Shree Warana Vibhag Shikshan Mandal's

WARANA UNIVERSITY,

WARANANAGAR

(A State Public University established under Section 3 (6) of MPUA, 2016)

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Warana University

Established:2025

Structure & Syllabus For

First Year of M. Tech. in Construction Management

Semester- I and II

Department of Civil Engineering

UNDER

Faculty of Science & Technology

(As Per National Education Policy – 2020)

With Effect from Academic Year 2025-26 Onwards

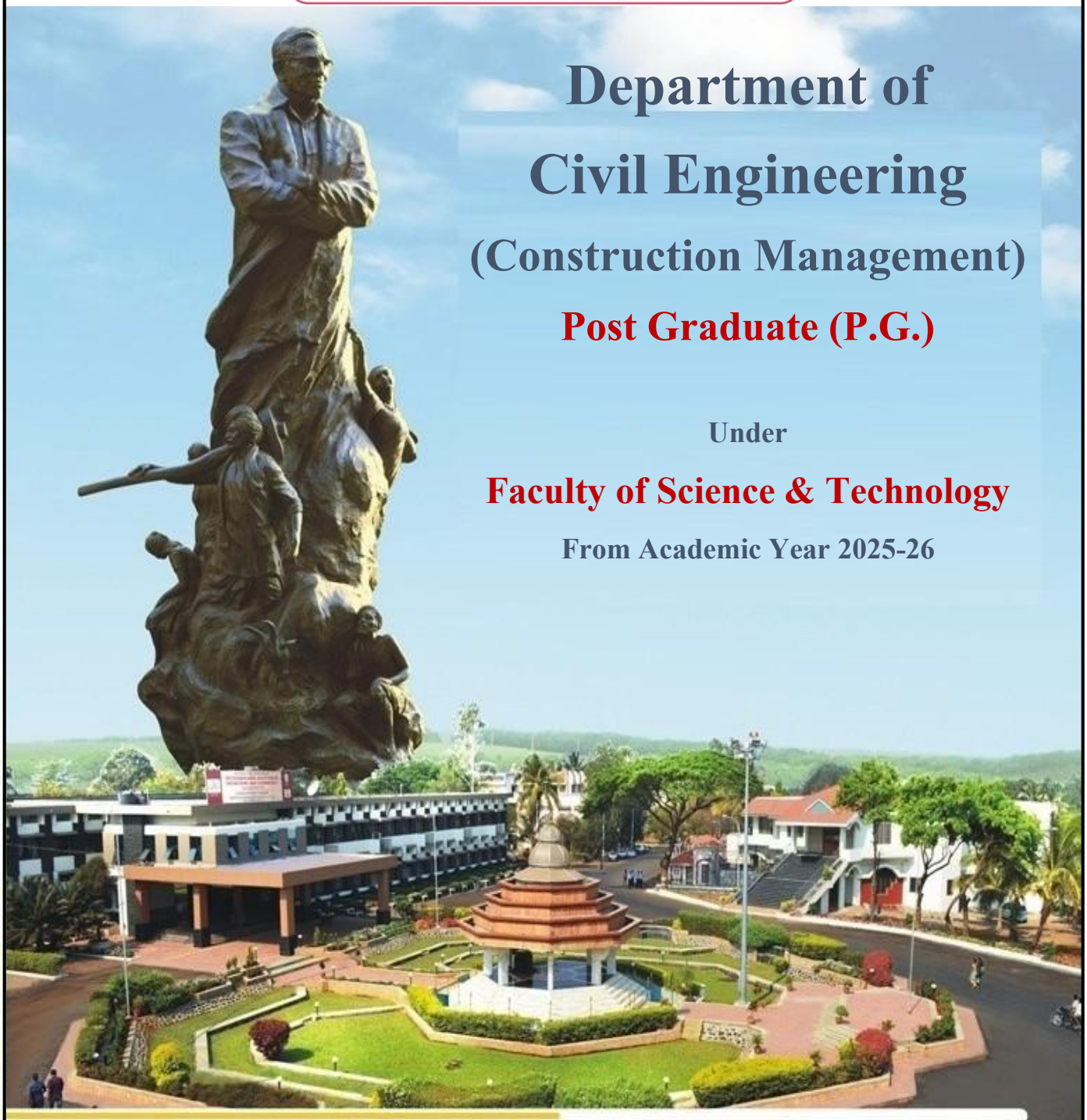
Shree Warana Vibhag Shikshan Mandal's

TATYASAHEB KORE INSTITUTE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS), WARANANAGAR, KOLHAPUR

TKIET
Estd. 1983

Lead Institute of

WARANA UNIVERSITY, WARANANAGAR
(A State Public University)



Department of Civil Engineering (Construction Management)

Post Graduate (P.G.)

Under

Faculty of Science & Technology

From Academic Year 2025-26

M. Tech. in Civil (Construction Management)

Structure and Syllabus under Autonomy as per NEP Policy 2020

Contents

Preface

The National Education Policy (NEP) 2020 has introduced significant reforms in India's higher education system, emphasizing multidisciplinary learning, flexibility, innovation, skill development, and industry-oriented education. In line with these transformative initiatives, Tatyasaheb Kore Institute of Engineering & Technology (TKIET), Warana University, Warananagar, is committed to adopting NEP 2020 in its true spirit to develop competent, ethical, and industry-ready professionals.

The Department of Civil Engineering is pleased to present the syllabus for the First Year M. Tech. in Construction Management, thoughtfully structured in accordance with NEP 2020 guidelines and current industry requirements. The first-year curriculum is designed to build a strong foundation in construction management by focusing on essential areas such as construction project management, project economics and financing, construction contracts and legal aspects, and construction methods and techniques.

The programme emphasizes the integration of engineering knowledge with managerial principles to enable students to effectively plan, execute, and control construction projects. It also incorporates exposure to modern tools, software applications, and emerging practices in the construction industry. Flexibility is provided through Program Electives and Open Electives, allowing students to explore specialized and interdisciplinary domains as per their interests and career aspirations.

This syllabus outlines detailed information regarding the course structure, credit framework, evaluation scheme, and academic guidelines to ensure systematic and effective implementation. The Department sincerely acknowledges the valuable contributions of the Board of Studies members, faculty experts, and industry professionals whose expertise and insights have been instrumental in framing this curriculum.

We are confident that this programme in Construction Management will provide a strong academic and professional foundation, enabling students to develop advanced competencies, innovative thinking, and leadership qualities required to manage modern construction projects and contribute effectively to industry and society.

Program Outcomes

Program Outcomes (POs) are clear, measurable statements that describe what students are expected to know, understand, and be able to do by the time they complete an academic program. They define the competencies, skills, and professional abilities that graduates should possess at the end of the program. In India, POs for Engineering Programs are formally prescribed and monitored by the National Board of Accreditation (NBA). NBA has defined the following three POs for a graduate of PG Engineering Program:

PO1: An ability to independently carry out research /investigation and development work to solve practical problems.

PO2: An ability to write and present a substantial technical Report/document.

PO3: Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program

Duration

- The full time M. Tech Program is a **2 years post graduate program**.
- The program is divided into **4 semesters**.

Eligibility

1. The Candidate should be an Indian National.

2. Passed Bachelor's Degree in the relevant field of Engineering & Technology from AICTE or Central or State Government approved institutions or equivalent, with at least 50% marks (at least 45% marks in case of candidates of Backward Class categories, EWS and PWD).

3. Obtained Qualified score or non-qualified score in GATE conducted by the IIT for the current academic year.

OR

3. For sponsored candidates (Proforma P and Q), a minimum of two years of full-time work experience in a registered firm/ company/ industry/ educational and/ or research institute/ any Government Department or Government Autonomous Organization in the relevant field in which admission is being required..

Medium of Instruction

- The medium of instruction, examinations, assignments, and project reports is English.

Abbreviations

Acronym	Full Form
ISE	In-Semester Examination
ISE -I	In-Semester Examination I
ISE-II	In-Semester Examination II
ESE	End Semester Examination
ISA	In Semester Assessment
POE	Practical Oral Examination
TH	Theory Lecture
Tut	Tutorial
PH	Practical Hours
P	Practical
O	Oral
TW	Term Work
CH	Contact Hours
C	Credit
PCC	Professional Core Course
PE	Program Elective
OEC	Open Elective Course
LC	Laboratory Course
MC	Mandatory Course
SW	Seminar work
II	Industrial Internship
PC	Dissertation
SLC/AC	Self Learning Course/Audit course

Examination & Evaluation Pattern

Evaluation tools used for the evaluation of a student for each course is as follows:

For Theory Courses	In-Semester Examination (ISE) And End Semester Examination (ESE)
For Lab / Tutorial Courses	In-Semester Assessment (ISA) And / Or Practical and Oral Examination (POE)

Refer course structure for specific evaluation tools used for each course.

In-Semester Examination (ISE)

The In-Semester Examination (ISE) will be conducted at the departmental level. There will be two tests in each semester for every theory course: ISE-I and ISE-II.

- Each test will be of 40 marks.
- The duration of each test will be 1 hour and 30 minutes.

The total ISE marks will be calculated as the average of ISE-I and ISE-II. These rules may be modified from time to time as per the guidelines of the concerned regulatory authorities.

- ISE-I will cover Unit I and Unit II.
- ISE-II will cover Unit III and Unit IV.

  - **Minimum Passing Criteria**

    Students must score a minimum of 40% marks in the ISE. If a student fails to secure the minimum required marks, he/she must appear for a Make-up Examination.

    The Make-up Examination will be conducted in the same semester for:

    - Students who fail to secure minimum passing marks.
    - Students who were absent due to valid reasons such as medical issues, natural calamities, or participation in NSS, NCC, or similar activities (subject to verification of absence and recommendation from the Head of Department).

- **Special Provision**

  If a failed student appears for three tests (including the Make-up test) and scores more than 16 marks when calculating the average of the best two out of the three tests, the student will be awarded the minimum passing marks of 16 only.

  For students absent with valid reasons:

  - If absent in one test, the average of the attempted test and the Make-up test will be considered.
  - If absent in two tests, the decision will be taken after reviewing the reasons and based on the recommendation of the Head of Department.

End Semester Examination (ESE):

The End Semester Examination (ESE) will be conducted for 60 marks and will be based on the entire syllabus. The duration of each examination will be 2 hours.

Weightage of Units

The weightage of units in the ESE question paper will be as follows:

a) Units that are not covered in ISE-I or ISE-II will carry 30% weightage each.

b) Units that are covered in ISE-I and ISE-II will carry 10% weightage each.

Backlog Examination

Students who fail in the End Semester Examination (ESE) of either the odd or even semester within an academic year will be allowed to appear for the Backlog Examination, which will be conducted along with the regular ESE of the respective semester.

- **Re-Examination of ESE**

  A Re-Examination (Make-up Examination) for all courses (UG and PG), including both theory and laboratory courses, will be conducted once a year before the commencement of the odd semester of the next academic year.

  - A one-grade penalty will be applied to students appearing for the Make-up/Re-Examination.
  - However, no grade penalty will be applied if a student secures a 'P' grade in the Make-up/Re-Examination.
  - Grace marks will not be awarded for the Make-up/Re-Examination.
  - Exception: Grace marks may be considered if the student is appearing for the ESE for the first time.

- **Eligibility Criteria for ESE**

  To be eligible for the End Semester Examination (ESE), a student must:

  - Secure at least 40% marks in ISE and ISA of the concerned course.

- Fulfil the attendance requirements as per the norms of Warana University, Warananagar.

If a student does not meet these requirements, he/she will not be eligible to appear for the ESE.

Nature of Question Paper for ESE

Q. No.			Marks	BL	CO
1	**Attempt the following.**		**24**		
	a	**Unit -1**		II	1
	b	**Unit -2**		III	2
	c	**Unit -3**		IV	1
	d	**Unit -4**		I	1
2	**Attempt any Two of the following.**		**18**		
	a	**Unit -5**		VI	2
	b	**Unit -5**		II	3
	c	**Unit -5**		IV	3
3	**Attempt any Two of the following.**		**18**		
	a	**Unit -6**		IV	4
	b	**Unit -6**		III	4
	c	**Unit -6**		III	4

In Semester Assessment (ISA):

ISA for laboratory courses will be conducted as a continuous assessment throughout the semester. The assessment will be based on the following:

1. Performance in laboratory work.
2. Submission of experiments in the form of a properly maintained journal or report.
3. Timely completion of assigned experiments.
4. Attendance in laboratory sessions.
5. Understanding of the experiments conducted, evaluated through methods such as quizzes, oral examinations, case studies, field work, surveys, open-book tests, model preparation, programming, projects, or any other criteria specified by the course teacher.

Practical Oral Examination (POE):

POE for laboratory courses will be conducted immediately after the end of the semester. The duration of the practical examination will be as specified in the curriculum structure. The POE will be conducted jointly by an Internal Examiner and an External Examiner.

The examination may be conducted in any one of the following ways:

1. **Oral Examination Only**

   Both the Internal and External Examiners will ask questions based on the practical content of the course to assess the student's practical knowledge.

2. **Practical Examination Only**

   Students will be required to perform a given experiment, complete a workshop task, prepare a drawing, or develop a computer program, as applicable. In this case, the student's performance will be evaluated by the External Examiner only.

3. **Practical and Oral Examination**

   Students will first perform a given practical task. This will be followed by an oral examination (viva voce) based on the practical content of the course. The student's performance will be evaluated jointly by both the Internal and External Examiners.

Grading System

The University follows a **10-Point Grading System** to evaluate student performance.

- **Conversion of Marks into Grades**
  In every semester, the marks you get in each subject (out of 100) are converted into **grade points** as per the table below. You need at least **40% marks** to pass a subject.

Marks Obtained (Out of 100)	Grade Point	Letter Grade	Meaning
Absent	0	AB	Absent
0 – 39	0	F	Fail
40 – 44	4	P	Pass
45 – 49	5	C	Average
50 – 59	6	B	Above Average
60 – 69	7	B+	Good
70 – 79	8	A	Very Good
80 – 89	9	A+	Excellent
90 – 100	10	O	Outstanding

Note:

1. If decimal marks are 0.5 or more, they will be rounded off to the next higher number. (Example: 59.5 will become 60)
2. For courses of 50 marks or 200 marks, marks will be converted proportionally to 100 marks before assigning grade points.

- **Calculation of Semester Grade Point Average (SGPA)**
  SGPA is calculated at the end of each semester**.** It shows your average performance in one semester.

$$SGPA = \frac{\sum(Credit \times Grade\ Point)\ for\ each\ course\ of\ a\ Semester}{\sum(Credits)\ for\ a\ Semester}$$

- **Calculation of Cumulative Grade Point Average (CGPA)**
  CGPA is calculated after completing multiple semesters. CGPA reflects the overall academic performance of the student in the program.

$$CGPA = \frac{\sum(Total\ Credits\ of\ a\ Semester \times SGPA\ of\ Respective\ Sememster)\ of\ all\ semesters}{\sum(Course\ Credits)\ of\ all\ Semesters}$$

Note: The SGPA & CGPA shall be rounded off to 2 decimal points.

First Year M. Tech. Construction Management

Curriculum Structure & Evaluation Scheme for Semester-I

Course Category	Course Code	Course Title	Teaching and Credit Scheme					Examination and Evaluation Scheme			
			L	T	P	C	CH	Component	Marks	Min for Passing	
PCC	2501PCCMPCC101	Construction Project Management	3	-	-	3	3	ESE	60	24	40
								ISE	40	16	
	2501PCCMPCC101T	Construction Project Management Tutorial	-	1	-	1	1	ISA	25	10	10
	2501PCCMPCC102	Project Economics and Financing	3	-	-	3	3	ESE	60	24	40
								ISE	40	16	
	2501PCCMPCC102T	Project Economics and Financing Tutorial	-	1	-	1	1	ISA	25	10	10
PE	2501PCCMPE103X	Program Elective-I	3	-	-	3	3	ESE	60	24	40
								ISE	40	16	
	2501PCCMPE104X	Program Elective-II	3	-	-	3	3	ESE	60	24	40
								ISE	40	16	
	2501PCCMPE105X	Program Elective-III	3	-	-	3	3	ESE	60	24	40
								ISE	40	16	
LC	2501PCCMLC106P	Laboratory Practice	-	-	4	2	4	POE	25	10	20
								ISA	25	10	
SW	2501PCCMSW107T	Seminar-I	-	-	2	1	2	ISA	50	20	20
Total			**15**	**2**	**6**	**20**	**23**		**650**	**260**	**260**

Note : 'X' indicates the sequence number of PE/OE offered by the respective department.

First Year M. Tech. Construction Management

List of Program Electives for Semester-I

	Course Code	Course Title
Program Elective-I	2501PCCMPE1031	Construction Equipment
	2501PCCMPE1032	Construction Safety
	2501PCCMPE1033	Construction Disaster Management
Program Elective-II	2501PCCMPE1041	Human Resource Development in Construction
	2501PCCMPE1042	Advanced Construction Materials and Building Services
	2501PCCMPE1043	Repair and Rehabilitation of Structures
Program Elective-III	2501PCCMPE1051	Advanced Construction Techniques
	2501PCCMPE1052	Entrepreneurship in Construction
	2501PCCMPE1053	Value Engineering and Valuation

First Year M. Tech. Construction Management

Curriculum Structure & Evaluation Scheme for Semester-II

Course Category	Course Code	Course Title	Teaching and Credit Scheme					Examination and Evaluation Scheme			
			L	T	P	C	CH	Component	Marks	Min for Passing	
PCC	2501PCCM PCC201	Construction Contracts and Legal Aspects	3	--	--	3	3	ESE	60	24	40
								ISE	40	16	
	2501PCCM PCC201T	Construction Contracts and Legal Aspects Tutorial	--	1	--	1	1	ISA	25	10	10
	2501PCCM PCC202	Construction Methods and Techniques	3	--	--	3	3	ESE	60	24	40
								ISE	40	16	
	2501PCCM PCC202T	Construction Methods and Techniques Tutorial	--	1	--	1	1	ISA	25	10	10
PE	2501PCCM PE203X	Program Elective-IV	3		--	3	3	ESE	60	24	40
								ISE	40	16	
	2501PCCM PE204X	Program Elective-V	3	--	--	3	3	ESE	60	24	40
								ISE	40	16	
OE	2501PCCM OE205X	Open Elective Course	3	--	--	3	3	ESE	60	24	40
								ISE	40	16	
LC	2501PCCM LC206T	Software Lab	--	--	2	1	2	ISA	25	10	10
SW	2501PCCM SW207T	Seminar-II	--	--	2	1	2	ISA	50	20	20
CV	2501PCCM CV208P	Comprehensive Viva	--	--	2	1	2	OE	25	10	10
Total			**15**	**2**	**6**	**20**	**23**	**--**	**650**	**260**	**260**

Note: 'X' indicates the sequence number of Program Elective (PE) offered by Computer Science and Engineering Program. Students should opt for the Open Elective (OE) course from other departments. The list of OE courses offered by other departments is available in the structure. Although the OE course code is defined by the respective program in the structure, the actual opted OE course will appear on the mark card.

First Year M. Tech. Construction Management

List of Program Electives for Semester-II

	Course Code	Course Title
Program Elective-IV	2501PCCMPE2031	Management Information System
	2501PCCMPE2032	Computational Methods and Optimization Techniques
	2501PCCMPE2033	Resource Management
Program Elective-V	2501PCCMPE2041	Ground Improvement Techniques
	2501PCCMPE2042	Site Investing Methods and Practices
	2501PCCMPE2043	Environmental Impact Assessment

First Year M. Tech. Construction Management

List of Open Electives Offered by All Programs

Sr. No.	OE Offered by Program	Course Code	Open Elective Course
1	Chemical Engineering	2501PCHEOE2051	Project Management
2		2501PCHEOE2052	Operations Research
3		2501PCHEOE2053	Energy Technology
4	Electronics & Telecommunication Engineering	2501PETCOE2051	Advanced Operating Systems
5		2501PETCOE2052	Cyber Security
6		2501PETCOE2053	Artificial Intelligence and Machine Learning
7	Construction Management (Civil Engineering)	2501PCCMOE2051	Water Power Engineering
8		2501PCCMOE2052	Waste to Energy
9		2501PCCMOE2053	Contracts & Tenders
10	Mechanical Design (Mechanical Engineering)	2501PMDEOE2051	Cryogenics
11		2501PMDEOE2052	Design for Manufacture & Assembly
12		2501PMDEOE2053	Enterprise Resource Planning
13	Structural Engineering (Civil Engineering)	2501PCSTOE2051	Cost Management of Engineering Projects
14		2501PCSTOE2052	Optimization Techniques in Civil Engineering
15		2501PCSTOE2053	Industrial Safety
16	Computer Science and Engineering	2501PCSEOE2051	Ethical AI & Explainability
17		2501PCSEOE2052	Computer Vision
18		2501PCSEOE2053	High Performance Computing for Multidisciplinary Research

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCMPCC101 Course Name: Construction Project Management

Teaching Scheme	Credit	Evaluation Scheme
Lectures: 03 Hours/Week	03	ISE: 40 Marks ESE: 60 Marks

Prerequisites, if any:
1. Basics concepts of engineering management.
2. Critical Path Method and Program Evaluation Review Techniques.

Course Objectives: The objective of the course is to

1. To understand different aspects of site organizational structures, services required on site, personnelmanagement, safety in construction and work study.
2. To Determine EOQ, perform ABC analysis, understand SQC charts and compute standard time.
3. To understand procurement procedure, Quality circles, ISO 9000 and Performance appraisal.
4. To study different aspects of material storage, management of accidents, safety in construction, Networkanalysis concepts and role of computers in construction field.

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

CO1	Identify different aspects of site organizational structures, services required on site, personnelmanagement, safety in construction and work study.
CO2	Determine EOQ, perform ABC analysis, understand SQC charts and compute standard time.
CO3	Understand procurement procedure, Quality circles, ISO 9000 and Performance appraisal.
CO4	Appreciate different aspects of material storage, management of accidents, and safety in construction,Network analysis concepts and role of computers in construction field.

Course Content

Unit-1	**Site Organization:**	**6 Hours**
Organizational structures for construction field, Site layout,Services required on site.		
Unit-2	**Material Management:**	**6 Hours**
Functions, Inventory control, EOQ, ABC analysis,Estimating requirement, Procurement and storage of materials.		
Unit-3	**Personnel Management:**	**6 Hours**
Functions, Special characteristics, Manpower planning, Recruitment, Placement, Training and induction, Performance appraisal, Relevant labor laws.		
Unit-4	**Construction Quality Management:**	**6 Hours**
SQC charts, Sampling techniques, Qualitycircles, ISO 9000, Management Aspects		
Unit-5	**Safety In Construction:**	**6 Hours**
Safety Requirements, Safety and health codes,Occupational diseases, Economic aspects, Management of accidents, Safety departments.		

Unit-6	Network Analysis:	6 Hours
Network compression, Resource allocation, Cost control,Monitoring of Projects, PERT in construction projects, Computers in Construction Management, Field computerized construction managements andits applications in office.		
Learning Resources:		
Text Books 1) Principles of Management, Koontz and O Donnel. 2) Personal Management and Industries Relations, Dale. 3) Critical Path Methods in Construction Antill and Woodheads.		
Reference Books 1) Accounting for management, S. K. Bhattarcharya. 2) Principles of Management and Personal Management, A. S. Deshpande. 3) Project Planning and Control with PERT and CPM by Dr. B. C. Punmia and K.K. Khandelwal.		
MOOC / NPTEL/YouTube Links **1)** http://nptel.ac.in/ **2)** http://swayam.gov.in/ **3)** http://www.courses.com/civil-engineering **4)** http://www.youtube.com/user/nptelhrd **5)** www.khanacademy.org		

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCMPCC101T Course Name: Construction Project Management Tutorial

Teaching Scheme	Credit	Evaluation Scheme
Tutorial: 01 Hours/Week	01	ISA: 25 Marks

Prerequisites:

1) Basics concepts of engineering management.
2) Critical Path Method and Program Evaluation Review Techniques.

Course Objectives: The objective of the course is to

1) To understand different aspects of site organizational structures, services required on site, personnelmanagement, safety in construction and work study.
2) To Determine EOQ, perform ABC analysis, understand SQC charts and compute standard time.
3) To understand procurement procedure, Quality circles, ISO 9000 and Performance appraisal.
4) To study different aspects of material storage, management of accidents, safety in construction, Networkanalysis concepts and role of computers in construction field.

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

CO1	Identify different aspects of site organizational structures, services required on site, personnel management, safety in construction and work study.
CO2	Determine EOQ, perform ABC analysis, understand SQC charts and compute standard time.
CO3	Understand procurement procedure, Quality circles, ISO 9000 and Performance appraisal.
CO4	Appreciate different aspects of material storage, management of accidents, and safety in construction, Network analysis concepts and role of computers in construction field.

Course Content

The term work part should include One assignment on unit nos. 1,2 ,3, 4 and Two assignments on unit nos. 5 & 6, Total = 08

Learning Resources:

Text Books

1) Principles of Management, Koontz and O Donnel.
2) Personal Management and Industries Relations, Dale.
3) Critical Path Methods in Construction Antill and Woodheads.

Reference Books

1) Accounting for management, S. K. Bhattarcharya.
2) Principles of Management and Personal Management, A. S. Deshpande.
3) Project Planning and Control with PERT and CPM by Dr. B. C. Punmia and K.K. Khandelwal.

MOOC / NPTEL/YouTube Links

1) http://nptel.ac.in/
2) http://swayam.gov.in/
3) http://www.courses.com/civil-engineering
4) http://www.youtube.com/user/nptelhrd
5) www.khanacademy.org

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCMPCC102 Course Name: Project Economics and Financing

Teaching Scheme	Credit	Evaluation Scheme
Lectures: 03 Hours/Week	03	ISE: 40 Marks ESE: 60 Marks

Prerequisites:

1) Basics concepts of engineering management.
2) Basic formulae of Engineering economics.

Course Objectives: The objective of the course is to

1) To understand concepts of project economics, risk management and PPP in projects.
2) To understand use of appraisal methods for financial feasibility studies, risk estimation techniques andfinancing methods of projects.
3) To understand the concepts of finance and accounting in management of projects.
4) To make students aware about knowledge of PPP in infrastructure projects.

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

CO1	Understand concepts of project economics, risk management and PPP in projects.
CO2	Use appraisal methods for financial feasibility studies, risk estimation techniques and financing methods of projects.
CO3	Apply knowledge of finance and accounting in management of projects
CO4	Possesses knowledge of PPP in infrastructure projects

Course Content

Unit-1	**Economics of Engineering Projects:**	**6 Hours**
Nominal and effective rate of interest, Discrete and continuous compounding, Inflation and real rate of interest, Capitalized cost. Economic factors, Equivalence and use of multiple factors.		
Unit-2	**Financial Appraisal Criteria:**	**6 Hours**
Discounting and non- discounting criteria, (Payback period, NPV, AW, ROR, IRR, Benefit- cost ration, Break even analysis). MARR & it's estimation.		
Unit-3	**Risks In Construction Projects:**	**6 Hours**
Types of risk, Measures of project risk, Risk estimation, Risk analysis and Risk management. Sensitivity analysis, Simulation, Decision tree analysis, Selection of projects, Fuzzy Systems applications.		
Unit-4	**Financing Projects:**	**6 Hours**
Sources of finance, equity, debit, securities, borrowings, debentures, Working capital requirement, Financial institutes, Direct and indirect financial assistance.		
Unit-5	**Accounting:**	**6 Hours**
Site Accounts - preparation, reporting, Accounting records, Depreciations, Classification of construction costs, Standard budgeting and control.		

Unit-6	Public Private Participation in Projects:	6 Hours
PPP Models, BOOT, BOT, Joint Ventures, Annuity, DBFO, External Commercial Borrowings, International Finance.		
Learning Resources:		
Text Books **1)** Engineering Economy By E. Paul Degarmo, William G. Sullivan **2)** Project preparation Appraisal Implementation by Prasanna Chandra. **3)** Principles of Construction Management by Roy Pilcher. **4)** Engineering Economy By E. Pannerselvam.		
Reference Books **1)** Construction Project Management By Chitkara. **2)** Engineering economics by Riggs **3)** Corporate finance by Kuchal S.C. **4)** Principles of Corporate Finance by Brealey R.A. **5)** Principles of Engineering Economy by Grant Ireson/Leavenworth.		
MOOC / NPTEL/YouTube Links **1)** http://nptel.ac.in/ **2)** nptel.ac.in **3)** www.youtube.com **4)** freevideolectures.com		

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCMPCC102T Course Name: Project Economics and Financing Tutorial

Teaching Scheme	Credit	Evaluation Scheme
Tutorial: 01 Hours/Week	01	ISA: 25 Marks

Prerequisites:

1) Basics concepts of engineering management.
2) Basic formulae of Engineering economics.

Course Objectives: The objective of the course is to

1) To understand concepts of project economics, risk management and PPP in projects.
2) To understand use of appraisal methods for financial feasibility studies, risk estimation techniques andfinancing methods of projects.
3) To understand the concepts of finance and accounting in management of projects.
4) To make students aware about knowledge of PPP in infrastructure projects.

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

CO1	Understand concepts of project economics, risk management and PPP in projects.
CO2	Use appraisal methods for financial feasibility studies, risk estimation techniques and financing methodsof projects.
CO3	Apply knowledge of finance and accounting in management of projects
CO4	Possesses knowledge of PPP in infrastructure projects

Course Content

The term work part should include One assignment on unit nos. 1,2 ,3, 4 and Two assignments on unit nos. 5 & 6, Total = 08

Learning Resources:

Text Books

1) Engineering Economy By E. Paul Degarmo, William G. Sullivan
2) Project preparation Appraisal Implementation by Prasanna Chandra.
3) Principles of Construction Management by Roy Pilcher.
4) Engineering Economy By E. Pannerselvam.

Reference Books

1) Construction Project Management By Chitkara.
2) Engineering economics by Riggs
3) Corporate finance by Kuchal S.C.
4) Principles of Corporate Finance by Brealey R.A.
5) Principles of Engineering Economy by Grant Ireson/Leavenworth.

MOOC / NPTEL/YouTube Links

1) http://nptel.ac.in/
2) nptel.ac.in
3) www.youtube.com
4) freevideolectures.com

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCMPE1031 Course Name: Construction Equipment

Teaching Scheme	Credit	Evaluation Scheme
Lectures: 03 Hours/Week	03	ISE: 40 Marks ESE: 60 Marks

Prerequisites:

Basics concepts of engineering management.
Equipment requires for construction work.

Course Objectives: The objective of the course is to

To understand working of various excavating, hauling, compacting, conveying, hoisting and pile driving equipment.
To compute cycle time of operations, rating and output of equipment.
To understand selection of equipment for excavation, compacting, pile driving, tunnelling and concreting.
To apply the knowledge of equipment management.

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

CO1	Understand working of various excavating, hauling, compacting, conveying, hoisting and pile driving equipment.
CO2	Compute cycle time of operations, rating and output of equipment.
CO3	Select equipment for excavation, compacting, pile driving, tunnelling and concreting.
CO4	Apply the knowledge of equipment management.

Course Content

Unit-1	**Excavating Equipment, Hauling Equipment:**	**6 Hours**

Excavating Equipment: Excavator, Shovels - different types – back hoe draglines- clamshell, Cycles of operations, Excavators and their use in different soil conditions. Output criteria, Rippers, Trenchers, Graders.
Hauling Equipment: Tractor Dumpers, Trailers, Bulldozer, Scrapers, and Operation cycles times, Matching of Excavating and hauling equipment.

Unit-2	**Compacting Equipment:**	**6 Hours**

Compacting Equipment: Properties of soil, Soil stabilization, Soil compaction, and Different types of compacting equipment - Rollers, Sheep foot rollers, pneumatic rollers, vibratory rollers, vibrating plates/ shoes. Vibratory compaction.

Unit-3	**Conveying and Hoisting Equipment:**	**6 Hours**

Conveying and Hoisting Equipment: Different types of conveyors, Power requirement, Damages during operations, Economy of transportations, Cableways and Ropeways, Different types of hosting equipment - winch, derricks and cranes. Rating of cranes and power requirement of cranes.

Unit-4	**Piles and Pile driving equipment:**	**6 Hours**

Piles and Pile driving equipment: Pile Classifications and types, Pile driving and extracting equipment, Pile driving rigs, Pile driving hammers, Rating of pile hammers, Hammer accessories, Pile extractors. Concrete Mixers and Vibrators.

Unit-5	Tunnelling:	6 Hours
Tunnelling: Methods of tunnelling, Equipment for conventional tunnelling, Jumbo, Explosives, Temporary & permanent support, Lining, Mucking Equipment, Moles and use of laser beams to guide moles, Ventilations of tunnels. Use of TBM's.		
Unit-6	**Equipment Management:**	**6 Hours**
Equipment Management: Selection of equipment, Advantages and limitations of using machines, Planning of equipment – buying v/s hiring, Cost analysis, Economic life and Replacement, Preventative maintenance, System approach to planning. Problems of Equipment Management.		

Learning Resources:

Text Books

1) Construction Planning, Equipment and methods – Peurifoy-Tata McGraw Hill Publication.
2) Construction Equipment Planning and Applications – Dr. Mahesh Varma.
3) Construction Technology by Roy Chudley and Roger Greeno, Prentice Hall, 2005
4) Construction Equipment by Sharma.

Reference Books

1) Manuals, brochures, publications from construction companies, firms etc.
2) Construction Methods & Machinery - Kellog (Prentice-Hall Inc. New York.

MOOC / NPTEL/YouTube Links

1) http://nptel.ac.in/
2) http://swayam.gov.in/
3) http://www.courses.com/civil-engineering
4) http://www.youtube.com/user/nptelhrd
5) www.khanacademy.org

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCMPE1032 Course Name: Construction Safety

Teaching Scheme	Credit	Evaluation Scheme
Lectures: 03 Hours/Week	03	ISE: 40 Marks ESE: 60 Marks

Prerequisites:

1) Basics concepts of engineering management.
2) Safety requirements at construction work.

Course Objectives: The objective of the course is to

1) To understand construction accidents, accident prevention.
2) Follow the concept of construction safety management, safety in civil structures.
3) Understand safety use of equipment on construction sites.
4) Study and understand Designing for safety, Safety Training Programmes and Policies

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

CO1	Understand construction accidents, accident prevention.
CO2	Follow the concept of construction safety management, safety in civil structures.
CO3	Understand safety use of equipment on construction sites.
CO4	Study Designing for safety, Safety Training Programmes and Policies

Course Content

Unit-1	**Construction Accidents:**	**6 Hours**

Construction Accidents: Accidents and their Causes, Human Factors in Construction Safety, Costs of Construction Injuries, Occupational and Safety Hazard Assessment, Legal Implications.
Accident Prevention: Principles of accident prevention; job safety analysis; fault tree analysis; accident management.

Unit-2	**Construction Safety Management:**	**6 Hours**

Construction Safety Management: Introduction to Construction Safety and Safety Technology Government's policy in industrial safety, safety & health legislation in India, Construction Sites (Safety) Regulations, Codes of practice, Role of various parties, duties and responsibilities of top management, site managers, supervisors etc. role of safety officers, responsibilities of general employees, safety committee, safety training, incentives and monitoring, Writing safety manuals, preparing safety checklists and inspection reports.

Unit-3	**Safety in Typical Civil Structures:**	**6 Hours**

Safety in Typical Civil Structures: Safety of accidents on various construction sites such as buildings, dams, tunnels, bridges, roads, water Tanks, Retaining walls, etc. safety at various stages of construction, Critical factors for failure, Prevention of accidents, Regular Inspection and monitoring, Safety measures.

Unit-4	**Safety in Use of Construction Equipment:**	**6 Hours**

Safety in Use of Construction Equipment: Vehicles, cranes, hoist and lifts etc., Safety of scaffolding and working platforms, Safety in Erection and closing operation, Safety while using electrical appliances, Explosives.

Unit-5	Designing for Safety:	6 Hours

Designing for Safety: Workplace ergonomics, first aid and emergency preparedness, Safety culture, Safe Workers, Safety and First Line Supervisors, Safety and Middle Managers, Top Management Practices, Company Activities and Safety, Safety Personnel, Sub contractual Obligation, Project Coordination and Safety Procedures, Workers Compensation.

Unit-6	Safety Training Programmes and Safety Policies:	6 Hours

Safety Training Programs and Safety Policies: Construction Safety Management and Accident Prevention Safety training, safety policy, Safety Meetings, safety committees, safety inspection, safety audit, reporting accidents and dangerous occurrences, Safety Incentives. Problem areas in Construction Safety, Elements of an Effective Safety Program, Job-Site Safety Assessment, , Methods, equipment, and training provided on any ISO approved Construction Company, safety in office

Learning Resources:

Text Books

1) Giri Maldi and Simonds, Safety management

Reference Books

1) Davies V. S. Thomasin K, Thomas, Construction Safety Handbook – (Telford, London.)
2) ISI for safety in Construction – Bureau of Indian Standards
3) Safety Management in Construction Industry – A manual for project managers. NICMAR, Mumbai
4) Construction Safety Manual - Published by National Safety Commission of India.

MOOC / NPTEL/YouTube Links

1) http://nptel.ac.in/
2) http://www.courses.com/civil-engineering
3) http://www.youtube.com/user/nptelhrd
4) www.khanacademy.org

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCMPE1033 Course Name: Construction Disaster Management

Teaching Scheme	Credit	Evaluation Scheme
Lectures: 03 Hours/Week	03	ISE: 40 Marks ESE: 60 Marks

Prerequisites:

1) Basics concepts of engineering management.
2) Role of Disaster Management in construction work.

1) **Course Objectives:** The objective of the course is to
2) To learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.
3) Understand how to evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.
4) Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.

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

CO1	Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.
CO2	Understand how to evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives
CO3	Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations

Course Content

Unit-1	**Introduction to Disaster:**	**6 Hours**

Introduction to Disaster: Definition, Factors and Significance; Difference between Hazard and Disaster; Natural and Manmade Disasters: Difference, Nature, Types and Magnitude.

Unit-2	**Repercussions of Disasters And Hazards:**	**6 Hours**

Repercussions of Disasters and Hazards: Economic Damage, Loss of Human and Animal Life, Destruction of Ecosystem. Natural Disasters: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts and Famines, Landslides and Avalanches,
Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks and Spills, Outbreaks Of Disease and Epidemics, War and Conflicts.

Unit-3	**Disaster Prone Areas in India:**	**6 Hours**

Disaster Prone Areas in India: Study of Seismic Zones; Areas Prone to Floods and Droughts, Landslides and Avalanches; Areas Prone to Cyclonic and Coastal Hazards with Special Reference to Tsunami; Post-Disaster Diseases and Epidemics.

Unit-4	**Disaster Preparedness and Management:**	**6 Hours**

Disaster Preparedness and Management: Preparedness: Monitoring of Phenomena Triggering a Disaster or Hazard; Evaluation of Risk: Application of Remote Sensing, Data from Meteorological and Other Agencies, Media Reports: Governmental and Community Preparedness.

Unit-5	Risk Assessment:	6 Hours
Risk Assessment: Disaster Risk: Concept and Elements, Disaster Risk Reduction, Global and National Disaster Risk Situation. Techniques Of Risk Assessment, Global Co-Operation in Risk Assessment and Warning, People's Participation in Risk Assessment. Strategies for Survival.		
Unit-6	**Disaster Mitigation:**	**6 Hours**
Disaster Mitigation: Meaning, Concept and Strategies of Disaster Mitigation, Emerging Trends in Mitigation. Structural Mitigation and Non- Structural Mitigation, Programs of Disaster Mitigation in India.		
Learning Resources:		
Text Books **1)** R. Nishith, Singh AK, "Disaster Management in India: Perspectives, issues and strategies "'New Royal book Company. **2)** Sahni, PardeepEt.Al. (Eds.)," Disaster Mitigation Experiences and Reflections", Prentice Hall Of India, New Delhi.		
Reference Books **1)** Goel S. L. , Disaster Administration And Management Text And Case Studies" , Deep &Deep Publication Pvt. Ltd., New Delhi.		
MOOC / NPTEL/YouTube Links **1)** NPTEL/ Swayam/ Moocs on Disaster Management.		

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCMPE1041 Course Name: Human Resource Development In Construction

Teaching Scheme	Credit	Evaluation Scheme
Lectures: 03 Hours/Week	03	ISE: 40 Marks ESE: 60 Marks

Prerequisites:

1) Basics concepts of engineering management.
2) Role of Human Resource Development in construction work.

Course Objectives: The objective of the course is to

1) To identify the history of HRD in construction industry.
2) To understand development of human resource plans, forecast personnel needs and recruitment process.
3) To Evaluate methods of recruitment, training process, and Prepare evaluation and employee benefit system.
4) To make Familiars with various acts governing employee management relations.

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

CO1	Identify the history of HRD in construction industry.
CO2	Able to develop human resource plans, forecast personnel needs and understand recruitment process.
CO3	Evaluate methods recruitment, training process, and Prepare evaluation and employee benefit system.
CO4	Familiars with various acts governing employee management relations.

Course Content

Unit-1	**Introduction to Human Resource Management**	**6 Hours**

Introduction: Definition, history of human resource management, Objectives, HRD in construction industry, Status of construction labour in India.

Unit-2	**Human Resource Planning:**	**6 Hours**

Human Resource Planning: Formulating human resource plans – various method, Job analysis, job specifications, and job design in construction projects, Forecasting personal needs and supply in construction sector.

Unit-3	**Recruitment and Selection:**	**6 Hours**

Recruitment and Selection: Selection of project manager and project team, External and internal recruitment, Data gathering methods, Skill requirements of construction personnel.

Unit-4	**Training and Development:**	**6 Hours**

Training and Development: Training process, Individual and organizational development, Performance appraisal and use of performance appraisal information, Establishing the evaluation system.

Unit-5	Employee Benefits:	6 Hours
Employee Benefits: Employee health and safety, Wage and salary administration, Incentive system, Wages in construction industry, Retirement and pensions.		
Unit-6	**Employee Management Relations:**	**6 Hours**
Employee Management Relations: Collective bargaining, Trade unions connected with construction industry, Trade unions act, Labor welfare act, Payment of wages act, Worker's compensation act, Contract labor act, Management of conflict.		

Learning Resources:

Text Books

1) Personnel and Human Resources Management, Terry L. Deep, Mical D Crino, MacMillan Pub. Company.
2) Personnel Management, Edwin B. Flippo, McGraw Hill Book Company.
3) Human Behavior at Work, Keith Davis, Tata McGraw Hill Pub. Company.

Reference Books

1) Construction Planning and Management P.S. Gahlot.
2) Personnel Management Managing Human Resources, Paul S., Greenlaw, John P. Kohl harper and Row Pub.

MOOC / NPTEL/YouTube Links

1) NPTEL/ Swayam/ MOOCs on Human Resources Management.

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCMPE1042 Course Name: Advanced Construction Materials and Building Services

Teaching Scheme	Credit	Evaluation Scheme
Lectures: 03 Hours/Week	03	ISE: 40 Marks ESE: 60 Marks

Prerequisites:

1. Basics concepts of engineering management.
2. Use of Advanced Construction Materials and Building Services in construction.

Course Objectives: The objective of the course is to

1. To understand characteristics of modern construction materials.
2. To make familiarise with new construction techniques & understand concept of high-rise buildings.
3. To Identify components of water supply, sanitation arrangements in a building , ventilation, air conditioning and fire safety installations in a building.
4. To Follow the concepts of intelligent building.

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

CO1	Understand characteristics of modern construction materials.
CO2	Familiarize with new construction techniques & understand concept of high-rise buildings.
CO3	Identify components of water supply, sanitation arrangements in a building , ventilation, air conditioning and fire safety installations in a building.
CO4	Follow the concepts of intelligent building.

Course Content

Unit-1	**Modern Materials:**	**6 Hours**

Modern Materials: Glass Ceramics, Sealants for joints, Fibre glass reinforced plastic, Clay products, Refractories, Composite materials. Types Applications of laminar composites, Fibre textiles, Geosynthetics for Civil engineering applications. Timber And Other Materials Timber Market Forms Industrial timber, Plywood, Veneer, Thermocol Panels of laminates Steel, Aluminium and Other Metallic Materials Composition uses Market forms Mechanical treatment.

Unit-2	**Concrete:**	**6 Hours**

Concrete: Concrete ingredients, Manufacture, Batching plants, RMC. Properties of fresh concrete, Slump, Flow and compaction. Principles of hardened Concrete. Compressive, Tensile and shear strength. Modulus of rupture, Tests Mix specification, mix proportioning – IS method – High Strength Concrete and HPC Other types of Concrete – Code Practices

Unit-3	**High rise buildings:**	**6 Hours**

High rise buildings: Construction methods and techniques using in-situ concrete, Precast Concrete & Structural Steel, finished concrete, tunnel form, fire Fighting, Safety. Innovative methods of construction – Slip form technology, jump from technology, Dry wall technology, Plastering Machines.

Unit-4	Water Supply Systems:	6 Hours
Water Supply Systems: Water quality, Purification and treatment- water Supply systems-distribution systems in small towns –types of pipes used- laying jointing, testing-testing for water tightness plumbing system for building-internal supply in buildings- municipal bye laws and regulations - Rain Water Harvesting- Sanitation in buildings-arrangement of sewerage systems in housing -pipe systems- storm water drainage from buildings - septic and sewage treatment plant – collection, conveyance and disposal of town refuse systems		
Unit-5	**Ventilation and Its Importance:**	**6 Hours**
Ventilation and its importance-natural and artificial systems-Window type and packaged air-conditioners-chilled water plant –fan coil systems-water piping– cooling load –air conditioning systems for different types of buildings –protection against fire to be caused by A. C. Systems.		
Unit-6	**Intelligent Buildings:**	**6 Hours**
Intelligent buildings: Building Automation-Smart buildings- Building services in high rise buildings-green buildings-Energy efficient buildings for various zones- Case studies of residence, office buildings and other buildings in each zone.		

Learning Resources:

Text Books

1) R. K. Rajput, Engineering Materials, S. Chand & Company Ltd., 2000
2) M. S. Shetty, Concrete Technology (Theory and Practice), S. Chand & Company Ltd,2003
3) Construction Technology by Roy Chudley and Roger Greeno, Prentice Hall, 2005.
4) William H.Severns and Julian R.Fellows, "Air conditioning and refrigeration", John Wily and sons, London, 2008.

Reference Books

1) Reports of actual works executed.
2) NICMAR Publications on Construction Engineering.
3) Fair G.M., Geyer J.C. and Okun .D, "Water and waste engineering", Vol. II, John Wiley & sons, Inc., New York.
4) Manuals, brochures, publications from construction companies, firms etc.

MOOC / NPTEL/YouTube Links

1) NPTEL/ Swayam/ Moocs on Advanced Construction Materials.

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCMPE1043 Course Name: Repair and Rehabilitation of Structures

Teaching Scheme	Credit	Evaluation Scheme
Lectures: 03 Hours/Week	03	ISE: 40 Marks ESE: 60 Marks

Prerequisites:

1) Basics concepts of engineering management.
2) Repair and Rehabilitation activity work in construction.

Course Objectives: The objective of the course is to

1) To study various techniques of serviceability and durability of structures.
2) To understand maintenance and repair strategies and identify materials for repair.
3) To Suggest techniques of repairs for deflection, cracking, etc.
4) Understand knowledge of corrosion protection, grouting, guniting and shotcreting.

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

CO1	Follow various techniques of serviceability and durability of structures.
CO2	Use maintenance and repair strategies and identify materials for repair.
CO3	Suggest techniques of repairs for deflection, cracking, etc.
CO4	Possess knowledge of corrosion protection, grouting, guniting and shotcreting.

Course Description

Unit-1	**Serviceability and Durability of Concrete Structures**	**6 Hours**

Serviceability and Durability of Concrete Structures: Quality assurance for concrete construction as built environment, Concrete properties viz strength, permeability, thermal properties and cracking. Effects due to climate, temperature, chemicals, wear and erosion on, Design and construction errors, Corrosion mechanism, Effects of cover thickness and
Cracking, Methods of corrosion protection, Corrosion inhibitors, Corrosion resistant steels, Coatings, Cathode protection.

Unit-2	**Maintenance and Repair Strategies**	**6 Hours**

Maintenance and Repair Strategies: Definitions - maintenance, repair & rehabilitation, Factors of maintenance, Importance, Preventive measures on various aspects, Inspection, Assessment procedure for evaluating a damaged structure, Causes of deterioration, Testing techniques.

Unit-3	**Materials for Repair**	**6 Hours**

Materials for Repair: Special concretes and mortar, Concrete chemicals, Special elements for accelerated strength gain, Expansive cement, Polymer concrete, Sulphur infiltrated concrete, Ferro cement, Fiber reinforced concrete.

Unit-4	**Techniques for Repair**	**6 Hours**

Techniques For Repair: Rust eliminators and polymers coating for rebars during repair foamed concrete, mortar and dry pack, vacuum concrete,

Unit-5	Grout, Gunite and Shotcrete	6 Hours
Grout, Gunite and Shotcrete: Epoxy injection, Mortar repair for cracks, Shoring and underpinning. Maintenance and rehabilitation of bridges, dams and offshore structures.		
Unit-6	**Examples of Repair to Structures**	**6 Hours**
Examples of Repair to Structures: Repairs to overcome low member strength, Deflection, Cracking, Chemical disruption, Weathering, Wear, Fire, Leakage, Marine exposure. Engineered demolition techniques for dilapidated structures, Case studies.		
Learning Resources:		
Text Books **1)** Repair of Concrete Structures R. T. Allen and S.C. Edwards Blakie and Sons. **2)** Concrete Structures Denison Campbell, Allen and Harold Roper Materials, Maintenance and repair, Longman Scientific and Technical UK, 1991.		
Reference Books **1)** Training Course notes on Damage Assessment and repair in Low-Cost Ho using Santhakumar.		
MOOC / NPTEL/YouTube Links **1)** NPTEL/ Swayam/ MOOCs on Repair and Rehabilitation of Structures.		

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCMPE1051 Course Name: Advanced Construction Techniques

Teaching Scheme	Credit	Evaluation Scheme
Lectures: 03 Hours/Week	03	ISE: 40 Marks ESE: 60 Marks

Prerequisites:

1. Basics concepts of engineering management.
2. Use of Advanced Construction Techniques for construction work.

Course Objectives: The objective of the course is to

1. To understand various composite construction process and design formwork.
2. To aware about new construction material and familiar with land reclamation techniques as well as slip formwork.
3. To familiar with construction techniques of power plants, retaining structures, concrete pavements and rehabilitation of bridges.
4. To study advanced techniques like compacted concrete reinforced earth construction etc.

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

CO1	Understand various composite construction process and design formwork.
CO2	Use new construction material and familiar with land reclamation techniques as well as slip formwork.
CO3	Familiar with construction techniques of power plants, retaining structures, concrete pavements and rehabilitation of bridges.
CO4	Possess knowledge advanced techniques like compacted concrete reinforced earth construction etc.

Course Content

Unit-1	**Composite Construction & Formwork**	**6 Hours**

Composite Construction: Composite v/s Non composite action, Composite steel - concrete construction.
Formwork: Materials for formwork, special types of formwork, design of formwork.

Unit-2	**New Materials for construction & Land Reclamation**	**6 Hours**

New Materials for construction: such as Geosyntetics, Epoxy resins, Adhesives, MDF (Medium Density Fibre), FRC (Fibre Reinforced Concrete) FRP (Fibre Reinforced Polymer), Polymer based composites
Land Reclamation: Technical progress, drainage for land reclamation, Structural Improvement

Unit-3	**Construction of Power Plant**	**6 Hours**

Construction of Power Plant: Generation, structures, Atomic Power Stations, Thermal Power Stations, Wind- Mills.

Unit-4	**Rehabilitation of Bridges & Retaining Structures**	**6 Hours**

Rehabilitation of Bridges: Necessity and methods of strengthening, Preservation of Bridges. Retaining Structures: Diaphragm walls, Advanced methods of construction.

Unit-5	Advanced Techniques	6 Hours
Advanced Techniques: Compacted concrete, Vaccum, Ready Mix, Concrete dewatering in concrete slab construction, Reinforced earth construction, Foundation strengthening.		
Unit-6	**Construction of Concrete Pavement & Slip Formwork:**	**6 Hours**
Construction of Concrete Pavement: Vacuum processing, Revibrated concrete, Roller – compacted concrete. Slip Formwork: Slip form paving in pavement construction using wet mix macadam in road construction.		
Learning Resources:		
Text Books **1)** Formwork design and construction – Wynn. **2)** Formwork construction and practices – John. G. Richardson. **3)** Technical progress in land reclamation by B. G. Shtepa.		
Reference Books **1)** Water Power Engineering by Dandekar, Sharma. **2)** Bridge Engineering by Ponnuswamy. **3)** Monthly: Civil Engineering & Construction Review. **4)** Handbook of composite construction Enginnering by G. M. Subnis.		
MOOC / NPTEL/YouTube Links **1)** NPTEL/ Swayam/ Moocs on Advanced Construction Techniques.		

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCMPE1052 Course Name: Entrepreneurship In Construction

Teaching Scheme	Credit	Evaluation Scheme
Lectures: 03 Hours/Week	03	ISE: 40 Marks ESE: 60 Marks

Prerequisites:

1) Basics concepts of engineering management.
2) Role of Entrepreneurship in construction work.

Course Objectives: The objective of the course is to

1) To understand importance of entrepreneurship in construction industry.
2) Follow concept of project appraisal, financial analysis, problems in construction industry.
3) Student will be aware of different aspect of civil engineering entrepreneurship for small- and large-scale areas.

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

CO1	Understand importance of entrepreneurship in construction industry.
CO2	Follow concept of project appraisal, financial analysis, problems in construction industry.
CO3	Student will be aware of different aspect of civil engineering entrepreneurship for small- and large-scale areas.

Course Content

Unit-1	**Meaning and importance of entrepreneurship**	**6 Hours**

General: Meaning and importance of entrepreneurship. Definition and objectives of industrial estates, Awareness and requirements of an entrepreneur, Organization dealing with entrepreneurship Govt. and private. Socio-economic bases - Occupation impact on line of manufacture, the impact of education.

Unit-2	**Project**	**6 Hours**

Project: Selection by identification, Size, Appropriate technology, Cost and time scheduling. Project reports - Backing market survey, demand and supply relation, equipment cost, space and merit analysis recommendations.

Unit-3	**Project Appraisal**	**6 Hours**

Project Appraisal: Technical feasibility, Commercial soundness, financial capability, Economic viability, Managerial aspects.

Unit-4	**Financial Analysis**	**6 Hours**

Financial Analysis: Resources - loans, terms and conditions, Working capital, Repayment, Security, Financial institutes.

Unit-5	**Problems Faced by Enterprise**	**6 Hours**

Problems Faced by Enterprise: Marketing, Finance and taxes, Raw and finished materials. Government policies.

Unit-6	Civil Engineering Entrepreneurship	6 Hours
Civil Engineering Entrepreneurship: Small scale, large scale, Optimum size, Typical areas and preparation of specialized aspects.		
Learning Resources:		
Text Books **1)** Entrepreneurship & Growth of Enterprise in Industrial Estates, Dr. N. Gangadhar Rao (Deep & deep Publication) **2)** A Complete Guide To Successful Entrepreneurship, G.N. Pandey (Vikas Publication House).		
Reference Books **1)** Project Appraisal Prasanna Chandra. **2)** Entrepreneurship, Government of India Publication.		
MOOC / NPTEL/YouTube Links **1)** NPTEL/ Swayam/ Moocs on Entrepreneurship		

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCMPE1053 Course Name: Value Engineering and Valuation

Teaching Scheme	Credit	Evaluation Scheme
Lectures: 03 Hours/Week	03	ISE: 40 Marks ESE: 60 Marks

Prerequisites:

1. Basics concepts of engineering management.
2. Use of Value Engineering and Valuation in construction work.

Course Objectives: The objective of the course is to

1. To understand the concept of Value engineering, Value analysis and Methodologies.
2. To understand life cycle costing techniques.
3. To study the applications of value engineering to construction projects.
4. To understand valuation and valuation report preparation for different types of assets.

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

CO1	Understand the concept of Value engineering, Value analysis and Methodologies.
CO2	Possess knowledge of life cycle costing techniques.
CO3	Understand the applications of value engineering to construction projects.
CO4	Understand valuation and valuation report preparation for different types of assets.

Course Content

Unit-1	**Value Engineering & Value Analysis**	**6 Hours**

Value Engineering: Importance to contractors, Potential VE applications value: Basic and secondary functions, Factors contributing to value such as Aesthetic, Ergonomic, Technical. Value Analysis: 10 Commandments of value analysis, Value analysis team; principles of value analysis, Elements of job plan Viz. orientation, Information, presentation. Implementation, Follow up action, benefits of value analysis.

Unit-2	**Life Cycle Costing**	**6 Hours**

Life Cycle Costing: Forecasting of Capital as well as Operating and Maintenance cost, time value, Present worth analysis, DCF methods, ROR analysis, sensitivity analysis concept.

Unit-3	**Value Engineering Methodology**	**6 Hours**

Value Engineering Methodology: Orientation phase, Information phase, Function Analysis phase, Creative Phase, Evaluation Phase, Development Phase, Presentation Phase, Implementation Phase.

Unit-4	**Application of Value Engineering to Construction Projects**	**6 Hours**

Application of Value Engineering to Construction Projects: VE during the Planning Phase of a Construction Project, VE during the Design Phase of a Construction Project, VE during the Construction Phase of a Construction Project.

Unit-5	**Valuation**	**6 Hours**

Valuation: Types of value, purposes of valuation factors affecting value. Different methods of valuation for different types of assets such as land and building, horticulture, historical places.

Unit-6	Valuation Report	6 Hours
Valuation Report: Valuation Report, contents, standard formats, Case study of any one Report.		
Learning Resources:		
Text Books **1)** Value Engineering: Analysis And Methodology By Del Younke. **2)** Industrial Engg. & Mgt., O.P.Khanna, Dhanpat Rai Publicaton **3)** Industrial Organization & Engg. Economics, T.R.Banga, S.C.Sharma, Khanna Publicaton **4)** Estimating and Costing in Civil Engineering: Theory and Practice B.N Dutta Published S. Dutta & Company, Lucknow. **5)** Estimating and Costing By: Rangwala Published By: Charotar Publishing House.		
Reference Books **1)** Estimating, Costing Specifications & valuation in Civil EngineeringBy: M.Chakraborty. **2)** Estimating and Costing By: G.S.Birdie. **3)** Practical Information for Quantity Surveyors, Property valuers, Architects Engineers and Builders, P.T.Joglekar, Pune Vidyarthi Griha Prakashan, 2008 reprint.		
MOOC / NPTEL/YouTube Links **1)** NPTEL/ Swayam/ Moocs on Value Engineering & Valuation		

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCMLC106P Course Name: Laboratory Practice

Teaching Scheme	Credit	Evaluation Scheme
Practical: 04 Hours/Week	02	ISA: 25 Marks
		POE: 25 Marks

Prerequisites:

1) Basics concepts of engineering management.
2) Use of 4M's and Time in construction work.

Course Objectives: The objective of the course is to

1) To formulate report on construction project site undertaken.
2) To apply theoretical concept of project management and equipment management to a case study.

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

CO1	Formulate report construction project site undertaken.
CO2	Apply theoretical concept of project management and equipment management to a case study.

Course Content

Students are required to visit one or more construction project site and prepare visit Reports covering following aspects of live construction projects.

1. Site organization.
2. Material management.
3. Personnel Management.
4. Detailed Specification of Equipment.
5. Cycle Time and Output Calculation.
6. Quality Management.
7. Safety Measures on Construction Site.

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCMSW107T Course Name: Seminar-I

Teaching Scheme	Credit	Evaluation Scheme
Practical: 02 Hours/Week	01	ISA: 50 Marks

Prerequisites:

1) Basics concepts of engineering management.
2) Literature review.

Course Objectives: The objective of the course is to

1) To understand, develop research ability and present the knowledge gained from curriculum.
2) To study the recent trends, technological innovations in civil engineering construction management field.
3) To learn how to prepare, seminar research project topic report and enhance presentation skills.

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

CO1	Understand, develop research ability and present the knowledge gained from curriculum.
CO2	Study the recent trends, technological innovations in civil engineering construction management field.
CO3	Learn how to prepare seminar research project topic report and enhance presentation skills.
CO4	Prepare final report (25-30 pages) and PPT in hard and soft format.

Course Content

i) Seminar - I should be based on the literature survey on any topic relevant to civil engineering (construction & management) (Should be helpful for selecting a probable title of the dissertation). For this course, postgraduate is expected to learn, investigation, methodologies, study relevant research papers, correlate work of various authors/researchers critically, study the concepts techniques & prevailing results, analyze those and prepare a seminar report (25-30 pages of A4 size sheets and submit it in IEEE format) on all these aspects.

ii) Postgraduate has to deliver seminar presentation in front of the faculty of thedepartment and his classmates. The concerned faculty should assess thecandidates based on quality of seminar work carried out, preparation andunderstanding of candidates. Some marks should be reserved for the candidate's attendance.

Learning Resources:

1. Relevant reference books, journal publications, conferences publications, magazines, openweb site sources, ASCE. Science direct, NPTEL on selected topic of seminar.

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCMPCC201 Course Name: Construction Contracts and Legal Aspect

Teaching Scheme	Credit	Evaluation Scheme
Lectures: 03 Hours/Week	03	ISE: 40 Marks ESE: 60 Marks

Prerequisites:

1) Basics concepts of engineering management.
2) Use of Construction Contracts and Legal Aspect in construction activities.

Course Objectives: The objective of the course is to

1) To study salient features of Indian contract act, Arbitration act and process of contract administration.
2) Understand knowledge about bailment and FIDIC.
3) To understand provisions of labour laws and relevant acts.
4) To study safety engineering provisions and knowledge.

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

CO1	Identify salient features of Indian contract act, Arbitration act and process of contract administration.
CO2	Possess knowledge about bailment and FIDIC.
CO3	Asses provisions of labour laws and relevant acts.
CO4	Apply knowledge of safety engineering.

Course Content

Unit-1	**Professional Practice and Administration Contracts**	**6 Hours**

Professional Practice and Administration Contracts: The standard form of Building contracts. The right of building owner, Third parties, Indian contract Act, Sale of Goods Act, and Professional Ethics. RERA.

Unit-2	**Arbitration and Award**	**6 Hours**

Arbitration and Award: Indian Arbitration Act, Arbitration Agreement, Conduct of Arbitration, Power and Duties of Arbitration, Rules of Evidence, E- Tendering, Preparation and publication of ward, Methods of Enforcement impending and Awards.

Unit-3	**Bailment & International Contracting**	**6 Hours**

Bailment: Nature of Transactions, Delivery of Bailee, care to be taken, Bailee's Responsibility, Termination, Bailment of pledges.
International Contracting: Meaning Scope, Nature, Distinctive Features of FIDIC.

Unit-4	**Injunction**	**6 Hours**

Injunction: Types Temporary, Perpetual, Mandatory when referred, Indemnity and Guarantee, Difference between the two, The Contract of Guarantee and Indemnity, Consideration of Guarantee, Surety's Liability, Discharge of Surety.

Unit-5	Industrial Act and Labour Laws	6 Hours
Industrial Act and Labour Laws: Industrial Dispute Act, Payment of Wages Act.		
Unit-6	**Safety Engineering**	**6 Hours**
Safety Engineering: Sources, Classification, Cost of Accident and Injury, Workmen's Compensation Act, Safety Program, Safety Organization. Employers Liability Act, Employers Insurance Act, Safety and Health Standards Occupations Hazards, personal Protective equipment, preventive measures Factory Act, Fatal accidents		
Learning Resources:		
Text Books **1)** Indian Arbitration Act by B.S.Patil. **2)** Legal Aspects of Building and Engineering Contracts by B. S.Patil. **3)** Indian Contract Act Avatarsingh.		
Reference Books **1)** Indian Contract Act. **2)** Safety Engineering, Govt. of India Publicaiton. **3)** Professional Practice, Roshan Namavati. **4)** Indian contract Act Jhamb.		
MOOC / NPTEL/YouTube Links **1)** NPTEL/ Swayam/ Moocs on Construction Contracts and Legal Aspect		

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCMPCC201T Course Name: Construction Contracts and Legal Aspect Tutorial

Teaching Scheme	Credit	Evaluation Scheme
Tutorial: 01 Hours/Week	01	ISA: 25 Marks

Prerequisites:

1) Basics concepts of engineering management.
2) Use of Construction Contracts and Legal Aspect in construction activities.

Course Objectives: The objective of the course is to

1) To study salient features of Indian contract act, Arbitration act and process of contract administration.
2) Understand knowledge about bailment and FIDIC.
3) To understand provisions of labour laws and relevant acts.
4) To study safety engineering provisions and knowledge.

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

CO1	Identify salient features of Indian contract act, Arbitration act and process of contract administration.
CO2	Possess knowledge about bailment and FIDIC.
CO3	Asses provisions of labour laws and relevant acts.
CO4	Apply knowledge of safety engineering.

Course Content

The term work part should include One assignment on unit nos. 1,2 ,3, 4 and Two assignments on unit nos. 5 & 6, Total = 08

Learning Resources:

Text Books

1) Indian Arbitration Act by B.S.Patil.
2) Legal Aspects of Building and Engineering Contracts by B. S.Patil.
3) Indian Contract Act Avatarsingh.

Reference Books

1) Indian Contract Act.
2) Safety Engineering, Govt. of India Publicaiton.
3) Professional Practice, Roshan Namavati.
4) Indian contract Act Jhamb.

MOOC / NPTEL/YouTube Links

1) NPTEL/ Swayam/ Moocs on Construction Contracts and Legal Aspect.

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCMPCC202 Course Name: Construction Methods and Techniques

Teaching Scheme	Credit	Evaluation Scheme
Lectures: 03 Hours/Week	03	ISE: 40 Marks ESE: 60 Marks

Prerequisites:

1) Basics concepts of engineering management.
2) Use of various Construction Methods and Techniques for construction work.

Course Objectives: The objective of the course is to

1) To understand underground, underwater and steel construction methods.
2) To study the use of cofferdams, caissons and piles for foundation construction.
3) To understand, follow and apply prefabrication construction method.
4) To make Familiarise with vibration-controlled foundation, formworks and retaining walls.

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

CO1	Understand underground, underwater and steel construction methods.
CO2	Use cofferdams, caissons and piles for foundation construction.
CO3	Follow and apply prefabrication construction method.
CO4	Familiarize with vibration-controlled foundation, formworks and retaining walls.

Course Content

Unit-1	**Underground and Underwater Construction**	**6 Hours**

Underground and Underwater Construction: Shaft sinking, Tunnel driving in hard and soft strata, Surge chambers - Design criteria, loads, assumptions, Types of surge chambers. Underground power stations - Principal types. Underground railway stations - Construction and Maintenance, Parking places. Bedding of conduits. Underwater Construction Problems encountered, Underwater drilling, blasting, concreting and welding, Underwater structural concrete walls. Protection of structures against attack by ground.

Unit-2	**Steel Construction**	**6 Hours**

Steel Construction: Launching of steel, Pre-stressed, Precast bridges. Site erection methods: Side showing method for road railway bridges. End launching Using cranes and gantries, Cantilever method, Floatation method, Incremental launching for concrete girders. Case studies of steel cantilevers. Arches, Simply supported beams, Suspension, Cable stayed bridge launching. Moving formwork, staging, shuttering, centering. Dismantling for maintenance, repairs and inspection of bridges. Testing of bridges.

Unit-3	**Coffer Dams and Caissons**	**6 Hours**

Coffer Dams and Caissons: Land cofferdams, Soldier beam and horizontal sheeting techniques, Design considerations, Sinking rate, Open caissons, Pneumatic caissons. Machine bored caissons. Drop caissons. Details of design and construction, Case Studies. Pilling – behavior of single pile and a group of piles during driving, Under loads- ultimate loads on driven and cast in situ piles, Construction details of precast piles, Pre-stressed piles, Steel piles, Friction piles. Driven piles, Bored

piles, Large diameter bored piles, Negative and positive friction.		
Unit-4	**Pre-fabricated Construction**	**6 Hours**
Pre-fabricated Construction: Types, Standardization of components, Size and economy, Fabrication techniques, Transportation, Erection, Jointing, Fabrication techniques.		
Unit-5	**Vibration Controlled Foundation**	**6 Hours**
Vibration Controlled Foundation: Free and forced vibration, Damping, Vibrating machine, Weight of foundation, Natural frequency of machine foundation and soil system, Design procedure, Causes and effects of vibration transmitted through soil.		
Unit-6	**Formwork & Retaining Walls**	**6 Hours**
Formwork: Types, components and design of formwork, Special types of formworks such as slip form: Removal of formwork, Cost aspect of formwork. Retaining Walls: Types, Construction techniques.		
Learning Resources:		
Text Books **1)** Wells and Caissons – Vijaya Singh, New Chand & Bros, Roorkee. **2)** Modem Foundations- N-P-Kurion, Tata McGraw, Hill pub, co. Ltd. **3)** Foundation Engineering- G. A. Leonards Mcgraw Hills Co. Ltd. **4)** Prefabricated Construction by Mokk.		
Reference Books **1)** Construction Planning Equipments and Methods R.L Peurifey. **2)** Formwork Design and Construction-Wynn **3)** Hand Book of Civil Engineering- stubb **4)** Foundation Engineering- Tomlinson **5)** Cofferdams- While and prentice- Columbia University Press New-York		
MOOC / NPTEL/YouTube Links **1)** http://nptel.ac.in/ **2)** http://www.courses.com/civil-engineering **3)** www.youtube.com		

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCMPCC202T Course Name: Construction Methods and Techniques Tutorial

Teaching Scheme	Credit	Evaluation Scheme
Tutorial: 01 Hours/Week	01	ISA: 25 Marks

Prerequisites:

1) Basics concepts of engineering management.
2) Use of various Construction Methods and Techniques for construction work.

Course Objectives: The objective of the course is to

1) To understand underground, underwater and steel construction methods.
2) To study the use of cofferdams, caissons and piles for foundation construction.
3) To understand, follow and apply prefabrication construction method.
4) To make Familiarise with vibration-controlled foundation, formworks and retaining walls.

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

CO1	Understand underground, underwater and steel construction methods.
CO2	Use cofferdams, caissons and piles for foundation construction.
CO3	Follow and apply prefabrication construction method.
CO4	Familiarize with vibration-controlled foundation, formworks and retaining walls.

Course Content

The term work part should include One assignment on unit nos. 1,2 ,3, 4 and Two assignments on unit nos. 5 & 6, Total = 08

Learning Resources:

Text Books

1) Wells and Caissons – Vijaya Singh, New Chand & Bros, Roorkee.
2) Modem Foundations- N-P-Kurion, Tata McGraw, Hill pub, co. Ltd.
3) Foundation Engineering- G. A. Leonards Mcgraw Hills Co. Ltd.
4) Prefabricated Construction by Mokk.

Reference Books

1) Construction Planning Equipments and Methods R.L Peurifey.
2) Formwork Design and Construction-Wynn
3) Hand Book of Civil Engineering- stubb
4) Foundation Engineering- Tomlinson
5) Cofferdams- While and prentice- Columbia University Press New-York

MOOC / NPTEL/YouTube Links

1) http://nptel.ac.in/
2) http://www.courses.com/civil-engineering
3) www.youtube.com

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCMPE2031 Course Name: Management Information System

Teaching Scheme	Credit	Evaluation Scheme
Lectures: 03 Hours/Week	03	ISE: 40 Marks ESE: 60 Marks

Prerequisites:

1) Basics concepts of engineering management.
2) Role of Management Information System for construction work.

Course Objectives: The objective of the course is to

1) Understand fundamentals of engineering economics
2) Study the concepts of economic appraisal of projects and get expertise in using appraisal techniques
3) Understand the importance of risk and study fundamentals of risk management
4) Aware about various options available for financing projects

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

CO1	Understand fundamentals of engineering economics
CO2	Study the concepts of economic appraisal of projects and get expertise in using appraisal techniques
CO3	Understand the importance of risk and study fundamentals of risk management
CO4	Aware about various options available for financing projects

Course Content

Unit-1	**Introduction to Management Information System**	**6 Hours**
Introduction: Definition Role, Impact, Evolution, Structure of MIS in organization.		
Unit-2	**Decision Making**	**6 Hours**
Decision Making: Programmed and non-programmed decisions, Stages in decision making, Concepts of Information, Systems Theory, Decision Support System		
Unit-3	**Computers in MIS**	**6 Hours**
Computers in MIS: Hard ware, Software, Communication networks Office automation		
Unit-4	**Data Management**	**6 Hours**
Data Management: Collection and analysis of data, Database Management system.		
Unit-5	**Applications of MIS**	**6 Hours**
Applications of MIS: Materials, Finance, HRD, Marketing and Service sector		
Unit-6	**Implementation and Maintenance of MIS**	**6 Hours**
Implementation and Maintenance of MIS: Socio-technical approach, Factors of success and failure, Quality assurance of MIS.		

Learning Resources:
Text Books **1)** Management Information System, Jawadekar W. S. (Tata McGraw Hill) **2)** Management Information System, Jerome Kanter.
Reference Books **1)** The Management Information System Gary W. Dickson Janes C. Weatherbe, McGraw Hill Book company. **2)** Information System For Modern Management, Robert G. Murdick. Joel E Ross, Janes R. Claggeett.
MOOC / NPTEL/YouTube Links **1)** http://www.courses.com/civil-engineering **2)** http://www.youtube.com/user/nptelhrd **3)** www.khanacademy.org

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCMPE2032 Course Name: Computational Methods and Optimization Techniques

Teaching Scheme	Credit	Evaluation Scheme
Lectures: 03 Hours/Week	03	ISE: 40 Marks ESE: 60 Marks

Prerequisites:

1) Basics concepts of engineering management.
2) Role of Computational Methods and Optimization Techniques for construction work.

Course Objectives: The objective of the course is to

1) To understand the concept of error and its propagation.
2) To understand various methods to solve linear, nonlinear and differential equations.
3) To make Familiar with optimization models.
4) To study the Applications of linear programming and dynamic programming for solving mathematical models.

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

CO1	Understand the concept of error and its propagation.
CO2	Use various methods to solve linear, nonlinear and differential equations.
CO3	Familiar with optimization models.
CO4	Apply linear programming and dynamic programming to solve mathematical models.

Course Content

Unit-1	**Error and its Propagation**	**6 Hours**
Error and its Propagation - Solving non-linear equations, curve fitting, Linear and non-linear regression, Least squares regression, Gauss- Newton method, Interpolation, Statistical concepts, Linear correlation.		
Unit-2	**Linear & Nonlinear Equations**	**6 Hours**
Linear & Nonlinear Equations - Solution of simultaneous linear and non-linear equations, direct and iterative methods.		
Unit-3	**Numerical Differentiation and Numerical Integration**	**6 Hours**
Numerical Differentiation and Numerical Integration - Numerical solutions of ordinary differential equations, systems of ODEs, Runge-kutta method.		
Unit-4	**Optimization**	**6 Hours**
Optimization– Types of optimization models, objective function and constraints set, Convex and Concave functions, Objectives of optimization models.		
Unit-5	**Linear Programming**	**6 Hours**
Linear Programming - Simplex Method, Duality, Sensitivity analysis, Transportation and assignment models. Nonlinear programming- Single variable and multiple variables, Quadratic Programming.		

Unit-6	Dynamic Programming	6 Hours
Dynamic Programming – Principle of optimality. Integer programming Cutting plane algorithm, Simulation – Monto Carlo Method.		
Learning Resources:		
Text Books **1)** Operation Research by Taha. **2)** Numerical Methods for engineers, Chapra and Kanale. **3)** Quantitate Techniques - J. K. Sharma.		
Reference Books **1)** Optimisation – S. S. Rao. **2)** Numerical Methods – E Balaguruswamy.		
MOOC / NPTEL/YouTube Links **1)** http://nptel.ac.in/ **2)** http://swayam.gov.in/ **3)** http://www.courses.com/civil-engineering **4)** http://www.youtube.com/user/nptelhrd **5)** www.khanacademy.org		

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCM PE2033 Course Name: Resource Management

Teaching Scheme	Credit	Evaluation Scheme
Lectures: 03 Hours/Week	03	ISE: 40 Marks ESE: 60 Marks

Prerequisites:

1) Basics concepts of engineering management.
2) Role of Resource Management for construction activities.

Course Objectives: The objective of the course is to

1) Understand the resource requirements of different kinds of civil engineering projects.
2) Know different techniques of classification and codification of materials. They will be able to understand the purchase and procurement procedures and get acquainted with the concept of MRP, EOQ, JIT, MMS, QC, etc.
3) Understand the different kinds of equipment and knowledge gained will help them to make optimum utilization of equipment on construction site.
4) Understand the Human resource management (HRM) processes, functions, changes and challenges in today's emerging organizational perspective.

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

CO1	Understand the resource requirements of different kinds of civil engineering projects.
CO2	Know different techniques of classification and codification of materials. They will be able to understand the purchase and procurement procedures and get acquainted with the concept of MRP, EOQ, JIT, MMS, QC, etc.
CO3	Understand the different kinds of equipments and knowledge gained will help them to make optimum utilization of equipments on construction site.
CO4	Understand the Human resource management (HRM) processes, functions, changes and challenges in today's emerging organizational perspective.

Course Content

Unit-1	**Material Management**	**6 Hours**

Material Management: Importance of materials management and its role in construction industry-scope, objectives and functions, integrated approach to materials management, Role of materials manager.

Unit-2	**Material Planning and Analysis**	**6 Hours**

Material Planning and Analysis: Classification and Codification of materials of construction, ABC analysis-Procedure and its use, Standardization in materials and their management, Procurement, identification of sources of procurement, vendor analysis, Vendor analysis concept of (MRKP) Material requirement planning, planning, purchase procedure, legal aspects.

Unit-3	**Inventory Management**	**6 Hours**

Inventory Management: Inventory Control techniques. EOQ, Advantages and limitation of use of EOQ, Periodic ordering, order point control, safety stock, stock outs, application of ABC analysis in inventory control, Stores Management: Receipt and inspection, care and safety in handling, loss on

storage, wastage, Bulk purchasing, site layout and site organization, scheduling of men, materials and equipment.		
Unit-4	**Applications of MMS**	**6 Hours**
Applications of MMS: Materials Management Systems in materials planning, procurement, inventory, control, cost control etc.		
Unit-5	**Equipment Management**	**6 Hours**
Equipment Management: Working out number of construction equipment required based on the individual equipment work cycle, and based on the total time available and quantum of work, working out the total hourly cost and the cost per unit of item for the various construction machinery, Concept of equipment log book, Concept of equipment selection based on optimal used.		
Unit-6	**Human Resource Development**	**6 Hours**
Human Resource Development: Flow diagram of human resource development and human resource management, Training, competency development, capacity building of resources required at grass root level and at the managerial level in construction.		
Learning Resources:		
Text Books **1)** K. S. Menon, Purchasing and Inventory Control , Wheeler Publication **2)** Dr. Mahesh Verma, Construction equipment planning and applications **3)** Peurifoy, Construction planning, equipment and methods, Tata McGraw Hill pub		
Reference Books **1)** Biswajeet Pattanayak, Human Resource Management **2)** Bohlander & Snell, Managing Human Resources		
MOOC / NPTEL/YouTube Links **6)** http://www.courses.com/civil-engineering **7)** http://www.youtube.com/user/nptelhrd **8)** www.khanacademy.org		

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCMPE2041 Course Name: Ground Improvement Techniques

Teaching Scheme	Credit	Evaluation Scheme
Lectures: 03 Hours/Week	03	ISE: 40 Marks ESE: 60 Marks

Prerequisites:

1) Basics concepts of engineering management.
2) Use of Ground Improvement Techniques for construction activities.

Course Objectives: The objective of the course is to

1) To understand the importance of ground improvement.
2) To make Familiar with different ground improvement techniques.
3) Understand the theoretical background for different ground improvement techniques.
4) To Design and apply ground improvement techniques.

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

CO1	Follow the importance of ground improvement.
CO2	Familiar with different ground improvement techniques.
CO3	Understand the theoretical background for different ground improvement techniques.
CO4	Design and apply ground improvement techniques.

Course Content

Unit-1	**Ground Improvement:**	**6 Hours**

Ground Improvement: Definition, objectives, classification. Suitability of different techniques, Preloading - need, preloading without vertical drain, preloading with vertical drain, Dynamic consolidation.

Unit-2	**Stone Column**	**6 Hours**

Stone Column: Design of stone column: unit cell concept, area replacement ratio, spacing and diameter, depth, stress ratio, Load bearing capacity of individual stone column, Settlement of stone column, Failure mechanism.

Unit-3	**Ground Anchors**	**6 Hours**

Ground Anchors: components, load transfer mechanism, rock anchors, anchors in granular soil, anchors in cohesive soil, Rock bolt, types, action of rock bolt, Soil nailing, analysis of nailed soil.

Unit-4	**Soil Stabilization**	**6 Hours**

Soil Stabilization: Cement, lime, fly ash, Factors affecting. Grouting - classification, types of grouts, Equipment, design and layout, applications, case histories.

Unit-5	**Earth Reinforcement**	**6 Hours**

Earth Reinforcement: Mechanism and concept, Stress strain relationship of reinforced soil, Design theories, Stability analysis of retaining wall - tie back analysis, coherent gravity analysis, Application areas of earth reinforcement.

Unit-6	Geosynthetics	6 Hours
Geosynthetics: Types, functions, Application of geo synthetics: reinforcement, separator, filter, drainage, Selection of geo synthetics; damage and durability of geo synthetics.		
Learning Resources:		
Text Books **1)** Ground improvement techniques by Dr. P Purushothma Raj. **2)** An introduction to ground improvement engineering by Satyendra Mittal. **3)** Ground improvement techniques by Nihar Ranjan Patra. **4)** Ground improvement by Klaus Kirsch. **5)** Reinforced soil and its engineering applications by Swami Saran.		
Reference Books **1)** Earth reinforcement and soil structures by Colin JFPJones **2)** An introduction to soil reinforcement and geosynthetics by G. L.SivakumarBabu **3)** Geotechnical engineering by Shashi K Gulhati and Manoj Datta.		
MOOC / NPTEL/YouTube Links **1)** http://www.courses.com/civil-engineering **2)** http://www.youtube.com/user/nptelhrd		

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCM PE2042 Course Name: Site Investigation Methods and Practices

Teaching Scheme	Credit	Evaluation Scheme
Lectures: 03 Hours/Week	03	ISE: 40 Marks ESE: 60 Marks

Prerequisites:

1) Basics concepts of engineering management.
2) Applications of Site Investigation Method and Practice for construction work.

Course Objectives: The objective of the course is to

1) To study importance of site investigation in Civil Engineering process.
2) Describe different site investigation methods & non-destructive tests.
3) To identify the various soil exploration methods for soil sampling.
4) Examine the various field and lab test on soil also interpret how to write the technical report for site investigation.

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

CO1	State the importance of site investigation in Civil Engineering process.
CO2	Describe different site investigation methods & non-destructive tests.
CO3	Identify the various soil exploration methods for soil sampling.
CO4	Examine the various field and lab test on soil also interpret how to write the technical report for

Course Content

Unit-1	**Introduction to Site investigation**	**6 Hours**

Introduction to Site investigation: The importance of site investigation, purposes of a site investigation, Objectives, Need for site investigation, Advantages of site investigation, Phases in site investigation process, Approach to site investigation.

Unit-2	**Methodology of Site Investigation**	**6 Hours**

Methodology of Site Investigation: Preliminary site investigation, preliminary desk study, Topographical maps, Geological records, Mining records, Air-photography and remote sensing, Photogrammetry, Air-photo interpretation, Site walk-over survey, Reconnaissance of site works.

Unit-3	**Site Investigation using Non-Destructive Tests**	**6 Hours**

Site Investigation using Non-Destructive Tests: Introduction, Electrical Methods, Magnetic Methods, Gravity Methods, Acoustic Emission Methods, Seismic Methods.

Unit-4	**Site investigation using in situ testing**	**6 Hours**

Site investigation using in situ testing: Introduction, Penetration testing - Standard penetration test & Cone penetration test, Strength and compressibility testing - Field vane shear test, Pressure meter test, Plate loading test.

Unit-5	**Sampling**	**6 Hours**

Sampling: Introduction, Sample sizes, Soil Disturbance, Soil disturbance during drilling, Soil disturbance during sampling, Disturbance after sampling, Undisturbed sampling techniques, Sand Sampling, Preparation of disturbed samples for testing, Preparation of undisturbed samples for testing.

Unit-6	Laboratory testing for site investigation & Technical Report writing	6 Hours

Laboratory testing for site investigation: Introduction, Purpose of soil testing, Purpose & Significance of following test – Soil classification tests , Particle size distribution tests (Sieve analysis, Hydrometer analysis) , Plasticity tests (Liquid limit, Cone penetrometer test, Plastic limit) ,Compaction tests (Proctor compaction test) , Particle density(Specific gravity) determination ,Tests for Geotechnical parameters - Strength tests (CBR test, Lab vane test, Direct shear test, Triaxial test) ,Seepage and permeability tests.
Technical Report writing: Standard format for a Site Investigation.

Learning Resources:

Text Books

1) Site investigation by Clayton, Mathews and Simons.
2) Instrumentation in geotechnical engineering by K.R. Saxena and V.M. Sharma.
3) Site Investigation Practice by Joyce, M.D.; ESFN. SPON Publishers, 1982.

Reference Books

1) Hvorslev M.J. Subsurface exploration and sampling of soils for Civil Engg purposes.
2) Geotechnical Engineering Investigation Manual by R.E. Hunt, Mc Graw Hill Co. New York.
3) Compendium of Indian Standards on Soil Engineering Parts 1 and II 1987 - 1988.
4) Geotechnical and Geophysical Site Characterization, An-Bin Huang, Paul W Mayne, CRC Press, 2008, ISBN 0415469368.

MOOC / NPTEL/YouTube Links

1) http://www.courses.com/civil-engineering
2) http://www.youtube.com/user/nptelhrd

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCMPE2043 Course Name: Environmental Impact Assessment

Teaching Scheme	Credit	Evaluation Scheme
Lectures: 03 Hours/Week	03	ISE: 40 Marks ESE: 60 Marks

Prerequisites:

1. Basics concepts of engineering management.
2. Role of Environmental Impact Assessment for construction work.

Course Objectives: The objective of the course is to

1. To understand the fundamental concepts of EM and EIA.
2. To trace the evolution of EIA and use it as EM tool.
3. To apply environment impact assessment process for construction projects.
4. To prepare project report comply with environmental clearance procedure.

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

CO1	Understand the fundamental concepts of EM and EIA.
CO2	Trace the evolution of EIA and use it as EM tool.
CO3	Apply environment impact assessment process for construction projects.
CO4	Prepare project report comply with environmental clearance procedure.

Course Content

Unit-1	**Introduction**	**6 Hours**

Introduction: Environmental Management, Definition, Scope, Goals and need. International Environmental Movement, Environmental concerns in India.

Unit-2	**Policies & Program**	**6 Hours**

Policies & Program: Environmental Policies and Programmes in India, Environmental laws and Legislations, Evolution of Indian Legislations, Constitution of India.

Unit-3	**Environmental Impact Assessment**	**6 Hours**

Environmental Impact Assessment: Introduction, Purpose, Evolution, Forecasting environmental changes, Environment Impact Statement (EIS), Strategic Environmental Assessment (SEA). Screening and Scoping.

Unit-4	**EIA Documentation and Processes**	**6 Hours**

EIA Documentation and Processes: Preliminary Stages of EIA, Impact Prediction, Evaluation and Mitigation, Impact on Decisions, Cost Benefit Analysis of EIA of Construction Projects.

Unit-5	**Environmental Auditing**	**6 Hours**

Environmental Auditing: Audit Methodology, Life Cycle Assessment (LCA) – Purpose, Evolution and Stages. Environment Impact Statement (EIS), Requisites of good EIS.

Unit-6	**Environment Management System**	**6 Hours**

Environment Management System: EMS Standards: IS14000, Benefits of Implementing ISO 14001.

Learning Resources:

Text Books

1) Canter L (1996) Environmental Impact Assessment (Second Edition). McGrawHill Publishing Company, NewYork.
2) Environmental Management – Web course http://NPTEL.iitm.ac.in, Prof.T. V. Ramchandra.
3) UNDP (1992) Handbook and Guidelines for Environmental Management and Sustainable Development. Environment and Natural Resources Group, UNDP,New York.

Reference Books

1) World Bank (1997) Environmental Performance Monitoring and Supervision.Update. Environmental Assessment Sourcebook. World Bank, Washington,DC.
2) Lohani, B., J.W. Evans, H. Ludwig, R.R. Everitt, Richard A. Carpenter, and S.L.Tu. 1997. Environmental Impact Assessment for Developing Countries in Asia, Volume 1, Asian Development Bank
3) EIA Notification Published in the Gazette of India, Extraordinary, Part-II, and Section 3, Sub-section (ii) by MINISTRY OF ENVIRONMENT AND FORESTS New Delhi 14th September, 2006.

MOOC / NPTEL/YouTube Links

1) http://www.courses.com/civil-engineering
2) http://www.youtube.com/user/nptelhrd

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCMOE2051 Course Name: Water Power Engineering

Teaching Scheme	Credit	Evaluation Scheme
Lectures: 03 Hours/Week	03	ISE: 40 Marks ESE: 60 Marks

Prerequisites:

1. Basics concepts of engineering.
2. Use of Water Power Engineering.

Course Objectives: The objective of the course is to

1. To understand Energy sources, hydropower scheme, hydrographs & load duration curve.
2. Understand Intake, Surge tank, Design criteria, surge tank, forebay.
3. To study Water conveyance systems, Tunnel and types of power station
4. To understand use of turbines, Pumped storage plants, & Tidal power stations.

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

CO1	Understand Energy sources, hydropower scheme, hydrographs & load duration curve.
CO2	Understand Intake, Surge tank, Design criteria, surge tank, forebay.
CO3	Familiar with Water conveyance systems, Tunnel and types of power station.
CO4	Understand use of turbines, Pumped storage plants, & Tidal power stations.

Course Content

Unit-1	**Introduction to Water Power**	**6 Hours**

Introduction: Sources of energy, types of power station, types of hydro power schemes, Estimation of hydro power available, gross head, net head, storage and pondage, hydrographs, mass curves, flow duration curves. Nature of demand: Load curve, load duration curves, load factor, plant capacity factor, plant use factor, firm power, secondary power.

Unit-2	**Intake**	**6 Hours**

Intake: types, hydraulics of intake, trash rack, transition from gate to conduit, intake gates. Surge tank: Functions and behaviour of the surge tanks, location, types of surge tanks, basic design criteria of simple surge tank, forebay.

Unit-3	**Water Conveyance Systems**	**6 Hours**

Water Conveyance Systems: Power canals – Hydraulic Design Pen- stock : types, hydraulic design and economic diameter pipe, supports, anchor blocks, Tunnels: classification, location and hydraulic design, tunnel linings.

Unit-4	**Power station**	**6 Hours**

Power station: General arrangements of power station, power house, substructure and super structure, main dimensions Underground power station – necessity, types, development and economics. Advantages and disadvantages.

Unit-5	**Turbines**	**6 Hours**

Turbines: Classification of turbines, characteristics of different types, choice of type of turbine, turbine setting and cavitation, Tail Race, draft tubes, function and types, Hydraulic Design

Unit-6	Pumped storage plants & Tidal power stations	6 Hours
Pumped storage plants: purpose and general layout of pumped storage schemes, types, economics of pumped storage plants. Tidal power stations: Classification, general description of different types, depression power plants.		
Learning Resources:		
Text Books **1)** Water Power Engineering – M. M. Dandekar, Vikas Pub. House PVt. Ltd. **2)** Water Power Engineering – P. K. Bhattacharya, Khanna Pub., Delhi **3)** Water Power Engineering – M. M. Deshmukh, Dhanpat Rai and Sons **4)** Water Power Development – E. Mosoni, Vol. I & II. **5)** Hydro-electric Engineering Practice – G. Brown, Vol. I, II & III.		
Reference Books **1)** Hydro – Electric Hand Book – Creager and Justin. **2)** Hydro Power Structures – Varshney		
MOOC / NPTEL/YouTube Links **1)** http://nptel.ac.in/ **2)** http://online.stanford.edu/ **3)** http://www.courses.com/civil-engineering **4)** http://www.youtube.com/user/nptelhrd		

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCMOE2052 Course Name: Waste to Energy

Teaching Scheme	Credit	Evaluation Scheme
Lectures: 03 Hours/Week	03	ISE: 40 Marks ESE: 60 Marks

Prerequisites:

1) Basics concepts of engineering.
2) Use of Waste to Energy.

Course Objectives: The objective of the course is to

1) Understand how to generate energy from various wastes.
2) Learn the concept of Biomass pyrolysis, biomass gasification and combustion.
3) Understand design construction and operation biogas plant.
4) Learn biomass conservation processes applications, Energy program.

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

CO1	Understand how to generate energy from various wastes.
CO2	Learn the concept of Biomass pyrolysis, biomass gasification and combustion.
CO3	Understand design construction and operation biogas plant.
CO4	Learn biomass conservation processes applications, Energy program.

Course Description

Unit-1	**Introduction to Energy from Waste**	**6 Hours**

Introduction to Energy from Waste: Classification of waste as fuel – Agro based, Forest residue, Industrial waste - MSW – Conversion devices – Incinerators, gasifiers, digesters.

Unit-2	**Biomass Pyrolysis**	**6 Hours**

Biomass Pyrolysis: Pyrolysis – Types, slow fast – Manufacture of charcoal – Methods - Yields and application – Manufacture of pyrolytic oils and gases, yields and applications.

Unit-3	**Biomass Gasification**	**6 Hours**

Biomass Gasification: Grasifiers – Fixed bed system – Downdraft and updraft gasifiers – Fluidized bed gasifiers – Design, construction and operation – Gasifier burner arrangement for thermal heating – Gasifier engine arrangement and electrical power – Equilibrium and kinetic consideration in gasifier operation.

Unit-4	**Biomass Combustion**	**6 Hours**

Biomass Combustion: Biomass stoves – Improved chullahs, types, some exotic designs, Fixed bed combustors, Types, inclined grate combustors, Fluidized bed combustors, Design, construction and operation - Operation of all the above biomass combustors.

Unit-5	**Biogas**	**6 Hours**

Biogas: Properties of biogas (Calorific value and composition) - Biogas plant technology and status - Bio energy system - Design and constructional features - Biomass resources and their classification.

Unit-6	Biomass conversion processes	6 Hours
Biomass conversion processes: Thermo-chemical conversion - Direct combustion - biomass gasification - pyrolysis and liquefaction - biochemical conversion - anaerobic digestion - Types of biogas Plants – Applications - Alcohol production from biomass - Bio diesel production - Urban waste to energy conversion - Biomass energy program in India.		
Learning Resources:		
Text Books **1)** Non-conventional Energy, Desai, Ashok V., Wiley Eastern Ltd., 1990. **2)** Biogas Technology - A Practical Hand Book - Khandelwal, K. C. and Mahdi, S. S., Vol. I & II, Tata McGraw Hill Publishing Co. Ltd., 1983. **3)** Food, Feed and Fuel from Biomass, Challal, D. S., IBH Publishing Co. Pvt. Ltd., 1991.		
Reference Books **1)** Biomass Conversion and Technology, C. Y. WereKo-Brobby and E. B. Hagan, John Wiley & Sons, 1996.		
MOOC / NPTEL/YouTube Links **1)** Moocs/ Swayam Courses on Waste to Energy		

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCMOE2053 Course Name: Contracts & Tenders

Teaching Scheme	Credit	Evaluation Scheme
Lectures: 03 Hours/Week	03	ISE: 40 Marks ESE: 60 Marks

Prerequisites:

1. Basics concepts of engineering.
2. Use of Contracts & Tenders.

Course Objectives: The objective of the course is to

1. To understand PWD works.
2. To introduce specification of various items.
3. To understand concept of Contract & Tender.
4. To understand Arbitration act.

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

CO1	Execute the method of PWD for initial work.
CO2	Prepare the specification for various items in construction.
CO3	Execute the contract for civil engineering work.
CO4	Understand contract system for civil engineering work.
CO5	Prepare the tender for civil engineering work.
CO6	Understand arbitration act for civil engineering work.

Course Content

Unit-1	**Public work account**	**6 Hours**

Public work account: Introduction, Structure of PWD, Function of PWD, Administrative approval, Method used in PWD for carrying out of work.

Unit-2	**Specification**	**6 Hours**

Specification: Meaning, Necessity, Importance, Points to be observed in framing Specification, Types of Specification, Preparing detailed Specification of items in civil engineering work.

Unit-3	**Contract**	**6 Hours**

Contract: Introduction, Object of contract, Requirements of valid contract, Overview of Indian contract act 1872, Dispute in contract, international contract.

Unit-4	**Contract system**	**6 Hours**

Contract system: Classification of contractor on the basis of financial limits, Requirements of documents for registration of contractor in PWD, Condition of contract, Rights of contractor.

Unit-5	Tender & tender documents	6 Hours
Tender & tender documents: Tender, Types of tender, Tender form, Tender document, Tender notice, Time limit for tender notice, Acceptance & rejection of tender, Engineering tender documents, concept of e-Tender.		
Unit-6	**Arbitration**	**6 Hours**
Arbitration: Meaning, need of arbitration, Arbitrator, Qualification of arbitrator, Different kind of arbitration according to arbitration act, Procedure of settlement of dispute in contract, Action taken by departmental officer in charge, Arbitration award.		
Learning Resources:		
Text Books **1)** Patil B S, Civil Engineering Contract & Estimates, Orient Longman, Mumbai **2)** B N Datta, Estimating & Costing in civil engineering, USB Publication, New Delhi **3)** Chakraborti M, Estimating Costing Specification & Valuation, ISBN, Kolkata		
Reference Books **1)** Raina V K, Construction Management and Contract Practices, Shroff Publisher, New Delhi.		
MOOC / NPTEL/YouTube Links **1)** Moocs/ Swayam Courses on, Contracts & Tenders		

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCMLC206T Course Name: Software Lab

Teaching Scheme	Credit	Evaluation Scheme
Practical: 02 Hours/Week	01	ISA: 25 Marks

Prerequisites:

1) Basics concepts of engineering management.
2) Application of various software's for construction management.

Course Objectives: The objective of the course is to

1) To study, understand and develop software skills in construction management.
2) To achieve knowledge of planning, scheduling, tracking progress in live construction project.

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

CO1	Able to understand and develop software skills in construction management.
CO2	Able to achieve knowledge of planning, scheduling, tracking progress in live construction project.

Course Content

The students are required to prepare an assignment based on live construction projects using software's like Microsoft project (MSP), Primavera, BIM, etc.
List of Experiments.

- To practice on creating Bar Charts/Gantt Charts.
- To creating CPM/PERT charts for finding out critical path.
- Practice on resource allocation and levelling of resources.
- Practice on Project Monitoring (Cost &Time).
- Plotting and printing of various charts and project.
- Filters and layouts- formatting the display- printing and reports.
- Tracking progress- scheduling options and sequence of progress.

Learning Resources:

Reference Books
1) Software Manuals on MSP, Primavera, BIM, reference books.

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCMSW207T Course Name: Seminar-II

Teaching Scheme	Credit	Evaluation Scheme
Practical: 02 Hours/Week	01	ISA: 50 Marks

Prerequisites:

1. Basics concepts of engineering management.
2. Literature review.

Course Objectives: The objective of the course is to

1) To understand, develop research ability and present the knowledge gained from curriculum.
2) To study the recent trends, technological innovations in civil engineering construction management field.
3) To learn how to prepare, seminar research project topic report and enhance presentation skills.

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

CO1	Understand, develop research ability and present the knowledge gained from curriculum.
CO2	Study the recent trends, technological innovations in civil engineering construction management field.
CO3	Learn how to prepare seminar research project topic report and enhance presentation skills.
CO4	Prepare final report (35-40 pages) and PPT in hard and soft format.

Course Content

I. Seminar - II should be based on the tentative topic of dissertation literature relevant to civil engineering (construction & management).Each postgraduate is expected to learn, investigation, methodologies, study relevant research papers, correlate work of various authors/researchers critically, study the concepts techniques & prevailing results, analyse those and prepare a seminar report (25-30 pages of A4 size sheets and submit it in IEEE format) on all these aspects.

II. Postgraduate has to deliver seminar presentation in front of the faculty of the department and his classmates. The concerned faculty should assess the candidates based on quality of seminar work carried out, preparation and understanding of candidates. Some marks should be reserved for the candidate's attendance.

Learning Resources:

Reference Books

1) Relevant reference books, journal publications, conferences publications, magazines, open web site sources, ASCE. Science direct, NPTEL on selected topic of seminar.

Tatyasaheb Kore Institute of Engineering and Technology
First Year of Master of Technology Construction Management

Course Code: 2501PCCMCV208P Course Name: Comprehensive Viva

Teaching Scheme	Credit	Evaluation Scheme
Practical: 02 Hours/Week	01	ISA: 25 Marks

Prerequisites:

1. Basics concepts of engineering management.
2. Study of all subjects of First Year of Construction Management.

Course Objectives: The objective of the course is to

To verify the continuous assessment and performance of students by External examiner and Internal examiner.

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

CO1	Able to verify their knowledge based on the subjects they have studied in Semester-I and Semester-II.

Course Content

I. The students have to prepare on all subjects which they have studied in Ist and IInd semesters. The viva will be conducted by the External/Internal Examiner jointly and their appointments will be made by university.

II. The in-depth knowledge, preparation and subjects understanding will be assessed by the Examiners.