
 <b>MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI</b> <b>TEACHING AND EXAMINATION SCHEME FOR POST S.S.C. DIPLOMA COURSES</b>																	
<b>COURSE NAME : DIPLOMA IN CIVIL ENGINEERING</b>																	
<b>COURSE CODE : CC</b>																	
<b>DURATION OF COURSE : EIGHT SEMESTERS</b>										<b>WITH EFFECT FROM 2013-14</b>							
<b>SEMESTER : EIGHT</b>										<b>DURATION : 16 WEEKS</b>							
<b>PATTERN : CORRESPONDANCE - SEMESTER</b>										<b>SCHEME : G</b>							
SR. NO	SUBJECT TITLE	Abbreviation	SUB CODE	TEACHING SCHEME			EXAMINATION SCHEME										SW (17908)
				TH	TU	PR	PAPER HRS.	TH (1)		PR (4)		OR (8)		TW (9)			
								Max	Min	Max	Min	Max	Min	Max	Min		
1	Management	MAN	21030	06	01	--	1&½	50#*	20	--	--	--	--	--	--	50	
2	Design of R.C.C. Structures	DRS	21031	10	01	38	04	100	40	--	--	25#	10	50@	20		
3	<b>Elective (ANY ONE)</b>																
	Solid Waste Management	SWM	21032	07	01	24	03	100	40	--	--	--	--	25@	10		
	Plumbing Services	PSE	21033	07	01	24	03	100	40	--	--	--	--	25@	10		
4	Project	PRO	21034	--	--	32	--	--	--	--	--	50#	20	50@	20		
<b>Total</b>				<b>23</b>	<b>03</b>	<b>94</b>	<b>--</b>	<b>250</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>75</b>	<b>--</b>	<b>125</b>	<b>--</b>	<b>50</b>	
<b>TOTAL CONTACT HOURS DURING RESIDENT SESSION: 120 HRS [15 days * 8 hrs per day]</b>																	
Total Marks : <b>500</b>																	
@ Internal Assessment, # External Assessment, <span style="background-color: #cccccc; border: 1px solid black; display: inline-block; width: 1em; height: 1em;"></span> No Theory Examination, * Online Examination.																	
Abbreviations: TH-Theory, TU- Tutorial, PR-Practical, OR-Oral, TW- Term Work, SW- Sessional Work.																	
<b>NOTE:</b>																	
1. HOURS MARKED BY * FOR INTERNAL PRACTICAL EXAMINATION TO BE CONDUCTED AT RESSIDENT SESSION.																	
2. <b>ONE TEST OF 25 MARKS</b> TO BE CONDUCTED AT RESIDENT SESSION AND MARKS TO BE SUBMITTED TO GPDL PUNE.																	
3. 240 HOURS FOR SELF STUDY AT HOME.																	
4. ALL PRACTICALS/ORAL EXAMS [EXTERNAL ASSESSMENT INDICATED BY #] TO BE CONDUCTED AT EXAM CENTRE.																	
5. ORAL EXAMINATION [INTERNAL ASSESSMENT @] TO BE CONDUCTED AT EXAM CENTRE.																	
6. INTERNAL ASSESSMENT @ OF TERM WORK WILL BE DONE AT RESIDENT SESSION.																	

 <b>MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI</b> <b>TEACHING AND EXAMINATION SCHEME FOR POST S.S.C. DIPLOMA COURSES</b>																	
<b>COURSE NAME : DIPLOMA IN CIVIL ENGINEERING</b>																	
<b>COURSE CODE : CI</b>																	
<b>DURATION OF COURSE : EIGHT SEMESTERS</b>										<b>WITH EFFECT FROM 2013-14</b>							
<b>SEMESTER : EIGHT</b>										<b>DURATION : 16 WEEKS</b>							
<b>PATTERN : PART TIME - SEMESTER</b>										<b>SCHEME : G</b>							
SR. NO	SUBJECT TITLE	Abbreviation	SUB CODE	TEACHING SCHEME			EXAMINATION SCHEME										SW (17908)
				TH	TU	PR	PAPER HRS.	TH (1)		PR (4)		OR (8)		TW (9)			
								Max	Min	Max	Min	Max	Min	Max	Min		
1	Management	MAN	21030	03	--	--	1&½	50#*	20	--	--	--	--	--	--		
2	Design of R.C.C. Structures	DRS	21031	03	--	02	04	100	40	--	--	25#	20	50@	20		
3	<b>Elective (ANY ONE)</b>																
	Solid Waste Management	SWM	21032	03	--	02	03	100	40	--	--	--	--	25@	10	50	
	Plumbing Services	PSE	21033	03	--	02	03	100	40	--	--	--	--	25@	10		
4	Project	PRO	21034	--	--	04	--	--	--	--	--	50#	20	50@	20		
<b>Total</b>				<b>09</b>	--	<b>08</b>	--	<b>250</b>	--	--	--	<b>75</b>	--	<b>125</b>	--	<b>50</b>	
Student Contact Hours Per Week: <b>17 Hrs.</b> <b>THEORY AND PRACTICAL PERIODS OF 60 MINUTES EACH.</b> Total Marks : <b>500</b> @ Internal Assessment, # External Assessment, <span style="background-color: #cccccc; padding: 2px;"> </span> No Theory Examination, * Online Examination. Abbreviations: TH-Theory, TU- Tutorial, PR-Practical, OR-Oral, TW- Term Work, SW- Sessional Work.																	
<ul style="list-style-type: none"> <li>➤ Conduct two class tests each of 25 marks for each theory subject. Sum of the total test marks of all subjects is to be converted out of 50 marks as sessional work (SW).</li> <li>➤ Progressive evaluation is to be done by subject teacher as per the prevailing curriculum implementation and assessment norms.</li> <li>➤ Code number for TH, PR, OR and TW are to be given as suffix 1, 4, 8, 9 respectively to the subject code.</li> </ul>																	

**Course Name : All Branches of Diploma in Engineering & Technology**

**Course Code : CI/CC/EG/EC/CL/GC/MG/MC/IL/XC**

**Semester : Eight**

**Subject Title : Management**

**Subject Code : 21030**

**Teaching and Examination Scheme:**

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	--	1&½	50#*	--	--	--	50

**NOTE:**

- **Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.**
- **Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW).**

**Rationale:**

Management concepts are universal and it is a multidisciplinary subject. They are equally applicable to different types industries like Manufacturing, Service and Trade as well as different kind of business activities like industry, army, school, hospital, retail shops etc. Also, at the end of diploma course polytechnic students are expected to enter in to the Industrial Environment. This environment is altogether different and new to the students. A proper introduction and understanding of management fundamentals is therefore essential for all these students.

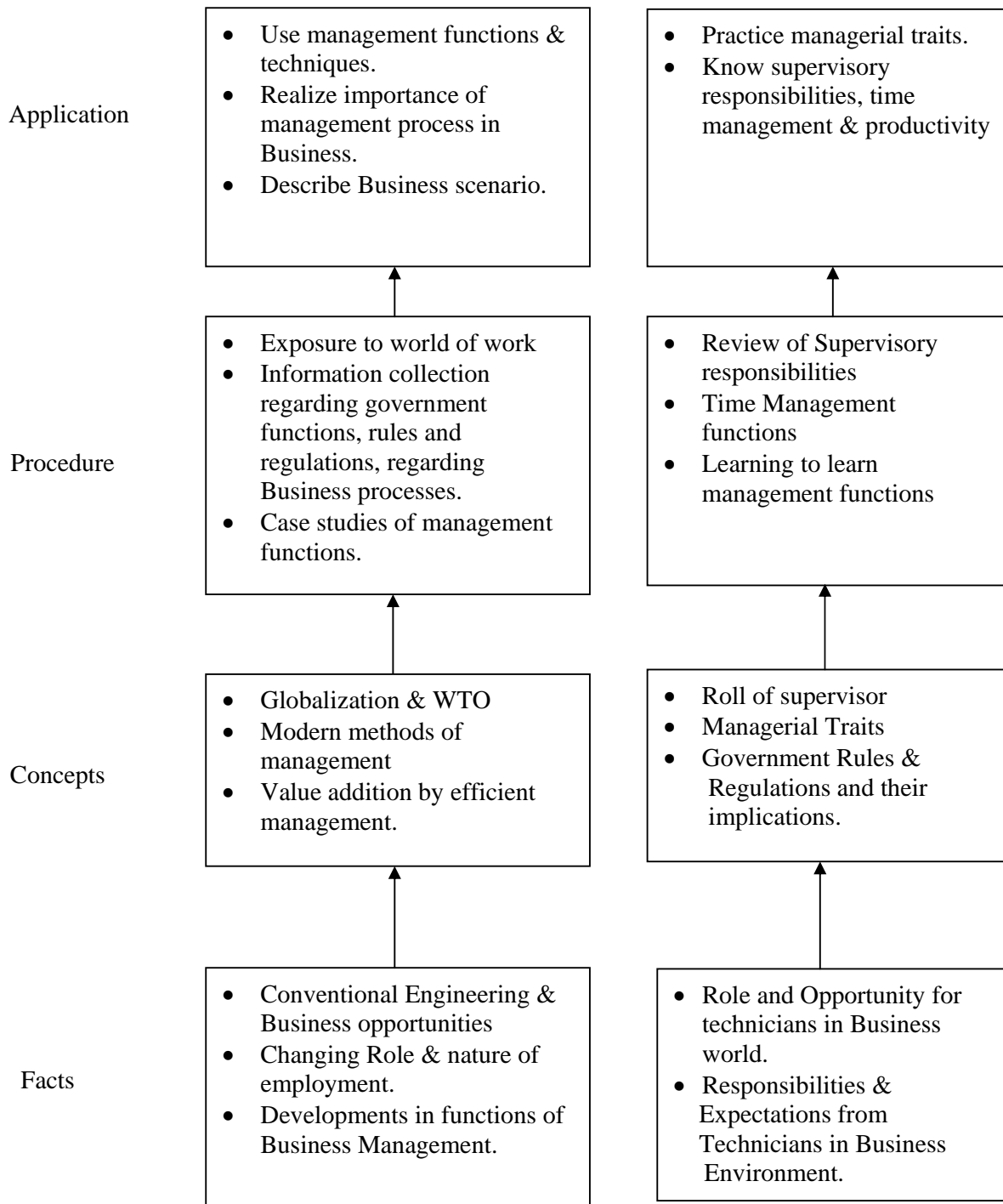
Contents of the this subject will enable the students to address various issues related to human resource, finance, materials, legislations etc. by use of basic principles of management. This will ensure that students will play their role effectively to enhance the quality of business output in total.

**Objective:**

The students will able to:

1. Get familiarized with environment related to business processes.
2. Know the management aspects of the organisations.
3. Understand Role & Responsibilities of a Diploma engineer.
4. Understand importance of quality improvement techniques.
5. Appreciate need and importance of safety in industries.
6. Understand process of Industrial finance and its management.
7. Know the latest trends in industrial management.

**Learning Structure:**



**Contents: Theory**

<b>Topic and contents</b>	<b>Hours</b>	<b>Marks</b>
<p><b>Topic 1: Overview of Business</b></p> <p><b>Specific Objectives:</b></p> <ul style="list-style-type: none"> <li>➤ State various business types and sectors</li> <li>➤ Describe importance of globalisation</li> </ul> <p>1.1. Types of Business</p> <ul style="list-style-type: none"> <li>• Service</li> <li>• Manufacturing</li> <li>• Trade</li> </ul> <p>1.2. Industrial sectors Introduction to</p> <ul style="list-style-type: none"> <li>• Engineering industry</li> <li>• Process industry</li> <li>• Textile industry</li> <li>• Chemical industry</li> <li>• Agro industry</li> <li>• IT industry</li> <li>• Banking, Insurance, Retail, Hospitality, Health Care</li> </ul> <p>1.3 Globalization</p> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Advantages &amp; disadvantages with respect to India</li> </ul>	02	04
<p><b>Topic 2: Management Process</b></p> <p><b>Specific Objectives:</b></p> <ul style="list-style-type: none"> <li>➤ State various management principles</li> <li>➤ Describe different management functions</li> </ul> <p>2.1 What is Management?</p> <ul style="list-style-type: none"> <li>• Evolution</li> <li>• Various definitions of management</li> <li>• Concept of management</li> <li>• Levels of management</li> <li>• Administration &amp; management</li> <li>• Scientific management by F.W.Taylor</li> </ul> <p>2.2 Principles of Management (14 principles of Henry Fayol)</p> <p>2.3 Functions of Management</p> <ul style="list-style-type: none"> <li>• Planning</li> <li>• Organizing</li> <li>• Directing</li> <li>• Controlling</li> <li>• Decision Making</li> </ul>	08	08
<p><b>Topic 3: Organisational Management</b></p> <p><b>Specific Objectives:</b></p> <ul style="list-style-type: none"> <li>➤ Compare different forms of organisation , ownership for a specific business</li> <li>➤ Describe types of departmentation</li> </ul> <p>3.1 Organization :</p> <ul style="list-style-type: none"> <li>• Definition</li> </ul>	08	08

<ul style="list-style-type: none"> <li>• Steps in organization</li> </ul> <p>3.2 Types of organization</p> <ul style="list-style-type: none"> <li>• Line</li> <li>• Line &amp; staff</li> <li>• Functional</li> <li>• Project</li> </ul> <p>3.3 Departmentation</p> <ul style="list-style-type: none"> <li>• By product</li> <li>• By process</li> <li>• By function</li> </ul> <p>3.4 Principles of Organisation</p> <ul style="list-style-type: none"> <li>• Authority &amp; Responsibility</li> <li>• Span of Control</li> <li>• Effective Delegation</li> <li>• Balance ,stability and flexibility</li> <li>• Communication</li> </ul> <p>3.5 Forms of ownership</p> <ul style="list-style-type: none"> <li>• Proprietorship</li> <li>• Partnership</li> <li>• Joint stock</li> <li>• Co-operative Society</li> <li>• Govt. Sector</li> </ul>		
<p><b>Topic 4: Industrial Safety and Legislative Acts</b></p> <p><b>Specific Objectives:</b></p> <ul style="list-style-type: none"> <li>➤ Describe types of accidents &amp; safety measures</li> <li>➤ State provisions of industrial acts.</li> </ul> <p>4.1 Safety Management</p> <ul style="list-style-type: none"> <li>• Causes of accidents</li> <li>• Types of Industrial Accidents</li> <li>• Preventive measures</li> <li>• Safety procedures</li> </ul> <p>4.2 Industrial Legislation - Necessity of Acts</p> <p>Important Definitions &amp; Main Provisions of following acts:</p> <ul style="list-style-type: none"> <li>• Indian Factory Act</li> <li>• Workman Compensation Act</li> <li>• Minimum Wages Act</li> </ul>	08	06
<p><b>Topic 5: Financial Management (No Numerical)</b></p> <p><b>Specific Objectives:</b></p> <ul style="list-style-type: none"> <li>➤ Explain functions of financial management</li> <li>➤ State the sources of finance &amp; types of budgets.</li> <li>➤ Describe concepts of direct &amp; indirect taxes.</li> </ul> <p>5.1 Financial Management- Objectives &amp; Functions</p> <p>5.2 Capital Generation &amp; Management</p> <ul style="list-style-type: none"> <li>• Types of Capitals - Fixed &amp; Working</li> <li>• Sources of raising Capital - Features of Short term, Medium Term &amp; Long Term Sources</li> </ul> <p>5.3 Budgets and accounts</p> <ul style="list-style-type: none"> <li>• Types of Budgets</li> </ul>	08	08

<ul style="list-style-type: none"> <li>• Fixed &amp; Variable Budget - Concept</li> <li>• Production Budget - Sample format</li> <li>• Labour Budget - Sample format</li> <li>• Profit &amp; Loss Account &amp; Balance Sheet - Meaning, sample format, meaning of different terms involved.</li> </ul> <p>5.4 Meaning &amp; Examples of -</p> <ul style="list-style-type: none"> <li>• Excise Tax</li> <li>• Service Tax</li> <li>• Income Tax</li> <li>• Value Added Tax</li> <li>• Custom Duty</li> </ul>		
<p><b>Topic 6: Materials Management (No Numerical)</b></p> <p><b>Specific Objectives:</b></p> <ul style="list-style-type: none"> <li>➤ Describe concept of inventory, ABC analysis &amp; EOQ.</li> <li>➤ Describe purchase functions &amp; procedures</li> <li>➤ State features of ERP &amp; MRP</li> </ul> <p>6.1 Inventory Concept, its classification, functions of inventory</p> <p>6.2 ABC Analysis - Necessity &amp; Steps</p> <p>6.3 Economic Order Quantity Concept, graphical representation, determination of EOQ</p> <p>6.4 Standard steps in Purchasing</p> <p>6.5 Modern Techniques of Material Management</p> <ul style="list-style-type: none"> <li>• Material Resource Planning (MRP) - Functions of MRP, Input to MRP, Benefits of MRP</li> <li>• Enterprise Resource Planning (ERP) - Concept, list of modules, advantages &amp; disadvantages of ERP</li> </ul>	08	08
<p><b>Topic 7: Quality Management</b></p> <p><b>Specific Objectives:</b></p> <ul style="list-style-type: none"> <li>➤ State Principles of Quality Management</li> <li>➤ Describe Modern Technique &amp; Systems of Quality Management</li> </ul> <p>7.1 Meaning of Quality</p> <p>Quality Management System – Activities, Benefits</p> <p>Quality Control - Objectives, Functions, Advantages</p> <p>Quality Circle - Concept, Characteristics &amp; Objectives</p> <p>Quality Assurance – Concept, Quality Assurance System</p> <p>7.2 Meaning of Total Quality and TQM</p> <p>Components of TQM – Concept, Elements of TQM, Benefits</p> <p>7.3 Modern Technique &amp; Systems of Quality Management like Kaizen, 5'S, 6 Sigma</p> <p>7.4 ISO 9001:2000 - Benefits, Main clauses.</p>	06	08
<b>Total</b>	<b>48</b>	<b>50</b>

**Learning Resources:****Books:**

<b>Sr. No</b>	<b>Author</b>	<b>Name of Book</b>	<b>Publisher</b>
01	Dr. O.P. Khanna	Industrial Engineering & Management	Dhanpat Rai & Sons New Delhi
02	Banga & Sharma	Industrial Engineering & Management	Khanna Publication
03	Dr. S.C. Saksena	Business Administration & Management	Sahitya Bhavan Agra
04	W.H. Newman E. Kirby Warren Andrew R. McGill	The process of Management	Prentice- Hall

**E Source:**

[nptel.iitm.ac.in](http://nptel.iitm.ac.in)

<http://iete-elan.ac.in/subjects/amIndustrialMgmt.htm>



**Course Name : Diploma in Civil Engineering**

**Course Code : CI / CC**

**Semester : Eight**

**Subject Title : Design of R.C.C. Structures**

**Subject Code : 21031**

**Teaching and Examination Scheme:**

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
04	--	02	04	100	--	25#	50@	175

**NOTE:**

- **Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.**
- **Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW).**

**Rational:**

Design of RCC Structures is the subject at Technology Level. The pre-requisite knowledge, skills and competencies for this subject are expected to be achieved by studying the subjects Mechanics of Structures and Theory of Structures in earlier semesters.

Limit State Method is to be used in the design of RCC structures. IS:456-2000 is to be used for analysis and design and IS:875-1987 is to be used for Loading Standards. Analysis and design of building elements like slabs, beams, columns, footings and dog-legged staircase will be useful in structural design of an RCC building. Emphasis is also on preparation and interpretation of structural drawing and detailing. An elementary terminology of earthquake engineering and exposure to ductile detailing as per IS:13920-2002 has been provided through a separate topic.

An introductory topic on prestressed concrete will be useful to acquaint the learner with the another common mode of use of concrete.

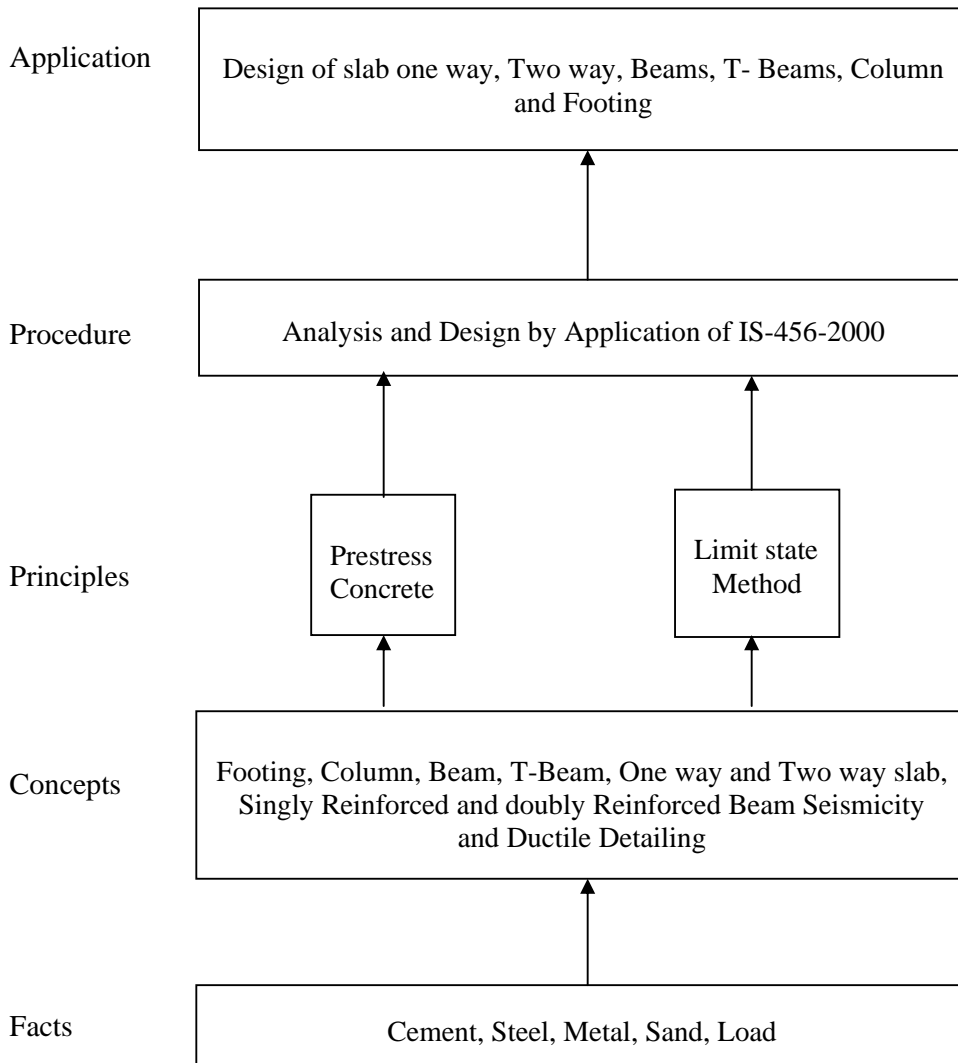
Thus the contents of the subject will be useful to the diploma technician in effective supervision and quality control on site.

**Objectives:**

Students will be able to:

1. Understand the basic principles and procedure of design of slab, beam, column and footing of RCC building as per IS:456-2000
2. Understand reinforcement detailing of RCC structural members.
3. Understand design of singly reinforced, doubly reinforced and flanged section of beams, simply supported one way & two way slabs, cantilevers slab, axially loaded columns and footings by limit state method.
4. Understand, read and interpret structural drawings.
5. Understand ductile detailing of structural components of buildings.

**Learning Structure:**



## Theory

Topic and Contents	Hours	Marks
<p><b>Topic 1 : Introduction to Limit State Method</b></p> <p><b>Specific Objectives :</b></p> <ul style="list-style-type: none"> <li>➤ State purpose of reinforcement in RCC</li> <li>➤ Define limit states</li> <li>➤ Enlist various types of loads on structures</li> </ul> <p><b>Content:</b></p> <ul style="list-style-type: none"> <li>• Definition of RCC, functions of reinforcement, material properties, use of IS:456-2000</li> <li>• Definition and types of limit states, partial safety factors for material strength, characteristic strength</li> <li>• Types of loads, use of IS:875-1987, characteristic load, design load</li> </ul>	02	04
<p><b>Topic 2 : Analysis and Design of Singly Reinforced Rectangular Sections by Limit State Method</b></p> <p><b>Specific Objectives :</b></p> <ul style="list-style-type: none"> <li>➤ Draw strain and stress diagrams</li> <li>➤ Calculate design constants and ultimate moment of resistance</li> <li>➤ Design balanced and under-reinforced singly reinforced rectangular sections</li> </ul> <p><b>Content :</b></p> <ul style="list-style-type: none"> <li>• Limit State of collapse (flexure) : assumptions, stress-strain relationship for concrete and steel, strain diagram and stress block diagram for singly reinforced section, design parameters and constants, ultimate moment of resistance</li> <li>• Under- reinforced, over-reinforced and balanced sections : meaning and comparison</li> <li>• Analysis and design : Numerical problems on determination of design constants, ultimate moment of resistance, ultimate load carrying capacity, design of balanced and under-reinforced sections</li> <li>• IS specifications regarding spacing, cover, minimum reinforcement, effective span, etc. in beams</li> </ul>	06	16
<p><b>Topic 3 : Analysis and Design of Doubly Reinforced Rectangular Sections by Limit State Method</b></p> <p><b>Specific Objectives:</b></p> <ul style="list-style-type: none"> <li>➤ Decide whether beam should be designed as doubly reinforced</li> <li>➤ Draw strain and stress diagram for beams</li> <li>➤ Calculate ultimate moment of resistance</li> <li>➤ Design doubly reinforced balanced beams</li> </ul> <p><b>Content :</b></p> <ul style="list-style-type: none"> <li>• Meaning and conditions for providing doubly reinforced beams</li> <li>• Analysis of doubly reinforced sections : strain and stress diagrams, numerical problems on ultimate moment of resistance</li> <li>• Design of doubly reinforced sections : Numerical problems on</li> </ul>	06	16

balanced design		
<p><b>Topic 4 : Analysis and Design of Flanged Beams by Limit State Method</b></p> <p><b>Specific Objectives :</b></p> <ul style="list-style-type: none"> <li>➤ Calculate effective flange width</li> <li>➤ Determine ultimate moment of resistance</li> <li>➤ Design flanged beam by carrying out load analysis</li> </ul> <p><b>Content :</b></p> <ul style="list-style-type: none"> <li>• Meaning and conditions for formation of flanged (T and L) beams, comparison with rectangular beams, effective width of flange</li> <li>• Analysis of singly reinforced flanged beams: Introduction to cases of neutral axis in i) flange and ii) web. Numerical problems on Moment of Resistance for the case of neutral axis in the flange only.</li> </ul>	06	12
<p><b>Topic 5: Shear and Bond by Limit State Method</b></p> <p><b>Specific Objectives :</b></p> <ul style="list-style-type: none"> <li>➤ Calculate ultimate shear strength of beam</li> <li>➤ Design beam for shear</li> <li>➤ Draw reinforcement detailing diagram for shear</li> <li>➤ Apply check for bond to beams and slabs</li> </ul> <p><b>Content :</b></p> <p><b>5.1 Shear:</b> ... (08 Marks) Meaning of shear in RCC beams and slabs. IS code specifications. Various forms of shear reinforcement in beams. Use of bent up bars. Zones of minimum shear reinforcement. Numerical problems on design of beams for shear</p> <p><b>5.2 Bond:</b> ... (04 Marks) Meaning of bond in RCC. IS code provisions. Meaning and calculation development length in tension and compression.</p>	06	12
<p><b>Topic 6 : Design of Slabs by Limit State Method</b></p> <p><b>Specific Objectives :</b></p> <ul style="list-style-type: none"> <li>➤ Decide type of slab from the given plan</li> <li>➤ Design various types of slabs</li> <li>➤ Draw reinforcement detailing diagram for slabs</li> </ul> <p><b>Content :</b></p> <ul style="list-style-type: none"> <li>• Definition and classification of slabs as one-way and two-way slabs, support conditions, main and distribution steel, I.S. specifications regarding spacing and cover for reinforcement, effective span, minimum reinforcement</li> <li>• Limit state of serviceability for slabs: Check for deflection</li> <li>• Design of slabs : Procedure and numerical problems on design of one-way simply supported slabs, cantilever slabs, two-way simply supported slabs with corners free to lift and waist slab of dog-legged staircase (No problem in the theory exam on design of dog legged staircase)</li> </ul>	08	16
<p><b>Topic 7: Design of Columns and Footings by Limit State Method</b></p> <p><b>Specific Objectives :</b></p> <ul style="list-style-type: none"> <li>➤ Calculate ultimate load carrying capacity of a given axially loaded</li> </ul>	06	16

<p>column</p> <ul style="list-style-type: none"> <li>➤ Design a column and draw reinforcement detailing</li> <li>➤ Design isolated sloped footing and draw reinforcement detailing</li> </ul> <p><b>Content :</b></p> <p><b>7.1 Axially Loaded Short Columns</b> ... (12 Marks)</p> <ul style="list-style-type: none"> <li>• Limit state of collapse in compression : assumptions, minimum eccentricity, slenderness ratio, short and long columns, calculation of ultimate load carrying capacity of axially loaded short rectangular and circular columns</li> <li>• Load analysis for a column : calculation of load on an axially loaded column from beams at a floor and at various floor levels in a building</li> <li>• Design of axially loaded short rectangular and circular columns: problems on design as per IS specifications for minimum and maximum reinforcement, transverse reinforcement, cover, etc.</li> </ul> <p><b>7.2 Axially Loaded Footings</b> ... (04 Marks)</p> <ul style="list-style-type: none"> <li>• Introduction to various types of RCC footings like isolated stepped and sloped footings, combined footings, piles</li> <li>• Design of isolated square sloped footing: Flexural design with checks for one-way shear, two-way shear and bond. (Problems on design of footing for bending moment only in theory examination paper)</li> </ul>		
<p><b>Topic 8 : Seismicity and Ductile Detailing</b></p> <p><b>Specific Objectives :</b></p> <ul style="list-style-type: none"> <li>➤ Define basic terms in seismicity</li> <li>➤ Draw ductile detailing diagrams for common RCC members as per IS:13920-2002</li> </ul> <p><b>Content :</b></p> <ul style="list-style-type: none"> <li>• Definition, magnitude and intensity of earthquake. Zones</li> <li>• Earthquake damages to RCC Buildings like bond failure, shear cracking, slab tearing. Remedies</li> <li>• Ductile Detailing Provisions in IS:13920-200</li> </ul>	04	04
<p><b>Topic 9 : Introduction to Prestressed Concrete</b></p> <p><b>Specific Objectives :</b></p> <ul style="list-style-type: none"> <li>➤ Compare prestressed concrete with RCC</li> <li>➤ Distinguish between pre-tensioning and post-tensioning</li> <li>➤ Enlist losses of prestress</li> </ul> <p><b>Content :</b></p> <ul style="list-style-type: none"> <li>▪ Meaning of prestressed concrete, comparison with RCC. Advantages and disadvantages of prestressed concrete.</li> <li>▪ Methods of prestressing, pretensioning and post-tensioning</li> <li>▪ Losses of prestress : meaning and list of losses (No numerical problems shall be asked in written examination on this chapter)</li> </ul>	04	04
<b>Total</b>	<b>48</b>	<b>100</b>

**Practicals:**

Skills to be developed

**Intellectual Skills:**

1. Design of structural components
2. Interpretation of structural drawings

**Motor Skills:**

1. Preparing structural drawings

Term work shall consist of the following:

**1. Mini-project on structural design of a G + 2 framed residential building:**

Design of slabs, beams, columns and footings for a simple plan of a G + 2 residential building based on the contents taught in the theory. Students should be encouraged to prepare their own architectural plan otherwise teacher will provide separate data of plan, dimensions and material grades separate for separate groups or batches of students; maximum batch size not exceeding 20.

The students shall submit the design details in the following form:

- a) Design Report as included in the Lab. Manual prescribed by MSBTE.
- b) Two full imperial size drawing sheets finished in pencils containing i) key-plan ii) reinforcement detailing for sample slabs and beams, column, column footing of each type and staircase iii) schedules of slabs, beams, columns and footings iv) design notes

**2. Study and Interpretation of Professional Structural Drawings:**

Professional structural drawings including reinforcement detailing of the components slabs, beams, columns, footings and stair-case shall be collected from nearby consultants. Teacher shall set at least 10 objective questions on each of the five components based on the drawing sheets obtained. Each student shall write the answers in the corresponding exercise in the Lab. Manual of MSBTE.

**Learning Resources:****Books:**

Sr. No.	Author	Title	Publisher
1	Dr. V. L. Shah & Dr. S. R. Karve	Limit State Theory and Design of Reinforced Concrete Structures	Structures Publications, Pune
2	N.C.Sinha & S.K.Roy	Fundamentals of Reinforced Concrete	S. Chand & Co., New Delhi
3	N.Krishna Raju & R.N.Pranesh	Reinforced Concrete Design Principles and Practice	New Age International, Mumbai
4	S.U.Pillai & Devdas Menon	Reinforced concrete Design	Tata Mcgraw Hill
5	P. C.Varghase	Limit State Design of Reinforced Concrete	Prentice Hall of India,
6	N.Krishna Raju	Prestressed Concrete	Tata McGraw Hill, Mumbai
7	T.Y.Lin	Design of Prestressed Concrete	Wiley India

		Structures	
8	David Dowrick	Earthquake Resistant Design and Risk Reduction	Wiley India Pvt.Ltd., New Delhi
9	Steven L. Kramer	Geotechnical Earthquake Engineering	Pearson Education

**I.S. Codes:**

1. IS 456:2000 - Plain and Reinforced concrete code of Practice
2. SP16- Design Aids for reinforced concrete to IS 456
3. I.S. 875 (Part 1-5) - 1987 code of practice of design loads for Buildings and structures.
4. SP 24 - Explanatory Handbook on IS 456
5. IS 1343-1980 - Indian Standard code of (Reaffirmed 1990) Practice for Prestressed concrete.
6. SP34: 1987 - Handbook on concrete reinforcement and Detailing.
7. IS 13920-1993 Ductile Detailing of R. C. Building subjected to Seismic forces.

**Softwares:**

1. Struds
2. Scadds/nucleus r(200)
3. Build master
4. Staad.pro.vsi
5. Etabs.9.5

**1. Field Visits:**

Structured field visits can be organized with proper planning to construction sites to view the following points:

- i) Reinforcement detailing of components like slabs, beams, columns, footing, staircase
- ii) Main concreting operations like batching, mixing, transporting, compacting and curing on site
- iii) Stacking of material like cement, sand, metal, steel, etc. on the site
- iv) Formwork for the various components
- v) Cutting and bending of bars on site
- vi) Verification of sample details in the structural drawing with the reinforcement actually provided on site

**2. Development / Use of MS PowerPoint Slide Shows:**

- i) Students can be asked to take digital photographs and videos of the details observed in the field visits. MS PowePoint Slide Shows and MS Movie maker clips can be developed from the photographs and videos by the students as special credit assignments.
- ii) Slide shows on earthquake damages and ductile detailing can be screened

**3. Experts' Lectures / Demonstrations:**

Experts' lecture-demonstration presentations can be organized on the following topics :

- i) Modern site practices
- ii) Use of software packages for design
- iii) Case study of a major construction project

**Course Name : Diploma in Civil Engineering**

**Course Code : CI / CC**

**Semester : Eight**

**Subject Title : Solid Waste Management**

**Subject Code : 21032**

### Teaching and Examination Scheme

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	02	03	100	--	--	25@	125

#### Rationale:

Industrialization and Urbanization is increasing day by day. As a result of this the generation of solid waste is a major problem all over the country within the urban as well as rural area. In view of this the management of solid waste produced is of prime need to keep the environment safe and clean.

Information on classification and characteristics of solid waste will enable to decide appropriate decision about the collection and transportation of waste produced. Various disposal methods of solid waste will enable to recommend suitable method of disposal of solid waste with economy and acceptable environmental constraints including reuse and recycle wherever applicable.

Content on other types of solid waste such as biomedical waste, Construction waste, E-waste and plastic waste will useful in deciding appropriate method for collection, transportation and disposal of these wastes.

Thus, the knowledge of solid waste management with the concept like recycling, recovering and reuse will lead to proper disposal with acceptability. This will further lead to keeping the natural resources condemnation free.

#### General Objectives:

Students will able to

1. Understand various types of solid waste produced with their characteristics
2. Understand different methods of collection, transportation and disposal of solid waste.
3. Apply different method of disposal of solid waste for safe disposal.
4. Understand concept of Bio medical waste, E-waste and Industrial waste.
5. Understand recycling and reuse of solid waste.
6. Understand different transportation equipments with their limitations.



**Theory:**

Topic and Contents	Hours	Marks
<p><b>Topic 1: Introduction</b>  <b>Specific objectives :</b></p> <ul style="list-style-type: none"> <li>➤ State meaning of solid waste</li> <li>➤ List types of solid waste</li> <li>➤ Write the impact of solid waste</li> <li>➤ List characteristics of solid waste</li> <li>➤ List waste management techniques</li> </ul> <p><b>Content :</b></p> <ul style="list-style-type: none"> <li>• Definition of solid waste</li> <li>• Meaning of different solid waste - Domestic waste, commercial waste, industrial waste, market waste, agricultural waste, biomedical waste, E-waste, hazardous waste, institutional waste, etc.</li> <li>• Sources of solid waste</li> <li>• Classification of solid waste - hazardous and non-hazardous waste.</li> <li>• Physical and Chemical characteristics.</li> <li>• Impact of solid waste on environment.</li> <li>• Solid waste management techniques - solid waste management Hierarchy, waste prevention and waste reduction.</li> <li>• Factors affecting on solid waste generation.</li> </ul>	08	16
<p><b>Topic 2: Storage, Collection and Transportation of Municipal Solid Waste.</b>  <b>Specific Objectives :</b></p> <ul style="list-style-type: none"> <li>➤ State methods of storage of municipal solid waste.</li> <li>➤ List methods of collection of municipal solid waste.</li> <li>➤ List various transportation equipment</li> <li>➤ Draw the organization pattern of solid waste management.</li> </ul> <p><b>Content :</b></p> <ul style="list-style-type: none"> <li>• Storage of municipal waste.</li> <li>• Collection methods of municipal waste.</li> <li>• Tools and Equipments - Litter Bin, Broom, Shovels, Handcarts, Mechanical road sweepers, Community Bin like movable and stationary Bin.</li> <li>• Transportation of municipal waste.</li> <li>• Transportation vehicles with their capacity and working-Animal carts, Auto vehicles, Tractors or Trailers, Trucks, Dumper, Compactor vehicles. Transfer station- meaning, necessity, location</li> <li>• Organization pattern of solid waste management.</li> </ul>	08	16
<p><b>Topic 3 : Disposal of Solid Waste</b>  <b>Specific objectives :</b></p> <ul style="list-style-type: none"> <li>➤ List the types of disposal of solid waste</li> <li>➤ Describe the process of composting.</li> <li>➤ Describe the process of land filling.</li> <li>➤ Describe the process of incineration.</li> </ul> <p><b>Content :</b></p> <p>3.1 Composting of waste ..... 08</p> <ul style="list-style-type: none"> <li>• Principles of composting process</li> <li>• Factors affecting on composting process</li> </ul>	12	24

<ul style="list-style-type: none"> <li>• Methods of composting - <ul style="list-style-type: none"> <li>A) Manual Composting - Bangalore method, Indore Method</li> <li>B) Mechanical Composting - Dano Process</li> <li>C) Vermicomposting- Concept</li> </ul> </li> </ul> <p>3.2. Land filling technique ..... 08</p> <ul style="list-style-type: none"> <li>• Factors for site Selection</li> <li>• Land filling methods-Area method, Trench method and Ramp method</li> <li>• Leachate and its control</li> <li>• Biogas from landfill</li> <li>• Advantages and Disadvantages of landfill method</li> </ul> <p>3.3 Incineration of waste ..... 08</p> <ul style="list-style-type: none"> <li>• Introduction of incineration process.</li> <li>• Types of incinerators-Multiple chamber incinerators and Municipal incinerators</li> <li>• Products of incineration process with their use</li> <li>• Pyrolysis of waste –Definition, methods, Advantages and Disadvantages of incineration process</li> </ul>		
<p><b>Topic 4: Special Types of Solid Wastes.</b>  <b>Specific Objectives :</b></p> <ul style="list-style-type: none"> <li>➤ List various types of special waste.</li> <li>➤ Describe method of collection and disposal of biomedical waste, E-waste and industrial waste.</li> </ul> <p><b>Content:</b></p> <p>4.1 Biomedical Waste ..... 06</p> <ul style="list-style-type: none"> <li>• Definition of Biomedical Waste</li> <li>• Sources and generation of Biomedical Waste</li> <li>• Classification of Biomedical Waste Management technologies.</li> </ul> <p>4.2 E-waste .....06</p> <ul style="list-style-type: none"> <li>• Definition of E- waste</li> <li>• Varieties of E- waste</li> <li>• Dangers of E- waste</li> <li>• Disposal of E- waste</li> <li>• Recycling of E- waste</li> </ul> <p>4.3 Industrial waste .....06</p> <ul style="list-style-type: none"> <li>• Variety of industrial waste</li> <li>• Collection of disposal of industrial waste</li> <li>• Control measures of industrial waste.</li> <li>• Recycling of industrial waste.</li> </ul> <p>4.4 Biomedical waste .....06  Biomedical waste management &amp; handling as per rule 1998.</p>	12	24
<p><b>Topic 5: Health aspect and public Involvement in solid waste management</b></p> <p><b>Specific Objectives:</b></p> <ul style="list-style-type: none"> <li>➤ Know health aspect during handling and processing.</li> <li>➤ State stages for public involvement</li> </ul> <p><b>Content :</b></p> <ul style="list-style-type: none"> <li>• Health aspect during handling and processing</li> <li>• Health problem during time of segregation, reuse, recovery, recycling of solid waste.</li> </ul>	04	10

<ul style="list-style-type: none"> <li>Public Involvement and participation in Solid waste management.</li> </ul>		
<b>Topic 6: Recycling of Solid Waste</b> <b>Specific objectives :</b> <ul style="list-style-type: none"> <li>Describe the process of recycling</li> <li>State marketing strategies for recyclables.</li> <li>Planning, Designing and implementation of recycling program.</li> <li>State benefits of recycling.</li> </ul> <b>Content :</b> <ul style="list-style-type: none"> <li>Introduction, purpose of recycling</li> <li>Benefits of recycling.</li> <li>Methods of collecting recyclables.</li> <li>Solid waste recycling in India.</li> </ul>	04	10
<b>Total</b>	<b>48</b>	<b>100</b>

**Practicals:****Skills to be developed:****Intellectual Skills:**

1. Understand various types of solid waste.
2. Understand various methods of disposal of solid waste with their suitability.
3. Understand rules and regulation during handling and disposal.

**Motor Skills:**

1. Observe methods of disposal of solid waste.
2. Prepare PowerPoint presentation of disposal of special waste.
3. Collect information of solid waste management in local area.

**Term work will be prepared by each student in the form of assignments as below.**

**List of Assignments:**

1. Visit report on solid waste disposal plant nearby city
2. Visit report on composting plant.
3. Visit report on Biogas plant.
4. Visit report on vermicomposting plant.
5. Visit report on biomedical waste treatment plant.
6. Visit report on Industrial solid waste treatment plant.
7. Collect information of various machinery used for collection and transportation of Solid waste.
8. Understand health aspect during handling and transportation of solid waste.
9. Visit report on transfer station.
10. Study organization pattern of solid waste management.

\*Student should prepare visit report by considering following points

(For sr. no.1 to 6 above)

1. Name and Location of Site
2. Sketch showing elements of plant
3. Raw material
4. Process
5. Production and capacity of plant
6. Advantages and Disadvantages
7. Financial assistance by govt. or any other statutory body.
8. Any other information.
9. Minimum two photograph of each visit attached to visit report.

(Size of photo 10cmx12cm)

(For sr. no.7 above)

1. List of machinery
2. Working of machinery
3. Capacity of machinery
4. Feasibility of machinery.
5. Any other information.

**Learning Resources:****Books:**

Sr. No	Author	Title	Publisher
1	Dr. A. D. Bhide	Solid Waste Management	--
2	Gorge Techobanoglous	Solid Waste	McGraw Hill
3	D.L. Manjunath	Environmental Studies	PEARSON Publication
4	Gottas	Composting	--
5	K.Sasikumar	Solid Waste Management	PHI learning
6	Khopkar S.M.	Environmental Pollution	New Age International limited
7	Edwards and Lofty	Earthworm Biology	--
8	Anindita Basak	Environmental Studies	PEARSON Publication
9	Rao C.S.	Environmental Pollution Control Engineering	Wiley Eastern Limited
10	B. B. Hosetti	Prospect and Perspectives of Solid Waste Management	NEW AGE International limited

**Websites:**

1. [www.hsagolden.com](http://www.hsagolden.com)
2. [www.almitrapatel.com](http://www.almitrapatel.com)
3. [www.yousee.in](http://www.yousee.in)
4. [www.skgsangha.org](http://www.skgsangha.org)
5. [www.epa.gov/epaoswer/non-hw/municipal/index.htm](http://www.epa.gov/epaoswer/non-hw/municipal/index.htm)
6. [En.wikipedia.org/waste-management](http://En.wikipedia.org/waste-management)

**Course Name : Diploma in Civil Engineering**

**Course Code : CI / CC**

**Semester : Eight**

**Subject Title : Plumbing Services**

**Subject Code : 21033**

**Teaching and Examination Scheme:**

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	02	03	100	--	--	25@	125

**NOTE:**

- **Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.**
- **Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW).**

**Rationale:**

A properly systematic course in Plumbing is not available in India. Plumbing though crucial but remained as neglected subject. As a result, there is a great demand to well trained Plumbing Professionals in the building industry.

Plumbing service is necessary for proper water supply & efficient drainage facility in a building. As buildings are becoming more complex and more modern plumbing materials and systems are available in India, it is necessary to include the same in the Civil Engineering curriculum.

Plumbing services are important component of Civil Engineering. Internal plumbing contributes to around 15% of the construction cost.

Indian Plumbing Association (IPA) has adopted, reviewed and revised the Uniform Plumbing Code of International association of Plumbing and Mechanical officials to suit Indian practices, customs and Laws. The code is published as Uniform Plumbing Code – 2008 India (UPC1).

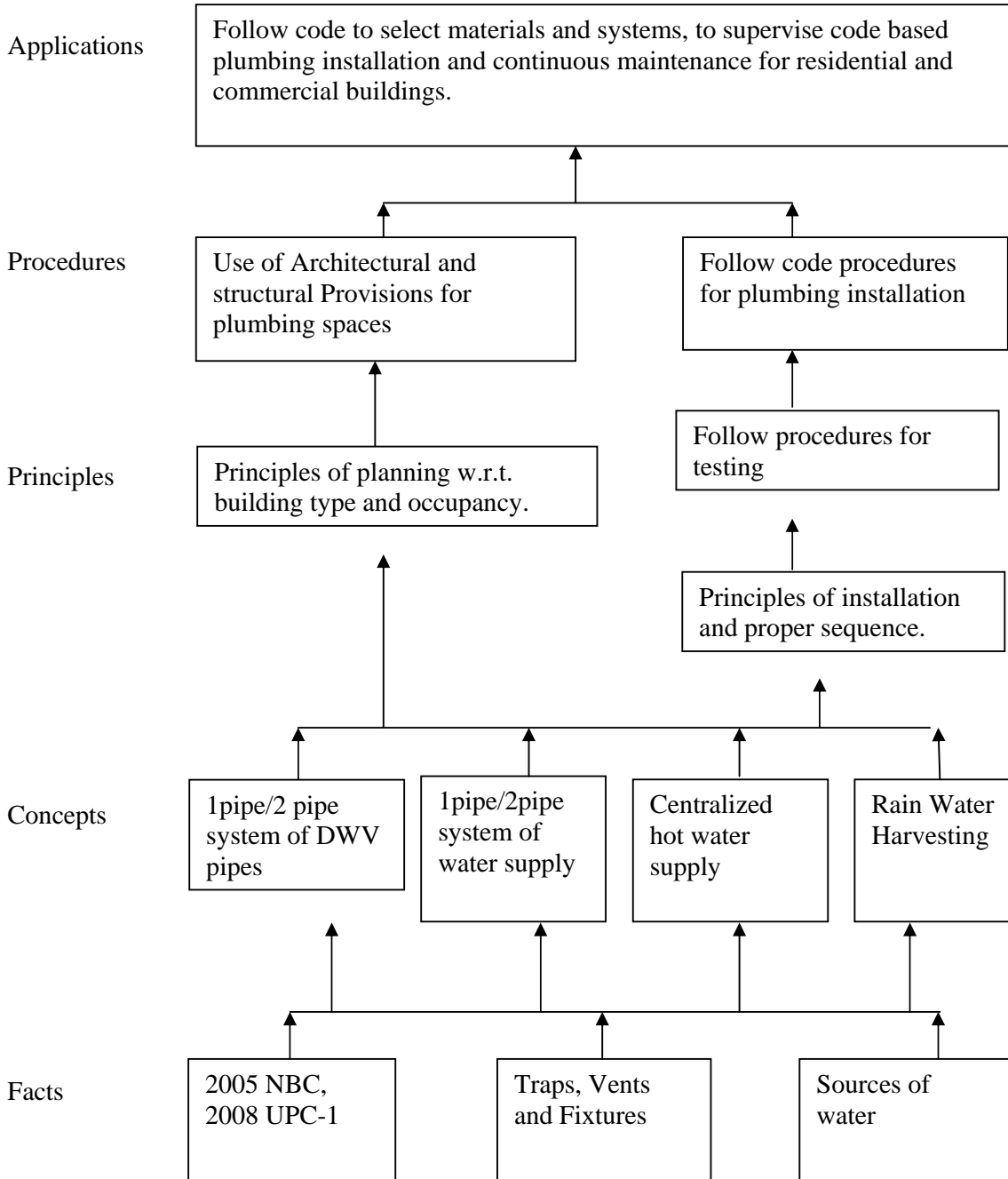
Need of proper use of Plumbing code must be code based education and training in Plumbing will have better job opportunities and improved income. The formal education in Plumbing will improve the plumbing system design and installation standards, thereby ensuring health and safety of people, structure and environment.

**General Objectives:**

The student will be able to,

1. Understand proper coordination of plumbing work with Architects and structural engineers.
2. Interpret plumbing drawings.
3. Select proper plumbing materials & systems.
4. Supervise plumbing installation as per UPC - 2008.
5. Understand methods to conserve water and energy.
6. Follow safety measures at site.
7. Follow standards for installation as per code practice.

**Learning Structure:**



**Contents: Theory**

Topic and contents	Hours	Marks
<p><b>Topic 1: Introduction to Codes, Architectural and Structural Coordination.</b></p> <p><b>Specific objectives:</b></p> <ul style="list-style-type: none"> <li>➤ Use relevant Code (UPC – 2008).</li> <li>➤ Maintain proper coordination amongst different agencies.</li> <li>➤ Select proper materials for plumbing.</li> <li>➤ Follow local municipal laws.</li> </ul> <p><b>Contents:</b></p> <p><b>1.1 :</b> Importance of plumbing, history of ancient plumbing, model code- roles, scope, purpose and use of codes and standards in building industry, approvals, AHJ(Authority Having Jurisdiction) general regulations, minimum standards, labeling, alternative materials, sewers required, damage to drainage system, improper location, workmanship, prohibited fitting and practices, engineered systems, water conservations, protection of pipes and structures, water proofing, rat proofing.</p> <p><b>1.2:</b> Architectural and structural coordination (not included in UPC1 and ITM ) Architectural and Structural provisions for Plumbing systems, coordination required during the planning stage, various agencies involved and their roles, policy decisions, schematic alternatives, planning spaces for plumbing systems, water tanks, pump room, centralized hot water system, toilet locations, toilet planning, plumbing shafts, basement and terraces planning. Structural parameters, sunken toilets, location of columns and beams, post tensioned slabs, importance of ledge walls, waterproofing. Local Municipal laws, domestic and fire static water requirements, water sources, prohibited fittings and systems.</p>	04	10
<p><b>Topic 2 : Plumbing Terminology</b></p> <p><b>Specific objectives:</b></p> <ul style="list-style-type: none"> <li>➤ Define terms used in plumbing.</li> <li>➤ List plumbing fixtures.</li> <li>➤ List drainage system and their joints.</li> <li>➤ List different valves used in water supply and drainage with their function.</li> </ul> <p><b>Contents:</b></p> <p>Definition , use/ Location purpose and sketches of the following</p> <p><b>2.1:</b> Plumber Plumbing fixture: accessible / readily accessible, aerated fitting, bathroom group, carrier, flood level rim, floor sink, flush tanks, lavatories, macerating toilet system, plumbing appliances, flushometer valve</p> <p><b>2.2:</b> Traps, indirect waste, vent blow off, development length, parts of vent system - stack vent, branch vent, continuous vent, individual vent, dirty arm, FOG (Fat, Oil and Grease) disposal system receptors, slip joint.</p> <p><b>2.3:</b> Drainage - adapter fitting, adjusted roof area, AAV (Air Admittance Valve), air break, air gap, area drain, bell and spigot joint, building drain, branch, DFU, grease interceptor, roof drain, smoke test, stack, joints.</p> <p><b>2.4:</b> Water Supply: Angle valve, anti- scald valve, check valve, gate valve, PRE (Pressure Relief Valve), back flow, bypass, cross connection, ferrule, gray water, joints.</p>	06	16
<p><b>Topic 3: Plumbing Fixtures and Fixture Fittings.</b></p> <p><b>Specific objectives :</b></p>	08	14

<ul style="list-style-type: none"> <li>➤ State use of different plumbing fixtures.</li> <li>➤ Draw plan and elevation of fixture and fitting with standard dimension.</li> <li>➤ State use of different plumbing fittings required for specific situation.</li> <li>➤ Know installation standard for fixtures as per code.</li> </ul> <p><b>Contents:</b>                  Different types of plumbing fixtures, shapes/ sizes, capacities, situation and where used:  <b>Ablution Fixtures</b> - Wash basin, sinks (kitchen sinks cleaner sinks) bath tub, flushing cistern, drinking fountain.  <b>Soil Fixtures</b> - water closets, urinal, mop sink, bidets, slop sinks plumbing fittings for Ablution fixtures and Soil fixtures  <b>Water Conserving Fixtures</b>- Water cooler, cloth washer, hot and cold water system, display fountain. Installation standard for plumbing fixtures, dimension in plan and elevation</p>		
<p><b>Topic 4: Traps, Interceptors, Indirect Waste and Vents.</b>  <b>Specific objectives :</b></p> <ul style="list-style-type: none"> <li>➤ State purpose of different traps and trap seals.</li> <li>➤ Describe proper methods of installing indirect waste piping.</li> <li>➤ State requirement and purpose of venting.</li> <li>➤ State installation standard as per code.</li> </ul> <p><b>Contents:</b>  <b>4.1:-----06</b>                  Traps- Definition, function, Requirement of good trap, trap arms, Development length, trap seals, venting to traps, trap primers, Classification of traps. prohibited traps,  <b>4.2:-----06</b>                  System of plumbing for building drainage-Two pipe system, one pipe system, waste receptors, dish washers, drinking fountain.  <b>4.3:-----08</b>                  Vent- purpose of venting, trap seal protection, materials, vent connection, flood rim level, , vent stacks, water curtain and hydraulic jump, cleanouts, venting of interceptors, vent sizing.</p>	10	20
<p><b>Topic 5: Sanitary drainage and storm drain.</b>  <b>Specific objectives :</b></p> <ul style="list-style-type: none"> <li>➤ State purpose of single and two pipe systems of plumbing.</li> <li>➤ List different pipe materials and joints.</li> <li>➤ Draw sketches for protection of pipes and structures.</li> <li>➤ State sizing of horizontal and vertical pipes.</li> <li>➤ List storm drains requirements, roof drains, sub drains and sub soil drains.</li> </ul> <p><b>Contents:</b>  <b>5.1: ----- 10</b>                  Preamble on single and two pipe systems, different pipe materials and jointing methods, special joints, hangers, and supports, protection of pipes and structures, alternative materials, workmanship, prohibited fittings and practices, hydraulic jump, change in direction of flow, T and Y fittings, cleanouts, pipe grading, fixtures below inverted level, suds relief, building sewers, trenching, testing sumps and pumps, sizing of horizontal and vertical pipes.</p>	10	20



<p><b>5.2: ----- 10</b></p> <p>storms drain required, prohibited connections, subsoil drains, sub drain, gutters/ channels/scuppers, roof drains, strainers, leaders, conductors and connections, collect/ capture storm water, discharging storm water, safety, traps required, prohibited installations.</p>		
<p><b>Topic 6: Water Supply, Gray and Reclaimed Water</b></p> <p><b>Specific objectives:</b></p> <ul style="list-style-type: none"> <li>➤ State sources of water.</li> <li>➤ Understand hot and cold water distribution system.</li> <li>➤ Differentiate potable and non potable water.</li> <li>➤ Learn gray water, reclaimed water and rain water harvesting.</li> <li>➤ Understand gray water approvals, specification, drawing and safety signs used.</li> <li>➤ Understand rain water harvesting.</li> </ul> <p><b>Contents :</b></p> <p><b>6.1: -----12</b></p> <p>Preamble on municipal water, sources of water, potable and non potable water, reclaimed water, water storage , hot and cold water distribution system, backflow protection, air gap, cross connection control, pipe materials and jointing method, alternative materials, hangers, and supports, workmanship, prohibited fittings and practices, protection of pipes and structures, pressure control, unions, thermal expansion, types of valves, installation and testing, disinfection, protection of underground pipes, color codes and arrow marking, introduction to wsfu.</p> <p><b>6.2: -----08</b></p> <p>Definition of gray water, approvals, specification, and drawing, safety, total gray water discharge, holding tanks, valves and piping, reclaimed water system, definition of reclaimed water, pipe identification, installation, safety signs, valves, cross connection, approved uses, Rain water harvesting in plumbing systems.</p>	10	20
<b>Total</b>	<b>48</b>	<b>100</b>

**Skills to be Developed:****Intellectual Skills:**

1. To identify plumbing fixtures and fittings.
2. To interpret plumbing installation with UPC-I and ITM.
3. To identify valves used in water supply and drainage system with their function.
4. To interpret plumbing drawings for multistoried buildings.

**Motor Skills:**

1. Ability to draw plan and elevation of fixtures and fittings with standard dimensions.
2. Ability to learn sizing of horizontal and vertical pipes used in drainage system.
3. Ability to draw toilet layouts, urinals and different manholes.

**Practicals: Term work will be prepared by each student in the form of assignments as below.**

**List of Assignments:**

1. Draw sketches of installation details of plumbing fixtures and fittings in plan, elevation and section; with standard dimensions (Minimum 4)
2. Interpretation of sample plumbing drawings for multistoried building.
3. Draw toilet layouts, plans, elevations and sections of selected case. Give dimensions.
4. Prepare layout of internal and external (outside the toilet) DWV pipes and fittings of a selected case. If possible, write pipe diameters.
5. **Seminar:** Students can select any topic from contents by referring codes, text book, professional magazines, technical papers published and websites of manufacturers and make a seminar presentation in 10 minutes using power point. Weightage is assigned for contents and presentation skills. (Students can work in a group of two.)
6. **Site visit report:** Visit any plumbing site and submit a report on observation on plumbing system, architectural and structural provisions, pipe materials work method, safety and recommendations based on the provisions of UPC-I and ITM.

**Learning Resources:****1. Books:**

Sr. No.	Title	Author	Publisher
1	Plumbing Engineering	S. M. Patil	Seema Publication, Mumbai.
2	Plumbing Design and Practice	S. G. Deolalikar	Tata McGraw-Hill
3	Plumbing Technology Design and Practice	Lee Smith	Delmar Publication
4	Practical Plumbing Design Guide	James C. Church	Mcgraw-Hill (T)
5	Plumbing and Illustrated Guide to the Plumbing codes.	Michal Casey, Douglas Hannes, Redwood Kardon	--

**2. IS, BIS AND INTERNATIONAL CODES:**

- 2008 Uniform plumbing code – India (UPC-I)
- 2008 Illustrated training manual (ITM).
- Extracts from IAPMO India

**3. Websites:**

- [www.plumbing services.com](http://www.plumbing services.com).
- [www.cookandlees.com](http://www.cookandlees.com)
- [www.mepdesignservices.com](http://www.mepdesignservices.com)
- [www.plumbing.1800anytyme.com](http://www.plumbing.1800anytyme.com)
- [www.dyno.com/plumbing](http://www.dyno.com/plumbing).

**Course Name : Diploma in Civil Engineering**

**Course Code : CI/CC**

**Semester : Eight**

**Subject Title : Project**

**Subject Code : 21034**

**Teaching and Examination Scheme:**

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
--	--	04	--	--	--	50#	50@	100

**Rationale:**

Apart from supervising construction and maintenance of civil engineering works a Diploma Engineer has to carry out survey, collect, analyze and synthesize the data. He / She has also to refer handbooks, I. S. Codes and design small structures on the basis of knowledge of different subjects.

Due to changing scenario the role of Diploma Engineer is becoming more prominent and has to acquire professional abilities and develop confidence to face civil engineering problems.

This subject is intended to apply civil engineering principles, rules and regulations to solve a real life problem and to provide a feasible solution. For this He / She will collect data through survey work and referring various information resources and prepare drawings, designs, estimate and write a detailed project report.

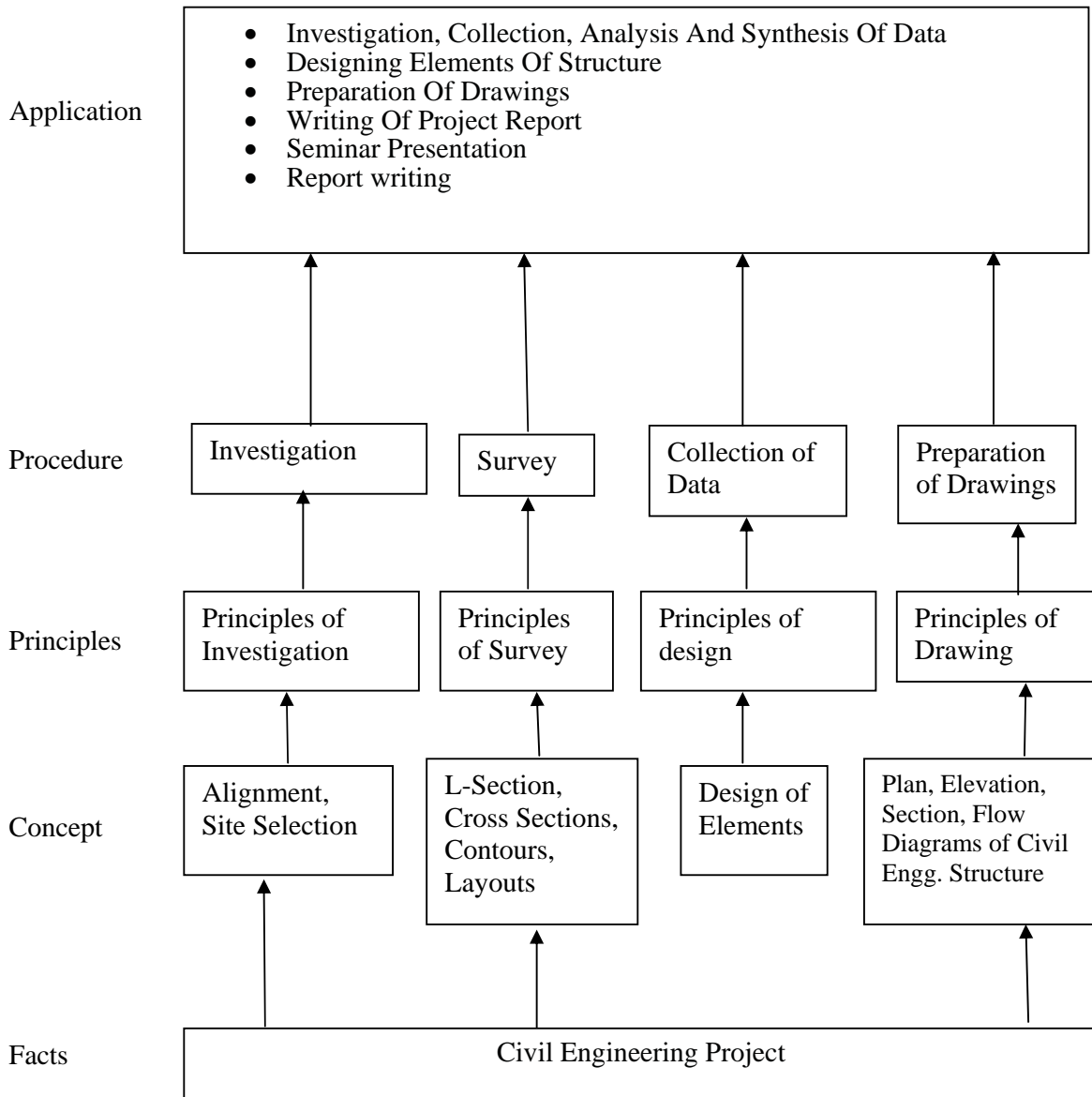
The project and seminar activities will provide students the exposure to handle real life problems and their solutions and prepare him/her to enter confidently in the world of work.

**Objectives:**

Students will be able to:

- 1) Collect the information for a given project.
- 2) Apply principles, theorems and bye-laws in the project planning and design.
- 3) Interpret and analyze the data.
- 4) Develop professional abilities such as persuasion, confidence, perseverance and Communication skill.
- 5) Develop presentation skill.
- 6) Enhance creative thinking.
- 7) Report writing.

**Learning Structure:**



**Notes: The batch of students for the project shall be limited to 06 students.**

**Project:**

Skills to be developed:

**Intellectual Skills:**

- 1) Decide and collect data for projects.
- 2) Read and interpret the drawing, data.
- 3) Apply the principles, rules, regulations and bye-laws.
- 4) Design the components.
- 5) Prepare format for reports.

**Motor Skills:**

- 1) Prepare drawings for project.
- 2) Use of computer for drawing, networking.
- 3) Work in a group for a given task.
- 4) Prepare a report.

**List of Projects:**

Following are the areas of suggested civil engineering projects to be undertaken by a group of students. The project can be selected from the following civil engineering systems like

- Building construction system
- Transportation Engineering
- Irrigation Engineering
- Public health Engineering
- Management

**The project report should preferably be in the following format:**

- Topic and objectives.
- Collection of data.
- Literature Survey.
- Required survey work.
- Design of components.
- Preparation of required drawing, if any.
- Preparation of Estimate.
- Management and construction procedure.
- Resources scheduling and networking.
- Benefits to society.
- Conclusion.

**List of Civil Engineering Projects:**

- 1) K.T. Weir.
- 2) Lift Irrigation scheme.
- 3) Micro irrigation -Drip/Sprinkler Irrigation.
- 4) Junction planning for city roads/planning for roads for congested area/parking studies etc.
- 5) Watershed development of small catchments.
- 6) Rain water harvesting for domestic or public building.

- 7) Campus development.
- 8) Interior design and decoration.
- 9) Concrete mix design.
- 10) Bridge design.
- 11) Structural Audit
- 12) NDT of any RCC building.
- 13) Solid waste management.
- 14) Hospital waste disposal.
- 15) Recycling of resources.
- 16) Manufacturing of pre-cast concrete products.
- 17) Prestressed concrete.
- 18) Non conventional sources of energy.
- 19) Concrete pipe manufacturing unit.
- 20) Advance construction techniques.
- 21) Transfer of technology to villages.
- 22) Planning and design for residential apartments/commercial complex.
- 23) Planning and design of water treatment plant for given data.
- 24) Planning and design of water supply scheme for given layout.
- 25) Planning and design of sewage treatment plant for given data.
- 26) Planning and design of sanitary scheme for given layout.
- 27) Concrete materials.

Any other similar project can be selected.

**Term Work:** Shall consist of -- Detailed project report in above format.  
Separate drawing sheets covering details of the project, if any shall also be prepared.

**Learning Resources:**

- 1) Civil Engineering Hand Books / Reference books.
- 2) Civil Engineering Magazines/Journals.
- 3) Relevant IS / International codes.
- 4) PWD Handbooks / M.I. Manuals.
- 5) Material/Machinery / Product Catalogues.
- 6) Related Websites for technological information.
- 7) [www.projectreport.com](http://www.projectreport.com)
- 8) [www.howstuffworks.com](http://www.howstuffworks.com)