV	Plumbing & Sanitary Fixture & Building Drainage System	12	20
V	Electrical Fittings	12	20
	Cycle Tests, Model exams & Revision Classes (2+2+3+8)	15	--
	Total	75	100

1E6313.1-REPAIRS &REHABILITATION STRUCTURE

CONTENT DETAILS

UNIT-I

1.1 INTRODUCTION :

Necessity, operation, maintenance & repairs of structures - Classification of maintenance- Rehabilitation (restoration), strengthening, retrofitting - Methodical approach to repairs, inspection-annual, emergency, special, repairs- minor, special and renovation.

1.2 CAUSES & DETECTION OF DAMAGES:

Causes of damages, damages due to earthquakes, fire hazards, flood, hazards,

UNIT-II

2.1 MASONRY WALLS:

Damp walls, causes effects, remedies, eradication of efflorescence - Cracks in walls, remedial & preventive measures

2.2 WATER PROOFING:

Leaking Basements - roofs – Water tank.

UNIT-III

3.1 CONCEPT OF REPAIRS & STRENGTHENING OF RCC STRUCTURES:

Concept of repairs of RCC structures - Physical examination of common defects - Structural repairs & strengthening repairs by new developments.

3.2 MATERIALS FOR REPAIRS:

Epoxy resin, epoxy mortar, gypsum cement mortar, quick setting, cement mortar.

3.3 ADVANCED DAMAGE DETECTION TECHNIQUES:

Advanced damage detection techniques - non destructive testing.

UNIT-IV

4.1 PLUMBING:

Elements of plumbing- Objectives of plumbing, purpose of plumbing, role of plumber, licensing of plumbers their functions, sewer Air, supply pipes, drainage &vent pipes application for obtaining supply connection - Pipes joints & fittings Introduction. Types of Pipe – G.I. Pipes, PVC Pipes, Copper pipes, C.I. Pipes, A.C. Pipes, prestressed concrete pipes, joints in pipes, method of fixing pipes such as G.I. fitting C.I fitting - Valves & Terminal Fittings Types of valves & its purpose, sluice valve, reflux valve, scour valve, Air relief valve, pressure relief valve, gate valves, Bio-taps & stop valve - self closing valve - Flush valve, mixing valve.

4.2 SANITARY FIXTURE & BUILDING DRAINAGE SYSTEM :

Building sanitary fittings – water closet, flushing appliances, urinals, washbasins, flushing cisterns, principles of building drainage siphonic action, traps & its types. Capacity & sizing of pipe, soil pipe, waste pipe, rain water pipe, system of plumbing. Installation of pipes, testing of pipes.

UNIT-V

5.1 ELECTRICAL FITTINGS:

Basics of electricity – Single/Three phase supply. Earthing for safety – types of earthling– ISI specifications - Electrical wiring systems in domestic and commercial buildings. Conduits, Types of wiring -Diagram for connection. Bus way, Bus Bars, lighting track and conduits (Aluminium metallic, non metallic) arrangements. Power handling, equipment, switch board, panel boards. Lighting conductors : Purpose, materials, fixing, earthling arrangements.

Text Books:

Sl.No.	Title	Author	Publisher
1.	Building Failures – Diagnosis and Avoidance – (2002)	Ransom W. H.	E and F. N. Spon.,Taylor & Francis

Reference Book:

Sl.No.	Title	Author	Publisher
1.	Maintenance and Repairs of Buildings - (2011)	Nayak B.	S.,Khanna Publication
2.	Maintenance and Repairs of Buildings - (1975)	HutchinSon, BD.,	Newnes –Butterworth

Online Source:

1. **http://cpwd.gov.in/Units/handbook.pdf.**
2. **http://www.uhab.org/sites/default/files/doc_library/Building_Repair.pdf.**
3. **http://studentskey.in/repair-and-rehabilitation-of-structures-notes/.**

Course outcome :

C01	Know the banking system.
C02	Able to the types of contract system
C03	Know the concepts and requirement of Entrepreneurship

1E6313.2-STEEL STRUCTURES

Rationale:

This subject is an applied engineering subject. Diploma holders in civil engineering will be required to supervise Steel construction and fabrication. He may also be required to design simple structural elements, make changes in design depending upon availability of materials. He must be able to read and interpret structural drawings of different elements. The subject thus deals with elementary design principles as per BIS code of practice BIS:800 and their relevant drawings.

Course Objectives:

- To understand the behavior of structural steel in its plastic stage:
- To learn plastic analysis of simple members.
- To design simple steel members to resist axial forces.
- To design simple flexural members.
- To design welded/ bolted connections for steel members

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
1E6313.2	5	75	5	Internal	External	Total	3 Hrs
				25	75	100	

UNITS –ALLOCATION OF HOURS AND MARKS			
Unit No.	Topics	No. of Hours	Marks
I	Introduction to plastic analysis and LSD	12	20
II	Design of tension and compression members by LSM	12	20
III	Design Of Flexural Members For BM and SF by LSM	12	20
IV	Design of section for combined actions	12	20
V	Design of connections and detailing	12	20
	Cycle Tests, Model exams & Revision Classes (2+2+3+8)	15	--
	Total	75	100

1E6313.2-STEEL STRUCTURES

CONTENT DETAILS

UNIT-I

1.1 INTRODUCTION TO PLASTIC ANALYSIS AND LIMIT STATE DESIGN

Plastic Analysis:

Analysis of steel structures-methods – elastic , plastic and dynamic analysis and advanced method of analysis based on IS 800-2007- idealized stress vs strain curve for structural steel – requirements and assumptions of plastic method of analysis – formation of plastic hinges in flexural members – plastic moment of resistance and plastic modulus of section – shape factors of rectangular / circular / I /T – sections – collapse load – determination of collapse loads for cantilever , simply supported and fixed beams by any (statically or kinematical method) – problems.

1.2 Limit state design:

Advantages of limits state design of steel structures – basis for design – classification of limit states – characteristics and design actions – ultimate and design strengths – partial safety factors for loads and materials – design requirements – strength requirements : stability, fatigue and plastic collapse – serviceability requirements: deflection limits , vibration, durability , fire resistance – geometrical properties of gross and effective cross sections – classification of cross sections as per IS :800-2007 – internal , external (Outstands) and tapered elements of sections – maximum effective slenderness ratio of members – necessity of bracings and expansion joints in steel structures

UNIT-II

DESIGN OF CONNECTIONS AND DETAILING

2.1 General:

Types of connections-bolted, riveted and welded connections-rigid and flexible connections - components of connections-basic requirements of connections-clearance for holes-minimum and maximum spacing of fasteners-minimum edge/ end distance-requirements of tacking fasteners.

2.2 Bolted connections:

Types of bolts-bearing types bolts-nominal and design shear strength of bolts-reduction factors for long joints, large grip lengths, thick packing plates-nominal and design tensile strengths(tension capacity) of bolts-friction grip types bolts-advantages-requirements as per IS 3757-nominal and design slip resistance of bolts in shear-slip factors-nominal and design tensile strengths of friction bolts-simple design problems(combined actions not included)

2.3 Welded connection:

Types of welds- Fillet welds-Minimum and maximum sizes-Effective length of weld-Fillet welds on inclined faces-Design strength of shop/site welds-Butt welds-Effective throat thickness and effective length of butt weld-Strength of butt weld-Intermittent welds-Slot or plug welds-Reduction factor for long joints-Stress in the weld due to individual forces-Design requirements of connections-Simple design problems(combined actions not included)

2.4 Detailing:

Beam to Beam and Beam to Column connections-Seat angle and web angle connections-Designing and detailing of simple connections for vertical forces(moment resisting connections are not included)-Simple problems-Connection details of truss members at joints(neat sketches)

UNIT-III

DESIGN OF TENSION AND COMPRESSION MEMBERS BY L.S.M

3.1 Tension Members:

Design strength of tension members against yielding of cross section , against rupture of critical section and due to block shear – design requirements – problems on determination of design strength of given members and designing tension members using rolled steel sections for given loads – design of bolted and welded connections for tension members – problems.

3.2 Compression members:

Effective length and effective sectional area of compression members – design stress and design strength – buckling class of cross sections imperfection factor – stress reduction factor – thickness of elements – eccentricity of loads on columns – single angle and double angle struts – bolted and welded connections for struts – design of built up columns – connecting the components of built up columns by tacking bolts / welds – requirements of connections – laced columns – single and double laced systems – requirements of lacing bars – design of lacings – battened columns – requirements of battens – design of battens – problems

3.3 Column bases:

Slab base and gusseted base – code provisions (IS 800-2007) – MINIMUM THICKNESS and effective area of base plate – design of slab base and gusseted base for axially loaded columns using bolts / welds.

UNIT-IV

Design of flexural member for BM and SF by L.S.M

4.1 Laterally supported beams:

Classification Of Steel Beams – Effective Span – Design Principle – Web Buckling And Web Crippling – Minimum Thickness Of Web – Section With Web Susceptible / Not Susceptible To Buckling Under Shear Before Yielding – Design Bending Strength Of Section With Low Shear – Effect Of Holes In Tension Zone – Nominal Shear Strength Design Shear Strength Of Sections Limiting Deflection Of Beams – Design Of Laterally Supported Simple Beams For Bending Moments And Shear Force Using Single – Double Rolled Steel Section (Symmetrical Cross Section Only) – Problems – Unsymmetrical (Bi – Axial) Bending – Design Of Laterally Supported Purloins For Sloped Roof Trusses (For Given Vertical UDL With BM Co- Efficient 0.085) – Simple Problems.

4.2 Laterally unsupported beams:

Lateral torsion buckling of compression flange – maximum permitted slenderness ratio of compression flange – design bending strength of laterally unsupported beams – design bending strength of laterally unsupported beams – bending stress reduction factor –

imperfection parameter – elastic lateral buckling moment of doubly symmetric sections – end torsion restraints and intermittent bracing of compression flange – requirements, types, and their effects – design of laterally unsupported beams for bending and shear using symmetrical rolled steel sections – problems.

UNIT-V

DESIGN OF SECTIONS FOR COMBINED ACTIONS

5.1 Sections subjected to bending moment and high shear force::

Effect of high shear on flexural capacity of sections-Limiting value of shear force for full moment capacity of sections-Reduced design strength of Plastic/Compact/semi compact sections subjected to high shear-Design of support sections of cantilever and continuous beam-Problems

5.2 Sections subjected to bending moment and axial compression(Beam-Column)::

Columns carrying eccentric loads, column subjected to vertical and horizontal loads (wind loads), columns of frames, principal rafters with purloins at non nodal points-material failure and buckling failure-inter action equations-overall buckling-design problems(with axial compression and uni-axial B.M only)

5.3 Sections subjected to bending moment and axial tension moment::

Bottom chord members of bridge girders-tie members of trusses with hanging loads-reduced effective moment-inter action equation- Design problems

Text Books:

Sl.No.	Title	Author	Publisher
1.	Limit state design in structural steel (2011)	M.R.Shiyekar,	PHI learning Pvt.ltd

Reference Book:

Sl.No.	Title	Author	Publisher
1.	Design of steel structures (2011)	S.S.Bhavikatti ,	IK internal Publishing house Pvt Ltd
2.	Steel Structures (2008)	Dr.Subramaniam ,	Oxford university press

Online Source:

1. **http://nptel.ac.in/courses/105106112/.**
2. **http://nptel.ac.in/courses/105103094/38.**
3. **http://nptel.ac.in/courses/105103094/3,**

Course outcome :

C01	Know the understand the behavior of structural steel in its plastic stage:
C02	Able to the plastic analysis of simple members.
C03	Know the design simple flexural members
C04	Able to the design welded/ bolted connections for steel members

1E6313.3-EARTH QUAKE ENGINEERING

Rationale:

Diploma holders in civil engineering have to supervise construction of various earthquake resistant buildings. Therefore, the students should have requisite knowledge regarding terminology of earthquake and the precautions to be taken while constructing earthquake resistant buildings.

Course Objectives:

- To know the causes and consequences of earthquakes;
- To understand the magnitude and effects of earthquakes on structures.
- To understand the behavior of various types of buildings during earthquakes;
- To know about the design concepts of earthquake resisting buildings;
- To know the methods of evaluation and retrofitting of damaged structures.

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
1E6313.3	5	75	5	Internal	External	Total	3 Hrs
				25	75	100	

UNITS –ALLOCATION OF HOURS AND MARKS			
Unit No.	Topics	No. of Hours	Marks
I	Introduction to earthquake	12	20
II	Seismic effects on structures	12	20
III	Behavior of structures during earthquakes	12	20
IV	Concepts of design of earthquake resisting buildings.	12	20
V	Retrofitting of buildings	12	20
	Cycle Tests, Model exams & Revision Classes (2+2+3+8)	15	--
	Total	75	100

1E6313.3-EARTH QUAKE ENGINEERING

CONTENT DETAILS

UNIT-I

INTRODUCTION TO EARTHQUAKE:

Objectives Of Earthquake Engineering – Engineering Seismology – Structure Of The Earth – Temperatures And Pressures With Respect To Depth – Plate Tectonics – Evolution Of Indian Sub Continent – Seism tectonics Of India – Severe Earthquakes In Indian Sub Continent – Causes Of Earthquakes – Definition Of Terms: Fault Line, Active Fault, Focus Or Hypo Centre, Epicenter, Epicenter Distance, Focal Depth, Peak Ground Acceleration, Foreshocks, Aftershocks , A seismic, Isoseismic, Seismic Gap – Ground Shaking – Seismic Waves – Body Waves – P-Waves And S-Waves – Surface Waves – Reyleigh And Love Waves Earthquake Intensity – Earthquake Size – Magnitude – Wave Magnitude, Duration Magnitude, Moment Magnitude – Energy Released – Classification Of Earthquake Based On Magnitude – Consequences Of Earthquake – Ground Motion, Ground Rupture, Liquefaction , Landslides, Fire, Tsunamis, Etc – Seismic Zoning Map Of India (2002) – Earthquake Frequency – Prediction Of Earthquake Risk – Measurement Of Earthquake – Instruments Used – Various Scales – Richter's Magnitude Scale.

UNIT-II

SEISMIC EFFECTS ON STRUCTURES

Nature Of Ground Motion – Effects Of Source, Path And Site – Ground Shaking Effect On Structures – Effects Of Amplitude, Duration And Distance Of Earthquake – Damage Potential Of Earthquakes – Effects Of Inertia Forces, Seismic Load, Deformations In Structures, Horizontal And Vertical Shaking Of Structures, Transfer Of Inertia Forces From Top To Bottom – Effects Of Soil – Influence Of Ground Condition On Earthquake Motion – Causes For Seismic Damages In Buildings: Soft Storey Failure, Floating Columns, Plan Irregularity, Vertical Irregularity, Lack Of Confinement Of Concrete, Long Cantilevers With Heavy Dead Loads, Insufficient Shear Reinforcements In Columns, Poor Quality Construction, Poor Quality Materials, Corrosion Of Reinforcement, Pounding Of Adjacent Buildings – Short Column Effect – Effects Of Size And Shape Of Buildings – Horizontal And Vertical Layout Of Buildings – Effect Of Shifting Of Filler Wall Locations From Floor To Floor, Non Uniform Rigidity Distribution – Ductility And Flexibility Of Buildings.

UNIT-III

BEHAVIOUR OF STRUCTURES DURING EARTHQUAKES

Characteristics Of Buildings Affecting Their Behavior – Symmetry, Regularity, Stiffness, Flexibility, Strength time Period, Damping, Ductility, Materials And Method Of Construction – Ductile, Brittle And Fatigue Fractures – Behavior Of Structures On Sloped Ground – Behavior Of Structures With Load Bearing Walls – Brick / Stone / Mud Masonry – Large Inertia Forces Due To Heavy Weight, Very Low Tensile / Shear Strengths And Brittleness Of Walls, Stress Concentration At Corners Of Openings, Unsymmetrical Openings, Poor Mortars, Free Standing Masonry Walls, Wall Enclosures Without Roof – Cracks In Load Veering Walls Due To Flexure And Shear Caused By Earthquake –

Improvements In The Behavior Of Reinforced Masonry Structures – Behavior Of RCC Structures – Framed / Shear Wall / Dual Structures – Shear Failure Of Columns – Types Damages In Beams – Functions Of Stirrups In Seismic Beams – Outward Bulging Of Concrete And Buckling Of Compression Reinforcement Of Beams – Effect Of Joints On The Ductile Behaviour Of RCC / Steel Members – Behaviour Of Steel Structures – Types Of Joints, Joint Ductility – Behaviour Of Brittle Elements – Behaviour Of Structural Members Under Cyclic Loading – Soil Characteristics And Its Impact On Various Types Of Structures During Earth Quake – Twisting.

UNIT-IV

CONCEPTS OF DESIGN OF EARTHQUAKE RESISTING BUILDING

Earthquake Proof Building – Earthquake Resisting Building – Acceptable Damages To Building Elements Under Minor And Frequent Earth Quakes, Moderate And Occasional Earthquakes, And Strong But Rare Earth Quakes – General Requirements Of Structures For Earthquake Resistance And Structural Safety – Concepts Of Ductility, Deformability And Damageability – Concept Of Base Isolation – Ductile Performance Of Structures – Reinforcement Detailing For Ductility Of RC Structures – Flexible Building Elements – Special Requirements For RC Columns And Beams To Resist Earthquake – Confining Steel In Columns – Special Confining Reinforcement For Short Columns – Maximum Spacing Of Ties And Minimum Lapping Length Of Main Bars In Columns – Ductile Detailing Of RC Buildings – Joints Of Framed Structures – Reinforcements In Beam Column Joints – Providing Shear Walls – Arrangement Of Shear Walls – Boundary Elements Of Shear Walls – In Stilt Floors Of RC Buildings – Earthquake Resistant Features For Masonry Buildings – Protection Of Openings In Masonry Walls – Masonry Bond – Horizontal Bands Or Ring Beams At Plinth / Lintel / Roof Levels In Masonry – Horizontal / Vertical Reinforcements In Masonry Walls – Framing Of Thin Load Bearing Walls – Reinforcement For Hollow Block Masonry – Reduction Of Earthquake Effects – Base Isolation Technique – Types – Seismic Dampers – Types Of Dampers: Viscous, Friction, Yielding Dampers – Seismic Vibration Control.

UNIT-V

RETROFITTING OF BUILDINGS

Evaluation, Repair, Restoration And Seismic Strengthening Of Buildings: Assessment Of Structural And Non Structural Damages Caused By Earthquakes, Major And Minor Damages, Feasibility Study For Retrofitting – Structural Level Retrofitting Method And Member Level Retrofitting Method – Repair Materials: Shotcrete, Epoxy Resins, Epoxy Mortar, Gypsum Cement Mortar, Quick Setting Mortars, Mechanical Anchors – Techniques To Restore Original Strength: Repair Of Minor And Medium Cracks, Repair Of Major Cracks, Crushed Concrete And Fractured / Excessively Yielded / Buckled Reinforcement – Seismic Strengthening Techniques: Modification Of Roofs Or Floors, Insertion Of New Slab, Stiffening Existing Slab, Anchoring The Slab To Supporting Walls / Beams – Inserting New Walls – Strengthening Existing Walls: Grouting, Use Of Wire Mesh, Connecting The Walls, Pre Stressing, Providing Buttress – Strengthening Of RC Members : Reinforced Concrete Rings Around Existing Columns, Jacketing The Existing Weak Beams, Welding New Steel

To The Old Steel And Replacing The Cover, Pre Stressing Of Old Beams – Introduction Of Additional Load Bearing Elements In The Structure – Strengthening Of Foundations: Improving Drainage, Providing Apron, Adding RC Strips With Keys – Strengthening Of Soft Or Weak Stories Of Existing Buildings – Bracing Of Roof Truss Frames, Anchoring Of Roof Trusses To Supporting Walls.

Text Books:

Sl.No.	Title	Author	Publisher
1.	Earth quake resistant design of structures (2010)	Pankaj Agarwal And Manish Shirkhande	PHI Learning Pvt Ltd

Reference Book:

Sl.No.	Title	Author	Publisher
1.	Geotechnical Earthquake Engineering Hand Book	Robert W.Day	McGRAW-HILL
2.	Earthquake tips	C.V.R.Murty	IIT , Kanpur , Sponsered by BMPTC , New Delhi.

Online Source:

1. **http://www.nptel.ac.in/downloads/105101004/.**
2. **http://nptel.ac.in/courses/105101004/**
3. **http://www.nptel.ac.in/courses/105101004/3.**
4. **http://nptel.ac.in/courses/105101134/.**

Course outcome :

C01	Able to the causes and consequences of earthquakes;
C02	Know the behaviour of various types of buildings during earthquakes;
C03	Know the methods of evaluation and retrofitting of damaged structures.

1E6314– STRUCTURAL ENGINEERING DESIGN AND DRAWING
(Written practical)

Rationale:

In previous term we have studied the analysis and design of beam, slab, column and column footing in RCC structures, and analysis and design of steel beam, compression member and tension member in Steel structures in the course of S.E. Diploma engineers should know the design and also structural drawing. In this course, we touch the design and drawing of beam, two way slab, column and footing, different types of stairs, Design of plated beam and design of king post truss using I.S. codes

Course Objectives :

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

- Design and drawing of Column and Column footing.
- Design and drawing of stairs including rise and tread type.
- Design and drawing of steel beam, column and column base. Etc

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
1E6314	6	9	3	Internal	External	Total	3 Hrs
				25	75	100	

Sl.No. of plates	Name of the Topic	Hours	Marks
1	Design and drawing of Lintel cum sunshade.	5	100
2	Design and drawing of Two way slab (corners are not held down)	5	
3	Design and drawing of Two way slab (corners are held down)	12	
4	Design and drawing of one way continuous slab.	5	
5	Design and drawing of continuous beam (singly reinforced only)	5	
6	Design and drawing of dog legged staircase	5	
7	Design and drawing of open well staircase	5	
8	Design and drawing of rise and tread type staircase	5	
9	Design and drawing of column and column footing (Square & Rectangular with uniform thickness)	12	
10	Design and drawing of cantilever retaining wall	5	
11	Design and drawing of Plated beam	5	
12	Design and drawing of column and column bases(I-section and Slab base only).	3	
13	Design and drawing of truss only	3	
	Revision	**3**	
	Cycle Tests and Model Examination	**12**	
	Total		

Note: Design and drawing of cantilever retaining and king post truss for Assignment purpose only.

Course outcome:

C01	Know the drawing of Column and Column footing.
C02	Able to the drawing of stairs including rise and tread type.
C03	Know the drawing of steel beam, column and column base. Etc.

1E6404 – COMPUTER APPLICATION IN CIVIL ENGG.

OBJECTIVES

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

- ❖ Understand the approval drawing.
- ❖ Understand the estimate of the buildings.
- ❖ Understand the design of RCC & Steel Structures using available software.

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
1E4404	4	60	2	Internal	External	Total	3 Hrs
				25	75	100	

SCHEME OF EVALUATION	
Plan	30
Section	25
Elevation	15
Viva voce	05
External (Total)	75

- ➢ Preparation of approval drawing to be submitted to -Corporation or Municipality showing required details

  One sheet such as
  - Site Plan (Land Boundary, Building boundary, Car parking, Passage, Sanitary layout, Septic Tank location etc.)
  - G.F. Plan, F.F. Plan, Section and Elevation (line diagram is enough)
  - Key Plan
  - Septic Tank Plan and Section (line diagram)
  - Rain water harvesting pit (with all detail)
  - Typical foundation details. (Column foundation or Spread footing)

Title block showing joinery details, Specification, Area Statement, Color Index, Title of the property, Space for Owner's Signature and Licensed Surveyor's Signature and Planner company address etc.

RCC DETAILING USING SOFTWARE:

Generation of detailed drawings for given specification and Preparation of Bar Bending schedule using available R.C.C detailing package for the following works:

Cross section and longitudinal section of:

1. Continuous one way slab (with three equal spans)
2. Simply supported two-way slab
3. Restrained / Continuous two - way slab (any one panel)

4. Singly reinforced rectangular beam
5. Doubly reinforced continuous rectangular beam with two equal span
6. Lintel and Sunshade
7. R.C.C Column with square Isolated footing

- Develop the drawing using CAD Packages and prepare detailed estimate for the Following works:
  - 01) School building.
  - 02) A residential building with two bed rooms with RCC flat roof.
  - 03) Septic tank with Dispersion Trench
  - 04)) R.C.C slab culvert
- Carry out the analysis and design of RCC/STEEL structures using available packages.
- Study of INTERNET - Using World Wide Web – Browsing famous Civil Engg. Sites.
- Creating an E-mail ID, sending E-mails with attachments.

Course outcome:

C01	Know the approval drawing.
C02	Able to the estimate of the buildings.
C03	Know the design of RCC & Steel Structures using available software.

1E6315 - CONSTRUCTION PRACTICE LAB

Course Objectives:

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

- Arrangement of bricks using English bond for right angled corner, Tee junctions and Square pillars
- Know the setting of foundation over the ground.
- Demonstration and practice of painting, varnishing and polishing
- Arrangement and pre- measurement of steel work for slab, beam, column and column footing
- Procedure for entering in measurement book
- Pre – Measurement for steel work
- Design of concrete mix design.

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
1E6315	4	60	2	Internal	External	Total	3 Hrs
				25	75	100	

SCHEME OF EVALUATION	
Part- A (or) Part -B	
1. Writing Procedure	15
2. Conducting and performance	20
3. Tabulation & Calculation	25
4. Result	10
Viva voce	05
Total	75

I CONSTRUCTION

1. Arrangement of bricks using English bond in one brick thick wall and one and half brick thick for right angled corner
2. Arrangement of bricks using English bond in one brick thick wall and one and half brick thick for Tee junction
3. Arrangement of bricks using English bond in one brick thick wall, one and half brick thick and Two brick thick wall square pillars.
4. Demonstration and practice of painting, varnishing and polishing
5. Casting and testing of small R.C beams
6. Cutting, hooking, cranking of specimen reinforcement bar and arrangement of Reinforcement for
   a) Beam

b) Lintel cum sunshade
c) Column and footing

7. Calculation of areas centering of the following (Given sketch)
   a) Roof slab with Beam
   b) Column
8. Measurement Book – Procedure for entering in measurement book
9. Entering measurement for building works

All the students should enter directly on measurement book and they should keep the entry for the following works independently in the measurement book including Schedule rates for the respective work for the current year.

10. Prepare and develop a centre line plan and foundation Plan for a given line sketch of a Building.
11. Setting out spread footing foundation in the field for a given line plan of a building.
12. Setting the layout of columns and footing foundation in the field for a given line plan of a building (Framed structure).
13. Setting out a small building in the field for a given line plan.

II. **EXERCISE FROM EXISTING BUILDINGS INSIDE THE CAMPUS AND ONLY SINGLE ROOM FOR EACH STUDENT**

14. Measurement and abstract for flooring work
15. Measurement and abstract for Brick work
16. Measurement and abstract for colour washing

III. **PRE – MEASUREMENT FOR STEEL WORK**

The following models should be prepared in the laboratory, students should take out measurement from the model, they should enter the measurement in the measurement book and the total quantity of steel required in kg for each item may be arrived.

17. One way slab-size - 2.0 m x 3.50 m.
    Main rod - 8 mm dia – 20 nos.
    Distributor - 6 mm dia – 12 nos.
18. Column footing
    Footing – size – 1.0 m x 1.0 m – 10 mm dia 5 nos. each direction
    Column -- size - - 230 x 230 mm– 4 nos. 12mm dia.

19. Beam – size – 230 mm x 300 mm – Length – 2.0 m.
    Bottom rod – 12 mm – 3 nos.
    Top rod – 10 mm – 2 nos.
    Stirrups – 6 mm – 14 nos.

III .**CONCRETE MIX DESIGN** (For demonstration purpose only, but it is compulsory)– I.S Method only.

Course outcome:

C01	Know the setting of foundation over the ground.
C02	Able to the Procedure for entering in measurement book
C03	Know the Pre – Measurement for steel work

1E6405– PROJECT WORK WITH ENTERPRENEURSHIP & DISASTER MANAGEMENT

Course Objectives:

At the end of this course, students will be able to know the preparation of project report of any work with help of curriculum and referring the various journals and magazine etc.,

Course Code	Instruction			Examination			
	Hours/week	Hours/Term	Credits	Marks			Duration
1E6405	4	60	2	Internal	External	Total	3 Hrs
				25	75	100	

SCHEME OF EVALUATION	
Part- A (or) Part -B	
1. Report Writing	10
2. Answer For Entrepreneurship	10
3. Answer For Disaster	10
4. Record	30
5. Viva - Voce	15
Total	**75**

Specific Objectives:

01. Identifies different works to be carried out in the Project.
02. Collects data relevant to the project.
03. Carries out site surveys
04. Selects the most efficient method from the available choices based on preliminary investigations.
05. Design the required elements of the projects as per standard practices.
06. Prepares working drawings for the project.
07. Estimates cost of project, men, materials and equipment required.
08. Prepares schedule of time and sequence of operations.
09. Prepares project report.
10. Prepares feasibility report for starting any type of enterprise.

COURSE CONTENT

Project work provides solution of field Engineering problems involving surveying, Planning, drawing plants, designing, estimating and marking out of a building highway/irrigation/public health project. Project work will also include works with different types of materials, different design and cost comparison.

Students shall be divided into small groups and each shall be assigned a problem that calls for application of the knowledge he has acquired in the course and also which involves some extra study of reference material.

The following types of problems are suggested.

01. Planning of a campus
02. Building project.
03. Industrial complex
04. Shopping complex
05. Irrigation project.
06. Water supply scheme.
07. Sanitary Engineering scheme.
08. Bridge project.
09. Cost comparison project etc.
10. Construction of a Bus shelter.
11. Installation of a Bio-Gas plant.
12. Low cost Housing with locally available materials.
13. Improvising mud wall construction
14. Ferro – cement structures like water tanks, septic tanks, silos, etc.,
15. Investigation of Bamboo as reinforcement for mud wall construction.
16. Investigation of soil composition for manufacture of brick and tiles.
17. Manufacture of cement from paddy husk and lime.
18. Investigation of soil – cement blocks.
19. Casting of R.C.C door frames and window frames
20. Suggesting suitable foundation for a particular locality.
21. Estimating seepage losses and proposing remedial measures for canals, irrigation tanks etc.
22. Analysis of Road accidents and remedial measures
23. Construction of cycle stand for polytechnic.

PLANNING DESIGN AND COST ANALYSIS OF:

24. A Panchayath Office
25. A Village post Office (Sub-Post Office)
26. A Community hall
27. A Kalyana Mandapam (Marriage Hall)
28. A Primary Health Centre.
29. A Bus Terminal Station.
30. A Public Library Building
31. A Bank Building
32. A Shopping Complex.
33. A Factory Building for a small Industry.
34. A Housing Scheme for a small Industrial colony
35. A Panchayath Market Yard.
36. A 20 Bed Hospital
37. A Semi-Permanent Theatre.
38. A Laboratory Block

39. An Extension to the main building
40. An Auditorium
41. A Stadium
42. A Hostel Building
43. A Canteen
44. Staff Quarters
45. Improvements of a certain reach of an existing highway
46. The Campus roads
47. A new village road
48. A cause way
49. A R.C.C Tee beam bridge with approaches.
50. A Bye-Pass Road.
51. A Fly over in a road junction.
52. A Subway for pedestrian crossing

1. DETAILED SYLLABUS FOR ENTREPRENEURSHIP:

1.1 Introduction – entrepreneur – characteristics of entrepreneur – contribution of an entrepreneur – functions of entrepreneur – barriers of to entrepreneurship – Role of government in entrepreneurial development.

1.2 Small scale industries (SSI) – SSI role in country's economic growth –importance of SSI –Starting of an SSI – Government organizations and nongovernmental organizations supporting SSI – DIC , NSIC , SIDO , KVIC , Development banks and their objectives – role of commercial banks in assisting SSI-Women entrepreneurs and opportunities – subsidy and concessions to SSI.

2. DETAILED SYLLABUS FOR DISASTER MANAGEMENT:

2.1 Introduction and Disaster mitigation measures – Disasters due to natural calamities such as earthquake, Rain, Flood, Hurricane, Cyclones Etc.,- Manmade Disasters – Crisis to fires , accidents , strikes , etc. loss of property and life- Causes for major Disasters – Risk identification – Hazard zones – Selection of sites for industries and residential buildings – minimum distances from sea – Orientations of buildings – Stability of structures – Fire Escapes in buildings – Cyclone Shelters – Warning systems.

2.2 Disaster Management -Preparedness, response , recovery – arrangements to be made in the industries/Factories and Buildings-Mobilizations of emergency services – Search and rescue operations-First Aids-Transportations of affected people - Hospital facilities-Fire fighting Arrangements – Communications systems-restoration of power supply-getting assistance of neighbors other organizations in recovery and rebuilding works-financial commitments-compensations to be paid-Insurances-Rehabilitation.

List of questions for Entrepreneurship:

1. Define the term entrepreneur.
2. What is Entrepreneurship?
3. List the various stages of decisions an entrepreneur has to make before reaching the goal of project?

4. What is innovation?
5. State briefly the role of an entrepreneur in the economic growth of a country.
6. List the characteristics of an entrepreneur.
7. What are the critical elements of an entrepreneur?
8. State the major functions of an entrepreneur.
9. What are the barriers to entrepreneurship?
10. Define Small Scale Industry.
11. What are the qualities of an entrepreneur?
12. What are the benefits of an entrepreneur?
13. What are the various SSI that can flourish in your district?
14. Identify the infrastructural needs for an industry.
15. What are the various agencies involved in the establishment and development of various SSI.
16. Name some of the agencies funding SSI?
17. Explain the roles played by government in entrepreneurial development?
18. What are the various concessions and incentives available for a SSI?
19. Name some consumer products wide demand that can be manufactured by a SSI.
20. What is feasibility study?
21. What is the importance of SSI?
22. What is DIC? State its functions.
23. What is NSIC? State its functions.
24. What is SIDO? State its functions.
25. Name the development banks in India working towards entrepreneurial development?
26. State the role of commercial bank in assisting SSI sector?
27. What are the different phases of entrepreneurial development program?
28. What is an industrial estate?
29. What are the facilities available in an industrial estate?
30. Indentify the various training agencies associated with SSI.
31. List the governmental agencies from whom you shall get financial assistance for a SSI.
32. What is KVIC? State its objectives.
33. Name some state finance corporations.
34. What are the steps involved preparing in a feasibility report?
35. What are the factors to be considered regarding raw materials for a SSI?
36. What are the features of SSI?
37. What are the advantages of becoming an entrepreneur?
38. Name the organizations offering assistance for the development of women Entrepreneur.
39. State the business opportunities for women entrepreneurs.
40. State the difference subsides given to SSI.

List of questions for Disaster Management:

1. What is meant by disaster management?
2. What are the different stages of disaster management?
3. Differentiate natural disasters and manmade disasters with examples.

4. Describe the necessity of risk identification and assessment survey while planning a Project.
5. What is disaster recovery and what does it mean to an industry?
6. What are the factors to be considered while planning the rebuilding works after a major Disaster due to flood/ cyclone/ Earthquake?
7. What are the arrangements required for emergency rescue works in the case of atomic power plants?
8. What are residential quarters not constructed nearer to atomic power plants?
9. List out the public emergency services available in the state which could be approached for a help during a natural disaster.
10. Specify the role played by an engineer in the process of disaster management?
11. What is the cause for earthquakes. How are they measured? Which parts of India are more Vulnerable for frequent earthquakes?
12. What was the cause for the tsunami 2004which inflicted heavy loss to life and property along the coast of Tamil Nadu? Specify its epicenter and magnitude. But what is a large volume? And how is it displaced?
13. Specify the earthquake hazard zones in which the following towns of Tamil Nadu lie: a)Chennai b) Nagapattinam c) Coimbatore d) Madurai e) Salem.
14. Which parts of India are experiencing frequent natural calamities such as a) Heavy Rainfall B) Huge losses due to floods c) Severe cyclones
15. Define basic wind speed. What will be the peak wind speed in a)Very damage risk zone b) High damage risk zone c) Low damage risk zone.
16. Specify the minimum distance from the sea shore and minimum height of the mean sea level desirable for the location of buildings?
17. Explain how the topography of the site place a role in disasters caused by floods and cyclones?
18. Explain how the shape and orientation of building could reduce the damages due to cyclones?
19. What is a cyclone shelter? When and were it is provided ?What are its requirements?
20. What precautionary measures have to be taken by the authorities before opening a dam for discharging the excess water in to a canal or river?
21. What are the causes for fire accidents? Specify the remedial measures to be taken in building to avoid fire accidents?
22. What is a fire escape in multi storied buildings? What are its requirements?
23. How the imamates of multi storied building are to be evacuated in the event of a fire/chemical spill/toxic a situation/terrorist attacks ?
24. Describe different fire fighting arrangements to be provided in an industry.
25. Explain the necessity of disaster warning systems in industry?
26. Explain how rescue operations have to be carried out in the case of collapse of the buildings due to earthquake/blast/cyclone/flood.
27. What are the necessary steps to be taken to avoid dangerous epidemics after a flood Disasters.
28. What relief works that have to be carried out to save the lifes of workers and the factory are suddenly affected by a dangerous gas leak/sudden flooding?

29. What are the difficulties faced by an industry when there is a sudden failure? How such a situation could be managed?
30. What are the difficulties faced by the management when there is a group clash between the workers? How such a situation could be managed?
31. What will be the problem faced by the management of an industry when worker dies because of the failure of the mechanic dvice due to poor maintenance? How to manage such a situations?
32. Explain the necessity of medical care facilities in an industries or project site?
33. Explain the necessity of proper training to the employees of industries dealing the hazardous products to act during disasters.
34. What type of disasters is excepted in coal mines ,cotton mills, oil refineries, ship yard and gas plants?
35. What is mean by emergency plan rehearsal? What are the advantages of such rehearsal?
36. What immediate action will you initiate when the quarters of your factory workers are suddenly flooded due to the breach in a nearly lake/Dam, during heavy rain?
37. What steps you will take to avoid a breakdown when the workers union of your industry have a given strike notice?
38. What types of warning systems are available to alert the people in the case of predicted disasters such as floods, cyclones etc.
39. Explain the necessity of team work in the crisis management in an industry/local body?
40. What are precautions have to be taken while storing explosives in a match/fire crackers factory?

Course outcome :

C01	Know the different works to be carried out in the Project.
C02	Know the Estimates cost of project, men, materials and equipment required
C03	Able to the project report.

MODEL QUESTION PAPER

SESHASAYEE INSTITUTE OF TECHNOLOGY,
(Autonomous)
TRICHY -10.

Model Question Paper
E – Scheme
[Note: Compulsory questions: Part A - No. : 8 & Part B - No. : 16]

Term: III Civil Engineering **Time: 3 Hours**
Course: Engineering Mechanics **Max. Mark: 75**

PART – A

Answer any FIVE from the following **(5 x 2 =10)**

1. State the conditions for static equilibrium of bodies.
2. What is meant by working stress?
3. What is point of contra flexure?
4. Define Moment of Inertia.
5. Define Section modulus.
6. State theory of simple bending.
7. Differentiate fixed support and hinged support.
8. Define flexural rigidity.

PART - B

Answer any FIVE from the following **(5 x 3 =15)**

9. Young's modulus for a material is 2×10^5 N/mm^2 and modulus of rigidity is 0.8×10^5 N/mm^2. Find the bulk modulus.
10. What is creep?
11. Sketch and name the different types of beams based on the support condition.
12. Differentiate determinate and indeterminate beams with examples.
13. State parallel axis theorem.
14. Find the torque which a shaft of diameter 100mm can safely transmit, if the shear stress is not to exceed 40 N/mm^2.
15. What are the assumptions made in the analysis of perfect frame?
16. Find the polar moment of inertia and polar modulus for solid circular section of 50mm diameter.

PART-C

Answer all questions from 17 to 21 either (a) or (b). **(5x 10 = 50)**

17. (a). A mild steel bar 20mm diameter and 400mm long is subjected to an axial pull of 30 kN. Calculate the final dimension and final volume. Assume modulus of Elasticity as 2×10^5 N/mm^2 and Poisson's ratio 0.30.

(OR)

(b). A mild steel rod of 20mm dia was tested for tensile strength with the gauge length of 200mm and following observations are recorded.
(i) Total elongation = 78 mm
(ii) Final diameter = 16 mm

(iii) Yield load = 34kN
(iv) Ultimate load = 61 kN
Calculate (a) yield stress (b) ultimate stress (c) percentage elongation (d) percentage of reduction in area.

18. (a). A simply supported beam of span 10m carries a two point loads of 10kN and 20 KN at 2m and 8m respectively from the left support. Draw SFD and BMD .

(OR)

(b). A cantilever beam of span 3m fixed at left end carries an UDL of 10 kN/m for a length of 2m from fixed end. It also carries two point loads of 15kN and 10kN at 2m and 3m respectively from the fixed end. Draw SFD and BMD.

19. (a). An I-section has the top flange 100 mm x 15 mm , web 150 mm x 20 mm and bottom flange 180 mm x 30 mm . Determine the M.I of I-Section about its centroid XX and YY axis.

(OR)

(b)Locate the centroid of a T-section having flange of 300 mm x 80mm and web of 280 mm x 80 mm. Determine also I_{xx} and I_{yy} about its centroidal axes

20. (a) A cast iron pipe of external diameter 50mm, internal diameter 40mm and 5m long is simply supported at its ends. The pipe carries a point load 120 N at its centre. Calculate the maximum flexural stress induced.

(OR)

(b). A solid circular shaft transmit 75kW at 200 rpm. Calculate the shaft diameter if the twist in the shaft is not to exceed 1^o in 2m length of the shaft and the shear stress is limited to 50 N/mm^2. Take G= 1 x 10^5 N/mm^2.

21. (a).Determine the forces in the member 4m as shown in figure1 below.

(OR)

(b). Analyse the truss shown in fig 2 by graphical method.

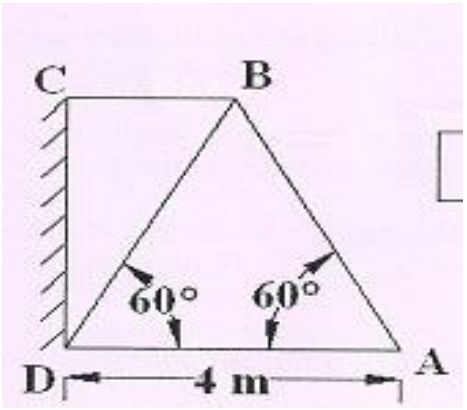

FIGURE:1

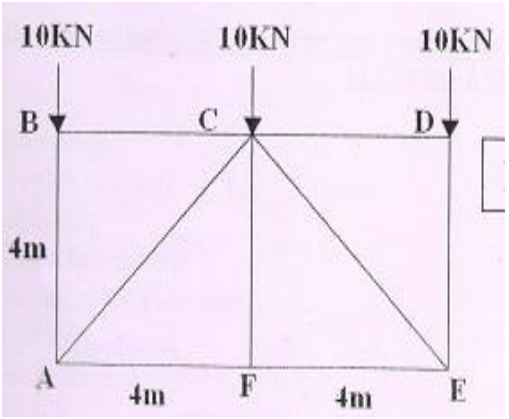

FIGURE:2

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Model Question Paper

E – Scheme

[Note: Compulsory questions: Part A - No. : 8 & Part B - No. : 16]

Term: III Civil Engineering **Time: 3 Hours**

Course: Construction Materials and Construction Practice **Max. Mark: 75**

PART - A

Answer any FIVE from the following **(5 x 2 =10)**

1. What is meant by metamorphic rock?
2. Define Quick lime.
3. What is tile?
4. Define the term seasoning of timber.
5. Give any two uses of glass.
6. What are the alloys of aluminum?
7. Write any two types of admixtures.
8. What is formwork?

PART-B

Answer any FIVE from the following **(5 x 3 =15)**

9. Write test on concrete.
10. Define Geo-synthetics.
11. Write difference between bitumen and Tar.
12. What is meant by thermoplastics?
13. Define buckling of sand.
14. What are the main differences between dry distemper and oil bound distemper?
15. Define the term sealants.
16. Write the types of steel bars used in construction.

PART-C

Answer all questions from 17 to 21 either (a) or (b). **(5x 10 = 50)**

17. (a) Write briefly about artificial stones used for flooring. **(05)**

(b). Define any five types of partitions **(05)**

(or)

(c) Explain various types of bond in brick masonry. **(10)**

18. (a) Explain the Classification of the different types of piles based on materials. **(10)**

(or)

(b) What are the causes of failure of pile foundations? **(05)**

(c) List of the different types of foundations **(05)**

19. (a) Explain various methods of curing concrete. **(10)**

(or)

(b) List out the advantages of ready mixed paint. **(05)**

(c) What are the requirements of an ideal damp proofing material? **(05)**

20. (a) Explain the types of varnishes and the process of varnishing on surfaces. **(10)**

(or)

(b) Write the properties of plastics. **(05)**

(c) Write about seasoning of timber. **(05)**

21. (a) Explain about the different admixtures of concrete. **(10)**

(or)

(b) Characteristics of good concrete. **(05)**

(c) Sketch the formwork for column and explain the features. **(05)**

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Model Question Paper

E – Scheme

[Note: Compulsory questions: Part A - No. : 8 & Part B - No. : 16]

Term: III Civil Engineering **Time: 3 Hours**

Course: surveying -I **Max. Mark: 75**

PART - A

Answer any FIVE from the following **(5 x 2 =10)**

1. Define surveying.
2. Define Tie line.
3. What are the types of meridians?
4. What is declination?
5. Define bench mark.
6. Define back sight.
7. Define reciprocal levelling.
8. Define contour gradient.

PART-B

Answer any FIVE from the following **(5 x 3 =15)**

9. Write a short note on plane surveying?
10. What are the errors in chain surveying?
11. What is meant by bearing? Explain fore bearing and back bearing
12. Explain reduction of levels and what are the methods?
13. What are the types of bench marks? Explain any one.
14. Define cross sectioning.
15. What are the uses of contour?
16. What are the application of aerial survey?

PART-C

Answer all questions from 17 to 21 either (a) or (b). **(5x 10 = 50)**

17. (a) Explain briefly about the principles of surveying **(05)**

(b) What do you mean by offset? Explain the different types offset with neat sketch. **(05)**

(or)

(c) A survey line was measured by means of a 20m chain,and found to be 5160m.The same survey line was also measured by a 30m chain and found to be 5188m.if the 20m chain was 200mm too long, what was the error in 30m.chain? **(10)**

18. (a) Explain components of prismatic compass with neat sketch **(10)**

(or)

(c) The fore and back bearing of the line of a closed traverse are as follows. Correct the bearing for local attractions. **(10)**

Line	FB	BB
AB	32° 30’	214° 30’
C	124° 30’	303° 15’
CD	181° 00’	1°00’
DA	289° 30’	108°45’

19. (a) Explain the temporary adjustments of leveling **?** **(10)**

(or)

(c) The following staff reading observed successively with a level 0.875, 1.235, 2.310, 1.385, 2.930, 3.125, 4.125, 0.120, 1.875, 2.030, 2.765. The first readings were taken with the staff held upon a B.M of elevation 132.135. The instrument has been moved after the second, fifth, and eighth readings. Enter the readings in a field book form and reduce the R.Ls. Apply usual check. **(10)**

20. (a) A level was set up at a point C at a distance of 350m from A and 750 m from B. The staff reading on the staff held at A was 1.650 and that on the staff held at B was 2.865.Find the true difference in elevations between A and B. Also find the R.L of B if the R.L of A was +105.000**.** **(10)**

(or)

(c) What are the errors in the levelling and explain? **(05)**

(d) Find the correction for curvature of earth and refraction for a distance of 2.5km **(05)**

21. (a) What are the characteristics of contour? **(10)**

(or)

(c) Explain the three elements of GPS (**10)**

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Model Question Paper

E – Scheme

[Note: Compulsory questions: Part A - No. : 8 & Part B - No. : 16]

Term: III Civil Engineering **Time: 3 Hours**

Course: Hydraulics **Max. Mark: 75**

PART - A

Answer any FIVE from the following **(5 x 2 =10)**

1. Define specific gravity.
2. Describe the different types of manometer.
3. Explain the term vena contracta.
4. What is notch?
5. What is open channel?
6. List out the losses in canals.
7. Define air vessel.
8. Define negative slip.

PART - B

Answer any FIVE from the following **(5 x 3 =15)**

9. Write the relationship between absolute pressure and vacuum pressure .
10. Distinguish between laminar and turbulent flow
11. Write the difference between notch and weirs?
12. Write the discharge formula for trapezoidal notch.
13. Define specific energy.
14. What are the advantages of canal lining?
15. What do you mean by priming in centrifugal pump?
16. Find the depth of oil of specific gravity 0.85 which will produce a pressure intensity of 450 $x10^3$ N/m^2.

PART-C

Answer all questions from 17 to 21 either (a) or (b). **(5x 10 = 50)**

17. (a) A U-tube manometer containing mercury was used to find the negative pressure in the pipe containing water. The right limb was open to the atmosphere. Find the vacuum pressure in the pipe if the difference of mercury level was 100 mm and the top of mercury level the left limb from the centre of the pipe was found to be 40 mm.

(or)

(b) A rectangle plate of 2m x 3m is immersed liquid of specific gravity 0.8. The top 3m side is parallel to and at a depth of 3m from the free surface. The other 3m side is at 4m from the free surface. Find (i) Total pressure on the plate (ii) Depth of centre of pressure from the free surface of water.

18. (a) The diameter of a pipe changes uniformly from 450mm at a point A, 6m above the datum line to 150mm at a point B, 2.5m above the datum line. The pressure at A is $539.5x10^3$ Pa and the velocity of flow is 1.4 m/s. Assuming no loss between A & B, compute(i) Velocity at B and (ii) pressure at B.

(or)

(b) A vertical sharp edged orifice 120mm in diameter is discharging water at the rate 98.2 liters/second under a constant head of 10 m. A point on the jet measured from the vena contracta of the jet has co-ordinates 4.5m horizontal and 0.54 m vertical. Find (i) coefficient of velocity(ii) coefficient of discharge and (iii) coefficient of contraction.

19. (a) Water flows over a rectangular notch of 1m wide over a depth of 160mm. Then the same quantity of water passes through a triangular right angled. Find the depth of water through the notch. Take Coefficient of discharge for the rectangular and triangular notch as 0.63 and 0.61 respectively. .

(or)

(b) A surplus weir is divided into eight spans of 2m each by means of vertical posts. Find the discharge when the head causing flow is 0.60m. Allow for end contraction if cd = 0.62 ?

20. (a) A pipe line 300mm dia and 400mm long connects two reservoirs. The discharge through the pipe line is 191 lps. Determine the loss of head

(i) Using Darcy's formula, if friction factor, f = 0.02.

(ii) Using Chezy's formula, if chezy's constant, C = 60

(or)

(b) A economical rectangular channel discharge 16 cumecs with a velocity of 1.50 m/s. Taking Chezy's constant as 60, find (i) Depth of flow (ii) Bed flow (iii) Bed fall

21. (a) A single acting reciprocating pump running at 50 rpm delivers 0.00736 m3/s of water. The diameter of the piston is 200 mm and stroke length 300 mm. The suction and delivery heads are 3.5 m and 11.5 m respectively. Determine (i) Theoretical discharge (ii) Coefficient of discharge (iii) Percentage slip (iv) Power required to run the pump

(or)

(b) (i) List the main components of a centrifugal pump and explain them.

(ii) State the advantages of centrifugal pump over a reciprocating Pump.

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SESHASAYEE INSTITUTE OF TECHNOLOGY, TRICHY -10.

(Autonomous)

Model Question Paper

E – Scheme

[Note: Compulsory questions: Part A - No. : 8 & Part B - No. : 16]

Term: IV Civil Engineering **Time: 3 Hours**

Course: Mechanics of structure **Max. Mark: 75**

PART - A

Answer any FIVE from the following **(5 x 2 =10)**

1. What is long column?
2. Define angle of repose.
3. What do you mean by Degree of indeterminacy?
4. Write the expression for Mohr's theorem I & II to find slope and deflection of the beam.
5. What is continuous beam?
6. Define point of contra flexure.
7. State the effect of an eccentric load on a short column?
8. State eddy's theorem

PART-B

Answer any FIVE from the following **(5 x 3 =15)**

9. What is slenderness ratio?
10. What is the difference between a dam and a retaining wall?
11. Define the stiffness factor.
12. What do you mean by fixed beam?
13. Define carry over moment.
14. Write expression to find rise of a three hinged parabolic arch.
15. How will you apply clapeyron's theorem of three moments to a continuous beam with fixed end supports?
16. Define sagging moment

PART-C

Answer all questions from 17 to 21 either (a) or (b). **(5x 10 = 50)**

17. (a) A 1.5m long column has a circular cross-section of 50mm diameter.One of the ends of the column is fixed direction and position and the other end is free. Taking factor of safety as 3.Calculate the safe load using:

1. Rankin's formula ,take σ_c=560 N/mm^2 and a=1/1600
2. Euler's formula ,young's modulus (E) for C.I=1.2x10^{5}N/mm^2

(OR)

(b) A cylindrical chimney 20m height of uniform hollow circular cross section.The external diameter of the section is 5m and internal diameter is 3m .The intensity of horizontal wind pressure is 1.5KN/m^2.Find the maximum normal stress intensities at the base, if the specific weight of masonry is 22.5KN/m^2

18. (a) A masonry dam 8m high ,1.5m wide at the top , and 5m height at the base retains water to a depth of 7.5m,the water face of the dam being vertical. Find the maximum and minimum intensity of stress at the base. The specific weight of water is 10KN/m^3 and the specific weight of masonry is 22KN/m^3

(OR)

(b) A retaining wall trapezoidal in section 8m high 1m wide at top 3m wide at bottom with a vertical face retains earth level with the top of the wall. Weight of the masonry is 24KN/m^2 and that of each is 18KN/m^3,with an angle of repose of 40^0.Calculate the maximum and minimum stresses at the base.

19.(a) A fixed beam of span 5m carries a concentrated load of 30KN at a distance of 2m from the left support .Find 1.Fixed end moments 2.The maximum (+) ve BM 3 Point of contra flexure and 4.Draw SFD and BMD

(OR)

(b) Construct SFD and BMD for a propped cantilever of length 6m with end prop carrying an UDL of 10 KN/m including its self weight over its length

20.(a) A cantilever of length 5m carries an Udl of 10 KN/m throughout. Find the slope an deflections. Take E=$2x10^5$ N/mm^2,I=$2x10^8$$mm^4$

(OR)

(b) A three hinged circular arch has a span of 50m and a rise of 10m.It carries a point load of 100KN at 10m from left support and 150KN at 15m from right support. Draw BMD

21.(a) A continuous beam ABC 10m long is supported at A,B and C such that AB=6m.It carries a point load of 30KN at 2m from A and UDL of 10KN/m over the entire span of BC. Draw SFD and BMD. Apply theorem of three moments. The ends A and C are simply supported.

(OR)

(b) A continuous beam ABC is fixed at A&C such that AB=5m and BC=6m .It carries a point load of 10KN at 2m from A and a point of 12KN at mid span in BC. Draw BMD by applying moment distribution method.

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SESHASAYEE INSTITUTE OF TECHNOLOGY, TRICHY -10.

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Model Question Paper

E – Scheme

[Note: Compulsory questions: Part A - No. : 8 & Part B - No. : 16]

Term: IV Civil Engineering **Time: 3 Hours**

Course: Transportation Engineering **Max. Mark: 75**

PART – A

Answer any FIVE from the following **(5 x 2 =10)**

1. What is road arboriculture?
2. Define Road Gradient.
3. What are the types of sight distance?
4. Write road making machineries?
5. Define conning of wheels.
6. What are the type's of gauges?
7. What are the uses of pier?
8. Define station yard.

PART-B

Answer any FIVE from the following **(5 x 3 =15)**

9. Define Nagpur plan.
10. What is super elevation?
11. Write types of formation of hill roads.
12. What is cutback?
13. Define sleeper density.
14. Define plate laying.
15. What do you mean by afflux?
16. What are the types of rail joints?

PART-C

Answer all questions from 17 to 21 either (a) or (b). **(5x 10 = 50)**

17. (a) Explain Nagpur plan. **(05)**

(b).What are the factors to be considered in road alignment **(05)**

(or)

(c) Explain briefly step by step procedure for construction of WBM road. **(10)**

18. (a) Describe in detail the construction of a bituminous macadam semi grouted road. **(10)**

(or)

(b) List the merits and demerits of concrete road? **(05)**

(c) What are the causes of accidents? **(05)**

19. (a) Explain the different types of sleepers and its functions. **(10)**

(or)

(b) Explain the different methods of plate laying in detail? **(10)**

20. (a) Classify the signals in railway according to its location and explain in details? **(10)**

(or)

(b) Explain the methods of interlocking? **(10)**

21. (a) What are the types of culverts. Explain briefly. **(10)**

(or)

(b) What are the factors governing the ideal site selection for bridge. **(05)**

(c) What are the different types of piers? Explain any one. **(05)**

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SESHASAYEE INSTITUTE OF TECHNOLOGY, TRICHY -10.

(Autonomous)

Model Question Paper

E – Scheme

[Note: Compulsory questions: Part A - No. : 8 & Part B - No. : 16]

Term: IV Civil Engineering **Time: 3 Hours**

Course: Surveying -II **Max. Mark: 75**

PART - A

Answer any FIVE from the following **(5 x 2 =10)**

1. Define transiting.
2. Name five important components of a transit theodolite.
3. What are the advantages of an analytic lens in a tacheometer?
4. What is meant by staff intercept?
5. What are the element of simple curve
6. State any two applications a Total Station.
7. What is cadastral survey?
8. What do you mean by single plan method in trigonometrical leveling?

PART-B

Answer any FIVE from the following **(5 x 3 =15)**

9. What do you mean by consecutive coordinate?
10. What is mean by repetition method of measuring horizontal angle?
11. Mention the various systems of tacheometry.
12. Write any four application of remote sensing.
13. List the two methods used to find elevation of objects when the base is inaccessible.
14. Write the expression for tangent length / length of curve / length of long chord
15. Define simple curve/ Compound curve / Reverse curve.
16. Mention any four total station characteristics.

PART-C

Answer all questions from 17 to 21 either (a) or (b). (5x 10 = 50)

17. (a) Determine the area of a closed traverse ABCD from the following latitude and departure Line **(10)**

Line	Latitude		Departure	
	Northing	Southing	Easting	Westing
AB	-	57.0	154.80	-
BC	210.50	-	52.50	-
CD	75.40	-	-	98.30
DA	-	228.70	-	109.00

(OR)

(c) The following table gives the length and bearings of a closed traverse ABCDE.The length and bearing of the line EA have been omitted. Calculate the length and bearing of the line EA **(10)**

Line	Length(m)	Bearing
AB	204	$87^0\,30'$
BC	226	20^0 20’
CD	187	280^0 00’
DE	192	$210^0\,30'$
EA	?	?

18. (a) A tachometer was setup at a station c and the following readings were obtained on a staff vertically held. Calculate the horizontal distance CD and RL of D . when the constants of instrument are 100 and 0.15 **(10)**

Instrument Station	Staff station	Vertical angle	Staff reading	Remarks
C	BM	-5˚20'	1.500, 1.800, 2.450	Rl of BM=750.50
C	D	+8˚12'	0.750, 1.500, 2.250	

(OR)

(c) A tacheometer having a multiplying constants 100 and additive constants 0.30m was setup over a BM of RL 250.00m and the following readings were taken. Calculate the distances of station from instrument station and also their elevation. The height of instrument was 1.415m. **(10)**

Staff station	Staff reading	Vertical angle
A	0.450,1.035,1.620	+5˚14'
B	0.860,1.270,1.680	-7˚23'

19. (a) Determine the reduced level of the top of a transmission tower from the following observations. Distance between A and B is equal to 100m. RL of BM is 168.27m. A and Bare not in the same Plane with top of tower horizontal angle at A ,between B and top of tower $+73^o\,44^o$.horizontal angle between A and top of tower at B is $+52^o\,08^o$ **(10)**

Instrument Station	Reading on B.M.	Vertical angle to top of tower
A	1.730	16˚42'
B	2.630	13˚38'

(OR)

(c) Find the elevation of the top of a chimney form the following data: Station A and B and top of the chimney are in the same vertical plane **(10)**

Instrument station	Angle of elevation	Remarks
A	12˚30'	R.L. of instrument axis=430.650m
B	9˚30'	Distance: AB=160m

20. (a) Two tangent intersect at chainage 1250with angle of intersection as 120^{o}.if the radius of curve is 250m, calculate the necessary data for setting out the curve by rankine's method. The pages are to be driven at 20m,intervals.prepare a setting out a table, when the least count of vernier is 20". **(10)**

(OR)

(c) Write down the field procedure for setting out a curve by taking offset from long chord. **(10)**

21. (a) i)Explain angular measurement and distance measurements using total station
ii)Explain the features of total station. **(10)**

(OR)

(c) i)Briefly explain the applications of GIS in natural and water resources.
ii)Explain the components of GIS. **(10)**

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SESHASAYEE INSTITUTE OF TECHNOLOGY, TRICHY -10.

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Model Question Paper

E – Scheme

[Note: Compulsory questions: Part A - No. : 8 & Part B - No. : 16]

Term: IV Civil Engineering **Time: 3 Hours**

Course: Estimating and costing -I **Max. Mark: 75**

PART – A

Answer any FIVE from the following **(5 x 2 =10)**

1. What is measurement book?
2. Assuming 20% wastage find out the quantity of cement mortar required for plastering 10m^2 area of brick wall of 15mm thickness.
3. Where the roads are laid partly in cutting and partly on embankment.
4. State any two main reasons for variation in cost of materials from place to place.
5. How the centre line length of an interior wall is determined for earth work excavation?
6. How the dimensions are cancelled in group system.
7. List out the methods of taking off quantities.
8. Prepare detailed quantity of 100mm thick RCC roof slab of room size 4mx5m with wall thickness as 300mm.

PART-B

Answer any FIVE from the following **(5 x 3 =15)**

9. Mention the methods of approximate estimates.
10. State the conditions to use prismoidal rule to find the volume of irregular sections.
11. Calculate the quantities of sand and cement required for preparing 2m^3 of C.M 1:4.
12. Prepare the detailed estimate for inside plastering with C.M 1:5, 12 mm thick of room size 6m x 5m and height 3m.
13. How the squaring has to be checked
14. Mention two advantages of group system.
15. List any two types of lump sum provisions and what is dimension paper.
16. Calculate the No of tiles required in flooring for 10m^2 of size 150 x 100 x 12mm.

PART-C

Answer all questions from 17 to 21 either (a) or (b). **(5x 10 = 50)**

17. **(a)** The actual expenditure incurred in the construction of a flat roofed residential building having a plinth area of 75m^2 and height is 3m of Rs.5.40 lakhs. It is proposed to construct another similar building in the some locality with a plinth area of 90m^2 and height 3.45m. Estimate the approximate amount required for the proposed building assuming the increasing in the cost of material and labour as 19.75%.

(Or)

(b) Write short notes on different types of estimates.

18. **(a)** A reservoir has the following water spread areas. Find the volume of reservoir by (i) Trapezoidal Rule (ii) Prismoidal rule

Contour Level (m)	100	105	110	115	120
Area under the contour(m)	650	780	1100	2750	7450

(Or)

(b) The following table refers to the offsets taken from a chain line of a land survey to a hedge. Calculate the area impounded between the chain line and hedge by using
(i) Average ordinate rule (ii) Trapezoidal rule

Chainage(m)	0	25	50	100	150	200	250	275	300
Offset(m)	5	3.5	2	3	3.6	3.8	3.5	4	3

20 a). Analyses and determine the rates for the following items of works with the given data.
(A) Reinforced cement concrete 1:2:4 for 100mm thick roof slab - Rate per m^3.

(Or)

(B) (i) Painting two coats with cement paint - $10m^2$
(ii) BW with CM 1:5 - $1.0m^2$

Materials and labour requirements:

Cement concrete 1:2:4 - $10m^3$

Broken stone 20mm	- $9.0m^3$
Cement	- 3.24 ton
Sand	- 4.5 m^3
Mason II class	- 3.5 Nos.
Mazdoor I class	- 21.2 Nos
Mazdoor II class	- 35.3 Nos.

Reinforced cement concrete 1:2:4 for 100mm thick roof slab-$1.0m^3$

Cement concrete 1:2:4	- $1.0m^3$
Steel	- 75kg
Binding wire	- 0.5kg.
Centering charges	- 10 m^2.
Bending and tying rods	- 75kg

Painting two coats with cement paint – $10m^2$

Cleaning the plastered surface	- $10m^2$
Cement paint	- 3.23 kg
Painter 1 class	- 0.5 No.
Mazdoor I class	- 0.5 No.
Mazdoor II class	- 0.80 No.

BW with CM 1:5 – 10 m^3

Bricks	- 5000Nos.
CM 1:5	- $1.4m^3$
Mason I class	- 7.0 Nos.
Mason II class	- 7.7 Nos.
Mazdoor I class	- 8.1 Nos
Mazdoor II class	- 8.4 Nos.

Cost of materials at site (in Rupees)

Broken stone 20mm	- $3000/m^3$
Cement	- 9000/Ton
Sand	- $7500/m^3$
Steel	- 48000/Ton
Binding wire	- 150/kg
Cement paint	- 450/kg
Bricks	-5200/1000Nos.

Cost of Labour (in Rupees):

Mason I class	- 550/day
Mason II class	- 475/day
Mazdoor I class	- 375/day

Mazdoor II class	- 300/day
Painter I class	- 475/day
Centering charges	- 1200/m^2
Bending and tying rods	- 60/kg
Mixing charges for CM	- 15/m^3
Cleaning the plastered surface	- 100/10m^2

19. Take the following quantities for the residential building as shown in fig.(SKETCH- 2) by trade system.

(a) i) Earth work excavation for foundation
ii) RCC roof slab

(OR)

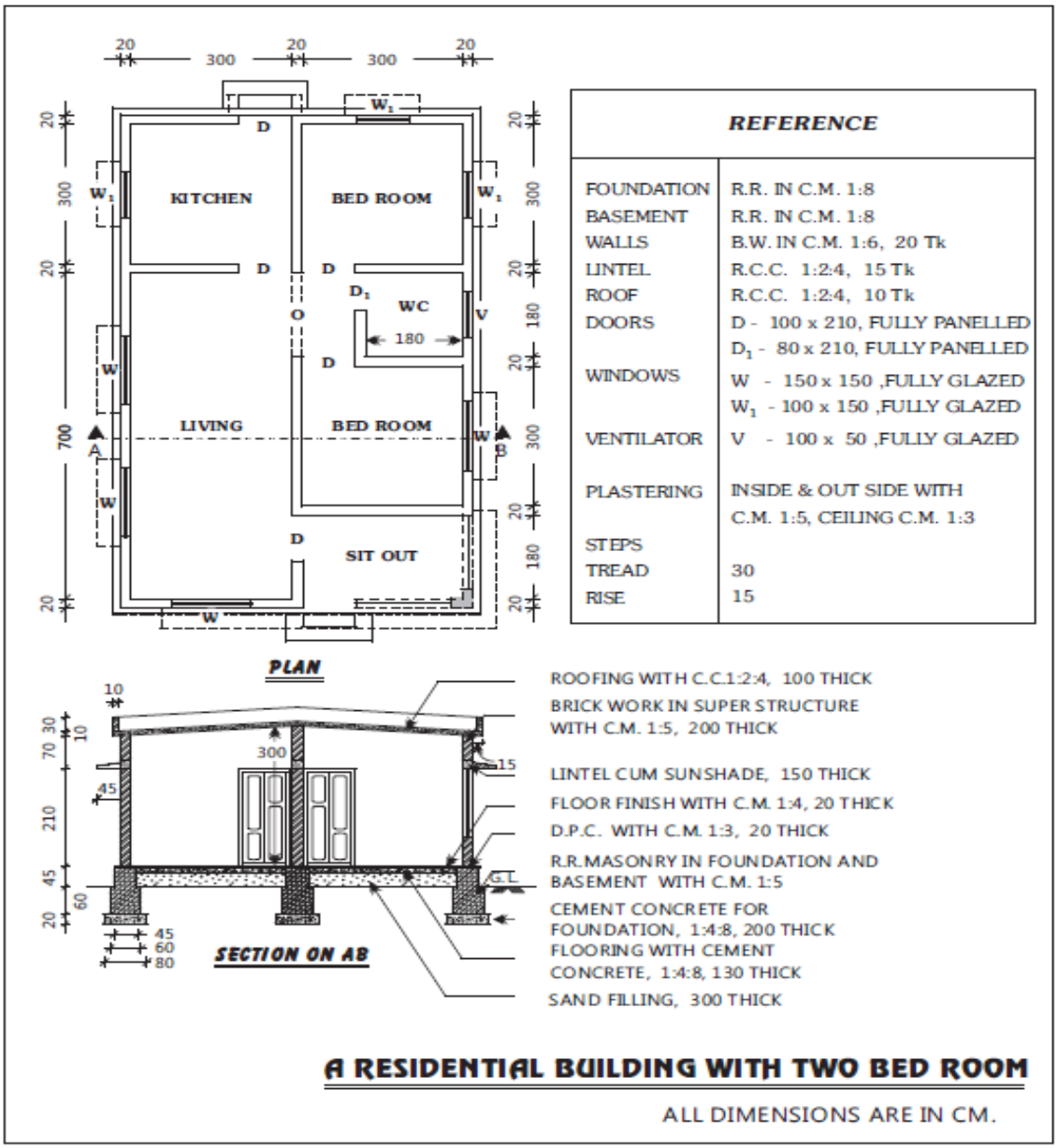
(b) Brick work in basement and foundation.

21. Take the quantities of work for a single roomed building as shown in fig(SKETCH-1) by group system.

a) i) Brickwork in basement and foundation
ii) Sand filling basemen

(OR)

b) i) Earth work excavation in foundation
ii) RCC 1:2:3 in roof slab.



REFERENCE	
FOUNDATION	R.R. IN C.M. 1:8
BASEMENT	R.R. IN C.M. 1:8
WALLS	B.W. IN C.M. 1:6, 20 Tk
LINTEL	R.C.C. 1:2:4, 15 Tk
ROOF	R.C.C. 1:2:4, 10 Tk
DOORS	D - 100 x 210, FULLY PANELLED D_1 - 80 x 210, FULLY PANELLED
WINDOWS	W - 150 x 150 ,FULLY GLAZED W_1 - 100 x 150 ,FULLY GLAZED
VENTILATOR	V - 100 x 50 ,FULLY GLAZED
PLASTERING	INSIDE & OUT SIDE WITH C.M. 1:5, CEILING C.M. 1:3
STEPS	
TREAD	30
RISE	15

A RESIDENTIAL BUILDING WITH TWO BED ROOM

ALL DIMENSIONS ARE IN CM.

SESHASAYEE INSTITUTE OF TECHNOLOGY, TRICHY -10.

(Autonomous)

Model Question Paper

E – Scheme

[Note: Compulsory questions: Part A - No. : 8 & Part B - No. : 16]

Term: V Civil Engineering **Time: 3 Hours**

Course: Structural Engineering **Max. Mark: 75**

PART – A

Answer any FIVE from the following **(5 x 2 =10)**

1. Define characteristics strength of concrete?
2. Why is cover necessary for reinforcement?
3. What is doubly reinforced beam?
4. Write the equation for find the effective width of the flange for isolated Tee-beam.
5. What is the check required for diameter of main reinforcement in slab?
6. What is nominal cover in slab using 10mm ϕ for mild expose condition?
7. What is restrained beam?
8. What is compression member?

PART-B

Answer any FIVE from the following **(5 x 3 =15)**

9. Determine the minimum lap length required for 12mm Fe415 grade steel bars and M20 grade concrete for tension?
10. Define clear span and effective span of R.C simply supported beam.
11. When will you design as a doubly reinforced beam?
12. What are the types of shears? Draw any one of them?
13. Write the difference between one way and two way slab.
14. Write the procedure for deflection check in the simple beam.
15. What are the checks required for the design of a tension member?
16. What are the possibilities of neutral axis in Tee beam?

PART-C

Answer all questions from 17 to 21 either (a) or (b). **(5x 10 = 50)**

17. (a) Specify the minimum area required for tension in a rectangular beam. **(2marks)**

(b) A rectangular RC beam is 250 mm wide and 500 mm deep to the end of the beam Using M_{20} grade concrete. It is reinforced with 3nos 25mm ϕ mild steel bars in the tension zone only. Calculate the moment of resistance of the section at the limit state of collapse. **(8marks)**

(Or)

(c) A simply supported rectangular beam of effective span of 6m is carrying a UDL of 20kN/m. (inclusive of its own weights) throughout the length. Design the mid span section for the limit state of collapse in flexure. Assuming breadth of the section 250mm using M20 grade concrete and fe 415 grade steel. **(10 marks)**

18. (a) A singly reinforced T-beam section has the following details .effective width of flange 1500mm, thickness of flange is 125mm,effective depth is 500mm, breadth of the web 250mm. use M20 grade concrete and Fe500 grade steel. Determine the limiting value of moment of resistance of the section at the limit state of collapse. **(10 marks)**

(Or)

(b) The support section of a simply supported singly reinforced R.C T-beam is subjected to a characteristic shear force of 110 kN. It has 4nos of 20mmϕ bars as tension reinforcement. The breadth of web and effective depth are 230mm and 410 mm respectively. Design the shear reinforcement using 8mm ϕ two legged vertical stirrups. Use M20 grade concrete and Fe 415 grade steel. **(10 marks)**

20. (a) Design the one way floor slab with a clear span of 3.6 m. Simply supported on 230mm thick masonry walls. To support a live load of $3kN/m^2$ and a floor finish of $1\ kN/m^2$. Use M20 grade concrete and Fe 415 grade steel. **(10 marks)**

(Or)

(b) A square R.C columns of size 400mm x 400mm carries an axial load of 1200kN. Safe bearing capacity of soil is $150kN/m^2$. Design the size of footing with uniform thickness, and area of steel using M20 grade concrete and Fe415 grade steel. Check for punching shear and transfer shear not necessary. **(10 marks)**

20. (a) Design a simple steel beam to carry an imposed load of 25 kN/m on an effective span of 6.0m. Assume f_y as 300Mpa and $E=2x10^5$Mpa **(10 marks)**

(Or)

(b) A tie member of a roof stress consists of 2ISA 100x 65x 10mm. The tie member is subjected to a pull of 250 kN. The angles are connected either side of a gusset plate of 12mm thick. Designing the welded connection if the permissible stress in the weld 108 Mpa. **(10 marks)**

21. (a) Design a steel column using symmetrical section to carry an axial load of 1000kN . The column is 3.6m long and fixed at both ends. Take f_y 250Mpa.

(Or)

(b) Design a single angel tension member to carry an axial load of 210 kN. The angle has to be gusset plate at its ends by fillet welds through its longer leg. Connection need not be designed. Take $f_y = 300\ N/mm^2$ and $f_u = 410\ N/mm^2$ **(10 marks)**

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SESHASAYEE INSTITUTE OF TECHNOLOGY, TRICHY -10.

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Model Question Paper

E – Scheme

[Note: Compulsory questions : Part A - No. : 8 & Part B - No. : 16]

Term: IV Civil Engineering **Time: 3 Hours**

Course: Environmental Engineering &Pollution Control **Max. Mark: 75**

PART - A

Answer any FIVE from the following **(5 x 2 =10)**

1. Define per capita demand.
2. State the methods of Hardness removal from water?
3. What is mean by Disinfection of water?
4. Define sanitation.
5. Define Humus tanks.
6. Why it is necessary to protect water supply?
7. Define Grit chambers
8. Name any three types of pumps used in distribution system

PART-B

Answer any FIVE from the following **(5 x 3 =15)**

9. Define Infiltration gallery.
10. What are the Impurities in water?
11. Define Reflux valve and Scour valve.
12. What are the types of filters?
13. What are the necessities of screening?
14. Define the terms: Recycle and Reuse
15. What are the materials used for sewers?
16. What are the preventions of pipe corrosion?

PART-C

Answer all questions from 17 to 21 either (a) or (b). **(5x 10 = 50)**

17. (a) From the following censes data, compute the probable population geometrical increases method in the years 2015 and 2025.

Year	1975	1985	1995	2005
population	18,500	26,700	35,200	46,400

(or)

(b) Explain briefly about the river intake with neat diagram?

18. (a) Explain the Sources, causes and effects of different types of impurities in water.

(or)

(b) Explain briefly about the construction and working of a “Rapid sand filter” with a neat Sketch.

19. (a) Explain briefly about the any two layouts of distribution with a neat sketch.

(or)

(b) Explain how the laying and testing of water mains are executed.

20. (a) Briefly explain the various types of joints in sewer line.

(or)

(b) Write a note on trickling filter with a neat sketch.

21. (a) What is activated sludge digestion tank? How does it work?

(or)

(b) What are all the methods of solid waste disposal? Explain any two methods.

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SESHASAYEE INSTITUTE OF TECHNOLOGY, TRICHY -10.

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Model Question Paper

E – Scheme

[Note: Compulsory questions: Part A - No. : 8 & Part B - No. : 16]

Term: V Civil Engineering **Time: 3 Hours**

Course: Water resource management **Max. Mark: 75**

PART - A

Answer any FIVE from the following **(5 x 2 =10)**

1. Define hydrology.
2. Define aquifer.
3. What are the classifications of river?
4. Define canal lining.
5. Define water shed.
6. Define runoff.
7. Define spillway.
8. Name any three types of soil erosion.

PART-B

Answer any FIVE from the following **(5 x 3 =15)**

9. What are the measurements of rainfall?
10. Define ground water exploration.
11. Define earth dam.
12. Define irrigation scheduling.
13. Define runoff collection.
14. Define spillway crest gates.
15. Define bench terracing.
16. Define soil reclamation.

PART-C

Answer all questions from 17 to 21 either (a) or (b). **(5x 10 = 50)**

17. (a) Define hydrology and explain briefly with neat sketch.

(or)

(b) Explain briefly about the Simon's rain gauge with neat diagram?

18. (a) Explain briefly about the geo physical method.

(or)

(b) Explain briefly about the artificial recharge of ground water.

19. (a) Explain briefly about the classification of river training.

(or)

(b) Explain how the causes of failure of earth dam?

20. (a) Explain briefly about the cross drainage works.

(or)

(b) What are the methods of improving canal irrigation?

21. (a) Define land drainage and explain it briefly its types.

(or)

(b) What are the remedial measures of water logging.

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SESHASAYEE INSTITUTE OF TECHNOLOGY, TRICHY -10.

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Model Question Paper

E – Scheme

[Note: Compulsory questions : Part A - No. : 8 & Part B - No. : 16]

Term: V Civil Engineering **Time: 3 Hours**

Course: Remote sensing & GIS **Max. Mark: 75**

PART - A

Answer any FIVE from the following **(5 x 2 =10)**

1. What is EMR?
2. Define photogammetry.
3. Define photo interpretation.
4. Define spatial data.
5. Define map overlay.
6. Define spectrum.
7. What are the types of data.
8. Define LIS.

PART-B

Answer any FIVE from the following **(5 x 3 =15)**

9. Define spectral signature concepts.
10. Define flight planning.
11. Write application of remote sensing in civil engg..
12. Define coordinate system.
13. Define data models.
14. Define resolution concept satellite.
15. Define DBMS.
16. What are the types of attributes.

PART-C

Answer all questions from 17 to 21 either (a) or (b). **(5x 10 = 50)**

17. (a) Write about detail process in remote sensing.

(or)

(b) Explain briefly about the principle in energy sources and radiation.

18. (a) What are the geometric elements of vertical photograph.

(or)

(b) Explain briefly about the stereoscopic plotting instruments.

19. (a) Explain briefly about the fundamentals of Air photo interpretation.

(or)

(b) What are the concepts involved in digital image processing.

20. (a) Explain the components of GIS.

(or)

(b) Explain in detail about types of data.

21. (a) Explain process of data input by digitization and scanning.

(or)

(b) Explain about the mapping concept.

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Model Question Paper

E – Scheme

[Note: Compulsory questions : Part A - No. : 8 & Part B - No. : 16]

Term: V Civil Engineering **Time: 3 Hours**

Course: Advanced Construction Technology **Max. Mark: 75**

PART - A

Answer any FIVE from the following **(5 x 2 =10)**

1. Write causes of failure of pile?
2. Define tilting mould method.
3. Define molder coordinate system?
4. Write a rules for fire resisting building?
5. Define structural crack?
6. Define lift modernization.
7. Define admixtures.
8. What are the materials used for filling crack?

PART-B

Answer any FIVE from the following **(5 x 3 =15)**

9. Define pile cap and pile shoe.
10. What are the types of prefabrication building?
11. Write property of fire resisting building material?
12. What are precautions taken during demolition?
13. Define green house and passive house.
14. Define load bearing pile.
15. Write characteristics to be considered in devising a system?
16. What are the safety aspects considered demolition of building?

PART-C

Answer all questions from 17 to 21 either (a) or (b). **(5x 10 = 50)**

17. (a) Explain the classification of piles? **(10)**

(Or)

(b) Briefly explain about system of pre stressing? **(10)**

18. (a) Explain in detail about grid module for industrial building **(10)**

(Or)

(b) Explain the various methods of prefabrications? **(10)**

19. (a) (i) Write precautionary measures to minimize danger of fire **(05)**

(ii) Explain in detail about the alarm system? **(05)**

(Or)

(b) Define seismic forces and its effect on building **(10)**

20. (a) Write down the sequence process in demolition operation? **(10)**

(Or)

(b) Define cracks and explain its classifications? **(10)**

21. (a) What are the factors to be considered in strengthening of old building? **(10)**

(Or)

(b) What are mechanical modernization and methods in lift modernisation. **(10)**

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SESHASAYEE INSTITUTE OF TECHNOLOGY, TRICHY -10.

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Model Question Paper

E – Scheme

[Note: Compulsory questions : Part A - No. : 8 & Part B - No. : 16]

Term: VI Civil Engineering **Time: 3 Hours**

Course: Project Management With MIS. **Max. Mark: 75**

PART - A

Answer any FIVE from the following **(5 x 2 =10)**

1. Define project phase.
2. Define joint venture.
3. Define activity.
4. Define dispute.
5. Define service tax.
6. Define contract document.
7. What are the elements of quality.
8. Define time value of money.

PART-B

Answer any FIVE from the following **(5 x 3=15)**

9. Define contract document.
10. Define cash book.
11. What are the net works of project management?
12. What are the categories of disputes.
13. Define construction automation.
14. Explain EMD?
15. What are the importance of M. Book.
16. What are the types of tax.

PART-C

Answer all questions from 17 to 21 either (a) or (b). **(5x 10 = 50)**

17. (a) What are the stages of planning by owner and contractor. **(10)**

(Or)

(b) Define sub contract and explain its briefly. **(10)**

18. (a) What are the functions of various departments in construction company. **(10)**

(Or)

(b) Explain briefly about N.M.R and D.L.R **(10)**

19. (a) Explain briefly about the methods of scheduling? **(10)**

(Or)

(b) What are the methods and tips for crashing? **(10)**

20. (a) What are the roles of various parties in safety management? **(10)**

(Or)

(b) Explain briefly about the employee provident fund act. **(10**

21. (a) What are the common functions of project management. **(10)**

(Or)

(b) What are the factors affecting the cash flow. **(10)**

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SESHASAYEE INSTITUTE OF TECHNOLOGY, TRICHY -10.

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Model Question Paper

E – Scheme

[Note: Compulsory questions : Part A - No. : 8 & Part B - No. : 16]

Term: VI Civil Engineering **Time: 3 Hours**

Course: Estimating &Costing-II **Max. Mark: 75**

PART - A

Answer any FIVE from the following **(5 x 2 =10)**

1. Specify the essential requirements of a specification
2. Define: Report writing.
3. Define the term “salvage value”
4. Write any two factors which govern the rent of a building?
5. What are the items lump sum provisions made in the estimate?
6. Define: Lead statement.
7. Write any two items of works involved in the laying of a water bound macadam road?
8. What do you mean by “observed data”?

PART-B

Answer any FIVE from the following **(5 x 3 =15)**

9. Differentiate between general specification and detailed specification
10. What are the important points to be included in a report?
11. Define: Book value & Depreciation.
12. Define: Sinking fund
13. Why rates are to be analyzed separately for each project site?
14. Write any two materials for which the lead cost is more than their actual cost.
15. What are the works involved in the construction of a septic tank?.
16. List out the usual outgoing of a property.

PART-C

Answer all questions from 17 to 21 either (a) or (b). **(5x 10 = 50)**

17. (a) Write a standard specification for Random rubble masonry in foundation.

(or)

(b) Write the technical report for water supply system for a village.

18. (a) A building was purchased for Rs. 2,00,000.Assume the salvage value at the end of 10 year as Rs. 50,000, find the annual depreciation for the sixth year, also find the depreciation and book value at the end of the sixth year. Assume 6% interest rate.

(or)

(b) Find the value of a free hold property with the following

Area of land	= 800 sq.m
Built up area	=300sq.m
Gross annual rent	=Rs. 72,000
Permissible built up area	=50% of the area of plot
Rate of open land	=Rs.1000 / sq.m

Outgoing =30% of gross rent
Interest on capital 8% and interest on redemption of capital 5%.

19. (a) R.C.C roof slab 120mm thick of mix 1:1½:3 using 20mm broken jelly with suitable reinforcement including centering, curing etc. Complete-----1m^3

(b) R.C.C 1:2:4 sunshade of 600mm projection and 80mm average thickness- Rate for 10m run.

(or)

(c) R.C.C 1:2:4 beam 300x500mm using 20mm broken stone jelly with suitable reinforcements including entering, shuttering, etc. Complete----1m^3

(d) R.C.C columns with mix 1:2:4 or size 200x200mm with suitable reinforcement including centering, curing etc. Complete------1m^3

SUB DATA

CC 1: **1½**:3-------10m^3

Materials required

Broken stone 20mm size	-9m^3
Sand	-4.5m^3
Cement	-4308 Kg
Masson II class	-3.5 Nos
Mazdoor I class	-21.20 Nos
Mazdoor II class	-35.30 Nos

a) R.C.C roof slab of mix 1:1½:3, 120mm thick -1m^3

Concrete 1: **1½**:3	-As required
Steel	-90Kg/m^3 of concrete
Binding ullie	-1% of reinforcement
Centering	-As required add 20%extra for sides
Bar bending	-As required

b) R.C.C 1:2:4, sunshade of **600mm** Projection- **1m run**

SUB DATA

Concrete 1:2:4	**-10m^3**
Broken stone 20mm size	-9m^3
Sand	-4.5m^3
Cement	-323 Kg
Mason II class	-3.5 Nos
Madoor I class	-21.20 Nos
Mazdoor II class	-35.30 Nos

Main data

Concrete 1:2:4	-As required
Steel	- 75 Kg/m^3
Binding wire	-1% of reinforcement
Centering	-As required add 20% extra for sides
Bar bending	-As required

c) R.C.C beam of mix 1:2:4 – 1m^3

Concrete 1:2:4	- 1m^3
Steel	- 150 kg/m^{3}concrete
Binding wire	- 1% of reinforcement
Centering	- As required
Bar bending	- As required

d) R.C.C 1:2:4 for column – 1m^3

Concrete	- 1m^3
Steel	- 90 Kg/m^3 of concrete
Binding wire	- 1% of reinforcement
Centering	- As required
Bar bending	- As required

Cost of materials and labour at site

Materials	- Rate (Rs)
Cement	- Rs. 8000 / tonne
Steel	- 48000 / tonne
Binding wire	- 50 / Kg
Broken stone	- 2000 / m^3 (20mm size)
Sand	- 1400 / m^3

Labour charges

Mason I class	- Rs. 600/each/day
Mason II class	- Rs. 550/each/day
Mazdoor I class	- Rs. 450/each/day
Mazdoor II class	- Rs. 400/each/day
Bar bending	- Rs. 800/100 Kg
Centering charges	- Rs.1000/m^3
Mixing charges	- Rs. 700/m^3

22. (a) Take a quantity of brick work and plastering of open well with masonry staining shown in sketch 'A' using trade system.

(b). Take a quantity of earthwork excavation.(Refer sketch 'A')

(c) Take a quantity of foundation concrete for retaining wall and pavement concrete for platform.(Refer sketch 'A')

(d). Take a quantity of brickwork for retaining wall and plastering.(Refer sketch 'A')

(or)

21.(a) Take the quantity of Earthwork excavation for foundation in abutment and wing walls of the Tee-beam bridge shown in Sketch B, using Trade system

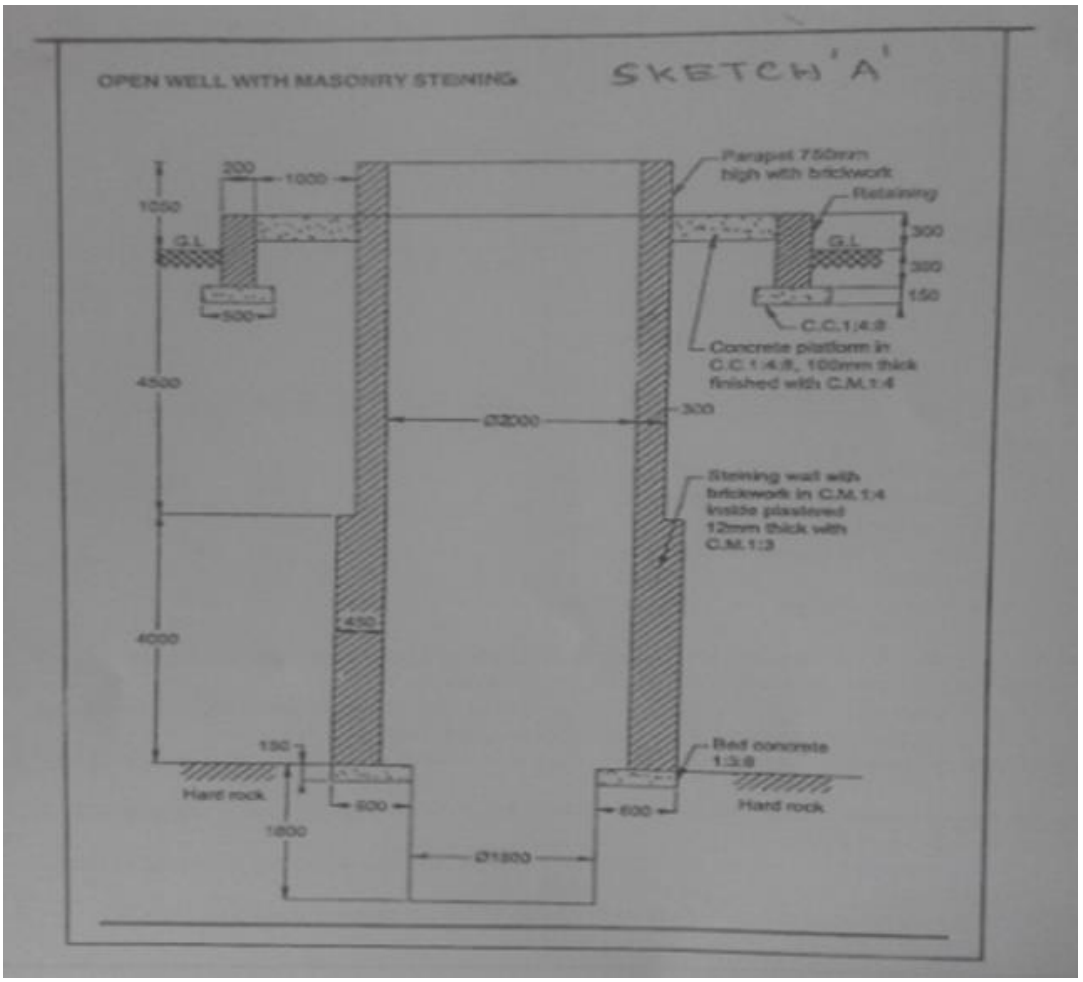
(b) Take the quantity of brick work in abutment and wing walls of the Tee-beam bridge shown in Sketch B, using Trade system

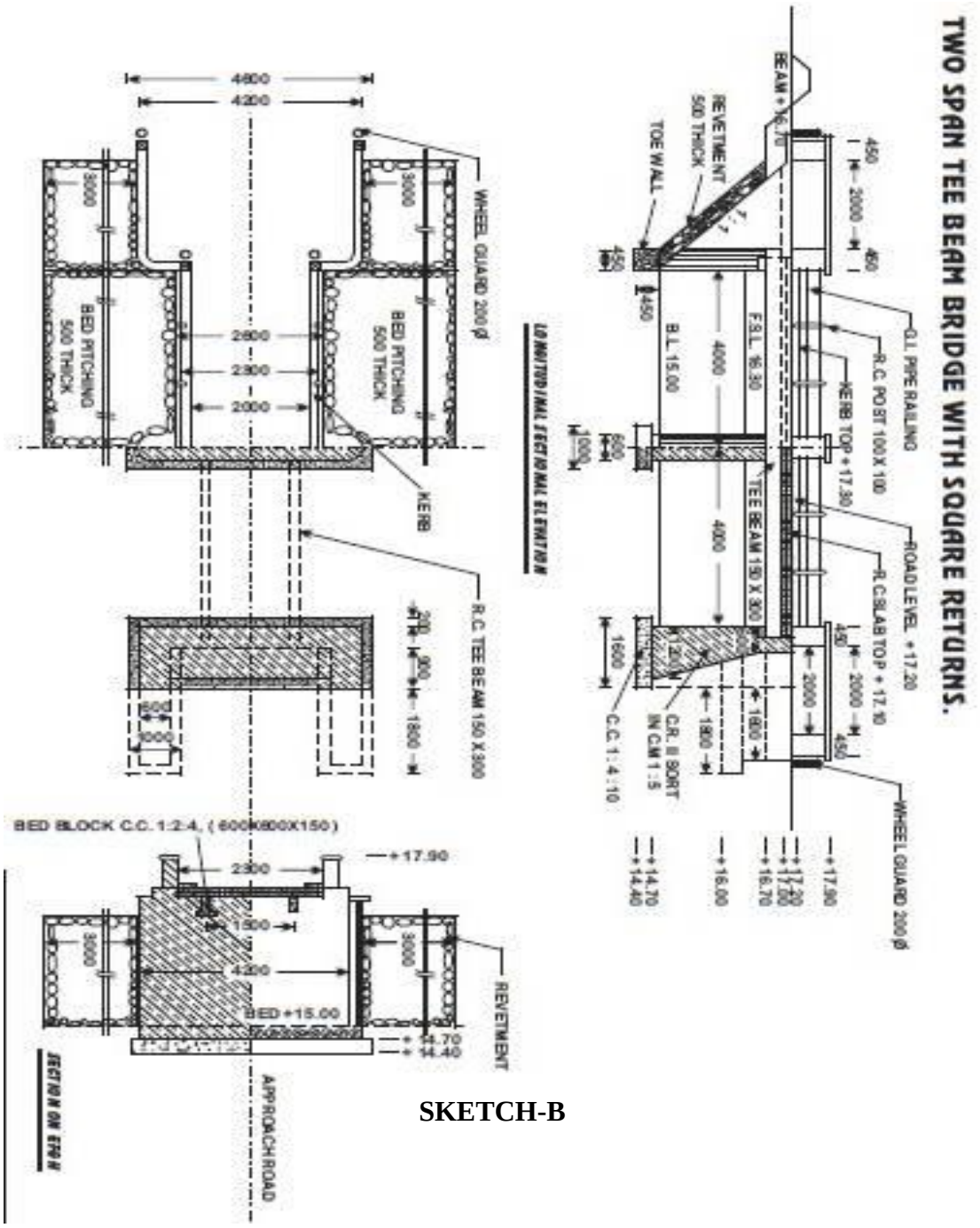
(or)

(c). Take the quantities of RCC in Beams and Slabs of the Tee beam bridge shown in Sketch B using Trade system. (Sketch B - A sectional plan and sectional elevation of a single span Tee beam bridge).

(d) Take the quantity of CC 1:4:10 in abutment and wing walls of the Tee-beam bridge shown in Sketch B, using Trade system

SKETCH-A


OPEN WELL WITH MASONRY STEINING
SKETCH 'A'
200
1000
1050
G.L
500
4500
4000
Ø2000
450
150
Hard rock
600
1800
Ø1800
Parapet 750mm high with brickwork
Retaining
300
300
150
G.L
C.C.1:4:8
Concrete platform in C.C.1:4:8, 100mm thick finished with C.M.1:4
300
Steining wall with brickwork in C.M.1:4 inside plastered 12mm thick with C.M.1:3
Bed concrete 1:3:6
600
Hard rock


TWO SPAN TEE BEAM BRIDGE WITH SQUARE RETURNS.
4800
4200
WHEEL GUARD 200 ø
3000
BED PITCHING 500 THICK
2800
2300
2000
KERB
R.C. TEE BEAM 150 X 300
1800
BED BLOCK C.C. 1:2:4, (600X600X150)
+17.90
1500
4200
BED +15.00
REVETMENT
APPROACH ROAD
LONGITUDINAL SECTION ON ABUTMENT
BEAM +16.70
REVETMENT 500 THICK
TOE WALL
450
2000
G.I. PIPE RAILING
R.C. POST 100 X 100
KERB TOP +17.30
F.S.L. 16.30
B.L. 15.00
4000
TEE BEAM 150 X 300
ROAD LEVEL +17.20
R.C.SLAB TOP + 17.10
1600
1200
C.C. 1:4:10
C.R. II SORT IN C.M 1:5
+17.20
+17.00
+16.70
+16.00
+14.70
+14.40
WHEEL GUARD 200 ø

SKETCH-B

SESHASAYEE INSTITUTE OF TECHNOLOGY, TRICHY -10.

(Autonomous)

Model Question Paper

E – Scheme

[Note: Compulsory questions : Part A - No. : 8 & Part B - No. : 16]

Term: VI Civil Engineering **Time: 3 Hours**

Course: Repairs and Rehabilitation Structures. **Max. Mark: 75**

PART - A

Answer any FIVE from the following **(5 x 2 =10)**

1. Define main and sub-main.
2. List out the component parts of lift?
3. Write the aims of good lighting?
4. Write the characteristics of the resisting material?
5. What are the types of cracks in wall?
6. What are the uses of generators?
7. What are the types of air conditioners?
8. What are the types of ventilators?

PART-B

Answer any FIVE from the following

9. List out the wiring accessories?
10. Define freight elevators.
11. What are the necessities of artificial lighting?
12. What are the requirements of acoustics?
13. Define thermal insulators.
14. What are the advantages of escalators?
15. What are the factors to be considered in the design of ventilation?
16. What are the types of absorption of co -efficient.

PART-C

Answer all questions from 17 to 21 either (a) or (b). **(5x 10 = 50)**

17. (a) Explain the various system of wiring? **(10)**

(Or)

(b) Explain a electrical layout for a small residence of small workshop? **(10)**

18. (a) Explain briefly about the different type of elevators? **(10)**

(Or)

(b) What are the components parts of air conditioning systems? **(10)**

19. (a) What are the remedial measures for illumination? **(10)**

(Or)

(b) What are the general rules followed for natural ventilation and write the advantages for it **(10)**

20. (a) List out the characteristics of wire resisting materials and explain it briefly **(10)**

(Or)

(b) What are the principles and factors to be considered in acoustical design **(10)**

21. (a) What are the types of cracks in wall and common methods of crack repair. **(10)**

(Or)

(b) What are the prevention of defects in buildings. **(10)**

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SESHASAYEE INSTITUTE OF TECHNOLOGY, TRICHY -10.

(Autonomous)

Model Question Paper

E – Scheme

[Note: Compulsory questions : Part A - No. : 8 & Part B - No. : 16]

Term: VI Civil Engineering **Time: 3 Hours**

Course: Design of steel structures **Max. Mark: 75**

PART - A

Answer any FIVE from the following (5 x 2 =10)

1. Define safe factor?
2. What is the partial safety factor of live load on beam in limit state method?
3. What is tension member?
4. How to check the section as plastic?
5. Define slenderness ratio?
6. What is fillet weld?
7. What is the diameter of holes for 20mm bolt?
8. What is the restrained beam?

PART-B

Answer any FIVE from the following (5 x 3 =15)

9. Write the characteristics action.
10. What are the types of column base? Draw any one type.
11. What is web buckling and web crippling?
12. Draw beam to beam connection.
13. Explain strut and tie member?
14. What are the types of welded connection?
15. Write the procedure for checking the shear in flexural member?
16. Write types of lacing. Draw any one type.

PART-C

Answer all questions from 17 to 21 either (a) or (b). (5x 10 = 50)

17. (a) Determine the collapse the load of the fixed beam with UDL w/m of span 'L' m. Using the kinematic methods? **(05)**

(b) Determine the safe factor for a rectangular beam of width b and depth d **(05)**

(Or)

(c) Write necessity of bracings and expansion joints in steel structures. **(10)**

18. (a) Design a lap joint between the two plates each of width 120mm, if the thickness of One plate is 16mm and the other is 12mm.The joint has to transfer a design load of 160 kN. The plates are of f_e 410 grade. Use bearing type bolts. **(10)**

(Or)

(b) A tie member of a roof truss consists of 2 ISA 100 x 75 x 8 mm. the angles are connected to either side of a 10mm gusset plates and the member is subjected to a working pull of 300KN. Design the welded connection. Assuming connections are made in the workshop?

(10)

19. (a) Design a double angle tension member connected on each side of a 10mm thick gusset plate, to carry an axial factored load of 375 Kn. Use 20mm black bolt .assume shop connection. **(10)**

(Or)

(b) Design a laced column with two channels back to back of length 10m to carry an axial factored load of 1400kN. The column may be assumed to have restrained in position but not in direction at both ends. **(10)**

20. (a) A roof of a hall measuring 8m x 12m consists of 100mm thick R.C slab supported on a steel I beam spaced 3m apart. The finishing load maybe taken as 1.5 kN/m^2 and live load as 1.5 kN/m^2 .design the steel beam **(10)**

(Or)

(b) An ISMB 500 section is used as a beam over a span 6m ,either simply supported ends. Determine the maximum UDL that the beam can carry. if the ends of restrained against torsion but compression flange is laterally unsupported ? **(10)**

21. (a) Design angle purlin for the following data by simplified method. Spacing of trusses =4m, spacing of purlins = 1.6m , weight of A.C Sheets including laps and fixtures = 0.205KN/m^2 , live load = 0.6 KN/m^2, wind load = 1 KN/m^2 and inclination of main rafter of truss = 21° ? **(10)**

(Or)

(b) A proposed cantilever beam is built in to a concrete wall. Its supports a dead load of 20 KN/m and a live load of 10 KN/m.The length of a beam is 5m select a suitable section with necessary checks. Assume stiff bearing length of 100mm **(10)**

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SESHASAYEE INSTITUTE OF TECHNOLOGY, TRICHY -10.

(Autonomous)

Model Question Paper

E – Scheme

[Note: Compulsory questions: Part A - No. : 8 & Part B - No. : 16]

Term: VI Civil Engineering **Time: 3 Hours**

Course: Earth Quake Engineering **Max. Mark: 75**

PART - A

Answer any FIVE from the following **(5 x 2 =10)**

1. Define plate techtonics.
2. Define nature of ground motion.
3. Define damping.
4. Write the concept of ductility?
5. Define restoration.
6. Define ground rupture.
7. What are the types of damages in beams?
8. Define grouting.

PART-B

Answer any FIVE from the following

9. Define ground shaking.
10. What are the effects of amplitidude?
11. Define fatigue fractures.
12. What is the concept of base isolation?
13. Define epoxy mortar.
14. What is the use of wire mesh?
15. Define dampers.
16. Define flexibility of buildings.

PART-C

Answer all questions from 17 to 21 either (a) or (b). **(5x 10 = 50)**

17. (a) What are the causes of earthquake and explain it? **(10)**

(Or)

(b) Explain briefly about the measurement of earthquake? **(10)**

18. (a) What are the causes for seismic damages in buildings? **(10)**

(Or)

(b) What are the effects of size and shape of the buildings? **(10)**

19. (a) What are the characteristics of building affecting their behavior **(10)**

(Or)

(b) What are the effects of joints on the ductile behavior of RCC/steel members. **(10)**

20. (a) Explain the production of openings in masonry wall? **(10)**

(Or)

(b) Explain briefly about the types of dampers? **(10)**

21. (a) What are the repair materials in retrofitting of buildings . **(10)**

(Or)

(b) Explain the strengthening of soft stories of existing buildings. **(10)**

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Equivalent of D – Scheme and E – Scheme Syllabus

S.No	D – Scheme	E – Scheme	Equivalent / Not Equivalent
		III Term	
1	STRENGTH OF MATERIALS	ENGINEERING MECHANICS	**Equivalent**
2	CONSTRUCTION MATERIALS ANDCONSTRUCTION PRACTICE	CONSTRUCTION MATERIALS ANDCONSTRUCTION PRACTICE	**Equivalent**
3	SURVEYING-I	SURVEYING-I	**Equivalent**
4	HYDRAULICS	HYDRAULICS	**Equivalent**
		IV Term	
5	MECHANICS OF STRUCTURES	MECHANICS OF STRUCTURES	**Equivalent**
6	TRANSPORTATION ENGINEERING	TRANSPORTATION ENGINEERING	**Equivalent**
7	SURVEYING –II	SURVEYING –II	**Equivalent**
8	ESTIMATING AND COSTING I	ESTIMATING AND COSTING I	**Equivalent**
		V Term	
9	STRUCTURAL ENGINEERING	STRUCTURAL ENGINEERING	**Equivalent**
10	PUBLIC HEALTH ENGG.	EVIRONMENTAL ENGG. & POLLUTION CONTROL	**Equivalent**
11	**ELECTIVE THEORY-**		
	1.ARCHITECTURE & TOWN PLANNING(EATP).	1. WATER AND RESOURCE MANAGEMENT(EWRM	**Not Equivalent(subject change)**
	2.ADVANCED CONSTRUCTION TECHNOLOGY(EACT).	2. ADVANCED CONSTRUCTION TECHNOLOGY(EACT).	**Not Equivalent(subject change)**
	3. BUILDING SERVICES& REHABILITATION OF RC STRUCTURES(EBSR).	3. REMOTE SENSING & GIS (ERSG)	**Not Equivalent(subject change)**
		VI Term	
12	PROJECT ENGG. MGT. WITH MIS	PROJECT ENGG. MGT. WITH MIS	**Not Equivalent**
13	ESTIMATING AND COSTING-II	ESTIMATING AND COSTING-II	**Equivalent**
14	**ELECTIVE THEORY-II**	**ELECTIVE THEORY-II**	
	1.WATERRESOURCE MANAGEMENT.(EWRM);	1. REPAIRS AND REHABILATION STRUCTURES(EBSRS).	**Not Equivalent(subject change)**
	2.SOIL MECHANICS & FOUNDATION ENGG.(ESMF)	2. STEEL STRUCTURES (ESS)	**Not Equivalent(subject change)**
	3. ADVANCED CONCRETE TECHNOLOGY(EACT)	3.EARTH QUAKE ENGINEERING (EEQE)	**Not Equivalent(subject change)**