

1. COURSE DETAILS

Programme: Civil Engineering
Course: # Inplant Training
Course Code: IPT190131

Semester: V
Group: A*
Duration: 26 Weeks

2. EXAMINATION SCHEME

Sr No	Course Name	Training Duration	Credits		Weekly Report	Quiz Test	Dissertation (Report)	Oral/Viva	Total	Group (Gr)
1	# Inplant Training (IPT190131)	26 Weeks **	20	Maximum Marks	50	50	50	50	200	A*
				Minimum Marks	20	20	20	20	80	

****Total Inplant Training Duration 26 weeks equal to 24 weeks actual training plus 2 weeks examination and processing**

*Compulsory, # Award Winning, Weekly Report and Quiz Test are assessed by Internal Examiner Only, Dissertation and Oral/Viva are Assessed by Internal and External Examiner Jointly

Gr- Group, B - Basic, C - Core, A - Application, M - Management

3. COURSE OBJECTIVE: -

The inplant training facilitates students to understand the various domains of construction industry along with work environment and the students are exposed to the latest developments in technologies. By exposing and interacting with the real-life construction industry setting, student will appreciate and understand the actual working and best practices adopted in the construction industry. This short association with industry will be instrumental in orienting the students in transforming them into construction industry ready output after completion of diploma program.

4. SKILL COMPETENCY

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences.

- Soft Skills including Communication, Presentation and liaising etc.
- Life skills including Time management, Safety, Innovation, Entrepreneurship, Team building etc.
- Hands-on including Reading Drawings and Design, Implementation and Quality Assurance aspects etc.
- Industry specific tools including Value Engineering, Concurrent Engineering etc.



5. COURSE OUTCOMES(COs) At the end of the semester student will be able to: -

CO No.	COURSE OUTCOME	Bloom's LEVEL
CO1	Communicate effectively (verbal as well as written) the work carried out.	Apply
CO2	Prepare and present the report of the work carried out.	Apply
CO3	Exercise time management and safety in the work environment.	Apply
CO4	Work in a team.	Apply
CO5	Demonstrate various quality assurance.	Apply
CO6	Interpret and solve routine technical problems through the application of engineering principles.	Apply

6. IMPLEMENTATION STRATEGY (PLANNING)

Students shall be sent for 24 weeks Inplant training in the V semester. Students understand basic working of industry and its work culture. Students are made aware about industrial safety norms. Before the training begins, the students are addressed by the Principal about rules, safety precautions and discipline to be maintained in the company during the training. The same is reminded by the institute supervisor on every visit. The company supervisor also takes care about students' safety

In the initial weeks company personnel train, the students about their manufacturing process and products. The students are involved in project implementation for onsite execution, design and drawings, use of software and similar work.

Each company is visited by the institute supervisor on regular basis till the end of Inplant training. Each student is monitored for performance, any difficulty, grievances and absenteeism. Accordingly corrective and preventive actions are taken.

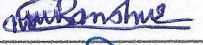

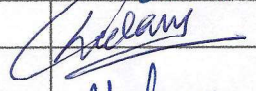



7. EVALUATION CRITERIA

Each student performance is assessed by a company supervisor and is recorded in weekly report. The same record is maintained and assessed by the institute supervisor. Depending on the grades given by the company supervisor and also by examining the performance in the weekly report, marks are given out of 50 by the institute supervisor. Considering their work profile in the company, institute supervisor gives 5 quiz tests each of 10 marks to the students. The same are assessed by institute supervisor. The training report submitted by a student is assessed together by internal and external examiner and accordingly marks are given out of 50. Students presents the work done by them in the company and are examined by internal and external examiner together for 50 marks, constituting total 200 marks. These marks are

converted to out of 100 marks for final evaluation (Award of Diploma). The external examiner appointed for Inplant training examination is from industry.

8. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	Shri S. N. Ranshur	
2	Internal	Shri A. K. Singh	
3	Internal	Ms Neelam Petkar	
4	External	Mr. Dhirajkumar S. Pandirkar Organization: Chief Engineer, Maharashtra Housing & Area Development Authority (MHADA)	



1. COURSE DETAILS:

Program: CE	Semester: VI
Course: # Civil Engineering Project	Group: A*
Course Code: CEP190122	Compulsory

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per Week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks(ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
-	04	-	-	04	-	-	-	-	-	50		50	100

3. COURSE OBJECTIVE:

The main objective of this course is to develop a Civil Engineering Project to give an in depth understanding and exposure of the concepts learnt at the lower semesters. And also to expose students to the various fields in civil engineering and enhance their capability to work in a team.

4. SKILL COMPETENCY:

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences.

- Design and develop civil engineering materials and experimentation.
- Interact with peers and present the work carried out effectively.

5. COURSE OUTCOMES(COs) At the end of the semester student will be able to: -

CO No.	COURSE OUTCOME	Bloom's LEVEL
CO1	Collect and Analyse data for various concepts, methods, experiments etc.	Understand, Apply
CO2	Carry out the required tests as per Indian Standards	Understand, Apply
CO3	Make models for the theoretical / practical concepts learnt	Understand, Apply
CO4	Write the Project Report	Understand, Apply



6. Each student/group of students will submit detailed project report with following details:

- a) Importance of the topic selected
- b) Methodology adopted to complete the project
- c) Experimentation carried out, if any
- d) Case studies, If any
- e) Cost comparison, If any
- f) Self-contribution in the project
- g) Conclusion

7. Identification of projects and allocation methodology to faculty members and relevance of the projects and their contribution towards attainments of PO's

- i. In the preceding semester, the Head of Department notifies and briefs the students about project development, industry sponsored project, modification or value addition in previous project, project group formation, selection criteria and project scope. Students are asked to carry out the literature survey, review the latest technologies, look for emerging trends, list software platform available, refer previous project reports to prepare project proposals considering available time, cost, feasibility, environment, safety, standards, lab facility, ethics etc.
- ii. At the beginning of the semester the project groups present their ideas in front of HOD and faculty members.
- iii. Based on above criteria and relevance to contribution towards attainment of POs, the project topics are finalized group-wise and groups are allocated to faculties based on their area of expertise.

8. Process for monitoring and evaluation, process to assess individual and team performance

- i. The students are asked to prepare and submit synopsis and detail implementation plan of 16 weeks to their respective guides.
- ii. Interaction between students and project guide to discuss implementation methodology.
- iii. The project guide monitors the progress of implementation on continuous basis.
- iv. Final evaluation of project by examiners through presentation, demonstration and viva-voce.

9. Methodology to assess individual/collective contribution/understanding:

a. Internal evaluation (50 marks) by project guide.

Phase-I: 30% evaluation

At the end of first month, all the groups are asked to give presentation on progress made till date in front of committee consisting of HOD and project guides. The projects are evaluated based on project idea, knowledge, amount of work done, adherence to plan at every stage, motivation, interest shown, demonstration of skills (hardware, software, presentation), self-



motivation, sincerity, punctuality, ethics etc. by the project guide and project evaluation committee.

Phase-II: 30% evaluation

The above activity is carried out at the end of 2nd month. The students are guided for preparation of project reports.

Phase III: 40% evaluation

The above activity is carried out at the end of the semester along with demo and submission of project report.

The internal evaluation will be done on the basis of following criteria and weightage:

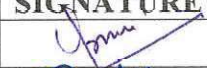
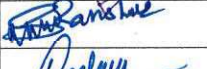

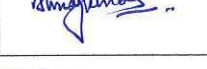
	Phase 1 (2-4 Week)	Phase 2 (6- 8 Weeks)	Phase 3 (14-16 Week)	Total
Marks	15	15	20	50
Evaluation Criteria	1. Project idea 2. Presentation	1. Progress made in the project 2. Presentation	1. Progress made in implementation 2 Presentation	

b. External evaluation (50 marks) by expert from industry/institute (external examiner)

The students demonstrate the prototype/ working projects / Experiments carried out with their results etc., and give power point presentation in front of external examiner. Internal and external examiners evaluate the student on the following aspects:

- a) Understanding and completeness of the Project
- b) Approach to the solution of problem
- c) Experimentation / Data collection procedure
- d) Students' contribution in the Project
- e) Project Report

10. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	Mr. V. B. Vanvari	
2	Internal	Mr. S. N. Ranshur	
3	Internal	Miss. Neelam Petar	
4	External	Mr. Dhirajkumar Pandirkar Organization: Chief Engineer, MHADA	



1. COURSE DETAILS:

Program: Civil Engineering	Semester: VI
Course: # Design Practice of R.C.C. Structure.	Group : A*
Code: RCC 190123	Duration: 16 Weeks

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Theory Paper Duration and Marks (ESE)		Scheme of Examination and Maximum Marks						
L	P	D	T	Cr (L+P+D+T)	Hrs	Mks	SSL	TA	Theory Paper	TW	PR	OR	Total
3	-	3	-	6	4	70	20	10	70	50	-	50	200

3. COURSE OBJECTIVE

To impart knowledge of designing the R.C.C. structural elements and to prepare the detailed drawing.

4. SKILL COMPETENCY

The aim of this course is to help the student to attain the following industry identified psychomotor and cognitive competency through various teaching learning experiences:

- Compute the dead load and live load on RCC elements
- Analyze and design the RCC elements
- Do the detailing and interpretation of drawings
- Check the reinforcement details at site

5. COURSE OUTCOMES (COs)

After completion of the course student will be able to: -

CO No.	COURSE OUTCOME	Bloom's Level
CO1	Analyse the structural elements for the internal stresses.	R, U, A
CO2	Design the structural elements for collapse, serviceability and durability.	R, U, A
CO3	Carry out reinforcement detailing and drawings.	U, A

R-Remember, U-Understand, A-Apply and above (Bloom's revised taxonomy levels)



6. COURSE CONTENTS:

Sr. No.	Topics / Sub Topics	Hours	Marks	COs
1	<p>1.0: Introduction to Limit State Method of Design:</p> <p>1.1 Introduction to design methods, limit state method, working stress method, properties of materials, grades of concrete, reinforcing steel</p> <p>1.2 Characteristic Strength of Materials, Characteristic Loads, Design values of materials and loads, Partial safety factors for materials and loads,</p> <p>1.3 Loading on structures as per IS 875 (Part 1 and 2) : 1987</p> <p>1.4 Safety and serviceability requirements, Types of limit states</p> <p>1.5 Environmental Exposure Conditions, Minimum Cement Content, Maximum Water - Cement Ratio, Minimum Grade of Concrete for Different Exposures, Nominal Cover to Meet Durability Requirements</p>	5	8	CO1
2	<p>2.0 Limit State of Collapse : Flexure:</p> <p>2.1 Assumptions, design, stress block parameters, Idealized stress – strain curves, Limiting values neutral axis depth,</p> <p>2.2 Modes of failure, under reinforced, over reinforced and balance section, Neutral axis,</p> <p>2.3 Moment of resistance of singly reinforced rectangular section, design of singly reinforced section,</p> <p>2.4 Requirements regarding spacing of reinforcement, minimum and maximum reinforcement, lapping of reinforcement.</p> <p>2.5 Moment of resistance of doubly reinforced rectangular section, design of doubly reinforced section,</p> <p>2.6 Effective width of flange, Moment of resistance of singly reinforced flanged section (T and L), design of singly reinforced flanged section (T and L) section,</p> <p>2.7 Requirements regarding spacing of reinforcement, minimum and maximum reinforcement, lapping of reinforcement.</p>	16	22	CO2 / CO3
3	<p>3.0 Limit State of Collapse : Shear, Bond & Anchorage and Serviceability</p> <p>3.1 Nominal Shear Stress, Design Shear Strength of Concrete, Design of shear - reinforcement, bent - up bars, stirrups, Minimum Shear Reinforcement, Detailing</p> <p>3.2 Development of Stress in Reinforcement, Development Length of Bars, Design bond stress, Anchoring Reinforcing Bars, Anchorage value of standard hooks and bends, lapping of bars.</p> <p>3.3 Control of Deflection, Basic and modified values of span to depth ratio to satisfy deflection limit.</p>	5	5	CO2 / CO3



Sr. No.	Topics / Sub Topics	Hours	Marks	COs
	3.4 Crack control in design (No calculation of crack width)			
4	4.0 Design of slab (LSM): 4.1 Classification of slab, effective span, 4.2 Design and detailing of One-way slab, 4.3 Design and detailing of one way continuous slab (B.M and S.F. calculation from IS – B.M. & S.F. Coefficients), 4.4 Design and detailing of Two way slab with corner free. 4.5 Design and detailing of dog-legged stair case.	6	8	CO2 / CO3
5	5.0 Design of beam (LSM): 5.1 Beam Sizing, computation of loads, analysis, design of simply supported beams, drawing and detailing, 5.2 Computation of loads on lintel, design of lintel, drawing and detailing.	4	7	CO2 / CO3
6	6.0 Column (WSM): 6.1 Definition, classification - Short and Slender Columns, unsupported length, effective length, slenderness limit, 6.2 Minimum cover, requirement governing reinforcement and detailing, 6.3 Transverse reinforcement, Transverse reinforcement design, Arrangement of transverse reinforcement, Helical reinforcement, 6.4 Design of axially loaded square, rectangular and circular columns by WSM (No design for increased load on the column on the strength of the helical reinforcement).	4	6	CO2 / CO3
7	7.0 Footing: 7.1 SBC and Size of isolated square and rectangular footing, edge thickness, Moments and Forces, Critical section for BM, Shear, Two-way shear and development length, 7.2 Design of isolated footing (LSM), footing, design for flexure and shear. (No sloped footing).	4	7	CO2 / CO3
8	8.0 Retaining wall : 8.1 Design of retaining wall, dimensioning of Tee shaped cantilever retaining wall level top (no surcharge and design of stem only. Stability check is excluded).	4	7	CO2 / CO3
	Total	48	70	

Use of I.S. Codes (IS:456-2000 and IS:875-1987), Specifications, tables and handbooks should be explained to the students to make them conversant with their use and to enable them to use at the time of examination.



7. LIST OF PRACTICALS AND DRAWINGS:

Term Work consists of drawing sheets containing minimum 04 no of half imperial sheets (marked with *) with approximate no of hours required and corresponding CO attained are specified here.

SN	DRAWING SHEET	APPROX. HOURS	COs
1	*Design and detailing of Slabs (simply supported one way slab).	8	CO1 / CO 2
2	*Design and detailing of Slabs (continuous slab).	8	CO1 / CO 2
3	*Design and detailing of an axially loaded R. C. Column and column footing.	8	CO2 / CO 3
4	Design and detailing of a simple R.C. dog legged staircase.	8	CO2 / CO 3
5	*Design and detailing of R.C. Cantilever retaining wall retaining earth level to the top.	8	CO2 / CO 3
6	Introduction to Ductile detailing as per IS 13920 : 1993	8	CO3
Total		48	

8. IMPLEMENTATION STRATEGY (PLANNING) :

1. Teaching Plan / Practical Plan
2. Use of visual aids
3. Models

9. LEARNING RESOURCES

Sr. No	Title	Author	Publication
1	Design of RCC Structure	S. Ramamurtham	Dhanpat Rai & Sons
2	RCC Theory & Design	Shah & Kale	Trinity Press
3	Design of RCC Structures	Dayaratnam P.	Tata McGraw Hill New Delhi
4	Design of R.C. Structures	Ramchandra	Dhanpatrai & Sons Co.
5	Reinforced concrete Vol. I Part I / II	H. J. Shah	Charotar Publishing House

10. WEB REFERENCES

1. www.nptel.ac.in
2. www.discoveryforengineers.com
3. www.swayam.gov.in



11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Sr. No.	Topics / Sub Topics	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1	Introduction to Limit State Method of Design:	3	3	2	8
2	Limit State of Collapse : Flexure:	4	4	14	22
3	Limit State of Collapse : Shear, Bond & Anchorage and Serviceability	2		3	5
4	Design of slab (LSM):	2	2	4	8
5	Design of beam (LSM):			7	7
6	Column (WSM):	2		4	6
7	Footing	2		5	7
8	Retaining wall	2		5	7
	Total	17	9	44	70

R-Remembering, U-Understanding, A-Applying and above (Bloom's revised taxonomy levels)

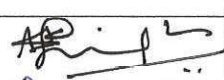
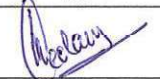
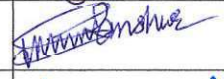

NOTE:

1. This specification table provides general guidelines to assist students for their learning and to teachers to teach and assess students with respect to attainment of Cos. The actual distribution of marks at different taxonomy levels (R, U, A) in the question paper may vary from above table.
2. Use of I.S. Codes (IS:456-2000 / latest revision) is allowed during term end examination and periodical tests to enable students to refer & use the design provisions.

12. QUESTION PAPER PATTERN

Ques No.	End Sem Exam		Periodical Test Exam	
	Bits	Marks	Bits	Marks
1	Any 3 out of 5 (05 marks each)	15	Any 1 out of 2	4
2	Any 2 out of 3 (10 marks each)	20	Any 2 out of 3	16
3	Any 3 out of 5 (05 marks each)	15		
4	Any 2 out of 3 (10 marks each)	20		
	Total	70	Total	20

13. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	Mr. A. K. Singh	
2	Internal	Ms. Neelam N. Petkar	
3	Internal	Mr. Sandeep N. Ranshur	
4	External	Mr. Sameer Sawant Organization: Sameer Sawant Consulting Engineers	



1. COURSE DETAILS:

Program: Civil Engineering	Semester: VI
Course: # Project Engineering Management and Contract Administration	Group: M*
Course Code: PMC190124	Duration: 16 Weeks

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs	Tutorial Hrs	Credits (L+P+D+T)	Theory Paper Duration and marks (ESE)	SSL	TA	TH	TW	PR	OR	Total	
					Hours	Marks							
3	3	-	-	6	03	70	20	10	70	50	50	--	200

3. OBJECTIVE:

This subject intends to equip the students with concept and principles of project planning and scheduling. It also intends to prepare the students to use various methods of project planning and scheduling. Any organization promoting development of project has to deal with method of execution, technology of construction and management of people in the organization. This course describes method of executing works and administration of contract.

4. SKILL COMPETENCY:

The aim of this course is to help the students to attain the following industry identified competency through various teaching learning methods.

- Identify project parameters and tools & techniques to monitor these
- Analyze different problems related to project management and contract administration.
- Identify methods of execution and analyze dispute areas
- Ensure safety at construction project sites

5. COURSE OUTCOMES (COs):

After the successful completion of the course, the student will be able to



CO No.	COURSE OUTCOMES	Bloom's Level's
CO1	Characterize project, its parameters, tools and methods of planning scheduling and controlling project.	R, A
CO2	Differentiate method of executing works, contract and its administration.	A, U
CO3	Apply the construction safety practices to various situations at the projects. And apply statutory acts.	A, U
CO4	Use various methods of resolving disputes.	A, U

R-Remember, U-Understand, A-Apply and above (Bloom's revised taxonomy levels)

6. COURSE CONTENTS

Sr. No.	Topics / Sub-topic	Hour	Marks	CO no:
1.	1.0 Planning and related Tools & Techniques 1.1 Planning by Management level 1.2 Pre-tender, post-tender, pre-construction and 1.3 Detailed Construction Planning 1.4 Bar & Milestone Charts, CPM, PERT, LOB	05	07	CO1
2.	2.0. Network Techniques and Resources 2.1 Brief Historical Development, basic elements of network 2.2 Event activity, simple logics of network 2.3 AOE and AON network, their construction 2.4 Probable errors of network 2.5 Analysis of network 2.6 Critical event, critical path and semi-critical path 2.7 Overlapping relationships: start to start, finish to start and finish to finish relationship 2.8 non-critical activity, float, types of floats 2.9 Practical applications of network, compression, decompression, activity utility, time cost trade off	08	11	CO1



Sr. No	Topic/Sub-topic	Hour	Marks	CO
	2. 10 Resource allocation, resource smothering, resource levelling, (resource constraint related problems) 2.11 Multi project scheduling, time chainage chart histograms 2.12 Cost optimization			
3.	3.0 Project Updating, plans, PERT 3.1 Updating plans, calendaring networks 3.2 Risk management 3.3 Concept of GERT, VERT, etc. 3.4 Project plans, schedules, budgets, master network. Multi project management	06	10	CO1
4	4.0 Use of software and Quality 4.1 Use of project management software, concurrent engineering 4.2 Quality control, assurance, TQM, ISO, Method statement	05	08	CO1
5	5.0 Execution of works and Contracts 5.1 Different methods of executing works 5.2 Prequalification and Contracts 5.3 Introduction, Invitation of Tenders 5.4 Tender Notices, Tender Documents 5.5 Earnest Money 5.6 Security Deposit 5.7 Preparing & Submitting Tender 5.8 Scrutiny Analysis, Comparative, Weighted Rating 5.9 Acceptance of Tenders 5.10 L.O.I., W.O. and Contract Document 5.11 Different types of Contracts	07	10	CO2



	5.12 Lump-Sum, Item Rate, Percentage Rate, Cost Plus percentage, B.O.O.T. Annuity and BOOT Toll. 5.13 Labour material and sub-contract for service contract			
6	6.0 Conditions of Contract, Interpretation 6.1 Importance of condition of contract 6.2 Price adjustment clause 6.3 General conditions such as time limit, extra items, payments to the contractors 6.4 Suspension of work 6.5 Termination of contract 6.6 Liquidated damages, disputed and arbitration 6.7 Various bank guarantees and bonds 6.8 Arbitration Act, 1996, Techno legal arbitration 6.9 Indian contract Act and international contracts 6.10 Contract Act and Important Section 6.11 FIDIC contract conditions 6.12 Interpretation of contract 6.13 Delay, Damages, Clause in contract 6.14 Various types of disputes and claims 6.15 Alternate dispute resolution mechanism, legal implications 6.16 Pitfalls 6.17 Pitfalls in Construction of Contract	09	11	CO2 CO4
7	7.0 Construction safety and statutory acts 7.1 Cause of accidents 7.2 Methods to prevent accidents 7.3 Insurance Policy, CAR Policy 7.4 Minimum wages act 7.5 Workman compensation act 7.6 Factory act	04	07	CO3



8	8.0 Contract accounts, HRD and Requirements	04	06	CO2
	8.1 Current account in bank			
	8.2 Over draft and Solvency			
	8.3 Bank guarantee and line of credit			
	8.4 Cost of finance			
	8.5 NEFT and RTGS			
	8.6 Organization Setup and HRD			
	8.7 Civil contractors' statutory requirements			
	8.8 Registration, PAN, GST			
	8.9 Filing of tax returns			
	TOTAL	48	70	

7. LIST OF ASSIGNMENTS / REPORTS

Term work consists of minimum 10 assignments / report of guest lectures (marked with *) with approximate no of hours required and corresponding CO attained are specified here.

Sr. No.	Practical's, Assignments and Reports	Approx. Hrs required	CO No.
1	*Bar Chart of Compound Wall and G + 1 Bungalow	04	CO1
2	*Project Details, Activity Chart & Bar Chart	04	CO1
3	*Work Breakdown Structure of G + 1	02	CO1
4	*Work Breakdown Structure of Project	02	CO1
5	*Critical Path Method of G + 1	04	CO1
6	*Critical Path Method of Project	08	CO1
7	*MS Project for Project planning & scheduling (Expert Lecture)	02	CO2
8	*Reading Drawings & preparing Bills of Quantity	02	CO2
9	*Specifications	02	CO2, CO4
10	*Notice Inviting Tender	02	CO2,
11	Comparative Statement	02	CO2
12	Work Order	02	CO2, CO4
13	Letter of Intent	02	CO2, CO4



14	General Conditions of Contract	03	CO3
15	Special Conditions of Contract	05	CO3
16	Use of Build Master (Expert Lecture)	02	CO2
	TOTAL	48	

8. IMPLEMENTATION STRATEGY (PLANNING):

1. Teaching Plan
2. Site Visits
3. Technical Films
4. Guest lectures
5. Case studies

9.-LEARNING RESOURCES

SN.	Title	Author	Publication
1.	Construction Project Planning	K K Chitkara	Tata-McGraw, Hill Publication, New Delhi, 1996
2.	Critical Path Methods In construction practice	Antil & Woodhaed	John Wiley
3.	Procedure & Arrow Networking Techniques	Harvis R.B.	John Wiley
4.	Construction Planning, Equipment & Methods	Purifoy R.L	McGraw Hill, Tokyo, 1970
5.	Administration of Engineering Contract	Prof Subash Patil	Mrs Savita Patl, 3, Nirmal Soc., Gokuldharm, Goregoan (E), 1997
6.	Guide for Drafting Construction Contract & Tendering	P.M Deshpande S.V.Joshi	Hindustan Mudranalay, Pune, 1997

10. WEB REFERENCES

- https://en.wikipedia.org/wiki/Construction_management
- https://www.cmu.edu/cee/projects/PMbook/01_The_Owners'_Perspective.html
- <https://www.smartsheet.com/construction-project-management-101>
- https://www.cmu.edu/cee/projects/PMbook/02_Organizing_For_Project_Management.html
- <https://www.constructionplacements.com/construction-project-management>



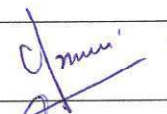
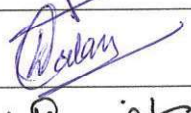


11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Sr. No	CHAPTER	Distribution of Theory Marks			
		R Level	U Level	A LEVEL	Total Marks
1	Planning Tool and Techniques	02	03	02	07
2	Network Techniques and Resources	03	03	05	11
3	Project updating, plans and PERT	03	03	04	10
4	Use of software and Quality	02	02	04	08
5	Execution of works and Contracts	03	03	04	10
6	Conditions of contracts and Interpretation	03	05	03	11
7	Construction safety and statutory acts	02	02	03	07
8	Contract accounts, HRD and Requirements	02	02	02	06
TOTAL		20	23	27	70

R-Remembering, U-Understanding, A-Applying and above (Bloom's revised taxonomy levels)

NOTE: This specification table provides general guidelines to assist students for their learning and to teachers to teach and assess students with respect to attainment of Cos. The actual distribution of marks at different taxonomy levels (R, U, A) in the question paper may vary from above table.

12. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	Mr. V B Vanvari	
2	Internal	Ms. Neelam Petkar	
3	Internal	Mr. A K Singh	
4	External	Mr. Amar Peswani	
		Project Management Facilitator	



1. COURSE DETAILS

Program : Civil Engineering	Semester: VI
Course: #Water Resource Engineering	Group: A*
Course Code: WRE190125	Duration: 16 Weeks

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per Week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks (ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
3	-	2	-	5	03	70	20	10	70	50	-	50	200

3. COURSE OBJECTIVE:

Agricultural sector plays vital role in the economy of the country. Civil Engineer must possess basic knowledge of this course and various Civil Engineering Structures associated with water resources for its use in agriculture.

4. SKILL COMPETENCY

The aim of this course is to help the student to attain the following industry identified Competency through various teaching learning experiences:

- Analyze civil engineering works to be carried out for irrigation schemes.

5. COURSE OUTCOME:

After the successful completion of the course, the student will be able to

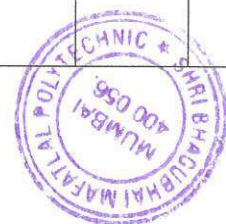
CO	COURSE OUTCOME	Bloom's Level
CO1	Differentiate between various technical terms used for Irrigation, soil water, hydrology and water requirement of crops, etc	R, U
CO2	Identify the different civil engineering works to be carried out for the irrigation schemes.	R, U, A
CO3	Evaluate volume of water that can be stored and discharge required for a particular season.	R, U, A

R-Remember, U-Understand, A-Apply and above (Bloom's revised taxonomy levels)



6. COURSE CONTENTS

Sr. No.	Topic / Sub-topics	Hours	Marks	CO No.
1.	Introduction 1.1 Importance, Definition, necessity, advantages and disadvantages, classification of irrigation systems	02	04	CO1
2.	Soil Water Plant Relationship 2.1 Water Holding Capacity of soil, Classification of soil water, Methods of Irrigation.	04	08	CO1
3.	Hydrology and Ground Water Hydrology 3.1 Hydrological Cycle, Precipitation, Measurement of precipitation, Methods of calculating average depth of Rainfall over an area, Arithmetic mean, Isohyetal and Thiesson's Polygon method 3.2 Runoff, Factors affecting Runoff, Hydrograph, Unit Hydrograph. 3.3 Definitions of aquifer, aquiclude, aquifuge, aquitard 3.4 Types of Aquifers, Confined, Semi-confined, Unconfined and Perched aquifers 3.5 Wells , definitions, types, open wells, bore holes, Strainer type tube wells, Cavity type tube wells and Slotted type tube wells	06	08	CO1
4.	Water Requirements of Crops 4.1 Crops, their seasons, duty and delta, factors affecting duty of water, kor watering, kor period, kor depth, time factor, capacity factor, cumec day, relation between duty and delta 4.2 Methods of Improving Duty of water, Commands areas and Intensity of Irrigation, Consumptive use of water, Assessment of Irrigation water. 4.3 Problems on estimation of demand of water for a given Crop pattern, calculating reservoir capacity, design discharge etc	06	10	CO1, CO3
5.	Reservoir Planning 5.1 Introduction, Classification of reservoirs, factors governing selection of site for reservoir 5.2 Zones of Storage in Reservoir, Useful storage, Dead storage, Surcharge storage, Bank Storage, Valley storage, Simple numerical problems on Fixing Control levels. 5.3 Apportionment of total cost of a Multipurpose Reservoir, Equal apportionment method, Use of Facilities method, Alternative Justifiable expenditure method, Remaining Benefits method. 5.4 Measures to Reduce Evaporation Losses in Reservoirs	06	08	CO2



Sr. No.	Topic / Sub-topics	Hours	Marks	CO No.
	5.5 Control of Sedimentation of Reservoirs			
6.	6.0 Dams 6.1 Classification of Dams based on Function, Hydraulic Design, Materials of Construction, Structural Behavior. 6.2 Factors affecting Selection of type of Dam, Site selection for Dam. 6.3 Salient features of Important Dams of India (Students to prepare a report of the same, No questions to be asked) 6.4 Forces acting on Gravity Dam 6.5 Theoretical and Practical profile of Gravity Dam 6.6 Openings in Dams, Waterways and Galleries, Classification of Galleries, Foundation gallery, Drainage gallery, Gate gallery, Grouting gallery, Inspection gallery 6.7 Adits, Vaults and Shafts	06	06	CO2
7.	Embankment Dams 7.1 Definition and types of Earth Dams, Rolled fill, Hydraulic fill and semi-hydraulic fill dam 7.2 Causes of Failure of Earthen Dams, Hydraulic, Seepage and Structural failures, piping and sloughing failure 7.3 Component parts of a Earthen Dam in Cross Section and their functions	06	06	CO2
8.	Spillways and Energy Dissipators 8.1 Definition, Essential requirements of a spillway 8.2 Classification of Spillways 8.3 Free overfall or straight drop spillway, ogee spillway, Chute or open channel or trough spillway. 8.4 Side channel spillway, shaft or morning glory spillway, Conduit or tunnel spillway, and siphon spillway 8.5 Definition of Energy dissipaters, its functions.	04	06	CO2
9.	Canals 9.1 Definition, Classification based on source of supply, function, discharge and relative importance, alignment, financial output, soil through which it is constructed, 9.2 Alignment of canal, factors affecting the alignment. Inundation canal (No problems to be asked on design of Canal) 9.3 Lining of Canal, advantages of lining, requirements of lining, and various types of lining, Fall and Escapes, Definition	04	06	CO2



Sr. No.	Topic / Sub-topics	Hours	Marks	CO No.
	9.4 Diversion Head Works 9.5 Weir and Barrages, definition and types 9.6 Diversion Head Works, its component parts like Divide wall, Fish ladder, Silt excluder, under sluices, head regulator, guide bunds, marginal bunds, approach channel etc 9.7. Bandhara Irrigation 9.8 layout, selection of site for Bandhara 9.9 Phad and Block System of Irrigation 9.10 Farm ponds, Jalayukt Shivar schemes.			
10.	Cross Drainage Works 10.1 definition, types, aqueduct, siphon aqueduct, super passage, level crossing, inlet or inlet and outlet	04	08	CO2
	Total	48	70	

7. LIST OF ASSIGNMENTS AND DRAWINGS

Term Work consists of drawing sheets containing minimum 06 no of full imperial sheets (marked with *) with approximate no of hours required and corresponding CO attained are specified here.

Sr. No.	Title of Assignments and Drawings	Approximate No. of Hrs required	COs
1.	*Methods of Irrigation	04	CO1
2.	*Types of rain gauges	04	CO1
3.	*Types of Aquifers and Wells	04	CO1
4.	*Zones of storage in reservoir	02	CO2
5.	*Theoretical & Practical profile of gravity Dam and openings in dam	02	CO2
6.	*Typical cross section of Earthen Dam	04	CO2
7.	Component parts of Diversion Head Works and Bandhara Irrigation System	04	CO2
8.	Types of Cross Drainage Works	04	CO2
9.	Calculate the volume of water required for irrigation	04	CO3
	Total	32	

8. IMPLEMENTATION STRATEGY (PLANNING) :

1. Teaching Plan
2. Site Visit to any Dam
3. Presentations
4. Use of audio-visual aids/ models



9. LEARNING RESOURCES

Sr. No	Title	Author	Publication
1	Irrigation Engineering & Hydraulics Structures	S. K. Garg.	Khanna Publications
2	Irrigation Engineering	Priyani	Charotar Publications
3	Irrigation Engineering & Hydraulic Structures	B.C. Punmia.	Laxmi Publications
4	Irrigation Water Resources & Water Power Engineering	Dr. P. N. Modi	Standard Book House
5	Irrigation Engineering	Muzumdar	Tata McGraw Hill
6	Irrigation Engineering	Benani	Often Michlow Ltd Israel
7	Irrigation Engineering	R. K. Sharma T. K. Sharma	S. Chand

10. WEB REFERENCES

1. [NPTEL :: Civil Engineering - Water Resources Engineering](#)
2. [\(34\) Water Resources Engineering | CE 309 - WRE | S5 CIVIL - KTU | Subject Introduction - YouTube](#)
3. [\(34\) WRE - Water Resources Engineering - Subject Introduction - CE309 - KTU - BTech Civil Engineering - YouTube](#)

11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Sr. No.	TOPIC	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1.	Introduction	-	4		4
2.	Soil Water Plant Relationship	4	4	-	8
3.	Hydrology and Ground Water Hydrology	-	8	-	8
4.	Water Requirements of Crops	-	4	6	10
5.	Reservoir Planning	4	4	-	8
6.	Dams	-	3	3	6
7.	Embankment Dams	-	6		6







Sr. No.	TOPIC	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
8.	Spillways and Energy Dissipators	3	3	-	6
9.	Canals	3	3		6
10.	Cross Drainage Works	-	4	4	8
	Total	14	43	13	70

R Remember, U Understand, A Apply and above (Bloom's revised taxonomy levels)

NOTE: This specification table provides general guidelines to assist students for their learning and to teachers to teach and assess students with respect to attainment of COs. The actual distribution of marks at different taxonomy levels (R, U, A) in the question paper may vary from above table.

12. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	Shri. Sandeep Narayan Ranshur	
2	Internal	Shri. A. K. Singh	
3	Internal	Miss. Neelam Nagraj Petkar	
4	External	Mr. Dhirajkumar S. Pandirkar	
		Organization: Chief Engineer, Maharashtra Housing & Area Development Authority (MHADA)	



1. COURSE DETAILS:

Program: Civil Engineering	Semester: VI
Course: #Quantity Survey and Estimation	Group : A*
Course Code : QSE190126	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+ P+D+T)	Theory Paper Duration and marks (ESE)	SSL	TA	TH	TW	PR	OR	Total	
					Hours	Marks							
3	2	-	-	5	03	70	20	10	70	50	50	-	200

3. COURSE OBJECTIVE:

This subject will help the students to understand the different methods of estimating, mode of measurement and enable the student to prepare outline specification and learns to draft specification for building items.

4. SKILL COMPETENCY:

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- Identify and analyze different types of estimates and specifications
- Comprehend the importance of valuation and depreciation in construction industry

5. COURSE OUTCOMES:

After successful completion of the course the students will be able to:

CO No.	Course Outcome	Bloom's Level
CO1	Understand necessity, types and use of estimate	R, U
CO2	Prepare quantity estimates for civil engineering works along with specifications	R, U, A
CO3	Prepare measurement and abstract sheet for different specifications of civil engineering works	R, U, A
CO4	Develop rate analysis of civil engineering works with the concept of Valuation and Depreciation	R, U, A



6. COURSE CONTENTS:

Sr. No	Topic / Sub - topics	Hours	Marks	CO No.
1.	1.0 Introduction 1.1 Meaning of the terms - Quantity Surveying, Estimation 1.2 Purpose of Estimating and Costing 1.3 Type of Estimates: Approximate & Detailed	05	05	CO1
2	2.0 Types of Approximate Estimates 2.1 Uses of Approximate Estimates 2.2 Methods of Approximate Estimates for buildings only. 2.2.1 Plinth area / built up area 2.2.2 Cubical contents 2.2.3 Service unit/ Unit rate 2.2.4 Bay Method	06	08	CO1
3	3.0 Modes of measurements 3.1 Fixing unit of measurement for items of work (Principle of Unit) 3.2 Desired accuracy in taking measurement 3.3 Standard modes of measurement of important items of Civil & Architectural works as per P.W.D. and I.S. - 1200	06	08	CO2
4	4.0 Detailed Estimates 4.1 Uses of detailed Estimates 4.2 Types of Detailed Estimates - 4.2.1 Fresh/New estimate 4.2.2 Supplementary estimate, 4.2.3 Revised estimate, 4.2.4 Annual repair & maintenance estimate & special repairs estimate 4.3 Data required for preparing detailed Estimate - drawings, specification, rates & mode of measurements. 4.4 Estimating quantities for different items of work for buildings (P.W.D.method).	08	12	CO2
5	5.0 Measurement and Abstract sheets: 5.1 Introduction to Measurements sheets and abstract sheets: 5.2 Methods of writing measurements of items. Abstract and bill of quantities.	03	05	CO3
6	6.0 Specifications 6.1 Definition and purpose. 6.2 Principles of writing specifications. 6.3 Types of Specification 6.4 Drafting of detailed specifications	06	12	CO3
7	7.0 Rate analysis: 7.1 Definition. 7.2 Factors affecting Rate Analysis 7.3 District Schedule of rates. 7.4 Lump sum provisions, Contingencies, Overhead costs. 7.5 Rate analysis for important items of work of Civil Engineering.	08	12	CO4



8	8.0 Valuation and Depreciation: 8.1 Meaning of Valuation 8.2 Types of Values. 8.3 Methods of Valuation 8.4 Rent fixation 8.5 Introduction on various software used for valuation	06	08	CO4
	Total	48	70	

7. TERM WORK:

The term work shall comprise of the following list of Practicals:

Sr No.	Description	CO	Hours
1	Simple problems on method of approximate estimates for building only	CO1	6
2	Simple problems on calculation of quantities for different components of building	CO2	6
3	Writing / drafting specifications for some important items of Civil and Architectural works (Minimum 5 items)	CO3	6
4	Preparing rate analysis for some important items of Civil and Architectural works (Minimum 5 items)	CO4	8
5	Numericals on Valuation	CO4	6
		TOTAL	32

8. IMPLEMENTATION STRATEGY (PLANNING):

1. Teaching Plan
2. Slides / Presentation
3. Self - learning online resources
4. Use of audio - visual aids / models

9. REFERENCE BOOKS:

Sr. No.	Title	Author	Publisher & Address
1	Estimating & Costing	B.N. Dutta	S. Datta & Co. Lucknow
2	Estimating & Costing	M. Chakraborti	M. Chakraborti Calcutta
3	Estimating & Costing	S.C. Rangawala	Charotar
4	Estimating & Costing	G.S. Birdi	Dhanpat Rai
5	Estimating & Costing	Gangrade	S.Chand
6	Red book of PWD	Government of Maharashtra - Public Work Department	Government of Maharashtra



10. WEB REFERENCES

1. <https://nptel.ac.in/courses/105/103/105103093/>
2. https://www.brainkart.com/subject/Estimation-and-Quantity-Surveying_34/
3. <https://www.youtube.com/watch?v=WcfBJ8H3kkg&list=PLQibxotQ9iEgCX1pgE3HW62rbU5fsreBH>
4. <https://dsr.emahapwd.com/employee/gtrtfd/RedBook-Voll-Revised-Standard-Specifications-Roads-2012.pdf>

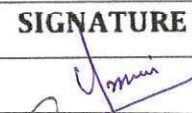
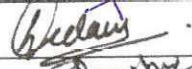


11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Sr. No	CHAPTER	Distribution of Theory Marks			
		R Level	U Level	A LEVEL	Total Marks
1	Introduction	02	03	-	05
2	Types of approximate estimate	03	05	-	08
3	Modes of measurement	03	-	05	08
4	Detailed Estimate	-	04	08	12
5	Measurement and Abstract sheet	-	02	03	05
6	Specification	02	04	06	12
7	Rate Analysis	02	03	07	12
8	Valuation and Depreciation	-	04	04	08
TOTAL		12	25	33	70

R-Remembering, U-Understanding, A-Applying and above (Bloom's revised taxonomy levels)

NOTE: This specification table provides general guidelines to assist students for their learning and to teachers to teach and assess students with respect to attainment of COs. The actual distribution of marks at different taxonomy levels (R, U, A) in the question paper may vary from above table.

12. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	Mr. Vinod. B. Vanvari	
2	Internal	Ms. Neelam N. Petkar	
3	Internal	Mr. Sandeep N. Ranshur	
4	External	Mr. Dheerajkumar Pandirkar	
		Organization: Dy. Chief Engineer, MHADA	



1 PROGRAM DETAILS:

Program: Civil Engineering	Semester: VI
Course: #Geotechnical Engineering	Group: A*
Course Code: GTE190127	Duration: 16 Weeks.

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per Week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks (ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
4	2	-	-	6	03	70	20	10	70	50	-	50	200

3. COURSE OBJECTIVES:

To impart the knowledge of soil classification and determine the basic properties and behaviour of soil under different conditions, to judge the strength parameters and find the bearing capacity of soil, to determine the earth pressure on the retaining walls.

4. SKILL COMPETENCY:

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- Apply knowledge of types of soils and their properties to classify the soil
- Perform independently lab & field tests to find consistency and strength parameters & interpret the results.
- Apply the knowledge to find Bearing Capacity of soil for foundation design and carry out field tests.

5. COURSE OUTCOMES: At the end of the course the students will be able to

CO NO.	COURSE OBJECTIVES	Bloom's Level
CO1	Identify the soil and its properties.	R, U, A
CO2	Calculate the various index properties of soil.	R, U, A
CO3	Calculate the permeability of soils and determine the compaction parameters,	R, U, A
CO4	Compare shear parameters, earth pressure and bearing capacity of soils along with suggestion for improvements	R, U, A



6. COURSE CONTENTS:

S. NO.	Topics / Sub Topics	PERIODS	MARKS	CO
1	<p>INTRODUCTION</p> <p>1.1 Definition of soil, Geological & Engineering</p> <p>1.2 Importance of soil in Civil Engineering Structures as foundation bed for structures</p> <p>1.3 Field application of geotechnical engineering foundation design, pavement design, design of earth retaining structures, design of earthen dams (brief ideas only)</p>	02	03	CO1
2	<p>PHYSICAL PROPERTIES OF SOIL</p> <p>2.1 Soil as a two phase & three phase system</p> <p>2.2 Water content, Determination of water content by oven drying method as per IS code</p> <p>2.3 Void ratio, porosity and degree of saturation, density index</p> <p>2.4 Unit weight of soil mass – bulk unit weight, dry unit weight, unit weight of solids, saturated and submerged unit weight</p> <p>2.5 Weight & volume and other fundamental relationships.</p> <p>2.6 Determination of bulk unit weight and dry unit weight by core cutter method and sand replacement method as per IS code</p> <p>2.7 Specific gravity, determination of specific gravity by pycnometer.</p>	08	08	CO1
3	<p>CONSISTENCY OF SOIL</p> <p>3.1 Consistency of soil, stages of consistency, Atterberg's limits of consistency viz. Liquid limit, plastic limit and shrinkage limit, plasticity index.</p> <p>3.2 Determination of liquid limit, plastic limit and shrinkage limit as per IS code.</p>	06	08	CO2
4	<p>MECHANICAL ANALYSIS & CLASSIFICATION</p> <p>4.1 Particle size distribution, mechanical sieve analysis as per IS code particle size distribution curve, effective diameter of soil, Uniformity coefficient and coefficient of curvature, well graded and uniformly graded soils.</p> <p>4.2 Interpretation of result.</p> <p>4.3 Particle size classification of soils & IS classification of soil</p>	08	08	CO2
5	<p>PERMEABILITY OF SOIL</p> <p>5.1 Definition of permeability</p> <p>5.2 Darcy's law of permeability, difference between discharge velocity & seepage velocity</p> <p>5.3 coefficient of permeability, typical values of coefficient of permeability for different soil,</p> <p>5.4 Factors affecting permeability</p>	08	08	CO2



	5.5 Determination of coefficient of permeability by constant head and falling head permeability tests, simple problems to determine coefficient of permeability.			
6	SHEAR STRENGTH OF SOIL 6.1 Shear failure of soil, field situation of shear failure 6.2 Concept of shear strength of soil 6.3 Components of shearing resistance of soil – cohesion, internal friction 6.4 Mohr-coulomb failure theory, Strength envelope, strength equation 6.5 Types of soil based on Cohesion & Friction 6.6 Laboratory determination of shear strength of soil – Direct shear test, Unconfined compression test & vane shear test, plotting strength envelope, determining shear strength parameters of soil, demonstration of Tri-axial Shear Test	08	09	CO4
7	COMPACTION OF SOIL 7.1 Concept of compaction, purpose of compaction field situations where compaction is required. 7.2 Standard proctor test – test procedure as per IS code, Compaction curve, optimum moisture content, maximum dry density, zero air voids line. 7.3 Modified proctor test 7.4 Factors affecting compaction 7.5 Field methods of compaction – rolling, ramming & vibration and Suitability of various compaction equipment's. 7.6 California bearing ratio, CBR test, significance of CBR value 7.7 Difference between compaction and consolidation	08	09	CO3
8	SOIL STABILISATION 8.1 Concept of soil stabilization, necessity of soil stabilization 8.2 Different methods of soil stabilization – Mechanical soil stabilization, lime stabilization, cement stabilization, bitumen stabilization, fly-ash stabilization	04	04	CO3
9	BEARING CAPACITY OF SOILS 9.1 Concept of bearing capacity, ultimate bearing capacity, safe bearing capacity and allowable bearing pressure 9.2 Terzaghi's analysis and assumptions made. 9.3 Effect of water table on bearing capacity 9.4 Field methods for determination of bearing capacity – Plate load test and standard penetration test. IS Test procedures. 9.5 Typical values of bearing capacity from building code IS:1904 9.6 Improving the Bearing capacity of soil	08	09	CO4



10	EARTH PRESSURE 10.1 Introduction to theories of earth pressure. 10.2 Effects of back- fill on retaining walls (without surcharge)	04	04	CO4
TOTAL		64	70	

7. LIST OF PRACTICALS

The term work consists of any six experiments from among the following (marked with *) with approximate no of hours required and corresponding CO attained are specified here.

Sr. No.	Title of Assignments and Drawings	Approximate No. of Hrs required	COs
1.	*Determination of Water Content	02	CO2
2.	*Determination of specific gravity.	02	CO2
3.	*Sieve Analysis.	03	CO1
1.	*Atterberg's limits.	04	CO1
2.	*Standard Proctor compaction test.	03	CO3
3.	Modified Proctor compaction test	03	CO3
4.	Determination of Permeability	03	CO3
5.	Direct Shear test.	03	CO4
6.	Unconfined Compression test	03	CO4
7.	California bearing test.	03	CO4
8.	*Determination of field density.	03	CO4
9.	Total	32	

8. IMPLEMENTATION STRATEGY (PLANNING):

1. Teaching Plan
2. Charts & Models
3. Power Point Presentations

9. SUGGESTED LEARNING RESOURCES

S. N.	Author	Title	Edition	Publisher & Address
1	B.C.Punmia	Soil Mechanics & Foundation Engineering.	Latest	Laxmi Publishers
2	K R Arora	Soil Mechanics & Foundation Engineering	Latest	Standard Publishers
3	Gopal Ranjan, A S R Rao	Basic & Applied Soil Mechanics	Latest	New Age International Publishers
4	S.D.Pathak	Geotechnical Engineering	Latest	-
5	Murty	Soil Mechanics & Foundation Engineering.	Latest	Tata McGraw Hill , New Delhi
6	B. J. Kasmalkar	Soil Mechanics	Latest	Pune Vidhyarti Griha, Pune



10. WEB REFERENCE

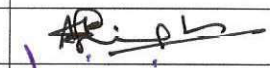
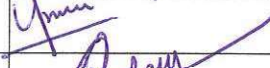


1. www.nptel.ac.in
2. www.swayam.gov.in
3. [Soil Mechanics and Foundation Engineering | Home \(springer.com\)](http://Soil Mechanics and Foundation Engineering | Home (springer.com))

11. SUGGESTED SPECIFICATIONS TABLE WITH HOURS AND MARKS (THEORY):

Unit No	Topic Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
1	INTRODUCTION	2	2	1	-	3
2	PHYSICAL PROPERTIES OF SOIL	8	2	2	4	8
3	CONSISTANCY OF SOIL	6	2	2	4	8
4	MECHANICAL ANALYSIS & CLASSIFICATION	8	-	4	4	8
5	PERMEABILITY OF SOIL	8	2	2	4	8
6	SHEAR STRENGTH OF SOIL	8	2	2	5	9
7	COMPACTION OF SOIL	8	2	2	5	9
8	SOIL STABILISATION	4	-	2	2	4
9	BEARING CAPACITY OF SOIL	8	2	2	5	9
10	EARTH PRESSURE	4	-	2	2	4
Total		64	14	21	35	70

Legends: R- Remember; U-Understand; A- Apply and above levels (Bloom's revised Taxonomy)

10. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	Shri. A K Singh	
2	Internal	Shri. V. B. Vanvari	
3	Internal	Miss. Neelam Petkar	
4	External	Shri. Shantital Jain	
		Organisation: CEO, Struct Bombay Consultants	



1. COURSE DETAILS

Program: Civil Engineering	Semester: VI
Course: Pre stress Concrete	Group: A*
Course Code: PRC190128	Duration: 16 Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per					Examination Scheme and Maximum Marks							
Theory Hrs L	Practical Hrs P	Drawing Hrs	Tutorial Hrs	Credits (L+ P+D+T)	Theory Paper Duration and marks (ESE)	SSL	TA	TH	TW	PR	OR	Total
					Hours	Marks						
2	-	-	-	2	03	70	20	10	70	-	-	100

3. COURSE OBJECTIVE:

This subject is from engineering application group intended to teach the students about various pre-stressing system available, their use and precautions to be taken during and after execution of the same, in the life time of the structure.

4. SKILL COMPETENCY:

The aim of this course is to help the students to analyse design parameters of prestressed concrete structure as per site suitability and the losses occurring in prestressing.

5. COURSE OUTCOME:

After successful completion of the course, student will be able to :-

CO No.	COURSE OUTCOME	Bloom's Level
CO1	Identify the prestressed elements based on the observations	R, U
CO2	Differentiate between different types of pre-stressing technique	R, U, A
CO3	Calculate the losses in the pre-stressing	R, U, A
CO4	Analyse various sections and design prestress concrete beam	R, U, A

R – Remember, U – Understand, A – Apply and above (Bloom's revised taxonomy levels)



6. COURSE CONTENTS

Sr. No.	Topic / Sub-topics	Hours	Marks	CO No.
1.	Introduction 1.1 Basic principle of Prestressed Concrete, 1.2 Material used and their properties 1.3 Terminologies of Prestressed Concrete 1.4 Advantages of Prestressed Concrete 1.5 Limitations of Prestressed Concrete	04	10	CO1
2.	2. Types of Prestressing 2.1 Introduction on types of prestressing 2.2 Source of prestressing force 2.3 External or internal Prestressing, Circular prestressing, Linear prestressing, pre-tensioning and post-tensioning 2.4 Bonded and unbonded prestressing	02	06	CO2
3.	3. Devices used in Prestressing 3.1 Pre-tensioning – Stages, Devices – jacks, anchoring devices, harping devices 3.2 Post-tensioning –Stages, Advantages, Disadvantages Devices - Anchoring devices, Sequence of anchoring, Jacks, Couplers, Grouting pipe	02	06	CO2
4.	4. Methods of Pre-tensioning and Post-tensioning 4.1 Classification of methods in Pre-tensioning and post tensioning, 4.2 Hoyer line system, Freyssinet system, Magnel Blaton System, Gifford Udall System.	02	06	CO2
5.	5. Principle of Prestress 5.1 General principle of prestressed concrete 5.2 Assumptions, concentric tendons, eccentric tendons, bent tendons & parabolic tendons (Simple design numerical on analysis at transfer and working conditions) 5.3 Concepts of centre of compression 5.4 Kern of a section, 5.5 Efficiency of the section 5.6 Pressure line and safe cable zone	08	18	CO3
6.	6. Losses in pre stress 6.1 Creep of concrete 6.2 Elastic shortening 6.3 Shrinkage of concrete 6.4 Relaxation of steel due to friction 6.5 Anchorage slip.	06	10	CO3
7.	7. Analysis of various types of sections subjected to prestress	04	6	CO4
8.	8. Simple Design of prestressed concrete beams (no end block design)	04	8	CO4
	TOTAL	32	70	



7. IMPLEMENTATION STRATEGY (PLANNING):

1. Teaching Plan
2. Slides / Presentation
3. Self-Learning Online Resources
4. Use of audio - visual aids / models

8. REFERENCE BOOKS:

SN.	Title	Author	Publication
1.	Prestressed Concrete	N. Krishnaraju	Tata Mcgraw Hills
2.	Pre-stressed Concrete Design	Dr. Amlan K Sengupta	Indian Institute of technology, Madras

9. WEB REFERENCES

1. <https://law.resource.org/pub/in/bis/S03/is.1343.1980.pdf>
2. <https://www.youtube.com/watch?v=NXVBSTdmheY>
3. https://www.youtube.com/watch?v=yOuk_DSuTb0
4. <https://nptel.ac.in/courses/105/106/105106117/>

10. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN



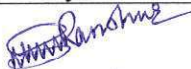

Sr. No	CHAPTER	Distribution of Theory Marks			
		R Level	U Level	A LEVEL	Total Marks
1	Introduction	5	5	-	10
2	Types of Prestressing	3	3	-	06
3	Devices used in Prestressing	-	4	2	06
4	Methods of Pre-tensioning and Post-tensioning	-	4	2	06
5	Principles of Prestress	3	7	8	18
6	Losses in Prestress	-	4	6	10
7	Analysis of various types of sections subjected to prestress	-	4	2	6
8	Simple design of Prestressed Concrete beams	-	4	4	8
TOTAL		11	35	24	70



R-Remembering, U-Understanding, A-Applying and above (Bloom's revised taxonomy levels)

NOTE: This specification table provides general guidelines to assist students for their learning and to teachers to teach and assess students with respect to attainment of COs. The actual distribution of marks at different taxonomy levels (R, U, A) in the question paper may vary from above table.

11. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	Ms. Neelam Petkar	
2	Internal	Mr. A K Singh	
3	Internal	Mr. S. N. Ranshur	
4	External	Mr. Dheerajkumar Pandirkar Organization: Chief Engineer, MHADA	



1. COURSE DETAILS

Programme: Civil Engineering	Semester: VI
Course: Solid Waste Management	Group: M*
Course Code: SWM190129	Duration: 16 Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per Week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks (ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
2	-	-	-	2	03	70	20	10	70	-	-	-	100

3. COURSE OBJECTIVE

This course provides an understanding of technical issues and the management of solid wastes. It introduces appropriate methods of storage, collection, transfer, treatment and disposal. Improper disposal of municipal solid waste can create unsanitary conditions, and these conditions in turn can lead to pollution of the environment and to outbreaks of diseases.

The course acquaints the students with health aspects of solid waste management & also attempts to familiarize various steps involved in solid waste management.

4. SKILL COMPETENCY

The aim of this course is to help the student to attain the following industry identified psychomotor and cognitive competency through various teaching learning experiences

- Identify the types of solid wastes
- Manage the solid waste effectively to maintain the hygienic conditions

5. COURSE OUTCOMES (COs)

At the end of the semester student will be able to: -

CO No.	COURSE OUTCOME	Bloom's Level
CO1	Classify the types, sources and composition of solid waste	R, U
C02	Identify the physical, chemical and biological properties of solid waste	R, U
C03	Implement the relevant method for disposal of Industrial wastes and E-waste.	U, A
C04	Identify various health hazards while handling solid waste .	R, U, A



R-Remember, U-Understand, A-Apply and above (Bloom's revised taxonomy levels)

6. COURSE CONTENTS

Sr. No.	Topic / Sub-topics	Hours	Marks	CO No.
1	Introduction 1.1 Definition of Solid waste 1.2 Types of Solid waste: Domestic, Commercial, Industrial, Market, Agricultural, Bio-medical and E-waste. Construction waste 1.3 Sources of solid waste	03	10	CO1, CO2
2	Characteristics of Solid waste 2.1 Quantities and Composition of Solid waste 2.2 Sources of Solid waste 2.3 Physical, Chemical and Biological properties of solid waste 2.4 Factors of affecting solid waste generation 2.5 Impact of solid waste on environment. 2.6 Solid Waste Management Rules 2016	04	12	CO2
3	Solid waste generation and collection, 3.1 Handling, processing of solid waste 3.2 Collection methods of municipal solid waste. 3.3 Tools and equipment's used for storage and collection. 3.4 Transportation of municipal solid waste. Vehicles used for transportation of waste.	04	10	CO1
4	Composting & Land filling of Municipal Solid waste 4.1 Composting of solid waste, Principle of composting process, Factors affecting on composting process. 4.2 Methods of composting- i) Manual composting ii) Mechanical composting iii) Vermi composting concept. 4.3 Land fill method of disposal- Factors for site selection, Land filling methods, Advantages and disadvantages of land fill method.	05	10	CO3
5	Biomedical Waste management 5.1 Definition of Bio medical waste 5.2 Sources & generation of Biomedical Waste 5.3 Classification of Biomedical Waste	05	8	CO3, CO4
6	Industrial Waste Management 6.1 Definition of E-waste. 6.2 Varieties of E-waste, Dangers of E-waste. 6.3 Disposal of E-waste.	7	10	CO3
7	Health aspects of municipal solid waste collection, conveyance, treatment and disposal. 7.1 Health aspect during handling and processing. 7.2 Health problems during time of segregation, reuse, recovery, recycling of solid waste.	04	10	CO4



Sr. No.	Topic / Sub-topics	Hours	Marks	CO No.
	TOTAL	32	70	

7. IMPLEMENTATION STRATEGY (PLANNING)

1. Teaching Plan/Practical/Sketches
2. Minimum no. of practical/Sketches etc.
3. Visit to solid waste management plant
4. Slides / Presentation
5. Assignments
6. Self-Learning Online Resources

8. LEARNING RESOURCES

Sr. No.	Title of Book	Author	Publication
1	Solid Waste Technology & Management	Christensen, H. T.	Wiley, 2010, Volume 1 & 2
2	Solid Waste Management	Bhide A. D.	Indian National Scientific Documentation Centre, New Delhi Edition 1983
2	HANDBOOK OF SOLID WASTE MANAGEMENT	Tchobanoglous, G. and Kreith, F.	McGraw Hill, 2002, 2nd Edition
3	Integrated Solid Waste Management: Engineering Principles and Management Issues	Tchobanoglous, G., Theisen and Vigil	McGraw Hill, 1993.
	Environmental Pollution Control Engineering	Rao C. S.	New Age International, New Delhi 2006
4	Environmental Pollution	Khopkar S. M.	New age international limited, New Delhi 2007
5	Environmental Studies	Anindita Basak	Pearson Publication Delhi 2009
6	Solid Waste Management Rules 2016	MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE NOTIFICATION	MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE NOTIFICATION

9. WEB REFERENCES

1. https://onlinecourses.nptel.ac.in/noc21_ce69
2. www.teriin.org
3. www.cpcp.nic.in
4. www.cpcp.gov.in



5. www.indiaenvironmentportal.org.in
6. www.whatis.techtarget.com
7. www.sustainabledevelopment.un.org
8. www.conserve-energy-future.com
9. www.epa.gov/epaoswer/non-hw/municipal/index.htm
10. en.wikipedia.org/waste-management
11. [Waste Management | The Official Website of Ministry of Environment, Forest and Climate Change, Government of India \(moef.gov.in\)](http://Waste Management | The Official Website of Ministry of Environment, Forest and Climate Change, Government of India (moef.gov.in))

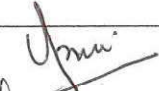
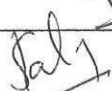


10 SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Sr. No.	TOPIC	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1.	Introduction	4	6	-	10
2.	Characteristics of Solid waste	6	6	-	12
3.	Solid waste generation and collection,	4	2	4	10
4.	Composting & Land filling of Municipal Solid waste	--	6	4	10
5.	Biomedical Waste management	--	4	4	8
6.	Industrial Waste Management	2	4	4	10
7.	Health aspects of municipal solid waste collection, conveyance, treatment and disposal.	2	4	4	10
	Total	18	32	20	70

R Remember, U Understand, A Apply and above (Bloom's revised taxonomy levels)

NOTE: This specification table provides general guidelines to assist students for their learning and to teachers to teach and assess students with respect to attainment of COs. The actual distribution of marks at different taxonomy levels (R, U, A) in the question paper may vary from above table.

11. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	Shri.Vinod Vanvari	
2	Internal	Mrs. Supriya Prasad Patil	
3	Internal	Mr Sandeep Ranshur	
4	External	Mr Dhirajkumar Pandirakar	
		Organisation: Chief Engineer, MHADA	



1. COURSE DETAILS

Program: Civil Engineering
Course: Disaster Management
Course Code: DMT190130

Semester: VI
Group: M
Duration: 16 Weeks

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per Week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks (ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
2	-	-	-	2	-	-	-	-	-	50	-	50	100

3. COURSE OBJECTIVE:

Making a resilient District where communities respond to disasters with sense of urgency and in a planned way to minimize human, property and environmental loss by developing a holistic, proactive, multi-disaster and technology driven strategy for Disaster Management is need of the hour. The objective of this course is making the students aware about the Disaster Management to with respect to planning, preparedness, operational, coordination and community participation.

4. SKILL COMPETENCY

The aim of this course is to help the student to attain the following industry identified

Competency through various teaching learning experiences:

- To assess various hazard, vulnerability, capacity and risk associated with the district.
- To lay down various measures and guidelines for prevention and mitigation.
- To lay down preparedness measures for all stakeholders



5. COURSE OUTCOME:

After the successful completion of the course, the student will be able to

CO	COURSE OUTCOME	Bloom's Level
CO1	Discuss different types of disaster and remedial measures.	R, U
CO2	Know early warnings and safety measures of disasters and Risk assessment	R, U, A
CO3	Use Prevention, Mitigation, Preparedness, Response and Recovery, Rehabilitation & Reconstruction methods appropriately	R, U, A

R-Remember, U-Understand, A-Apply and above (Bloom's revised taxonomy levels)

6. COURSE CONTENTS

Sr. No.	Topic / Sub-topics	Hours	CO No.
1	Disaster Introduction: Definition, Classification, Natural and Anthropogenic, Accidents, Disaster Profile of India. Geoclimatic and social conditions, Past records, Vulnerable areas of the country, national response approach.	04	CO1
2	Introduction on Disaster Different Types of Disaster: A) Natural Disaster: such as Flood, Cyclone, Earthquakes, and Landslides etc. B) Man-made Disaster: such as Fire, Industrial Pollution, Nuclear Disaster, Biological Disasters, Accidents (Air, Sea, Rail & Road), Structural failures (Building and Bridge), War & Terrorism etc. Causes, effects and practical examples for all disasters.	06	CO1
3	Prediction & Preparation Prediction and forecasting, disaster preparedness, data base Assessment of disaster relief and Rehabilitation measures, Mobilization of men and material, Legal frame work, Trigger mechanism – Water, Climate and Geologically related Chemical, Industrial, Nuclear, GIS enabled Disk net, Activities, Agencies, Resources and Funds, Implementation and Monitoring Flood Hazard Map, Quick response flow chart, Emergency operation center, Emergency support functions, Disaster specific modules.	06	CO2/CO3
4	Risk Assessment Risk assessment, Contingency Planning, Major Natural disasters, Earth Quake, Cyclone, Flood, Epidemics, Check list-Agencies, Personnel, Equipment, Materials, Services and Time management, Risk and Vulnerability Analysis:	04	CO2/CO3



	Risk concept and analysis, Risk Reduction, Vulnerability: Its concept and analysis, Strategic Development for Vulnerability Reduction.		
5	Disaster Preparedness: Concept and Nature, Disaster Preparedness Plan, Prediction, Early Warnings and Safety Measures of Disaster, Role of Information, Education, Communication, and Training, Role of Government, International and NGO Bodies, Role of IT in Disaster Preparedness, Role of Engineers on Disaster Management.	06	CO3
6	Rehabilitation, Reconstruction and Recovery: Reconstruction and Rehabilitation as a Means of Development, Damage Assessment, Post Disaster effects and Remedial Measures, Creation of Long-term Job Opportunities and Livelihood Options, Disaster Resistant House Construction, Sanitation and Hygiene, Education and Awareness, Dealing with Victims' Psychology, Long-term Counter Disaster Planning, Role of Educational Institute.	06	CO3
	Total	32	

7. LIST OF ASSIGNMENTS

Term Work consists of Assignments containing minimum 04 no (marked with *) and corresponding CO attained are specified here.

Sr. No.	Title of Experiments and Drawings	COs
1.	Different types of disaster	CO1
2.	Prediction and preparation for disaster	CO2/CO3
3.	Risk assessment	CO2/CO3
4.	Rehabilitation, reconstruction and recovery	CO3

8. IMPLEMENTATION STRATEGY (PLANNING):

1. Teaching Plan
2. Visit to Disaster Management cell of MCGM
3. Presentations
4. Use of audio-visual aids/ models




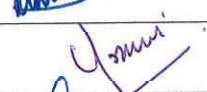


9. LEARNING RESOURCES

Sr. No	Title	Author	Publication
1	Disaster Management Handbook	W. Nick Carter	Asian Development Bank
2	Risk factors for mortality and injury: Post tsunami epidemiological findings from Tamil Nadu	Sapir Ghua-D, Parry CV, Degomme O (Belgium) & Joshi, PC, Arnold Saulina JP (India)	Cred
3	Disaster Management – Lessons drawn and strategies for future.	Anil Sinha	NIDM – National Institute of Disaster Management
4	Disaster Management	M.C.Gupta, L.C.Gupta, B.K.Tamini & Vinod K. Sharma	NIDM - National Institute of Disaster Management
5	Manual on Disaster Management in India	Arun Jha & A.A.Khan	NIDM - National Institute of Disaster Management
6	Natural Disasters in India – some recent case studies		NIDM - National Institute of Disaster Management

10. WEB REFERENCES

1. <https://nptel.ac.in/courses/124/107/124107010/>
2. <https://nptel.ac.in/courses/105/104/105104183/>
3. <http://dm.mcgm.gov.in/home>
4. http://www.dmc.gov.lk/index.php?option=com_content&view=article&id=72&Itemid=234&lang=en#:~:text=The%20main%20activities%20of%20the%20Disaster%20Management%20Centre,Disaster%20Activities%20in%20collaboration%20with%20the%20key%20agencies.

11. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	Shri. Sandeep Narayan Ranshur	
2	Internal	Shri. V. B. Vanvari	
3	Internal	Miss. Neelam Nagraj Petkar	
4	External	Mr. Dhirajkumar S. Pandirkar	
		Organization: Chief Engineer, Maharashtra Housing & Area Development Authority (MHADA)	



Committees

I.1 Managing Council (MC)

Representatives of Shri Vile Parle Kelavani Mandal		Shri Amit Balwant Sheth, Chairman Shri Nayan Patel Shri Hiten V.Parekh Shri Asoke Basak Dr. Madhav N.Welling Dr. Sharad Mhaiskar Dr. D. J. Shah
Member, Industry Representative		Mr, Hemant Minocha, M.D, Rajiv Plastics, Mumbai
Representatives of Government		
Representative of the State Government		Dr. Abhay Wagh, Director, Directorate of Technical Education, Maharashtra State.
Representative of the Maharashtra State Board of Technical Education		Dr. Vinod Mohitkar, Director, Maharashtra State Board of Technical Education
Representative of Central Government		Shri P. N. Jumle Director, Board of Apprenticeship Training (W.R.)
Representative of the All India Council for Technical Education		Dr. Ajeet Singh, Regional Officer & Assistant Director, All India Council for Technical Education (Western Region)
Expert Members nominated by the State Government/AICTE		-----
Ex-Officio –Secretary-Principal		Dr. M. Z. Shaikh



I.2 Board of Studies (BOS)

Sr. No.	Name	Designation and organization	BOS Designation
1.	Dr. (Mrs) Shubha Pandit	Principal, K. J. Somaiya Engg. College, Mumbai	Chairman
2.	Dr. Vinod Mohitkar	Director, MSBTE	Member
3.	Dr. M. Z. Shaikh	Principal, S.B.M. Polytechnic	Member
4.	Mrs. Neeta Kadukar	Vice Principal and Head, Information Technology Department, S.B.M. Polytechnic	Member
5.	Shri. Dhirajkumar Pandirkar	Chief Engineer, MHADA	Member
6.	Shri. B. R. Patel	Director, Procem Consultants, Mumbai (Alumni)	Member
7.	Dr. A. V. Bhonsale	Ex. Principal, Vidyavardhini College of Engineering, Vasai	Member
8.	Shri. Sunil Kangane, Alumni	Director, Invotech, (Alumni), Mumbai	Member
9.	Shri. Ricky Uchil	Vice President, Adani Electricity Mumbai	Member
10.	Shri. Apurva Patel	Director, Exult Industries Ltd. Mumbai	Member
11.	Shri. V. M. Joshi	Adjunct Faculty. Swami Vivekananda Institute of Technology, Mumbai	Member
12.	Shri. Paresh Haria	General Manager PCS Technology, Mumbai	Member
13.	Shri. Hemant Minocha	Managing Director, Rajiv Plastics, Mumbai	Member
14.	Prof. E. Narayanan	Ex-Faculty DJSCOE, Mumbai	Member
15.	Shri. Ramesh Vulavala	Ex-HOD, DJSCOE, Mumbai	Member
16.	Dr. D. J. Shah	Ex-Principal, SBMP	Member
17.	Shri. Milind Kamat	General Manager, Toyo Engg. Ltd., Mumbai	Member
18.	Shri. Harinder Salwan,	Managing Director, Tircom Multimedia Pvt. Ltd. Mumbai	Member
19.	Shri. Ashih Tapiawala, Alumni	Trainer, Vibrant Bootcamp, (Alumni) Mumbai	Member
20.	Shri. Ashok Mehta	Ex. Principal, S.B.M. Polytechnic	Invitee
21.	Shri. Vinod B. Vanvari	Head, Civil Engg., S.B.M. Polytechnic	Member



Sr. No.	Name	Designation and organization	BOS Designation
22.	Shri. A. K. Chore	Head, Mechanical Engg., S.B.M. Polytechnic	Member
23.	Shri. N. D. Adate	I/c. Head, Electrical Engg., S.B.M. Polytechnic	Member
24.	Mrs. A. A. Kulkarni	Head, Electronics Engg, S.B.M. Polytechnic	Member
25.	Shri. D. M. Karad	Head, Plastics Engg., S.B.M. Polytechnic	Member
26.	Shri. R. D. Shimpi	Head, Chemical Engg., S.B.M. Polytechnic	Member
27.	Shri. J. S. Kulkarni	Head, Computer Engg., S.B.M. Polytechnic	Member
28.	Shri. Abhijit Dongaonkar	Lecturer, IT, S.B.M. Polytechnic	Member
29.	Shri. S. T. Khelkar	Controller of Examinations, S.B.M. Polytechnic	Member
30.	Shri. Gajanan Badwe	Lecturer, Mechanical and I/C TPO, S.B.M. Polytechnic	Member
31.	Shri. L. B. Deshpande	Lecturer, Electronics, S.B.M. Polytechnic	Convenor



I.3 Programme wise committee (PBOS)

Sr. No.	Name & Office address	PBOS Designation
1	Mr. Dhiraj Kumar Pandirkar Chief Engineer, MHADA, Kalanagar, Bandra East, Mumbai 400 051	Chairman
2	Mr. Chetan Raikar CMD, Structwel Designer and Consultants Pvt. Ltd., Sion Panvel highway, Near Sanpada, Navi Mumbai	Industry –Representative Member
3	Dr. A. R. Kambekar, Head, Civil Engineering Department, Sardar Patel College of Engineering (SPCE), Mumshi Nagar, Andheri West, Mumbai 400058	Academic – Representative, Member
4	Mr. B. R. Patel Director, Procem Consultants, 1A/2 , Ashapuri CHS, Near Hotel Pancharatna, MTNL Road, Panvel, 410206	Alumni – Representative, Member
5	Mr. Girish Wadwa Structural Engineer, Krishnakunj Bunglow 2 nd Floor, RSC 26-27, Gorai 2, Borivali west, Mumbai 400092	Invitee Member
6	Mr. Rajesh Shah, Project Management Consultant, 402, Janki Centre, Shah Industrial Estate, off: Veera Desai Road, Andheri (West), Mumbai 400 053	Invitee Member



I.4 PROGRAMME CURRICULUM DEVELOPMENT COMMITTEE

Institute Level Curriculum Development Cell

Sr. No.	Name of the Faculty	Designation
1	Dr. M. Z. Shaikh, Principal	Chairman
2	Mrs. Neeta Kadukar, Vice-Principal and Head, IT Dept.	Member
3	Shri. V. B. Vanvari, Head, Civil Engg. Dept.	Member
4	Shri. A. K. Chore, Head, Mechanical Engg. Dept.	Member
5	Shri. N. D. Adate, I/C Head, Electrical Engg. Dept.	Member
6	Mrs. A. A. Kulkarni, Head, Industrial and Digital Elex. Dept.	Member
7	Shri. D. M. Karad, Head, Plastics Engg. Dept.	Member
8	Shri. R. D. Shimpi, Head, Chemical Engg. Dept.	Member
9	Shri. J. S. Kulkarni, Head, Computer Engg. Dept.	Member
10	Shri. A. B. Dongaonkar, Lecturer, IT Dept.	Member
11	Mrs. K. P. Bhavle Lecturer, Chemistry Dept.	Member
12	Shri. G. J. Badwe, Training and Placement Officer	Member
13	Shri. S. T. Khelkar, Controller of Examinations	Member
14	Shri. L. B. Deshpande, Lecturer, Electronics Dept.	Member Secretary

Department Level Committee (Department Co-Ordinators)

Sr. No.	Name of the Faculty	Designation
1	Shri. S. N. Ranshur	Lecturer, Civil Engineering
2	Shri. A. S. Shukla	Lecturer, Mechanical Engineering
3	Shri. D. G. Rajmandai	Lecturer, Electrical Engineering
4	Ms. P. J. Nikhade	Lecturer, Industrial/Digital Electronics
6	Shri. S. A. Kamble	Lecturer, Plastics Engineering
5	Shri. M. M. Belwalkar	Lecturer, Chemical Engineering
7	Shri. P. H. Shah	Lecturer, Computer Engineering
8	Shri. P. D. Rathod	Lecturer, Information Technology



COURSE-WISE CURRICULUM DEVELOPMENT COMMITTEE - SCHEME 2019

Department of CIVIL ENGINEERING

SEMESTER I

Sr. No	Course Code	Course Name	Course Expert Committee Member		Course Expert External
			Internal	External	
1	BMT190001	Basic Mathematics	Ms. Kavita K. Dange	Mr. R. R. Ambade	Ms. Meena Gawas
2	ACH190002	Applied Chemistry	Ms. Sneha Suvarna	Ms. Kirti Bhawe	Dr. S. Unni
3	EVS190003	Environmental Studies	Ms. Sneha Suvarna	Ms. Kirti Bhawe	Dr. S. Unni
4	DLS190004	Development of Life Skills	Mr. Balaji Pande	Mrs. Anita Kulkarni	Prof. Aanchal Lalla
5	EDG190101	Engineering Drawing	Mr. Nitin Pathak	Mr. Nitin Patil	Prof. Mohan Bodkhe
6	APM190005	Applied Mechanics	Ms. Neelam Petkar	Mr. Atulyakumar Singh	Mr. Dhirajkumar Pandirkar
7	WSP190102	Workshop Practice (CE)	Mr. Atulyakumar Singh	Mr. Sandeep Ranshur	Mr. Shantilal Jain

SEMESTER II

Sr. No	Course Code	Course Name	Course Expert Committee Member		Course Expert External
			Internal	External	
1	EMT190009	Engineering Mathematics	Ms. Kavita K. Dange	Mr. R. R. Ambade	Ms. Meena Gawas
2	APH190010	Applied Physics	Mr. G.R. Waghware	Mr. Suresh Salve	Mr. M. B. Jaiswar
3	CMS190011	Communication Skills	Mr. Balaji Pande	Mrs. Anita Kulkarni	Prof. Aanchal Lalla
4	BCN190103	Building Construction	Mr. Atulyakumar Singh	Mr. Sandeep Ranshur	Mr. Shantilal Jain
5	CEM190104	Civil Engineering Materials	Mr. Atulyakumar Singh	Mr. Sandeep Ranshur	Mr. Shantilal Jain
6	SUR190105	Surveying-I	Mr. Sandeep Ranshur	Ms. Neelam Petkar	Mr. Dheerajkumar Pandirkar
7	STM190012	Stress Management	Mr. Nitin Pathak	Mr. Rajendra Shimpi	Mr. Chirag Kachaliya



SEMESTER III

Sr. No	Course Code	Course Name	Course Expert Committee Member			Course Expert External
			Internal	Internal	Member	
1	AMT190013	Applied Mathematics	Ms. Kavita K. Dange	Mr. R. R. Ambade	Mr. Umang Patel	Ms. Meena Gawas
2	SU190106	Surveying-II	Mr. Sandeep Ranshur	Ms. Neelam Petkar	Mrs. Supriya Patil	Mr. Dheerajkumar Pandirkar
3	CED190107	Civil Engineering Drawing	Mr. K.P. Jayateerth	Mr. Sandeep Ranshur	Ms. Neelam Petkar	Arch. Jawed Ghazali
4	HBR190108	Highways, Bridges and Railways	Mrs. Supriya Patil	Mr. Atulyakumar Singh	-	Mr. Binu Patel
5	MNS190109	Materials and Structures	Ms. Neelam Petkar	Mr. Atulyakumar Singh	Mr. K.P. Jayateerth	Mr. Dheerajkumar Pandirkar
6	CES190110	Civil Engineering Software	Mr. Sandeep Ranshur	Ms. Neelam Petkar	Mr. Atulyakumar Singh	Mr. Dheerajkumar Pandirkar
7	AMT190111	Airports and MRTS	Mr. Vinod Vanvari	Mrs. Supriya Patil	Ms. Neelam Petkar	Mr. Binu Patel
8	DCR190112	Development Control and Promotion Regulations	Mr. Sandeep Ranshur	Mr. Atulyakumar Singh	Ms. Neelam Petkar	Arch. Jawed Ghazali



SEMESTER IV

Sr. No	Course Code	Course Name	Course Expert Committee Member			Course Expert External
			Internal	Internal	Internal	
1	ENV190113	#Environmental Engineering	Mr. Sandeep Ranshur	Mrs. Supriya Patil	Ms. Neelam Petkar	Ms. Ashwini Waghmare
2	DPS190114	Design Practice of Steel Structures	Ms. Neelam Petkar	Mr. K.P. Jayateerth	Mr. Atulyakumar Singh	Mr. Dheerajkumar Pandirkar
3	MOS190115	Mechanics of Structures	Mr. Atulyakumar Singh	Mr. K.P. Jayateerth	Ms. Neelam Petkar	Mr. Dheerajkumar Pandirkar
4	CTH190116	Concrete Technology	Mr. Atulyakumar Singh	Mrs. Supriya Patil	Mr. Sandeep Ranshur	Mr. Dheerajkumar Pandirkar
5	FMH190117	Fluid Mechanics	Mr. Vinod Vanvari	Mr. Atulyakumar Singh	Mrs. Supriya Patil	Mr. Dheerajkumar Pandirkar
6	BMR190118	Building Maintenance Repair, Services and Urban Renewal & Redevelopment	Mr. Vinod Vanvari	Mr. Atulyakumar Singh	Mr. Sandeep Ranshur	Mr. Dheerajkumar Pandirkar
7	CET190119	Construction Equipment & Techniques	Mr. Sandeep Ranshur	Mr. Atulyakumar Singh	Mrs. Supriya Patil	Mr. Dheerajkumar Pandirkar
8	EGL190120	Engineering Geology	Mr. K.P. Jayateerth	Mr. Sandeep Ranshur	Mr. Atulyakumar Singh	Mr. Dheerajkumar Pandirkar
9	TSS190121	Advance Survey	Mr. Sandeep Ranshur	Ms. Neelam Petkar	Mrs. Supriya Patil	Mr. Dheerajkumar Pandirkar



SEMESTER V

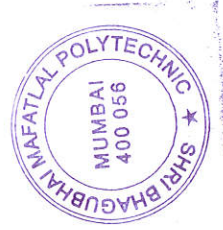
Sr. No	Course Code	Course Name	Course Expert Committee Member Internal		Course Expert External
			Mr. Sandeep Ranshur	Mr. Atulyakumar Singh	
1	IPT190131	Implant Training	Mr. Sandeep Ranshur	Mr. Atulyakumar Singh	Mr. Dheerajkumar Pandirkar

SEMESTER VI

Sr. No	Course Code	Course Name	Course Expert Committee Member Internal			Course Expert External
			Mr. Vinod Vanvari	Mr. Sandeep Ranshur	Ms. Neelam Petkar	
1	CEP190122	Civil Engineering Project	Mr. Vinod Vanvari	Mr. Sandeep Ranshur	Ms. Neelam Petkar	Mr. Dheerajkumar Pandirkar
2	RCC190123	Design Practice of RCC	Mr. Atulyakumar Singh	Ms. Neelam Petkar	Mr. Sandeep Ranshur	Mr. Sameer Sawant
3	PMC190124	Project Engineering Management and Contract administration	Mr. Vinod Vanvari	Ms. Neelam Petkar	Mr. Atulyakumar Singh	Mr. Amar Peswani
4	WRE190125	Water Resource Engineering	Mr. Sandeep Ranshur	Mr. Atulyakumar Singh	Ms. Neelam Petkar	Mr. Dheerajkumar Pandirkar
5	QSE190126	Quantity Survey and Estimation	Mr. Vinod Vanvari	Ms. Neelam Petkar	Mr. Sandeep Ranshur	Mr. Dheerajkumar Pandirkar
6	GTE190127	Geotechnical Engineering	Mr. Atulyakumar Singh	Mr. Vinod Vanvari	Ms. Neelam Petkar	Mr. Shantilal Jain
7	PRC190128	Pre stress Concrete	Ms. Neelam Petkar	Mr. Atulyakumar Singh	Mr. Sandeep Ranshur	Mr. Dheerajkumar Pandirkar
8	SWM190129	Solid waste management	Mr. Vinod Vanvari	Mrs. Supriya Patil	Mr. Sandeep Ranshur	Mr. Dheerajkumar Pandirkar
9	DMT190130	Disaster Management	Mr. Sandeep Ranshur	Mr. Vinod Vanvari	Ms. Neelam Petkar	Mr. Dheerajkumar Pandirkar

(Signature)

CDC Co-Ordinator
(Department)



(Signature)
Head of the Department

Head, Civil Engineering Department
Shri Bhagubhai Marfatlal Polytechnic
Vile Parle (west), Mumbai- 400056

Certificate

The curriculum of the programme has been modified in the year 2019, as per the provision made in curriculum development process of Shri Bhagubhai Mafatlal Polytechnic, Mumbai.

This is the **outcome-based Curriculum of Diploma in Civil Engineering Programme**, which shall be implemented from academic year 2019-20.

Verified by

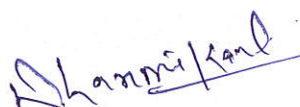


Department Level CDC Representative
S.B.M. Polytechnic, Mumbai.



Head of Department
Civil Engineering
S.B.M. Polytechnic, Mumbai.

Head, Civil Engineering Department
Shri Bhagubhai Mafatlal Polytechnic
Vile Parle (west), Mumbai- 400056



In-charge, Curriculum
Development Cell S.B.M.
Polytechnic, Mumbai



Principal
S.B.M. Polytechnic, Mumbai.



PRINCIPAL
Shri Bhagubhai Mafatlal Polytechnic
Vile-Parle (W), Mumbai - 400 056.

CERTIFICATE OF BENCHMARKING OF CURRICULUM

ISSE

INDIAN SOCIETY
OF
STRUCTURAL ENGINEERS



C/o, S. G. Dharmadhikari, 24, Pandit Niwas, S. K. Bole Marg, Dadar (W), Mumbai - 400 028 India
Tel. : +91-22-2431 4423, 2422 1015 E-mail : issemumbai@gmail.com Website www.isse.org.in

PRESIDENT : Shantilal Jain, **SECRETARY** : Hemant Vadalkar **TREASURER** : M. M. Nandgaonkar,

TO WHOMSOEVER IT MAY CONCERN

Certificate of Benchmarking Curriculum

This is to certify that the Curriculum of Diploma Program in Civil Engineering at SVKM's Shri Bhagubhai Mafatal Polytechnic, for scheme 2016 and 2019 are at par with respect to industry requirements.

Below are the salient features of the above programme.

- Three-year full-time Diploma in Civil Engineering with 06 months in-plant training.
- Curriculum with credit system having compulsory and optional subjects.
- Appropriate proportion of theory and practical throughout the programme.
- Appropriate weightage given to the courses covered under Basic, Core, Application and Management
- Industry exposure through in-plant training of 24 weeks (one semester of six months).
- Curriculum is incorporating futuristic technologies and is matching needs of building construction industry.
- Excellent experienced faculty members

Some key courses offered are:

Building Construction, Design of Steel & RCC Structures, Building Repairs & Services, Pre- Stressed Concrete, Urban Renewal & Redevelopment, Airports & MRTS, Environmental Engineering, Water resources and Concrete Technology.

Curriculum is revised regularly with inputs from experts in industry, institute, academia, alumni, students and all other relevant stake holders. There is structured approach to review, revise and upgrade curriculum through search conference, Programme wise board of studies, board of studies followed by equivalence from MSBTE.

We further certify that the curriculum is as per industry standards.

For , Indian Society of Structural Engineers


S. H. Jain (M.E. / FIE)
President

MANAGING TRUSTEE : The Maharashtra Executor & Trustee Co. Pvt Ltd., Bank of Maharashtra, Janamangal,
5th Floor, 45/47, Mumbai Samachar Marg, Fort, Mumbai - 400 023.
Registered with Charity Commissioner, Reg. No. E 17940, Mumbai Donations exempted from tax Under 80 G.



CERTIFICATE OF BENCHMARKING OF CURRICULUM



Ref. No.: ASTR/O - / 2020
Date: 17-12-2020

TO WHOMSOEVER IT MAY CONCERN

CURRICULUM BENCHMARKING CERTIFICATE

This is to certify that curriculum of Diploma Programme in Civil Engineering at Shri Vile Parle Kelavani Mandal's Shri Bhagubhai Mafatlal Polytechnic, Vile Parle (W), Mumbai-400 056 for the schemes 2016 and latest 2019 are meeting the futuristic requirements of industry and cater the need of industry.

Good to learn that during Diploma programme, students undergo on site inplant training for 6 months, where they get good exposure to site related matter and relate the institute level study and observe the happenings at sites / offices.

It is a good practice to get the curriculum vetted by industry. Following are salient features of programme.

1. Three years full time diploma programme having 6 months inplant training.
2. Credit system giving flexibility to choose courses from several available optional and elective courses.
3. Practical weightage is at par to theory.
4. Good exposure to industry through 6 months inplant training.
5. Justified inclusion of all courses falling under basic, core, application and management categories.
6. Futuristic approach accounting requirement of industry in days to come.

Building materials, specially design Civil Engineering Workshop, Analysis and Design of Structures, Building Repairs & Services, Redevelopment (Urban Renewal), Airport & MRTS, Disaster Management, DCPR, Water Resources, Concrete Technology, etc. are good and relevant courses, which will serve the requirements.

We certify that the curriculum is as per industry requirement and standards.

For Association of Structural Rehabilitation (ASTR),

Jt. Secretary



Association of Structural Rehabilitation

A-3031, Oberoi Garden Estate, off Chandivali Farm Road, Andheri (East), Mumbai- 400072

Tel: +9122 2857 7810-11 Email: info@myastr.com / Web: www.myastr.com



**PROGRAMME -CIVIL ENGINEERING
MAPPING MATRIX OF PO'S, PSO's AND CO'S:**

APPENDIX-II

SEMESTER – I

Course Name & Code	Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
Basic Mathematics (BMT190001)	C101.1	3	1	1		1		2	2	1
	C101.2	3	2	2	2	1	2	2	2	2
	C101.3	3	1	1		1		2	1	1
	C101.4	3	1			1	2	2	2	1
C101	3.00	1.25	1.33	2.00	1.00	2.00	2.00	1.75	1.25	

Applied Chemistry (ACH190002)	C102.1	3	-	-	-	-	-	-	-	-
	C102.2	3	-	-	-	-	-	-	-	-
	C102.3	3	2	2	1	2	-	1	1	-
	C102.4	2	2	2	-	2	-	1	1	-
	C102.5	2	2	1	1	1	-	-	1	-
	C102	2.6	2	1.67	1	1.67	-	1	1	-

Environmental Studies (EVS190003)	C103.1	2	-	1	-	3	-	1	1	-
	C103.2	-	-	-	-	2	-	-	-	-
	C103.3	-	-	3	-	2	-	1	-	-
	C103.4	2		2	-	2	1	1	1	-
	C103.5		1	2	-	2	1	-	-	-
	C103	2	1	2	-	2.2	1	1	1	-
C104.1	-	-	1		2	3	1	1	1	1



Course Name & Code	Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
Development of Life Skills (DLS190004)	C104.2	1	1	1	1	1	3	2	1	1
	C104.3	1	2	2	1	2	3	2	1	1
	C104.4	-	-	1	-	2	3	2	1	1
	C104	1	1.5	1.25	1	1.75	3	1.75	1	1

Engineering Drawing (EDG190101)	C105.1	3	2	2	-	-	1	3	3	1
	C105.2	3	1	3	-	-	1	3	3	1
	C105.3	3	2	2	-	-	3	3	3	1
	C105.4	3	3	3	-	-	3	3	3	1
	C105	3	2	2.5	-	-	2	3	3	1

Applied Mechanics (APM190005)	C106.1	3	2	1	-	-	-	-	-	-
	C106.2	3	2	2	2	-	-	2	1	-
	C106.3	1	2	2	2	-	-	2	1	-
	C106.4	3	2	2	2	-	-	2	2	-
	C106.5	3	1	-	-	-	-	2	-	-
	C106	2.6	1.8	1.75	2	-	-	2	1.33	-

Workshop Practice (CE) (WSP190102)	C107.1	1	1	2	-	-	-	1	3	1
	C107.2	1	2	1	-	-	-	1	1	1
	C107.3	1	2	-	1	-	-	1	3	1
	C107.4	-	1	1	1	-	-	1	1	-
	C107	1	1.5	1.33	1	-	-	1	2	1



SEMESTER II

Course Name & Code	Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
Engineering Mathematics (EMT190009)	C108.1	3	2	2	1	1	1	2	1	2
	C108.2	3		1	1	1	1	2	1	1
	C108.3	3	1	1	1	1	1	2	1	2
	C108.4	3	2	2	2	1	2	2	1	2
	C108	3	1.67	1.5	1.25	1	1.25	2	1	1.75

Applied Physics (APH190010)	C109.1	3	2	1	3	1	1	2	2	2
	C109.2	3	2	2	2	1	1	2	2	2
	C109.3	3	2	3	1	1	1	2	1	1
	C109.4	3	2	3	1	1	1	2	1	1
	C109	3	2	2.25	1.75	1	1	2	1.5	1.5

Communication Skills (CMS190011)	C110.1	1	2	2	-	2	3	1	-	-
	C110.2		1	1	1	1	3	1	1	1
	C110.3	2	1	1	-		3	1	-	-
	C110.4		1	1	1	1	3	1	1	1
	C110	1.5	1.25	1.25	1	1.33	3	1	1	1



Course Name & Code	Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
Building Construction (BCN190103)	C111.1	1	-		3				3	
	C111.2	1			1	1				
	C111.3				1			2	3	1
	C111.4					2	2	2	2	2
	C111.5	1			1	1	2	2	3	1
	C111	1	-	-	1.67	1.5	2	2	2	2.67

Civil Engineering Materials (CEM190104)	C112.1	3			1	2		1	3	1
	C112.2	2			2	1		1	1	1
	C112.3	1			2				2	2
	C112.4	2				3		1	1	3
	C112	2	-	-	1.67	2	-	1	1.75	1.75

Surveying-I (SUR190105)	C113.1	3	3	2	3			2	1	3
	C113.2	2	3	1	2		3	2	1	3
	C113.3	2	3	1	2		3	2	1	3
	C113.4	2	3	1	2		3	2	1	3
	C113.5	2	3	1	2		3	2	1	3
	C113	2.2	3	1.2	2.2	-	3	2	2	1



Course Name & Code	Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
Stress Management (STM190012)	C114.1						2	2	1	1
	C114.2						2	2	2	1
	C114.3						2	1	3	1
	C114.4						2	3	3	2
	C114	-	-	-	-	-	2	2	2.25	1.25



SEMESTER III

Course Name & Code	Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
Applied Mathematics (AMT190013)	C201.1	3	3	3	2	1	2	2		1
	C201.2	3	3	3	2	2	2	2	1	1
	C201.3	3	3	3	2	1	1	2		
	C201.4	3	3	3	2	1	2	2		1
	C201	3	3	3	2	1.25	1.75	2	2	1

Surveying-II (SUR190106)	C202.1	2	3	2	3	-	3	2	3	1
	C202.2	2	3	2	3	-	3	2	3	1
	C202.3	1	3	3	2	-	3	2	3	1
	C202.4	1	3	3	3	-	3	3	3	1
	C202.5	1	3	2	1	-	2	1	3	1
	C202	1.4	3	2.4	2.4	2.4	-	2.8	2	3

Civil Engineering Drawing (CED190107)	C203.1	2	-	-	-	2	-	2	3	-
	C203.2	-	-	-	-	2	-	2	1	-
	C203.3	1	2	-	-	3	-	2	1	2
	C203.4	-	-	1	-	2	-	-	-	-
	C203	1.5	2	1	-	2.25	-	2	1.67	2



Course Name & Code	Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
Highways, Bridges and Railways (HBR190108)	C204.1	1	2		3	2	1		3	
	C204.2		2		2	2	1	1	1	2
	C204.3	1				2		1	2	1
	C204.4				3	2		2	2	1
	C204	1	2	-	2.67	2	1	1.33	2	1.33

Materials and Structures (MNS190109)	C205.1	3	3	1	1		2	2	3	1
	C205.2	1	3	1	1		1	2	3	1
	C205.3	2	3	2	1		2	3	3	1
	C205.4	1	3	1	1		3	3	3	1
	C205.5	1	3	2	2		3	3	3	1
	C205	1.6	3	1.4	1.2	-	2.2	2.6	3	1

Civil Engineering Software (CES190110)	C206.1	2						2		1
	C206.2	1		3	2			2	3	2
	C206.3	1			2		2	3	2	2
	C206	1.33	-	3	2	-	2	2.33	2.5	1.67



Course Name & Code	Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
Airports and MRTS (AMT190111)	C207.1	3	1			3	2		1	1
	C207.2	2	2			2			3	
	C207.3	2	1			2			1	1
	C207.4	3	3			2			2	
	C207	2.5	1.75	-	-	2.25	2	-	1.75	1

Development Control and Promotion Regulations (DCR190112)	C208.1	3	3	2		2	2	1	2	1
	C208.2	3	2	2		3	2	2	3	
	C208.3	2	3	3		3	3	3	3	3
	C208	2.67	2.67	2.33	-	2.67	2.33	2	2.67	2



SEMESTER IV

Course Name & Code	Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
#Environmental Engineering (ENV190113)	C209.1	1	2	2	2	3		1	1	
	C209.2	1	2	3	2	3		1		3
	C209.3	1		2	2	2		1	2	
	C209.4		3	2	2	3		1	1	
	C209	1	2.33	2.25	2	2.75	-	1	1.33	3

Design Practice of Steel Structures (DPS190114)	C210.1	1	2	3	2			1	3	1
	C210.2	1	2	3	2			1	3	1
	C210.3		3	3	3			2	3	1
	C210	1	2.33	3	2.33	-	-	1.33	3	1

Mechanics of Structures (MOS190115)	C211.1	2	3	3				2		1
	C211.2	2	2	2				1		3
	C211.3	1	2	1				1		1
	C211.4	1	2	2				1	1	
	C211.5	1	1	3				1		1
	C211	1.4	2	2.2	-	-	-	1.2	1	1.5



Course Name & Code	Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
Concrete Technology (CTH190116)	C212.1	3	2	1	3	2	1	3	3	2
	C212.2	1	3	2	3	1	1	2	3	2
	C212.3	2	3	3	3	3	1	3	3	2
	C212.4	2	2	1	3	2	1	3	3	2
	C212	2	2.5	1.75	3	2	1	2.75	3	2

Fluid Mechanics (FMH190117)	C213.1	3	1					1	2	
	C213.2	3	3	2	2			1	2	1
	C213.3	3	2	1	1			1	1	
	C213.4	3	1	1	1			1	1	1
	C213.5	2	1		3			1	2	1
	C213.6	2	2	2	3			1	2	
	C213	2.67	1.67	1.5	2	-	-	1	1.67	1

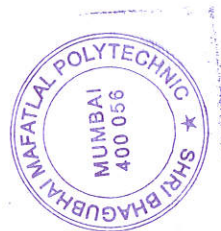
Building Maintenance Repair, Services and Urban Renewal & Redevelopment (BMR190118)	C214.1	2	1		2	2	2	3	3	1
	C214.2	3	2		3	3	2	2	3	1
	C214.3	1	3		2		1		3	1
	C214.4	2	3		2			1	3	1
	C214	2.00	2.25	-	2.25	2.50	1.67	2.00	3.00	1.00



Course Name & Code	Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
Construction Equipment & Techniques (CET190119)	C215.1	1	2				2	2	3	1
	C215.2	2	3					2	2	1
	C215.3	3	2				3	2	3	1
	C215	2	2.33	-	-	-	2.5	2	2.67	1

Engineering Geology (EGL190120)	C216.1	3	3					1	3	1
	C216.2	2	3				2	1	3	1
	C216.3	2	3				3	1	3	1
	C216	2.33	3	-	-	-	2.5	1	3	1

Advance Survey (TSS190121)	C217.1	2	3	2	3		2	3	3	2
	C217.2	2	3	2	3		2	3	3	2
	C217.3	1	3	3	3		3	2	1	1
	C217	1.67	3	2.33	3	-	2.33	2.67	2.33	1.67



SEMESTER V

Course Name & Code	Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
Implant Training (IPT190131)	C301.1	3		3	3	3	3	3	3	3
	C301.2	3		3			3	3	3	3
	C301.3	3	3		3		3	3	3	3
	C301.4		3				3	3	3	3
	C301.5			3	3			3	3	3
	C301.6	3	3			3		3	3	3
	C301	3	3	3	3	3	3	3	3	3



SEMESTER VI

Course Name & Code	Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
#Civil Engineering Project (CEP190122))	C302.1	1	1	1	1	1	1	1	1	1
	C302.2	1	2	2	1	3	3	2	2	3
	C302.3	1	1	3	3	2	3	1	1	1
	C302.4	1	1	2		2	3	1	3	1
	C302.5	1	1	1	1	1	3	1	3	1
	C302.6	1	3	3		3	2	1	3	3
	C302	1	1.5	2	1.5	2	2.5	1.17	2.17	1.67

#Design Practice of RCC Structure (RCC190123)	C303.1	2	2	3	-	1	1	2	3	-
	C303.2	2	2	3	2	2	1	2	-	3
	C303.3		2	3	-	1	1	2	3	
	C303.4				2	1	1	2	3	
	C303	2	2	3	2	1.25	1	2	3	3

#Project Engineering Management & Contract Administration (PEM190124)	C304.1		3	2		2	3	1	1	1
	C304.2	1	3	1			2	1	3	1
	C304.3		2	1		2	3	1	1	1
	C304.4		3	1	2		2	2	1	2
	C304	1	2.75	1.25	2	2	2.5	1.25	1.5	1.25



Course Name & Code	Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
#Water Resource Engineering (WRE190125)	C305.1	2	3	2				2	1	
	C305.2	2	3	1		1	2	3		2
	C305.3	3	3	1		3	1	2	-	3
	C305.4		3					2	-	2
	C305	2.33	3	1.33	-	2	1.5	2.25	1	2.33

#Quantity Survey, Estimation & Valuation (QSE190126)	C306.1	1	1	1				1	1	1
	C306.2	2						2	1	1
	C306.3	2	2	2				1		1
	C306.4	3	1	3				2	2	
	C306.5		2	3				1	3	1
	C306.6		3	3				1	3	2
	C306	2	1.8	2.4	-	-	-	1.33	2	1.2

#Geotechnical Engineering (GTE190127)	C307.1	3	2	1	3	2	1	3	3	2
	C307.2	1	3	2	3	1	1	2	3	2
	C307.3	2	3	3	3	3	1	3	3	2
	C307.4	2	2	1	3	2	1	3	3	2
	C307	2	2.5	1.75	3	2	1	2.75	3	2



Course Name & Code	Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
Pre-stress Concrete (PRC190128)	C308.1	3	2		2			1	3	
	C308.2	3		2	1			1	2	
	C308.3	2	3	2				1	2	1
	C308.4	3	2	3				1	3	
	C308	2.75	2.33	2.33	1.5	-	-	1	2.5	1

Solid Waste Management (SWM190129)	C2309.1	1	2	1		1		1	3	1
	C309.2	1	1	1		2		1		
	C309.3	2	1	1		3		1	3	
	C309.4	3	3	1		3	1	1	3	1
	C309	1.75	1.75	1	-	2.25	1	1	3	1

Disaster Management (DMT190130)	C310.1	1	2	-	-	1	-	-	-	-
	C310.2	1	1	1	-	2	-	-	-	2
	C310.3	1	1	1	-	3	-	-	-	-
	C310.4	1	2	1	2	1	3	2	3	-
	C310	1	1.5	1	2	1.75	3	2	3	2


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