

I - SEMESTER

BUILDING MANAGEMENT(STUDIO 1)			
Course Code	2MCPM101	CIE Marks	50
Teaching Hours/Week (L: T:P:TW+SL)	42:00:28:50	Viva Marks	50
Total Hours of Pedagogy	120 hrs.	Total Marks	100
Credits	04	Exam Hours	00
Course Learning objectives: - To know the overview of building services in a multi-storeyed building. - To know the working principles and operation and maintenance of HVAC, firefighting, and lifts. - To study the time schedules for the installation of services in buildings. - To study the WBS for services and analyze cost estimates.			
Module-1			
The site (Layout and Organization). Site inputs planning. Site works planning, Temporary construction lighting. Electricity on building site. Winter and Monsoon Construction. Site cost control techniques. Site quality control operations, Quality control of concreting and steel. Improving site productivity. Site accounts. Demolition			
Teaching-Learning Process	Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the fundamentals in building services, Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.		
Module-2			
Introduction to building services (HVAC, firefighting, Electrical, plumbing, STP, and vertical transportation) by the faculty and book review. Introduction to NBC and relevant IS codes.			
Teaching-Learning Process	Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concept of HVAC and fire fighting and ICT and Digital support: Video to demonstrate the process of HVAC and fire fighting. Power point presentation to elaborate Modelling of HVAC. Site visit: To understand the installation and other planning parameters.		
Module-3			
Case studies and industrial visits related to the building techniques, building services and operation and maintenance, analysing the details.			
Teaching-Learning Process	ICT and Digital support: Video to demonstrate the BIM modelling .Power point presentation to elaborate Modelling of BIM. Collaborative and Cooperative learning: Students should work as group work. Preparation of time schedules for activities		
Module-4			
Preparation of work breakdown structure and estimates.			
Teaching-Learning Process	Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the the work breakdown structure. Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same. ICT and Digital support: Video to demonstrate the process of integrated building system. Power point presentation to elaborate integrated building system.		
Module-5			
Preparation of time schedules related to installation of services in building.			

Teaching-Learning Process	<i>Collaborative and Cooperative learning:</i> Students should work as a group and present the compilation of work starting with introduction , Creating activity schedules and estimates.
Assessment Details (both CIE and SEE) The weightage of Continuous Internal Evaluation (CIE) is 50% and for Viva voce is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in Viva is 50% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the sum total of the CIE (Continuous Internal Evaluation) and Viva- Voce taken together. Continuous Internal Evaluation: CIE marks shall be awarded by a committee comprising of Principal/Dean, PG Course Coordinator/HOD and Guide/Co-guide of the department. The CIE marks awarded for PSC (professional supportive course), shall be based on the progress of the student throughout the semester, presentation skills in seminars and submission of the report. Viva voce Examination: 1.The student needs to submit his/her report done throughout the semester, including the data collection for the Viva examination, at least one day prior to the Viva examination to the PG course coordinator/HOD. 2. The Viva-voce will be evaluated by two external examiners appointed by the University along with PG Course coordinator/ guide/ co-guide or an internal examiner. 3. The viva-voce marks awarded for PSC (Professional supportive course), shall be based on the evaluation of report submission, presentation skill and performance in Question-and-Answer session in the ratio 30:10:10. 4. The viva-voce marks list generated is to be signed by both internal and external examiners and submitted to VTU in the sealed cover through the Principal of the institution.	
Suggested Learning Resources: Books 1. Frederick S. Merritt, Jonathan T. Ricketts, Building design and construction Handbook, McGraw-Hill Inc., 5th edition, 1994 2. Fred hall and Roger Greeno, Building Services Handbook, Routledge, 7th edition, 2013 3. . M.David Egan, Architectural Acoustics, J. Ross Pub., 2007 4. Gurcharan Singh, Jagdish Singh, Water Supply & Sanitary Engineering, Standard Publishers Distributors, 2007 5. Shri V.K. Jain, Fire Safety in Buildings, New age publishers, 2010 6. BIS, National Building Code 2005, New Delhi, 2005. 7. Heating , ventilation and air conditioning by James E Braumberg	
Web links and Video Lectures (e-Resources): NPTEL Lecture - Inputs to scheduling: https://youtu.be/psls4kgau8c Work Breakdown Structure in project management https://www.youtube.com/watch?v=9mOXdcgdf_U	

Skill Development Activities Suggested

- Guest Lecture from expert.
- Case Studies :
To choose building projects(High rise buildings) where scope of services to be learnt is more .

Course outcome (Course Skill Set)

At the end of the course the student will be able to:

Sl. No.	Description	Blooms Level
C01	Students will be able to understand importance and typical services installations inside the building.	L2
C02	To understand the working principles and maintenance of HVAC, Firefighting and lifts.	L2
C03	To compile time schedules for installation of services in buildings.	L4
C04	To compile WBS structure for services installation.	L4
C05	To compile cost estimates.	L4

Program Outcome of the CPM Program:

Sl. No.	Description	POs
1	Acquire outstanding fundamental knowledge in the field of Construction Project Management.	PO1
2	Encompass the ability to work in collaboration with interdisciplinary teams.	PO2
3	Demonstrate creativity in the problem-solving process through professional quality graphic presentations and technical drawings.	PO3
4	Acquire outstanding knowledge & software skills for design, construction, resources management and scheduling & Monitoring of projects.	PO4
5	Understanding the diverse needs of values and systems of society and providing sustainable solutions.	PO5
6	Demonstrate design solutions that integrate contextual, social, economic, cultural, ethical, environmental concerns.	PO6
7	Ability to do independent/option-based research and exploration of advanced and emerging topics.	PO7
8	Appraise professional standards and ethical responsibilities as a team member.	PO8

Mapping of COS and POS

	P01	P02	P03	P04	P05	P06	P07	P08
C01	H	M	L	H	0	H	L	L
C02	H	L	M	L	0	0	L	0
C03	H	L	M	L	0	0	L	0
C04	H	L	M	L	0	0	L	0
C05	H	L	M	L	0	0	L	0

H – High , M – Medium, L - Low

I-SEMESTER

PROJECT MANAGEMENT			
Course Code	2MCPM202	CIE Marks	50
Teaching Hours/Week (L: T:P:TW+SL)	56:00:00:64	SEE Marks	50
Total Hours of Pedagogy	120 hrs.	Total Marks	100
Credits	04	Exam Hours	3
Course Learning objectives: - To understand the basic concepts, principles and processes of project management in building and construction projects - To understand the roles and responsibilities of project managers, construction managers and various project stakeholders - To study and create project schedules as per concepts of PERT and CPM. - To understand project crashing and other project planning and optimization methodologies - To introduce basic concepts and techniques for monitoring and controlling of projects.			
Module-1			
INTRODUCTION AND BASICS OF PROJECT MANAGEMENT: Need for management of building/construction projects, Principles and Objectives of Project Management, brief understanding of the study areas in Project Management. Phases of the project, project life cycle, Types of construction projects. Project, Programme and Portfolio Management.			
Teaching-Learning Process	<i>Direct method: The lecture supported by the conventional method of Blackboard and chalk to introduce the concepts. Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</i> <i>Blended learning: Power point presentation to elaborate more on key topics/online video's.</i>		
Module-2			
IMPORTANCE OF PROJECT MANAGER Structure of project organization, management levels, failures and success of a project. Roles & Responsibilities of Project/Construction Managers. STAGES OF PROJECT MANAGEMENT Project planning, project scheduling and project controlling. Project planning, preparing Work Breakdown Structure (W.B.S.), project scheduling using Network Theories – CPM, PERT, Project crashing. Scope control, Cost control, Quality control and Time control.			
Teaching-Learning Process	<i>Direct method : : Lecture supported by conventional method of Blackboard and chalk to introduce the concepts Discussions, Debate, Industry interactions, and research paper/new s paper reading and inferences from the same.</i> <i>ICT and Digital support: : Power point presentation to elaborate more on key topics.</i>		
Module-3			
PROJECT MANAGEMENT Development of Project Charter and Project Management Plan. PROJECT MANAGEMENT AREAS Scope Management, Resource Management, Stakeholder Management, Change Management, Risk Management, Procurement Management, Safety Management, Quality Management, Communication Management and Strategy Management.			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</i> <i>Blended learning: Power point presentation to elaborate more on key topics.</i>		

Module-4	
Organization Breakdown Structure, Resource Levelling, Cost Monitoring and Control, Contract Administration, Dispute Resolution and Performance Reporting. PROJECT CLOSURE Project closure process and documentation, contract closure, project performance evaluation and review, project handover and close-out, lessons learned and post-project review.	
Teaching-Learning Process	Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts Blended learning: PowerPoint presentation to elaborate more on key topics.
Module-5	
CONSTRUCTION MANAGEMENT: Introduction, understand the role and the importance of the construction manager to the project, construction manager's tasks, difference between a construction manager and a general or prime contractor for a construction project, define due diligence and how it applies to construction projects, understand the construction manager's role in contract signing, carry out the construction manager's duties	
Teaching-Learning Process	Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts Blended learning: PowerPoint presentation to elaborate more on key topics.
Assessment Details (both CIE and SEE) The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Continuous Internal Evaluation: Three Unit Tests each of 20 Marks (duration 01 hour 30 min) 1. First test at the end of 5th week of the semester 2. Second test at the end of the 10th week of the semester 3. Third test at the end of the 13th week of the semester Two assignments each of 10 Marks 4. First assignment at the end of 4th week of the semester 5. Second assignment at the end of 9th week of the semester Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for 20 Marks(duration 01 hours) 6. At the end of the 13th week of the semester The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be scaled down to 50 marks	

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (duration 03 hours)

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module.

The students have to answer 5 full modules, selecting one full question from each module. Marks scored by the student will be scale down to 50 Marks

Suggested Learning Resources:

Books

1. Association for Project Management, 2012. A PM body of knowledge. Buckinghamshire: Association for Project Management.
 2. Guide, A., 2017. Project Management Body of Knowledge (PMBOK® GUIDE). Project Management Institute.
 3. Dr. K.G. Krishnamurthy and S. V. Ravindra, 2008. Construction and Project Management.
 4. Hendrickson, C., Hendrickson, C.T. and Au, T 1989. Project management for construction: Fundamental concepts for owners, engineers, architects, and builders. Chris Hendrickson.
 5. Chris, H., 2003. Project Management for Construction: Fundamental Concepts for Owners, Engineers, Architects and Builders. Department of Civil and Environmental Engineering.
 6. Punmia, B.C. and Khandelwal, K.K., 2002. Project Planning and Control with PERT & CPM. Firewall media.
 7. Jha, K.N., 2015. Construction Project Management: Theory and Practice. Pearson Education India.
- Chitkara, K.K., 1998. Construction project management. Tata McGraw-Hill Education.

Web links and Video Lectures (e-Resources):

NPTEL Lecture

<https://www.youtube.com/watch?v=RQNZWCl6eXI&list=PLBd76GK9sWTwVXm9FIVHOTXXbGY2vZR8z>

NPTEL Lecture

<https://www.youtube.com/watch?v=RjOA7AxOVj8>

Skill Development Activities Suggested

- Guest Lecture from expert.
- Case Studies :

Visiting construction sites / organization office to understand management techniques followed To manage projects

Course outcome (Course Skill Set)

At the end of the course the student will be able to :

Sl. No.	Description	Blooms Level
C01	Understand the basic concepts of Project Management.	L2
C02	Describe the construction project lifecycle and phases.	L2
C03	Demonstrate the ability to perform project scheduling.	L3
C04	Interpret the roles and responsibilities of project manager.	L3
C05	Interpret the concepts of communication, procurement, cost and quality management for construction projects.	L4
C06	Describe about handling contracts and design management	L4

Program Outcome of the CPM Program:

Sl. No.	Description	POs
1	Acquire outstanding fundamental knowledge in the field of Construction Project Management.	P01
2	Encompass the ability to work in collaboration with interdisciplinary teams.	P02
3	Demonstrate creativity in the problem-solving process through professional quality graphic presentations and technical drawings.	P03
4	Acquire outstanding knowledge & software skills for design, construction, resources management and scheduling & Monitoring of projects.	P04
5	Understanding the diverse needs of values and systems of society and providing sustainable solutions.	P05
6	Demonstrate design solutions that integrate contextual, social, economic, cultural, ethical, environmental concerns.	P06
7	Ability to do independent/option-based research and exploration of advanced and emerging topics.	P07
8	Appraise professional standards and ethical responsibilities as a team member.	P08

Mapping of COS and POS

	P01	P02	P03	P04	P05	P06	P07	P08
C01	H	0	L	0	M	H	M	M
C02	H	H	M	0	M	M	M	L
C03	H	L	L	M	H	L	H	M
C04	0	L	M	H	L	L	M	M
C05	M	L	M	M	M	M	H	H
C06	M	M	L	H	H	M	M	M

H – High , M – Medium, L - Low

I-SEMESTER

CONTRACT MANAGEMENT			
Course Code	2MCPM103	CIE Marks	50
Teaching Hours/Week (L: T:P:TW+SL)	56:00:00:64	SEE Marks	50
Total Hours of Pedagogy	120 hrs.	Total Marks	100
Credits	04	Exam Hours	3
Course Learning objectives: • Introduction to construction contracts. Understanding of the Indian Contract Act, 1872. • To familiarize about forms of contract, procedures for inviting tenders, scrutiny and comparison of tender documents. • Understanding of conditions of contract, contract pricing, performance and closure. • Introduction to general conditions and special conditions of contract. Understanding model forms of contract. • Introduction to FIDIC contracts, EPC Contracts, Design Build contract.			
Module-1			
CONSTRUCTION CONTRACTS Indian Contract Act (1872): Definition of the contract as per the ACT. Valid, Voidable, Void contracts, Objectives of the Act. Clauses1to75- Contract formation, contract performance, valid excuses for non-performance, Breach of contract, effects of breach-understanding the Clauses and applying them to situations/scenarios on construction projects.			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</i> <i>Blended learning: Power point presentation and webinars.</i>		
Module-2			
CONTRACT FORMATION Standard forms of contracts, methods of inviting tenders, pre-bid meetings, prequalification system, scrutiny of tenders and comparative statement.			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</i> <i>ICT and Digital support: PowerPoint presentation to elaborate more on key topics.</i>		
Module-3			
CONTRACT FORMATION Conditions of contracts, contracts with various stakeholders on a major construction project, contract pricing by the client, project management consultants and the contractor, contract performance, contract correspondence and contract closure.			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</i> <i>Blended learning: PowerPoint presentation to elaborate more on key topics.</i>		

Module-4	
CONTRACT CONDITIONS a) General conditions and Particular conditions, b) Conditions of the Ministry of Statistics Program Implementation- Government of India. Model forms of contract.	
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</i> <i>Blended learning: Power point presentation and webinars.</i>
Module-5	
FIDIC: ICE conditions-Introduction, FIDIC conditions- evolution of FIDIC document, types based on whether design is of employer or contractor, Design & Build contract, EPC contract, short forms of contract- Colour Code. Various conditions of Red Book.	
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</i> <i>Collaborative and Cooperative learning: Students should work on as individual work. The research and learning to be share with the class.</i>
Assessment Details (both CIE and SEE) The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.	
Continuous Internal Evaluation: Three Unit Tests each of 20 Marks (duration 01 hour 30 min) 1. First test at the end of 5th week of the semester 2. Second test at the end of the 10th week of the semester 3. Third test at the end of the 13th week of the semester.	
Two assignments each of 10 Marks 4. First assignment at the end of 4th week of the semester 5. Second assignment at the end of 9th week of the semester	
Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for 20 Marks(duration 01 hours) 6. At the end of the 13th week of the semester The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be scaled down to 50 marks	
Semester End Examination: Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (duration 03 hours)	
1. The question paper will have ten questions. Each question is set for 20 marks. 2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3	

sub-questions), should have a mix of topics under that module.

The students have to answer 5 full modules, selecting one full question from each module. Marks scored by the student will be scale down to 50 Marks.

Suggested Learning Resources:

Books

1. Clough,R.H.,Sears,G.A.,Sears,S.K.,Segner,R.O.andRounds,J.L.,2015.ConstructionContracting:APracticalGuidetoCompanyManagement.JohnWiley&Sons.
2. Building and Engineering contracts Law and Practice by P.C. Makranda
3. Digest of Indian Contract Act 1872(2011onwards)
4. Law of contract Part I and Part II,Dr.R.K. Bangia-2005Edition,AllahabadLawAgency
5. Standard General Conditions for Domestic Contracts-2001Edition-Published by Ministry Of Statistics and Program Implementation, Government of India.

FIDIC Document (1999).

Web links and Video Lectures (e-Resources):

NPTEL Lecture

<https://www.youtube.com/watch?v=RQNZWCl6eXI&list=PLBd76GK9sWTwVXm9FIVHOTXXbGY2vZR8z>

Web Link

<https://www.udemy.com/course/contracts-management-in-construction-projects/>

Skill Development Activities Suggested

- Guest Lecture from expert.
- Interviews from contract management experts

Course outcome (Course Skill Set)

At the end of the course the student will be able to :

Sl. No.	Description	Blooms Level
C01	Describe the construction contracts and its silent features.	L1
C02	Explain the methods of inviting tenders, scrutiny and award of contract.	L1
C03	Summarize and interpret the conditions of contract.	L2
C04	Describe the contracts framed by the government.	L1
C05	Interpret and classify the international contracts	L2

Program Outcomes of the CPM Program:

Sl. No.	Description	POs
1	Acquire outstanding fundamental knowledge in the field of Construction Project Management.	P01
2	Encompass the ability to work in collaboration with interdisciplinary teams.	P02
3	Demonstrate creativity in the problem-solving process through professional quality graphic presentations and technical drawings.	P03
4	Acquire outstanding knowledge & software skills for design, construction, resources management and scheduling & Monitoring of projects.	P04
5	Understanding the diverse needs of values and systems of society and providing sustainable solutions.	P05
6	Demonstrate design solutions that integrate contextual, social, economic, cultural, ethical, environmental concerns.	P06
7	Ability to do independent/option-based research and exploration of advanced and emerging topics.	P07
8	Appraise professional standards and ethical responsibilities as a team member.	P08

Mapping of COS and POS

	P01	P02	P03	P04	P05	P06	P07	P08
C01	H	L	M	L	0	0	L	0
C02	H	L	L	L	0	0	L	0
C03	H	L	L	M	0	0	L	0
C04	H	L	L	L	0	0	L	0
C05	H	L	L	L	0	0	L	0

H – High , M – Medium, L - Low

I- SEMESTER (Integrated Professional Core Course)

CONSTRUCTION ENVIRONMENTAL MANAGEMENT			
Course Code	2MCPM104A	CIE Marks	50
Teaching Hours/Week (L: T:P:TW+SL)	42:00:28:50	VIVA Marks	50
Total Hours of Pedagogy	120 Hrs	Total Marks	100
Credits	04	Exam Hours	00
Course Learning objectives: The student will understand the role of EM in construction. Classical EM principles will be emphasized and practical applications for construction managers, contractors, and other construction functions will be described.			
Module-1			
An integrative methodology & Effective prevention at the preconstruction stage: Local regulation of CEM. Qualitative analysis of construction pollution. Construction pollution measurements.			
Teaching-Learning Process	<i>ICT and Digital support: Videos and to understand the basic concepts of Environmental engineering.</i>		
Module-2			
Project scheduling together with EM using the Construction Pollution Index (CPI). A pseudo-resource approach for CPI leveling. CPI leveling using GA. Introduction to DEMAP and DEMAN. CEM reports. Site waste material management plan			
Teaching-Learning Process	<i>Collaborative and Cooperative Learning: Students should work in a group to understand value analysis through case studies.</i>		
Module-3			
Effective control at the construction stage: General construction waste. CEM construction technologies. CEM materials. Management methods. Incentive reward programs. Barcoding technologies in CEM.			
Teaching-Learning Process	<i>Collaborative and Cooperative Learning: Students should work in a group to understand life cycle costing through case studies.</i>		
Module-4			
Addressing air quality in the CEMP. Addressing noise in the CEM. Site contamination. Addressing water quality in the CEM. Implementation of the environmental report during construction.			
Teaching-Learning Process	<i>ICT and Digital support: Videos and PPTs to explain the various phases involved in the methodology of VE.</i>		
Module-5			
Effective reduction at post-construction contaminated land remediation. Salvaging, Recycling. Disposing of non-hazardous demolition and construction waste. Wastage audit at site. Online waste exchange approach plan.			
Teaching-Learning Process	<i>Collaborative and Cooperative learning: Students should work in a group to apply value engineering at the different phase of construction.</i>		

Assessment Details (both CIE and VIVA-VOCE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for viva-voce examination is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in viva voce examination is 50% of the maximum marks. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the sum total of the CIE (Continuous Internal Evaluation) and viva voce marks taken together.

Continuous Internal Evaluation:

CIE marks shall be awarded by a committee comprising of Principal/Dean, PG Course Coordinator/HOD and Guide/Co-guide of the department. The CIE marks awarded for PSC (professional supportive course), shall be based on the progress of the student throughout the semester, presentation skills in seminars and submission of the report.

Viva-voce Examination:

1. The student needs to submit his/her report done throughout the semester, including the data collection for the Viva examination, at least one day prior to the Viva examination to the PG course coordinator/HOD.
2. The Viva-voce will be evaluated by external examiners appointed by the University along with PG Course coordinator/ guide/ co-guide or an internal examiner.
3. The viva-voce marks awarded for PEC (Professional elective course), shall be based on the evaluation of report submission, presentation skill, and performance in the Question-and-Answer session in the ratio 30:10:10.
4. The viva-voce marks list generated is to be signed by both internal and external examiners and submitted to VTU in the sealed cover through the Principal of the institution.

Suggested Learning Resources

Books

1. Jain,R.K.and Rao,S.S.,2008.Industrial safety,health and environment management systems.Romesh Chander Khanna.
2. Ferrett,E.and Hughes,P.,2015.Introduction to health and safety in construction:For the NEBOSH national certificate in construction health and safety. Routledge.
3. Basudev Panda,2013 Industrial Safety, Health Environment and Security. Laxmi Publications; First Ed.
4. Li,H.and Chen,Z.,2007.Environmental Management in Construction: A Quantitative Approach.
5. Griffith,A.,1994.Environmental management in construction. Macmillan International Higher Education.
6. Uren,S.and Griffiths,E.,2000.Environmental management in construction.
7. Rapp,R.R.and Benhart,B.L.eds.,2015.Construction Site Planning and Logistical Operations:Site Focused Management for Builders.Purdue University Press.
8. Dr.K.G.Krishnamurthy and S.V.Ravindra,2008.Construction and Project Management.
9. Barrie,D.S.and Paulson,B.C.,1984.Professional construction management. New York: McGraw-Hill.
10. Ritz,G.J.,1994.Total construction project management.
11. Toole,T.M.,2002.Construction site safety roles. Journal of Construction Engineering and Management,128(3),pp.203-210.

Web links and Video Lectures (e-Resources):

1. NPTEL Lecture 07: environmental Engineering

Concepts <https://youtu.be/mJoaZ4Gewyl>

2. <https://www.gordian.com/resources/environmental-engineering-for-construction/>

Skill Development Activities Suggested

- Guest lectures
- Learning EM by applying it to real time live projects at every stage of construction.

Course outcome (Course Skill Set)

At the end of the course the student will be able to :

Sl. No.	Description	Blooms Level
C01	Illustrate the concepts of Environmental engineering, identify the advantages, applications	L4
C02	Discuss various phases of value engineering. Analyze the function, approach of function and evaluation of function. Determine the worth and value.	L2
C03	Apply EM to construction company business and industry technical situations	L3
C04	Appraise the Environmental engineering operation in maintenance and repair activities	L4
C05	Develop the Environmental engineering team and discuss the Environmental management case studies.	L3

Program Outcomes of the CPM Program:

Sl. No.	Description	POs
1	Acquire outstanding fundamental knowledge in the field of Construction Project Management.	PO1
2	Encompass the ability to work in collaboration with interdisciplinary teams.	PO2
3	Demonstrate creativity in the problem-solving process through professional quality graphic presentations and technical drawings.	PO3
4	Acquire outstanding knowledge & software skills for design, construction, resources management and scheduling & Monitoring of projects.	PO4
5	Understanding the diverse needs of values and systems of society and providing sustainable solutions.	PO5
6	Demonstrate design solutions that integrate contextual, social, economic, cultural, ethical, environmental concerns.	PO6
7	Ability to do independent/option-based research and exploration of advanced and emerging topics.	PO7
8	Appraise professional standards and ethical responsibilities as a team member.	PO8

Mapping of COS and POS

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
C01	H	M	M	L	M	H	H	H
C02	H	M	M	L	H	H	M	H
C03	H	H	M	H	H	H	H	H
C04	H	H	M	H	H	H	H	H
C05	H	M	H	M	M	M	M	H

H - High, M - Medium, L - Low

I – SEMESTER (Integrated Professional Core Course)

ADVANCED MATERIALS AND CONSTRUCTION TECHNIQUES			
Course Code	2MCPM104B	CIE Marks	50
Teaching Hours/Week (L: T:P:TW+SL)	42:00:28:50	VIVA Marks	50
Total Hours of Pedagogy	120 Hrs	Total Marks	100
Credits	04	Exam Hours	00
Course Learning objectives: - Describe the manufacturing, properties and uses cements. Understand its application in construction activities. - Understand the uses and application of specialized concrete. - Introduction to large span structures and methods to construct it. - Introduction to bridges and its basic structural details. - Learning about special structures like silos, chimneys. Its transportation, handling and erection.			
Module-1			
Lime, Pozzolana cement, Raw materials, Manufacturing Process, Properties, and uses. Fibers- metal and synthetic, Properties and applications. Fiber-reinforced plastics, Matrix materials, Fibers organic and synthetic, Properties, and applications. Building materials from agro and industrial wastes, Types of agro wastes, Types of industrial and mine wastes, Properties and applications. Masonry blocks using industrial wastes. Construction and demolition wastes			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</i> <i>Blended learning: PowerPoint presentation and webinars.</i>		
Module-2			
Definition & Introduction, General properties, Advantages, Disadvantages, Applications, High density concrete, Shrinkage compensating concrete, Mass concrete, Roller compacted concrete. Light weight concrete, High strength concrete, Ultra-high strength concrete (reactive powder concrete), High workability concrete/Self compacting concrete, Fiber reinforced concrete, Polymer-concrete composites.			
Teaching-Learning Process	<i>Direct method : : Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</i> <i>ICT and Digital support: : Power point presentation to elaborate more on key topics.</i>		
Module-3			
Conceptual understanding of various large span structures; Principles, methods of fast track of construction projects.			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</i> <i>Blended learning: Power point presentation to elaborate more on key topics.</i>		
Module-4			
Bridges, types of construction of special type of bridges such as cable stayed bridge, suspension and prestressed bridge, construction of foundation and super structure.			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</i> <i>Blended learning: PowerPoint presentation and webinars.</i>		

Module-5	
Techniques of construction for continuous concreting operation in tall buildings of various shapes and varying sections cooling towers, silos, chimney erection techniques of tall structures erection of articulated structures aerial transporting, handling, erecting light weight components on tall structures, In-situ pre-stressing in high rise structures. Composite construction of steel and concrete. Rapid construction techniques.	
Teaching-Learning Process	Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts Collaborative and Cooperative learning: Students should work on as individual work. The research and learning to be share with the class.
Assessment Details (both CIE and Viva voce) The weightage of Continuous Internal Evaluation (CIE) is 50% and for viva-voce examination is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in viva voce examination is 50% of the maximum marks. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the sum total of the CIE (Continuous Internal Evaluation) and viva voce marks taken together. Continuous Internal Evaluation: CIE marks shall be awarded by a committee comprising of Principal/Dean, PG Course Coordinator/HOD and Guide/Co-guide of the department. The CIE marks awarded for PSC (professional supportive course), shall be based on the progress of the student throughout the semester, presentation skills in seminars and submission of the report. Viva voce Examination: 1. The student needs to submit his/her report done throughout the semester, including the data collection for the Viva examination, at least one day prior to the Viva examination to the PG course coordinator/HOD. 2. The Viva-voce will be evaluated by external examiners appointed by the University along with PG Course coordinator/ guide/ co-guide or an internal examiner. 3. The viva-voce marks awarded for PEC (Professional elective course), shall be based on the evaluation of report submission, presentation skill, and performance in the Question-and-Answer session in the ratio 30:10:10. 4. The viva-voce marks list generated is to be signed by both internal and external examiners and submitted to VTU in a sealed cover through the principal of the institution.	
Suggested Learning Resources: Books 1. Mir Publishers 2. P. Dyanchenko & S. Mirotvorsky, of Reinforced Mir Publishers 3. Henrick Nissen, Building and Modular Cement Concrete Association, London. 4. I to IV)Longman 5. Robert wade Brown, foundation engineering handbook Graw Hill Publications. 6. Patrick Powers. J., Dewatering: New Methods and John Wiley & Sons. 7. Roy Chudley & Roger Construction Pearson Prentice Hall 8. Planning, Equipment & Tata Mc Graw Hill Pub. SanksarS,	

Web links and Video Lectures (e-Resources):

NPTEL Lecture

https://www.youtube.com/watch?v=RSnNrQUTEnY&list=PLyqSpQzTE6M_k_G-Lwpb4UUxYUQ-garG1
<https://www.youtube.com/watch?v=2B7DhQvL8kw&list=PLwdnzlV3ogoVGSUhjx4VzW-dGz7DqQFoj>

Web Link

https://onlinecourses.nptel.ac.in/noc19_ce44/preview
Skill Development Activities Suggested

- Guest Lecture from expert.
- Site visits to major construction sites which have specialized materials and construction techniques.

Course outcome (Course Skill Set)

At the end of the course the student will be able to:

Sl. No.	Description	Blooms Level
C01	Describe the properties of cement and explain its manufacturing process.	L1
C02	Compare the construction materials and extract the relevant information	L1
C03	Describe the concepts of long span structures	L1
C04	Classify different types of special structures and summarize its construction techniques.	L2
C05	Devise schedules to fast track construction projects.	L4

Program Outcomes of the CPM Program:

Sl. No.	Description	POs
1	Acquire outstanding fundamental knowledge in the field of Construction Project Management.	PO1
2	Encompass the ability to work in collaboration with interdisciplinary teams.	PO2
3	Demonstrate creativity in the problem-solving process through professional quality graphic presentations and technical drawings.	PO3
4	Acquire outstanding knowledge & software skills for design, construction, resources management and scheduling & Monitoring of projects.	PO4
5	Understanding the diverse needs of values and systems of society and providing sustainable solutions.	PO5
6	Demonstrate design solutions that integrate contextual, social, economic, cultural, ethical, environmental concerns.	PO6
7	Ability to do independent/option-based research and exploration of advanced and emerging topics.	PO7
8	Appraise professional standards and ethical responsibilities as a team member.	PO8

Mapping of COS and POS

	P01	P02	P03	P04	P05	P06	P07	P08
C01	M	L	M	M	L	0	M	0
C02	H	L	L	L	0	L	M	0
C03	H	L	L	L	0	0	L	0
C04	H	L	L	L	0	0	L	0
C05	H	M	M	M	0	M	L	0

H – High , M – Medium, L - Low

I – SEMESTER (Integrated Professional Core Course)

SUSTAINABLE CONSTRUCTION			
Course Code	2MCPM104C	CIE Marks	50
Teaching Hours/Week (L: T:P:TW+SL)	42:00:28:50	VIVA Marks	50
Total Hours of Pedagogy	120 Hrs.	Total Marks	100
Credits	04	Exam Hours	00
Course Learning objectives: - To know the sustainable materials and the construction practices . - To know the energy conservation and energy management - To know the thermal comfort and energy efficient design strategies. - To know about the green building rating systems and the design criteria involved for rating system.			
Module-1			
Sustainable Construction Materials – Marginal materials, recycled materials, design aspects, construction practices using nonconventional materials and methods, milling and recycling techniques			
Teaching-Learning Process	<i>Direct method: The lecture is supported by the conventional method of Blackboard and chalk to introduce the concepts. Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</i> <i>Blended learning: PowerPoint presentation to elaborate more on key topics/online video's.</i>		
Module-2			
Energy Savings in Construction – Fundamentals of energy – Energy production systems, Energy and resource conservation, Energy efficient design strategies, Renewable energy sources – advantages and disadvantages; Energy management and conservation: electrical equipment – Improvement of power factor -maximum energy demand.			
Teaching-Learning Process	<i>Direct method : : Lecture supported by conventional method of Blackboard and chalk to introduce the concepts Discussions, Debate, Industry interactions, and research paper/new s paper reading and inferences from the same.</i> <i>ICT and Digital support: : Power point presentation to elaborate more on key topics.</i>		
Module-3			
Energy savings in electrical appliances used in buildings (pumps, fans, Compressed air systems, lighting systems, Air conditioning systems): Energy in building materials, energy efficient and environment friendly building: Thermal comfort and solar radiations.			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</i> <i>Blended learning: Power point presentation to elaborate more on key topics.</i>		
Module-4			
Green building rating system: Introduction to IGBC and LEED rating systems – various criteria for building rating.			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</i> <i>Blended learning: Power point presentation to elaborate more on key topics.</i>		

Module-5	
Pollutions and Management – air, water, noise pollutions and reduction measures during planning, design and construction.	
Teaching-Learning Process	<i>Collaborative and Cooperative learning: Students should work on individual work. The research and learning are be shared with the class.</i> <i>Site visits.</i>
Assessment Details (both CIE and Viva voce) The weightage of Continuous Internal Evaluation (CIE) is 50% and for viva-voce examination is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in viva voce examination is 50% of the maximum marks. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the sum total of the CIE (Continuous Internal Evaluation) and viva voce marks taken together. Continuous Internal Evaluation: CIE marks shall be awarded by a committee comprising of Principal/Dean, PG Course Coordinator/HOD and Guide/Co-guide of the department. The CIE marks awarded for PSC (professional supportive course), shall be based on the progress of the student throughout the semester, presentation skills in seminars and submission of the report. Viva voce Examination: 1. The student needs to submit his/her report done throughout the semester, including the data collection for the Viva examination, at least one day prior to the Viva examination to the PG course coordinator/HOD. 2. The Viva-voce will be evaluated by external examiners appointed by the University along with PG Course coordinator/ guide/ co-guide or an internal examiner. 3. The viva-voce marks awarded for PEC (Professional elective course), shall be based on the evaluation of report submission, presentation skill, and performance in the Question-and-Answer session in the ratio 30:10:10. The viva-voce marks list generated is to be signed by both internal and external examiners and submitted to VTU in a sealed cover through the principal of the institution.	
Suggested Learning Resources: Books 1. K S Jagadish, B V Venkataramana Reddy, K S Nanjunda Rao, “Alternative Buildings Materials and Technologies”, 2e, New Age International Publishers, New Delhi, ISBN: 978-9385923876, 2017 2. • K S Jagadish, “Sustainable Building Technologies”, IK International Publishers Pvt. Ltd, New Delhi, ISBN: 978- 9386768209, 2019. 3. • Moore F: Environmental Control System McGraw Hill, Inc., 1994. 4. • JMPQ Delgado, “Sustainable Materials in Building Construction”, Volume 11, Building Pathology and Rehabilitation, Springer, ISBN 978-3-030-46799-9 ISBN 978-3-030-46800-2 (eBook), 0 • Brown, G Z, Sun, Wind and Light: Architectural design strategies, John Wiley, 1985	
Web links and Video Lectures (e-Resources):	
NPTEL Lecture	
Skill Development Activities Suggested • Guest Lecture from expert. • Case Studies : Visiting sustainable buildings to understand the design strategies and materials used	

Course outcome (Course Skill Set)

At the end of the course the student will be able to:

Sl. No.	Description	Blooms Level
C01	Understand the sustainable materials and construction techniques.	L2
C02	Understand the energy conservation and energy management	L3
C03	To apply the design strategies for energy-efficient buildings	L3
C04	To integrate renewable energy resources in building design.	L4
C05	Understand the design criteria for green building rating systems	L4
C06	To implement and plan to reduce the environmental pollution	L4

Program Outcomes of the CPM Program:

Sl. No.	Description	POs
1	Acquire outstanding fundamental knowledge in the field of Construction Project Management.	PO1
2	Encompass the ability to work in collaboration with interdisciplinary teams.	PO2
3	Demonstrate creativity in the problem-solving process through professional quality graphic presentations and technical drawings.	PO3
4	Acquire outstanding knowledge & software skills for design, construction, resources management and scheduling & Monitoring of projects.	PO4
5	Understanding the diverse needs of values and systems of society and providing sustainable solutions.	PO5
6	Demonstrate design solutions that integrate contextual, social, economic, cultural, ethical, environmental concerns.	PO6
7	Ability to do independent/option-based research and exploration of advanced and emerging topics.	PO7
8	Appraise professional standards and ethical responsibilities as a team member.	PO8

Mapping of COS and POS

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
C01	H	0	L	0	M	H	M	M
C02	H	H	M	0	M	M	M	L
C03	H	L	L	M	H	L	H	M
C04	0	L	M	H	L	L	M	M
C05	M	L	M	M	M	M	H	H
C06	M	M	L	H	H	M	M	M

H – High , M – Medium, L - Low

I – SEMESTER (Integrated Professional Core Course)

MAINTENANCE AND REHABILITATION OF STRUCTURE			
Course Code	2MCPM104D	CIE Marks	50
Teaching Hours/Week (L: T:P:TW+SL)	42:00:28:50	VIVA Marks	50
Total Hours of Pedagogy	120 Hrs.	Total Marks	100
Credits	04	Exam Hours	00
Course Learning objectives: - To study the effects of climate, temperature, and chemicals on buildings. - To know the importance and assessment procedures for maintaining the buildings. - To study about materials and techniques to repair old buildings. - To assess the structural defects due to fire, leakage and marine exposure. - To assess strength and durability of concrete and know the quality control procedures.			
Module-1			
INFLUENCE ON SERVICEABILITY AND DURABILITY Effects due to climate, temperature, chemicals, wear and erosion, Design and construction errors, corrosion mechanism, effects of cover thickness and cracking, methods of corrosion protection, corrosion inhibitors, corrosion resistant steels, coatings, cathodic protection.			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</i> <i>Blended learning: PowerPoint presentation and webinars.</i>		
Module-2			
MAINTENANCE AND REPAIR STRATEGIES Definitions: Maintenance, repair and rehabilitation, facets of maintenance, importance of Maintenance Preventive measures on various aspects, inspection. Assessment procedure for evaluating a damaged structure; causes of deterioration – testing techniques			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same</i> <i>Blended learning: Power point presentation and webinars.</i>		
Module-3			
MATERIALS AND TECHNIQUES FOR REPAIR: Special concretes and mortar, concrete chemicals, special elements for accelerated strength gain, Expansive cement, polymer concrete, sulphur infiltrated concrete, Ferro cement, Fibre reinforced concrete. Rust eliminators and polymers coating for rebars during repair foamed concrete, mortar and dry pack, vacuum concrete, Guniting and Shotcrete Epoxy injection, Mortar repair for cracks, shoring and under pinning.			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</i> <i>Blended learning: PowerPoint presentation and webinars.</i>		
Module-4			
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.			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same</i> <i>Blended learning: PowerPoint presentation and webinars.</i>		

Module-5	
STRENGTH AND DURABILITY OF CONCRETE: Quality assurance for concrete–Strength, Durability- Cracks, different types, causes–Effects due to climate, temperature, Sustained elevated temperature, Corrosion. SPECIAL CONCRETES: Polymer concrete, Sulphur infiltrated concrete, Fibre reinforced concrete, High strength concrete, High performance concrete, Vacuum concrete, Self-compacting concrete, Geopolymer concrete, Reactive powder concrete, Concrete made with industrial wastes.	
Teaching-Learning Process	Direct method: <i>Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</i> Blended learning: <i>PowerPoint presentation and webinars.</i>
Assessment Details (both CIE and Viva voce) The weightage of Continuous Internal Evaluation (CIE) is 50% and for viva-voce examination is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in viva voce examination is 50% of the maximum marks. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the sum total of the CIE (Continuous Internal Evaluation) and viva voce marks taken together. Continuous Internal Evaluation: CIE marks shall be awarded by a committee comprising of Principal/Dean, PG Course Coordinator/HOD and Guide/Co-guide of the department. The CIE marks awarded for PSC (professional supportive course), shall be based on the progress of the student throughout the semester, presentation skills in seminars and submission of the report. Viva voce Examination: 1. The student needs to submit his/her report done throughout the semester, including the data collection for the Viva examination, at least one day prior to the Viva examination to the PG course coordinator/HOD. 2. The Viva-voce will be evaluated by external examiners appointed by the University along with PG Course coordinator/ guide/ co-guide or an internal examiner. 3. The viva-voce marks awarded for PEC (Professional elective course), shall be based on the evaluation of report submission, presentation skill, and performance in the Question-and-Answer session in the ratio 30:10:10. The viva-voce marks list generated is to be signed by both internal and external examiners and submitted to VTU in a sealed cover through the principal of the institution	
Suggested Learning Resources: Books • Denison Campbell, Alien and Harold Roper, Concrete Structures, Materials, Maintenance and Repair, Longman Scientific and Technical UK, 1991 • Allen R.T.and Edwards S.C., Repair of Concrete Structures, Blahie and Sons, UK,.1993 • Shetty M.S., Concrete Technology- Theory and Practice, Chand and Company, New Delhi, 2000 • Verghese P.C., Maintenance, Repair & Rehabilitation & Minor Works of Buildings, Prentice Hall, 2014 • Samuel Y. Harris, Building Pathology- Deterioration, Diagnostics and Intervention, John Wiley & sons, 2001	
Web links and Video Lectures (e-Resources): Video Tutorial https://www.youtube.com/watch?v=x9noZ4xEXyg&list=PLNRGMg8U7bLdPXyqgUHSzjL58kH3urQN1 Web Link https://www.constrofacilitator.com/repair-and-rehabilitation-of-structure/	

Skill Development Activities Suggested

- Guest Lecture from expert.
- Attending webinars.

Course outcome (Course Skill Set)

At the end of the course the student will be able to:

Sl. No.	Description	Blooms Level
C01	Know the influence of climate on building and understand the methods to treat the defects occurring out of weathering actions.	L1
C02	Summarize the maintenance and repair strategies for old and damaged buildings.	L2
C03	Identify the materials and techniques required to intervene on a defective or damaged structure	L1
C04	To describe the weathering actions on the structure	L1
C05	To summarize the quality assurance procedures for concrete structures and study Cause affects of damage arising due to climate, temperature, corrosion etc.	L2

Program Outcomes of the CPM Program:

Sl. No.	Description	POs
1	Acquire outstanding fundamental knowledge in the field of Construction Project Management.	P01
2	Encompass the ability to work in collaboration with interdisciplinary teams.	P02
3	Demonstrate creativity in the problem-solving process through professional quality graphic presentations and technical drawings.	P03
4	Acquire outstanding knowledge & software skills for design, construction, resources management and scheduling & Monitoring of projects.	P04
5	Understanding the diverse needs of values and systems of society and providing sustainable solutions.	P05
6	Demonstrate design solutions that integrate contextual, social, economic, cultural, ethical, environmental concerns.	P06
7	Ability to do independent/option-based research and exploration of advanced and emerging topics.	P07
8	Appraise professional standards and ethical responsibilities as a team member.	P08

Mapping of COS and POS

	P01	P02	P03	P04	P05	P06	P07	P08
C01	H	L	0	M	0	0	M	0
C02	H	L	0	M	0	0	M	0
C03	H	L	0	M	0	0	M	0
C04	H	L	0	M	0	0	M	0
C05	H	L	0	M	0	L	M	0

H – High , M – Medium, L - Low

I- SEMESTER (Professional elective courses – I)

DISASTER MANAGEMENT			
Course Code	2MCPM105A	CIE Marks	100
Teaching Hours/Week (L: T:P:TW+SL)	42:00:00:48	SEE Marks	00
Total Hours of Pedagogy	90 Hrs.	Total Marks	100
Credits	03	Exam Hours	00
Course Learning objectives: - To understand the disasters and their impacts over the built environments and the recovery policy and frameworks. - To impart knowledge of identifying improved disaster resilience opportunities using project management approach. - To familiarize the students with various disaster recovery planning and reconstruction activities.			
Module-1			
INTRODUCTION Introduction types of disaster geological disasters, hydro meteorological disasters, biological disasters, technological disasters, manmade disasters, global disasters; relationship between disaster and redevelopment; rehabilitation and reconstruction; Role of project management in disaster planning and reconstruction projects; method, tools, processes, practices and knowledge areas in managing disaster recovery and reconstruction.			
Teaching-Learning Process	Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concept.		
Module-2			
DISASTER RECOVERY AND RECONSTRUCTION FRAMEWORK Case studies of management of large scale disaster projects; experiences and lessons learnt; factors affecting success / failure of disaster planning and management; measurement of performance of disaster recovery projects; Governance and organization of disaster planning and recovery; multiple stakeholder management and coordination; professionalism and ethics of disaster planning and reconstruction; disaster planning and reconstruction policies and standards; innovative and participatory approach to disaster management.			
Teaching-Learning Process	Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concept. ICT and Digital support: Video and Power point presentation to elaborate the disaster recovery and reconstruction framework.		
Module-3			
POST DISASTER DAMAGE AND ASSESSMENT Disaster damage and need assessment effects and impacts of disaster damage and loss assessment (DALA) Human recovery needs assessments (HRNA)-Summary of assessment process Post disaster need assessment deliverables Issues and challenges in PDNA Involvement of government in assessment process Mega disasters of India and lessons learnt disaster management act -2005; National guidelines and plans on disaster management; role of government (local, state and national), role of non-government and inter governmental			
Teaching-Learning Process	ICT and Digital support: Video and power point presentation to explain about the post disaster damage and assessment.		
Module-4			
RECOVERY AND RECONSTRUCTION PLANNING Recovery planning Policy Key points to be considered for recovery policy Basic structure of recovery and reconstruction plan key areas of recovery and reconstruction planning Issues and challenges in livelihood recovery Community safety and disaster resilience; predicting disasters, and appropriate response management; risk management in disaster planning and reconstruction; identification of risks; role of Geo-informatics, land use planning and development regulations, disaster safe designs; structural and non-structural mitigation of disasters.			
Teaching-Learning Process	ICT and Digital support: Video and power point presentation to explain about the Recovery And Reconstruction Planning Collaborative and Cooperative learning: Selected topics to be given as seminar Group work. The research and learning to share with the class.		

Module-5	
CONSTRUCTIVE ASSESSMENTS Identifying and analysing the case studies of disaster, and do the study on the type of disaster and damage assessment basis the impact. Propose and justify the suitable recovery and resilient reconstruction planning for the particular development. Also identify and justify the project management approach suitable for such recovery and reconstruction planning.	
Teaching-Learning Process	Collaborative and Cooperative learning: <i>Selected topics to be given as seminar/group work and the research and learning to be shared with the class.</i>
Assessment Details (CIE Marks) The weightage of Continuous Internal Evaluation (CIE) is 100% . The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the CIE (Continuous Internal Evaluation) . Continuous Internal Evaluation: Three reviews each of 25 Marks First review at the end of 5th week of the semester Second review at the end of the 10th week of the semester Third review at the end of the 13th week of the semester Final report submission will carry 25 Marks The Final CIE marks will be a sum of three reviews, and report submission out of 100 marks	
Suggested Learning Resources: Books: 1. W.Nick Carter, Disaster Management, A disaster handbook, 2008. 2. S. Vaidyanathan, an Introduction to disaster management, natural disasters and manmade hazards, ikon books, New Delhi, 2011. 3. Harsh K.Gupta, Disaster Management, universities press 2003. 4. Damon P.Coppola, Introduction to International disaster management, Elsevier Inc, 2011 5. Palanivel K, Saravanavel J, Gunasekaran S, Disaster Management, Allied Publishers Pvt.Ltd, 2015 6. 6. Dr.ParagDiwan (Ed), A manual on disaster management, Pentagon Press, New Delhi, 2010	
Web Links and Video Lectures (E-Resources) • http://www.ndmaindia.nic.com • http://www.nidm.gov.in	
Skill Development Activities Suggested • Disaster preparedness, response, recovery and mitigation for a specific type of disaster. • Exploring on temporary structures for rehabilitation.	
Course outcome (Course Skill Set) At the end of the course the student will be able to:	

Sl. No.	Description	Blooms Level
C01	Interpret the Understanding of the various types of disasters and their impact over the built environment and society.	L1
C02	Analyze the impact of the disaster and their damages and understanding of suitable disaster recovery framework	L1
C03	Categorize the type of post disaster damages and understand the possible resilient reconstruction strategies	L4
C04	Surveying the factors influencing the proper implementation of reconstruction planning	L6
C05	Analyze the stakeholders involved and their role in implementing the reconstruction.	L6
C06	Analyze the major case studies and their resilient planning and reconstruction strategies implemented	

Program Outcomes of the CPM Program:

Sl. No.	Description	POs
1	Acquire outstanding fundamental knowledge in the field of Construction Project Management.	P01
2	Encompass the ability to work in collaboration with interdisciplinary teams.	P02
3	Demonstrate creativity in the problem-solving process through professional quality graphic presentations and technical drawings.	P03
4	Acquire outstanding knowledge & software skills for design, construction, resources management and scheduling & Monitoring of projects.	P04
5	Understanding the diverse needs of values and systems of society and providing sustainable solutions.	P05
6	Demonstrate design solutions that integrate contextual, social, economic, cultural, ethical, environmental concerns.	P06
7	Ability to do independent/option-based research and exploration of advanced and emerging topics.	P07
8	Appraise professional standards and ethical responsibilities as a team member.	P08

Mapping of COS and POS

	P01	P02	P03	P04	P05	P06	P07	P08
C01	H	M	H	M	H	H	H	H
C02	H	M	H	M	M	H	M	H
C03	H	H	H	H	H	H	H	H
C04	H	H	M	H	H	H	M	H
C05	H	H	M	M	H	H	M	H
C06	H	H	H	H	H	H	H	H

H - High , M - Medium, L - Low

I- SEMESTER (Professional Elective Course – I)

QUALITY MANAGEMENT			
Course Code	2MCPM105B	CIE Marks	100
Teaching Hours/Week (L: T:P:TW+SL)	42:00:00:48	SEE Marks	00
Total Hours of Pedagogy	90 Hrs.	Total Marks	100
Credits	03	Exam Hours	00
Course Learning objectives: - To know about the customer satisfaction ergonomics in quality - To study the concept of total quality control in construction. - To know the QA and QC programs in project inception and execution stages. - To study the procedures in carrying the quality audit and monitoring. - To introduce the concept of standardization in construction activities.			
Module-1			
QUALITY MANAGEMENT: Quality policy in construction industry-Consumer satisfaction Ergonomics, Time of Completion-Statistical Tolerance-concept of quality-Contract and construction programming-Inspection procedures, total quality control concept, sustainable construction methods.			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</i> <i>Blended learning: Power point presentation and webinars.</i>		
Module-2			
QUALITY ASSURANCE AND CONTROL: Total Quality Assurance and Quality Control Program and cost implication. Different aspects of quality Appraisals, failure mode analysis, Stability methods and tools, Influence of drawings ,detailing, specification.			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</i> <i>Blended learning: Powerpoint presentation and webinars.</i>		
Module-3			
QUALITY AUDITING AND INSPECTION: Internal and external quality audits, Inspection procedures, Audit planning and reporting, Follow-up and closure od audit findings			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same</i> <i>Blended learning: Power point presentation and webinars.</i>		
Module-4			
TOTAL QUALITY MANAGEMENT (TQM) IN CONSTRUCTION: TQM principles, continuous improvement, customer satisfaction, Employee involvement and team work			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</i> <i>Blended learning: Power point presentation and webinars.</i>		

Module-5		
CASE STUDY : Case study of relevant construction project to understand the quality management process, quality management plan and quality control.		
Teaching-Learning Process	Direct method: <i>Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</i>	
	Blended learning: <i>Power point presentation and webinars.</i>	
Assessment Details (CIE Marks) The weightage of Continuous Internal Evaluation (CIE) is 100% . The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the CIE (Continuous Internal Evaluation) .		
Continuous Internal Evaluation: Three reviews each of 25 Marks First review at the end of 5th week of the semester Second review at the end of the 10th week of the semester Third review at the end of the 13th week of the semester Final report submission will carry 25 Marks The Final CIE marks will be a sum of three reviews, and report submission out of 100 marks		
Suggested Learning Resources: Books • Quality on Site by FergusonI and Mitcheel Eric • Quality management-The project Managers perspective. By Patterson John • Rumane, A.R.,2016.Quality management in construction projects. Crc Press. • Howarth, T. and Watson,P.,2012.Constructionqualitymanagement:Principles and practice. Routledge		
Skill Development Activities Suggested • Guest Lecture from an expert. • Case studies of buildings under construction		
Course outcome (Course Skill Set) At the end of the course the student will be able to:		
Sl. No.	Description	Blooms Level
CO1	Explain about the quality control and customer satisfaction in construction projects	L1
CO2	Describe about the concepts of QA and QC.	L2
CO3	Interpret the methodology in quality appraisal, failure mode analysis.	L3
CO4	Summarize the influence of drawings on quality	L2
CO5	Describe about the procedure for quality assurance protocols, quality audit and monitoring	L3

Program Outcomes of the CPM Program:

Sl. No.	Description	POs
1	Acquire outstanding fundamental knowledge in the field of Construction Project Management.	P01
2	Encompass the ability to work in collaboration with interdisciplinary teams.	P02
3	Demonstrate creativity in the problem-solving process through professional quality graphic presentations and technical drawings.	P03
4	Acquire outstanding knowledge & software skills for design, construction, resources management and scheduling & Monitoring of projects.	P04
5	Understanding the diverse needs of values and systems of society and providing sustainable solutions.	P05
6	Demonstrate design solutions that integrate contextual, social, economic, cultural, ethical, environmental concerns.	P06
7	Ability to do independent/option-based research and exploration of advanced and emerging topics.	P07
8	Appraise professional standards and ethical responsibilities as a team member.	P08

Mapping of COS and POS

	P01	P02	P03	P04	P05	P06	P07	P08
C01	H	0	L	0	0	0	L	0
C02	H	0	L	L	0	0	L	0
C03	H	0	0	L	0	0	L	0
C04	H	0	L	L	0	0	L	0
C05	H	L	L	L	L	0	L	0

H – High , M – Medium, L - Low

I – SEMESTER (Professional Elective Course – I)

SAFETY MANAGEMENT			
Course Code	2MCPM105C	CIE Marks	100
Teaching Hours/Week (L: T:P:TW+SL)	42:00:00:48	SEE Marks	00
Total Hours of Pedagogy	90 Hrs.	Total Marks	100
Credits	03	Exam Hours	00
Course Learning objectives: - To understand safety management of the construction sites. - To understand the preparation of a safety management plan. - To explain the procedures to be followed in project safety planning, monitoring, and controlling			
Module-1			
INTRODUCTION Principles and concepts of safety management, Importance of safety management, Safety, health, and welfare of construction workers. Safety culture and safety leadership, Roles and responsibilities of project managers, safety officers, supervisors, contractors, and workers			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same</i> <i>Blended learning: Power point presentation and webinars.</i>		
Module-2			
CONSTRUCTION ACCIDENTS Causes and consequences of construction accidents , Types of construction accidents and common hazards - Human factors in construction safety - Cost of construction injuries - Occupational and Safety hazard assessment - Legal implications - Problem areas in construction safety			
Teaching-Learning Process	<i>ICT and Digital support: Power point presentations to explain the risk identification process, response and communication.</i> <i>Blended learning: Risk identification in live projects and preparing the probability matrix using software.</i>		
Module-3			
SAFETY PROGRAMMES - Elements of an effective safety Programme - Job site safety assessment, safety meetings, safety incentives - OHSAS 18001:2007 occupational health and safety certification procedures for organisation			
Teaching-Learning Process	<i>Collaborative and Cooperative learning: Group assignments and case studies to be presented to discuss the various construction risks involved and safety programmes for same.</i>		
Module-4			
SAFETY IN CONSTRUCTION SITES Safety in construction contracts - Safety record keeping - Safety culture - Safe workers - Safety and first line supervisors, safety and middle managers, top management practices - Company activities and safety - Safety Personnel - Contractual obligation – Contractor’s safety policies and procedures – Contractor’s job safety plan - Project Coordination and Safety Procedures - Workers Compensation			
Teaching-Learning Process	<i>Collaborative and Cooperative learning: Knowledge sharing of students through seminars and presentations.</i>		

Module-5	
CONSTRUCTIVE ASSIGNMENTS Select a small / medium scale construction project, list the possible risks involved in the execution of project, list the mitigation activities, and list possible impact of the risk over the time / cost / quality of the project. For the same project students to list the various safety and precautionary measures to be taken for the execution of the project safely. Also list the various violations that tend to happen while insisting safety and mitigation strategies to be followed.	
Teaching-Learning Process	Collaborative and Cooperative learning: Preparing a detailed report of risk assessment, response and mitigation for a live / hypothetical project.
Assessment Details (CIE Marks) The weightage of Continuous Internal Evaluation (CIE) is 100% . The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the CIE (Continuous Internal Evaluation) . Continuous Internal Evaluation: Three reviews each of 25 Marks First review at the end of 5th week of the semester Second review at the end of the 10th week of the semester Third review at the end of the 13th week of the semester Final report submission will carry 25 Marks The Final CIE marks will be a sum of three reviews, and report submission out of 100 marks	
Suggested Learning Resources: 1. Richard J. Coble, Jimmie W. Hinze and Theo C. Haupt, Construction Safety and Health Management, Prentice Hall, 2000 2. Levitt,R.E.andSamelson,N.M.,1993. Constructionsafetymanagement.John Wiley&Sons. 3. Zou,P.X.andSunindijo,R.Y.,2015.Strategicsafetymanagementinc onstructionandengineering.John Wiley& Sons. 4. Lingard,H.andRowlinson,S.M.,2005.Occupationalhealthandsaf etyinconstructionproject management.Taylor&Francis.	
Web links and Video Lectures (e-Resources): Lecture 51: Occupational Health & Safety Management Systems(OH&SMS) and OHSAS 18001-Part I https://youtu.be/Rr-xFmErOTk	
Skill Development Activities Suggested: • Guest lectures • Case studies of live projects • Webinars / seminars on infrastructure management Certification course on site safety management	

Course outcome (Course Skill Set)

At the end of the course the student will be able to:

Sl. No.	Description	Blooms Level
C01	Explain the fundamental principles, concepts, and importance of safety management in construction projects.	L2
C02	Identify and assess construction-site hazards, risks, and unsafe practices using appropriate safety management techniques.	L3
C03	Apply relevant occupational health, safety, and environmental regulations, standards, and procedures to construction activities.	L4
C04	Develop appropriate safety plans, risk-control measures, emergency response procedures, and accident-prevention strategies for construction projects.	L3
C05	Evaluate the effectiveness of safety management practices and recommend measures for continuous improvement of safety performance in construction projects	L4

Program Outcome of this course:

Sl. No.	Description	POs
1	Acquire outstanding fundamental knowledge in the field of Construction Project Management.	P01
2	Encompass the ability to work in collaboration with interdisciplinary teams.	P02
3	Demonstrate creativity in the problem-solving process through professional quality graphic presentations and technical drawings.	P03
4	Acquire outstanding knowledge & software skills for design, construction, resources management and scheduling & Monitoring of projects.	P04
5	Understanding the diverse needs of values and systems of society and providing sustainable solutions.	P05
6	Demonstrate design solutions that integrate contextual, social, economic, cultural, ethical, environmental concerns.	P06
7	Ability to do independent/option-based research and exploration of advanced and emerging topics.	P07
8	Appraise professional standards and ethical responsibilities as a team member.	P08

Mapping of COS and POs:

	P01	P02	P03	P04	P05	P06	P07	P08
C01	H	M	H	M	H	H	H	H
C02	H	M	H	M	M	H	M	H
C03	H	H	H	H	H	H	H	H
C04	H	H	M	H	H	H	M	H
C05	H	H	M	M	H	H	M	H
C06	H	H	H	H	H	H	H	H

H – High , M – Medium, L - Low

I-Semester (Professional Elective Courses – I)

RISK MANAGEMENT			
Course Code	2MCPM105D	CIE Marks	100
Teaching Hours/Week (L: T:P:TW+SL)	42:00:00:48	SEE Marks	00
Total Hours of Pedagogy	90 Hrs.	Total Marks	100
Credits	03	Exam Hours	00
Course Learning objectives: - To outline the planning procedure involved in project risk assessment and mitigation - To explain the risk implications and impact on various parameters involved in project risk management.			
Module-1			
INTRODUCTION Risk management process, Risk management Plan, Risk Awareness, Nature of construction Risks			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</i> <i>Blended learning: PowerPoint presentation and webinars.</i>		
Module-2			
Importance of Risk, types of risks, quantifiable and unquantifiable risks, Classification of risks, Risk Identification methods (checklists, prompt lists, brainstorming), risk owner identification.			
Teaching-Learning Process	Importance of Risk, types of risks, quantifiable and unquantified risks,Classification of risks, Risk Identification methods (checklists, promptlists,brainstorming),Riskowneridentification. <i>Blended learning: Power point presentation and webinars.</i>		
Module-3			
Risk Management :Risk avoidance, Risk reduction ,Risk sharing, Risk transfer, Risk deference, Risk mitigation, Risk contingency, Risk insurance, Risk acceptance.			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</i> <i>Blended learning: Power point presentation to elaborate more on key topics.</i>		
Module-4			
Risk assessment, Risk probability and Risk impact, Qualitative Risk Analysis, Quantitative Risk analysis, Quantification of probability, Quantification of impact(severity), Exposure rating, Risk Evaluation.			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts</i> <i>Blended learning: Power point presentation to elaborate more on key topics.</i>		

Module-5	
Risk Mitigation: Risk mitigation by elimination, reducing, transferring, avoiding, absorbing or pooling. Residual risk, mitigation of unquantified risk, Risk Monitoring, Risk register, Software usage (if any), Monitoring and reporting.	
Teaching-Learning Process	Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts, Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same. Blended learning: Power point presentation and webinars.
Assessment Details (CIE Marks) The weightage of Continuous Internal Evaluation (CIE) is 100% . The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the CIE (Continuous Internal Evaluation) . Continuous Internal Evaluation: Three reviews each of 25 Marks 1. First review at the end of 5th week of the semester 2. Second review at the end of the 10th week of the semester 3. Third review at the end of the 13th week of the semester Final report submission will carry 25 Marks The Final CIE marks will be a sum of three reviews, and report submission out of 100 marks	
Suggested Learning Resources: Books 1. Edwards,L.andEdwards,L.J.,1995.Practicalriskmanagementin the construction industry. Thomas Telford. 2. Cretu,O., Stewart,R.B.and Berends,T.,2011.Riskmanagementfor design and construction(Vol.75).John Wiley & Sons 3. Hopkin, P., 2018. Fundamentals of risk management: understanding, evaluating and implementing effective risk management. Kogan Page Publishers. 4. Smith,N.J.,Merna, T.and Jobling,P.,2014. Managing risk in construction projects. John Wiley & Sons. 5. Loosemore,M., Raftery,J. and Reilly,C.,2006.Riskmanagementin projects. Taylor & Francis.	
Web links and Video Lectures (e-Resources):	
NPTEL Lecture	
Project risk management PMP certification https://youtu.be/HyGb_eaT-U8	
Skill Development Activities Suggested • Guest Lecture from expert. • Case Studies : Study the risk management plan of various types of construction projects.	

Course outcome (Course Skill Set)

At the end of the course the student will be able to:

Sl. No.	Description	Blooms Level
C01	Explain the fundamental concepts, principles, and processes of risk management in construction projects.	L2
C02	Identify and classify potential risks associated with construction projects, including technical, financial, contractual, environmental, safety, and operational risks.	L3
C03	Apply qualitative and quantitative risk assessment techniques to evaluate the probability and impact of construction project risks.	L3
C04	Develop appropriate risk response and mitigation strategies to minimize the adverse effects of risks on project cost, time, quality, safety, and performance.	L4
C05	Evaluate and monitor construction project risks throughout the project life cycle and recommend appropriate measures for effective risk control and management.	L4

Program Outcome of the CPM Program:

Sl. No.	Description	POs
1	Acquire outstanding fundamental knowledge in the field of Construction Project Management.	PO1
2	Encompass the ability to work in collaboration with interdisciplinary teams.	PO2
3	Demonstrate creativity in the problem-solving process through professional quality graphic presentations and technical drawings.	PO3
4	Acquire outstanding knowledge & software skills for design, construction, resources management and scheduling & Monitoring of projects.	PO4
5	Understanding the diverse needs of values and systems of society and providing sustainable solutions.	PO5
6	Demonstrate design solutions that integrate contextual, social, economic, cultural, ethical, environmental concerns.	PO6
7	Ability to do independent/option-based research and exploration of advanced and emerging topics.	PO7
8	Appraise professional standards and ethical responsibilities as a team member.	PO8

Mapping of COS and POS

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
C01	H	0	L	0	M	H	M	M
C02	H	H	M	0	M	M	M	L
C03	H	L	L	M	H	L	H	M
C04	0	L	M	H	L	L	M	M
C05	M	L	M	M	M	M	H	H

H – High , M – Medium, L -LOW

I-Semester (Professional Elective Course – II)

VALUE ENGINEERING IN CONSTRUCTION MANAGEMENT			
Course Code	2MCPM106A	CIE Marks	100
Teaching Hours/Week (L: T:P:TW+SL)	42:00:00:48	SEE Marks	00
Total Hours of Pedagogy	90 Hrs.	Total Marks	100
Credits	03	Exam Hours	00
Course Learning objectives: The student will understand the role of VE in construction. Classical VE principles will be emphasized and practical applications for construction managers, contractors, and other construction functions will be described.			
Module-1			
VALUE ENGINEERING Definition, Importance to Contractors, Potential VE Applications Value: basic and secondary functions, factor contributing to value such as aesthetic, ergonomic, technical, economic: identifying reasons or unnecessary costs			
Teaching-Learning Process	<i>ICT and Digital support: Videos and PP s to understand the basic concepts of value engineering.</i>		
Module-2			
VALUE ANALYSIS 10 Commandments of value analysis; value analysis team; principles of value analysis, elements of a job plan viz. orientation, Information, presentation. Implementation, follow-up action, benefits of value analysis, various applications; assessing effectiveness of value analysis.			
Teaching-Learning Process	<i>Collaborative and Cooperative learning: Students should work in a group to understand value analysis through case studies.</i>		
Module-3			
LIFE CYCLE COSTING Life cycle costing Forecasting of Capital as well as operating & maintenance costs, time value, present worth analysis, DCF methods, ROR analysis, sensitivity analysis. Different methods of performing value engineering.			
Teaching-Learning Process	<i>Collaborative and Cooperative learning: Students should work in a group to understand life cycle costing through case studies.</i>		
Module-4			
VE METHODOLOGY Orientation phase, Information phase, Function Analysis phase, Creative Phase, Evaluation Phase, Development Phase, Presentation Phase, implementation Phase.			
Teaching-Learning Process	<i>ICT and Digital support: Videos and ppts to explain the various phase involved in the methodology of VE.</i>		
Module-5			
APPLICATION OF VALUE ENGINEERING TO A CONSTRUCTION PROJECT 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			
Teaching-Learning Process	<i>Collaborative and Cooperative learning: Students should work in a group to apply value engineering at the different phase of construction.</i>		

Assessment Details (CIE Marks)

The weightage of Continuous Internal Evaluation (CIE) is 100% . The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the CIE (Continuous Internal Evaluation) .

Continuous Internal Evaluation:

Three reviews each of 25 Marks

1. First review at the end of 5th week of the semester
2. Second review at the end of the 10th week of the semester
3. Third review at the end of the 13th week of the semester

Final report submission will carry 25 Marks

The Final CIE marks will be a sum of three reviews, and report submission out of 100 marks

Suggested Learning Resources:**Books**

Value Engineering: Analysis and Methodology by Del Younke.

Web links and Video Lectures (e-Resources):**3. NPTEL Lecture 07: Value Engineering Concepts**

<https://youtu.be/mJoaZ4Gwy>

I 4. <https://www.gordian.com/resources/value-engineering-for-construction/>

Skill Development Activities Suggested

- Guest lectures
- Learning VE by applying it to real time live projects at every stage of construction.

Course outcome (Course Skill Set)

At the end of the course the student will be able to :

Sl. No.	Description	Blooms Level
C01	Illustrate the concepts of value engineering, identify the advantages, applications	L4
C02	Discuss various phases of value engineering. Analyze the function, approach of function and evaluation of function. Determine the worth and value.	L2
C03	Apply VE to construction company business and industry technical situations	L3
C04	Appraise the value engineering operation in maintenance and repair activities	L4
C05	Develop the value engineering team and discuss the value engineering case studies.	L3

Program Outcomes of the CPM Program:

Sl. No.	Description	POs
1	Acquire outstanding fundamental knowledge in the field of Construction Project Management.	P01
2	Encompass the ability to work in collaboration with interdisciplinary teams.	P02
3	Demonstrate creativity in the problem-solving process through professional quality graphic presentations and technical drawings.	P03
4	Acquire outstanding knowledge & software skills for design, construction, resources management and scheduling & Monitoring of projects.	P04
5	Understanding the diverse needs of values and systems of society and providing sustainable solutions.	P05
6	Demonstrate design solutions that integrate contextual, social, economic, cultural, ethical, environmental concerns.	P06
7	Ability to do independent/option-based research and exploration of advanced and emerging topics.	P07
8	Appraise professional standards and ethical responsibilities as a team member.	P08

Mapping of COS and POS

	P01	P02	P03	P04	P05	P06	P07	P08
C01	H	M	M	L	M	H	H	H
C02	H	M	M	L	H	H	M	H
C03	H	H	M	H	H	H	H	H
C04	H	H	M	H	H	H	H	H
C05	H	M	M	M	M	M	M	H

H – High , M – Medium, L - Low

I-Semester (Professional Elective Course – II)

LEAN CONSTRUCTION MANAGEMENT			
Course Code	2MCPM106B	CIE Marks	100
Teaching Hours/Week (L: T:P:TW+SL)	42:00:00:48	Term work	00
Total Hours of Pedagogy	90 Hrs.	Total Marks	100
Credits	03	Exam Hours	00
Course Learning objectives: The student will understand the CONCEPT OF LEAN construction. Lean construction principles will be emphasized and practical applications for construction managers, contractors, and other construction functions will be described.			
Module-1			
Introduction and overview of the construction project management - Review of Project Management & Productivity Measurement Systems - construction project phases - The problems with current construction management techniques			
Teaching-Learning Process	<i>ICT and Digital support: Videos and PPT to understand the basic concepts of value engineering.</i>		
Module-2			
Introduction to lean management - -Evolution of lean in construction industry - Production theories in construction Lean construction value - Value in construction - Target value design - Lean project delivery system- Forms of waste in construction			
Teaching-Learning Process	<i>Collaborative and Cooperative Learning: Students should work in a group to understand value analysis through case studies.</i>		
Module-3			
Concepts in lean thinking Principles of lean construction Variability and its impact Traditional construction and lean construction Traditional project delivery - Lean construction and workflow reliability Work structuring Production control.			
Teaching-Learning Process	<i>Collaborative and Cooperative Learning: Students should work in a group to understand life cycle costing through case studies.</i>		
Module-4			
Value Stream Mapping Work sampling Last planner system Flow and pull based production Last Planner System Look ahead schedule constraint analysis weekly planning meeting-Daily Huddles Root cause analysis Continuous improvement Just in time.			
Teaching-Learning Process	<i>ICT and Digital support: Videos and ppts to explain the various phase involved in the methodology of VE.</i>		
Module-5			
LEAN IMPLEMENTATION IN CONSTRUCTION INDUSTRY Lean construction implementation- Enabling lean through information technology - Lean in design -Design Structure - BIM (Building Information Modelling) - IPD (Integrated Project Delivery) Sustainability through lean construction approach			
Teaching-Learning Process	<i>Collaborative and Cooperative learning: Students should work in a group to apply value engineering at the different phase of construction.</i>		

Assessment Details (CIE Marks)

The weightage of Continuous Internal Evaluation (CIE) is 100% . The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the CIE (Continuous Internal Evaluation) .

Continuous Internal Evaluation:

Three reviews each of 25 Marks

1. First review at the end of 5th week of the semester
2. Second review at the end of the 10th week of the semester
3. Third review at the end of the 13th week of the semester

Final report submission will carry 25 Marks

The Final CIE marks will be a sum of three reviews, and report submission out of 100 marks

REFERENCES:

1. Corfe, C. and Clip, B., Implementing lean in construction: Lean and the sustainability agenda, CIRIA, 2013.
2. Shang Gao and Sui Pheng Low, Lean Construction Management: The Toyota Way, Springer, 2014.
3. Dave, B., Koskela, L., Kiviniemi, A., Owen, R., and Tzortzopoulos, P., Implementing lean in construction: Lean construction and BIM, CIRIA, 2013.
4. Ballard, G., Tommelein, I., Koskela, L. and Howell, G., Lean construction tools and techniques, 2002.
5. Salem, O., Solomon, J., Genaïdy, A. and Luegring, M., Site implementation and Assessment of Lean Construction Techniques, Lean Construction Journal, 2005

Web links and Video Lectures (e-Resources):

NPTEL Lecture 07: Lean construction [https://www.gordia.com/resources/lean construction](https://www.gordia.com/resources/lean%20construction)

Skill Development Activities Suggested

- Guest lectures

Course outcome(Course Skillset)

At the end of the course, the student will be able to:

Sl. No.	Description	Blooms Level
C01	Illustrate the concepts of Lean engineering, identify the advantages, and applications	L4
C02	Discuss various phases of Lean engineering. Analyze the function, approach of function and evaluation of function. Determine the worth and value.	L2
C03	Apply LE to construction company business and industry technical situations	L3
C04	Appraise the Lean engineering operation in maintenance and repair activities	L4
C05	Develop the Lean engineering team and discuss the value engineering case studies.	L3

program Outcomes of the CPM Program:

Sl. No.	Description	POs
1	Acquire outstanding fundamental knowledge in the field of Construction Project Management.	P01
2	Encompass the ability to work in collaboration with interdisciplinary teams.	P02
3	Demonstrate creativity in the problem-solving process through professional quality graphic presentations and technical drawings.	P03
4	Acquire outstanding knowledge & software skills for design, construction, resources management and scheduling & Monitoring of projects.	P04
5	Understanding the diverse needs of values and systems of society and providing sustainable solutions.	P05
6	Demonstrate design solutions that integrate contextual, social, economic, cultural, ethical, environmental concerns.	P06
7	Ability to do independent/option-based research and exploration of advanced and emerging topics.	P07
8	Appraise professional standards and ethical responsibilities as a team member.	P08

Mapping of COS and POS

	P01	P02	P03	P04	P05	P06	P07	P08
C01	H	M	M	L	M	H	H	H
C02	H	M	M	L	H	H	M	H
C03	H	H	M	H	H	H	H	H
C04	H	H	M	H	H	H	H	H
C05	H	M	H	M	M	M	M	H

H – High , M – Medium, L - Low

I-SEMESTER (Professional Elective Course – II)

CONSTRUCTION AND DEMOLITION AND WASTE MANAGEMENT			
Course Code	2MCPM106C	CIE Marks	100
Teaching Hours/Week (L: T:P:TW+SL)	42:00:00:48	Viva Marks	00
Total Hours of Pedagogy	90 Hrs.	Total Marks	100
Credits	03	Exam Marks	00
Course Learning objectives: - To understand the sources, types, characteristics and environmental impacts of construction and demolition waste. - To study demolition techniques, dismantling methods and safety measures associated with building demolition and deconstruction. - To understand the principles, regulations and guidelines related to construction and demolition waste management. - To study methods of waste minimization, segregation, collection, transportation, treatment, recycling and reuse of construction and demolition waste. - To understand sustainable design and construction strategies for waste prevention, resource recovery and circular use of building materials.			
Module-1			
CONCEPTUAL UNDERSTANDING OF DEMOLITION TECHNIQUES: Demolition by Machines, Demolition by Explosives, Advanced Techniques using Robotic Machines, Demolition Sequence, Dismantling Techniques, Safety Precautions in Demolition and Dismantling. Case Studies of such Demolition Techniques and Reporting.			
Teaching-Learning Process	Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same. Blended learning: Power point presentation and webinars.		
Module-2			
STUDY AND REPORTING OF IS CODE PROVISIONS FOR DEMOLITION AND WASTE MANAGEMENT: Study and reporting of IS Code provisions for demolition and waste management as per IS 4130:1991 and Central Pollution Control Board C&D Waste Management Rules, 2016.			
Teaching-Learning Process	Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same. Blended learning: Power point presentation and webinars.		
Module-3			
ENVIRONMENTAL IMPACT OF BUILDING MATERIALS: Embodied energy of materials; impact on the local environment; toxicity of the material; life cycle assessment. Nature and source of direct and indirect waste; site types and origins; composition; quantity; current recycling/reuse potential of building materials.			
Teaching-Learning Process	Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same. Blended learning: Power point presentation and webinars.		

Module-4	
CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT PLANS: International good practice; planning requirements; company policy; demolition plans; site implementation; supplier agreements; subcontractor management; role of waste management contractor; training; auditing; skip management; current markets; current disposal options; health and safety; reporting to local authorities. Treatment of Construction and Demolition Waste, waste permits; waste licences; waste transfer facilities; landfills; treatment technologies; hazardous waste facilities; reporting to EPA.	
Teaching-Learning Process	Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same. Blended learning: Power point presentation and webinars.
Module-5	
DESIGNING FOR WASTE PREVENTION AND MINIMIZATION: Client, contractor and designer attitudes; proper maintenance of existing buildings; reuse of existing building structure; design flexibility; design for reuse and recycling; dimensional coordination and standardization; modular design; material selection and control. The Wider Context of Stakeholder Analysis in International Projects. Cross-Cultural Teamwork and Leadership Team.	
Teaching-Learning Process	Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same. Blended learning: Power point presentation and webinars.
Assessment Details (CIE Marks) The weightage of Continuous Internal Evaluation (CIE) is 100% . The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the CIE (Continuous Internal Evaluation) . Continuous Internal Evaluation: Three reviews each of 25 Marks 1. First review at the end of 5th week of the semester 2. Second review at the end of the 10th week of the semester 3. Third review at the end of the 13th week of the semester Final report submission will carry 25 Marks The Final CIE marks will be a sum of three reviews, and report submission out of 100 marks	

References

- Stessel, R.I., 2012. Recycling and resource recovery engineering: principles of waste processing. Springer Science & Business Media.
- Winkler, G., 2010. Recycling Construction & Demolition Waste: ALE ED-Based Toolkit (GreenSource). McGraw Hill Professional.
- Jeffrey, C., 2011. Construction and demolition waste recycling: A literature review. Dalhousie University's Office of Sustainability, 35.
- Tam, V.W. and Tam, C.M., 2008. Re use of construction and demolition waste in housing developments.

Skill Development Activities Suggested

- Guest lecture by an industry expert on construction and demolition waste management.
- Case studies of construction and demolition waste management practices in building projects.
- Site visit to a construction, demolition, recycling or waste processing facility to understand waste segregation, collection, transportation and treatment practices.

Course outcome (Course Skillset)

At the end of the course, the student will be able to:

Sl. No.	Description	Blooms Level
C01	Explain the sources, types, characteristics and environmental impacts of construction and demolition waste.	L4
C02	Demonstrate an understanding of demolition, dismantling and deconstruction techniques along with associated safety requirements.	L2
C03	Apply relevant codes, regulations and guidelines for planning and managing construction and demolition waste.	L3
C04	Analyse methods of waste segregation, collection, transportation, treatment, recycling, reuse and resource recovery.	L4
C05	Develop strategies for construction and demolition waste minimization through sustainable design, material selection, design for disassembly and circular construction practices.	L3

program Outcomes of the CPM Program:

Sl. No.	Description	POs
1	Acquire outstanding fundamental knowledge in the field of Construction Project Management.	PO1
2	Encompass the ability to work in collaboration with interdisciplinary teams.	PO2
3	Demonstrate creativity in the problem-solving process through professional quality graphic presentations and technical drawings.	PO3
4	Acquire outstanding knowledge & software skills for design, construction, resources management and scheduling & Monitoring of projects.	PO4
5	Understanding the diverse needs of values and systems of society and providing sustainable solutions.	PO5
6	Demonstrate design solutions that integrate contextual, social, economic, cultural, ethical, environmental concerns.	PO6
7	Ability to do independent/option-based research and exploration of advanced and emerging topics.	PO7
8	Appraise professional standards and ethical responsibilities as a team member.	PO8

Mapping of COS and POS

	P01	P02	P03	P04	P05	P06	P07	P08
C01	H	M	0	M	H	H	M	L
C02	H	M	M	H	M	M	M	L
C03	H	M	0	H	M	H	M	M
C04	H	H	M	H	H	H	M	M
C05	M	H	M	H	H	H	H	M

H - High , M - Medium, L - Low

I-SEMESTER (Professional Elective Course – II)

INTERNATIONAL PROJECT MANAGEMENT			
Course Code	2MCPM106D	CIE Marks	100
Teaching Hours/Week (L: T:P:TW+SL)	42:00:00:48	Viva Marks	00
Total Hours of Pedagogy	90 Hrs.	Total Marks	100
Credits	03	Exam Marks	00
Course Learning objectives: - To know the concepts of international project management and studying the process of evaluating A country's Risk. - To familiarize about Time, cost, and scope in international projects. - To familiarize about leadership in international projects. - To give an overview about communication and staffing strategies. - To know the methods to undertake stakeholder's analysis.			
Module-1			
Introduction to International Project Management, Evaluating of Country Risk and its impact on Project Selection and Management			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</i> <i>Blended learning: Power point presentation and webinars.</i>		
Module-2			
Managing Time, Cost, Scope and Quality Benefits and Risk in International Projects			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same</i> <i>Blended learning: Power point presentation and webinars.</i>		
Module-3			
Leadership of International Projects			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</i> <i>Blended learning: Power point presentation and webinars.</i>		
Module-4			
Managing, Communication and Controlling International Projects, Recruitment and Staffing of International Projects			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</i> <i>Blended learning: Power point presentation and webinars.</i>		

Module-5	
The Wider Context of Stakeholder Analysis in International Projects. Cross-Cultural teamwork and leadership team.	
Teaching-Learning Process	Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same. Blended learning: Power point presentation and webinars.
Assessment Details (CIE Marks) The weightage of Continuous Internal Evaluation (CIE) is 100% . The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the CIE (Continuous Internal Evaluation) . Continuous Internal Evaluation: Three reviews each of 25 Marks 1. First review at the end of 5th week of the semester 2. Second review at the end of the 10th week of the semester 3. Third review at the end of the 13th week of the semester Final report submission will carry 25 Marks The Final CIE marks will be a sum of three reviews, and report submission out of 100 marks	
Suggested Learning Resources: Books • Köster, K.,2009. International project management. Sage. • Lientz, B.and Rea, K., 2012.International project management. Routledge. • Grisham, T.W., 2009. International project management: Leadership in complex environments. John Wiley & Sons. • Mohammed, U.K., Prabhakar, G.P. and White,G.,2008.Culture and conflict management style of international project managers.InternationalJournalofBusinessManagement,3(5),pp.3-11. • Czuchry, A.J. and Yasin, M.M., 2003. Managing the project management process. Industrial Management & Data Systems.	
Web links and Video Lectures (e-Resources): Video Tutorial https://www.youtube.com/watch?v=ZRaZVLRXctU Web Link https://www.henryharvin.com/blog/what-is-international-project-management/	
Skill Development Activities Suggested • Guest Lecture from an expert • . • Attending webinars.	

Course outcome (Course Skill Set)

At the end of the course the student will be able to:

Sl. No.	Description	Blooms Level
C01	Describe about international project management and ways to evaluate a country's Risk	L1
C02	To interpret the time, cost and quality of a project and identifying the potential risks	L2
C03	Describe the leadership principles for international projects	L1
C04	Explain the methodology to manage communication, recruitment and staffing for International projects.	L1
C05	Describe about stakeholder analysis in international projects and leadership.	L1

Program Outcomes of the CPM Program:

Sl. No.	Description	POs
1	Acquire outstanding fundamental knowledge in the field of Construction Project Management.	PO1
2	Encompass the ability to work in collaboration with interdisciplinary teams.	PO2
3	Demonstrate creativity in the problem-solving process through professional quality graphic presentations and technical drawings.	PO3
4	Acquire outstanding knowledge & software skills for design, construction, resources management and scheduling & Monitoring of projects.	PO4
5	Understanding the diverse needs of values and systems of society and providing sustainable solutions.	PO5
6	Demonstrate design solutions that integrate contextual, social, economic, cultural, ethical, environmental concerns.	PO6
7	Ability to do independent/option-based research and exploration of advanced and emerging topics.	PO7
8	Appraise professional standards and ethical responsibilities as a team member.	PO8

Mapping of COS and POS

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
C01	H	M	L	O	0	0	L	L
C02	H	O	L	M	0	0	L	L
C03	H	M	0	L	0	0	L	L
C04	H	M	0	L	0	0	L	L
C05	M	M	L	L	L	0	L	L

H - High , M - Medium, L - Low

I- Semester (Professional Core Course Lab)

MS OFFICE FOR BUSINESS ADMINISTRATION			
Course Code	2MCPML107A	CIE Marks	50
Teaching Hours/Week (L: T:P:TW+SL)	00:00:28:2	Term Work	50
Total Hours of Pedagogy	30 Hrs.	Total Marks	100
Credits	1	Exam Hours	00
Course Learning objectives: - To understand the basic features and applications of MS Office tools for business and administrative activities. - To develop skills in preparing, formatting and managing professional documents using MS Word. - To develop skills in using MS Excel for data entry, calculations, analysis and graphical representation. - To develop skills in preparing professional presentations using MS PowerPoint. - To understand the use of MS Office tools for communication, documentation, reporting and administrative decision-making.			
Module-1			
MS WORD – DOCUMENT CREATION AND FORMATTING: Introduction to MS Word interface and basic features, creating, opening, saving and managing documents, text formatting, paragraph formatting, styles and templates, page layout, headers and footers, page numbering, tables, inserting pictures, shapes and SmartArt, bullets and numbering, columns, page borders, document themes, spelling and grammar check, find and replace, printing and PDF conversion.			
Teaching-Learning Process	Direct method: Lecture supported by demonstrations using computers to introduce the concepts and features of MS Word. Practical exercises, discussions and task-based learning. Blended learning: PowerPoint presentations, online tutorials and video demonstrations to elaborate on key topics.		
Module-2			
MS WORD – ADVANCED DOCUMENT MANAGEMENT: Mail merge, creation of letters and labels, document review and editing, comments and track changes, references and citations, table of contents, footnotes and endnotes, hyperlinks, bookmarks, document protection, collaboration and sharing, professional report preparation, business letters, memos, minutes of meetings and official correspondence.			
Teaching-Learning Process	Direct method: Demonstration and practical exercises using MS Word. Preparation of professional documents and administrative formats. Blended learning: Online tutorials, video demonstrations and digital learning resources to elaborate on advanced features.		
Module-3			
MS EXCEL – DATA MANAGEMENT AND ANALYSIS: Introduction to MS Excel interface and worksheets, workbook and worksheet management, data entry and formatting, rows and columns, cells and ranges, basic mathematical operations, formulas and functions, relative and absolute cell references, commonly used functions, sorting and filtering, tables, conditional formatting, data validation, page setup and printing.			
Teaching-Learning Process	Direct method: Demonstration and practical exercises using MS Word. Preparation of professional documents and administrative formats. Blended learning: Online tutorials, video demonstrations and digital learning resources to elaborate on advanced features.		
Module-4			

MS EXCEL – DATA ANALYSIS AND VISUALIZATION: Charts and graphs, column charts, bar charts, line charts and pie charts, data analysis using functions, logical functions, lookup functions, pivot tables, pivot charts, what-if analysis, basic data interpretation, preparation of budgets, cost statements, schedules and administrative reports, protection and sharing of Excel workbooks.	
Teaching-Learning Process	Direct method: Demonstration and practical exercises using MS Word. Preparation of professional documents and administrative formats. Blended learning: Online tutorials, video demonstrations and digital learning resources to elaborate on advanced features.
Module-5	
MS POWERPOINT – PRESENTATION AND BUSINESS COMMUNICATION: Introduction to MS PowerPoint, creating and managing presentations, slide layouts and themes, text formatting, tables, charts, SmartArt, images, shapes and icons, slide transitions and animations, audio and video insertion, hyperlinks and action buttons, slide master, presentation design principles, professional presentation techniques, preparation of business presentations, project reports and management presentations, presentation delivery and printing.	
Teaching-Learning Process	Direct method: Demonstration and practical exercises using MS Word. Preparation of professional documents and administrative formats. Blended learning: Online tutorials, video demonstrations and digital learning resources to elaborate on advanced features.
Assessment Details (CIE and Term Work) The weightage of Continuous Internal Evaluation (CIE) is 50% and Term Work is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in Term Work is 50% of the maximum marks. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/course if the student secures not less than 50% in the sum total of the CIE and Term Work marks taken together. Continuous Internal Evaluation: CIE marks shall be awarded based on the student's performance in practical exercises, assignments, class tests, presentations and continuous assessment throughout the semester. Term work will be evaluated for 100 Marks and scaled down to 50 Marks	
Suggested Learning Resources: Books 1. Walkenbach, J., 2018. <i>Microsoft Excel 2019 Bible</i>. Wiley. 2. Frye, C., 2019. <i>Microsoft Excel 2019 Step by Step</i>. Microsoft Press. 3. Lambert, J. and Cox, J., 2019. <i>Microsoft Word 2019 Step by Step</i>. Microsoft Press. 4. Lambert, J., 2019. <i>Microsoft PowerPoint 2019 Step by Step</i>. Microsoft Press. 5. Cox, J., 2019. <i>Microsoft Office 2019 Step by Step</i>. Microsoft Press. 6. Wempen, F., 2019. <i>Microsoft Office 365 All-in-One for Dummies</i>. Wiley.	
Web links and Video Lectures (e-Resources): • Microsoft 365 Training and Support resources. • Microsoft Word, Excel and PowerPoint tutorials and learning resources.	
Skill Development Activities Suggested • Preparation of professional letters, reports, notices and official documents using MS Word. • Preparation of project-related data sheets, cost statements and schedules using MS Excel. • Preparation of charts, graphs and analytical reports using MS Excel. • Preparation and presentation of a professional management presentation using MS PowerPoint. • Preparation of an integrated business/project administration report using MS Word, Excel and PowerPoint	

Course outcome (Course Skill Set):

At the end of the course the student will be able to :

Sl. No.	Description	Blooms Level
CO1	Demonstrate the use of MS Word for creating, formatting and managing professional documents.	L3
CO2	Prepare professional reports, correspondence and administrative documents using advanced MS Word features.	L4
CO3	Apply MS Excel tools, formulas and functions for data management and numerical calculations.	L3
CO4	Analyse and present data using Excel charts, pivot tables and other data visualization tools.	L5
CO5	Develop professional presentations using MS PowerPoint for business, administrative and project-related communication.	L3

Program Outcome of this course:

Sl. No.	Description	POs
1	Acquire outstanding fundamental knowledge in the field of Construction Project Management.	PO1
2	Encompass the ability to work in collaboration with interdisciplinary teams.	PO2
3	Demonstrate creativity in the problem-solving process through professional quality graphic presentations and technical drawings.	PO3
4	Acquire outstanding knowledge & software skills for design, construction, resources management and scheduling & Monitoring of projects.	PO4
5	Understanding the diverse needs of values and systems of society and providing sustainable solutions	PO5
6	Demonstrate design solutions that integrate contextual, social, economic, cultural, ethical, environmental concerns.	PO6
7	Ability to do independent/option-based research and exploration of advanced and emerging topics.	PO7
8	Appraise professional standards and ethical responsibilities as a team member.	PO8

Mapping of COs and POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
C01	H	M	M	H	O	O	L	M
C02	H	M	M	H	L	L	M	H
C03	H	M	L	H	M	O	M	M
C04	H	M	M	H	M	M	M	M
C05	H	M	H	H	M	M	M	H

H - High , M - Medium, L - Low

I Semester (Professional Core Courses Lab)

PROJECT LIBRE			
Course Code	2MCPML107B	CIE Marks	50
Teaching Hours/Week (L: T:P:TW+SL)	00:00:28:2	Term Work	50
Total Hours of Pedagogy	30 Hrs.	Total Marks	100
Credits	1	Exam Hours	00

Course Learning Objectives:

- To understand the basic concepts of project management software and its application in construction project planning.
- To familiarize students with the Project Libre environment and its project planning tools.
- To develop skills in creating project schedules, Work Breakdown Structures, and task relationships using Project Libre.
- To understand resource allocation, resource calendars, project costs, and resource conflict resolution.
- To develop skills in finalizing, optimizing, monitoring and presenting construction project schedules using Project Liber.

Module-1
GETTING STARTED WITH PROJECTLIBRE:

Identify Project Management Concepts, Introduction to Project Liber, installation and setup of Project Libre , navigating the Project Libre environment, understanding the project interface, views, and basic project management tools.

Teaching-Learning Process

Direct method: Demonstration and practical exercises using Project Liber to introduce the concepts. Discussions, problem-solving exercises and application-based learning.

Blended learning: PowerPoint presentations, online tutorials and video demonstrations to elaborate on key topics.

Module-2
DEFINING A PROJECT:

Create a New Project Plan, Define a Project, Assign a Project Calendar, enter project information, define project start date and basic project settings.

Teaching-Learning Process

Direct method: Demonstration and practical exercises using Project Liber to introduce the concepts. Discussions, problem-solving exercises and application-based learning.

Blended learning: PowerPoint presentations, online tutorials and video demonstrations to elaborate on key topics.

Module-3
CREATING AND ORGANIZING TASKS:

Add Tasks to a Project Plan, Import Tasks from Other Programs, Create a Work Breakdown Structure, Define Task Relationships, Schedule Tasks, define task duration and milestones, organize tasks and subtasks.

Teaching-Learning Process

Direct method: Demonstration and practical exercises using Project Liber to introduce the concepts. Discussions, problem-solving exercises and application-based learning.

Blended learning: PowerPoint presentations, online tutorials and video demonstrations to elaborate on key topics.

Module-4
MANAGING PROJECT PLAN RESOURCES:

Add Resources to a Project Plan, Create a Resource Calendar, Enter Costs for Resources, Assign Resources to

Tasks, Resolve Resource Conflicts, manage resource availability and allocation.	
Teaching-Learning Process	Direct method: Demonstration and practical exercises using Project Liber to introduce the concepts. Discussions, problem-solving exercises and application-based learning. Blended learning: PowerPoint presentations, online tutorials and video demonstrations to elaborate on key topics.
Module-5	
FINALIZING A PROJECT PLAN: Optimize a Project Plan, Set a Baseline, Share a Project Plan, review project schedules, monitor project progress and generate project reports.	
Teaching-Learning Process	Direct method: Demonstration and practical exercises using Project Liber to introduce the concepts. Discussions, problem-solving exercises and application-based learning. Blended learning: PowerPoint presentations, online tutorials and video demonstrations to elaborate on key topics.
Assessment Details (CIE and Term Work) The weightage of Continuous Internal Evaluation (CIE) is 50% and Term Work is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in Term Work is 50% of the maximum marks. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/course if the student secures not less than 50% in the sum total of the CIE and Term Work marks taken together. Continuous Internal Evaluation: CIE marks shall be awarded based on the student's performance in practical exercises, assignments, class tests, presentations and continuous assessment throughout the semester. Term work will be evaluated for 100 Marks and scaled down to 50 Marks	
Suggested Learning Resources: Books	
Web links and Video Lectures (e-Resources):	
Skill Development Activities Suggested • Practical exercises using ProjectLibre for construction project planning and scheduling. • Preparation of Work Breakdown Structure and construction project schedules using ProjectLibre. • Preparation of resource allocation and cost schedules for a selected construction project. • Case study and preparation of a complete construction project schedule using ProjectLibre. • Site visits to marquee projects within and outside the country to understand project planning, scheduling and resource management practices.	

Course outcome (Course Skill Set)

At the end of the course the student will be able to :

Sl. No.	Description	Blooms Level
C01	Demonstrate the use of ProjectLibre for creating and managing project plans.	L2
C02	Develop a Work Breakdown Structure and construction project schedule using ProjectLibre.	L2
C03	Apply task relationships, scheduling techniques and project calendars for construction projects.	L3
C04	Allocate project resources, assign costs and resolve resource conflicts using ProjectLibre.	L3
C05	Develop, optimize, baseline and present a complete construction project schedule using ProjectLibre.	L3

Program Outcome of this course:

Sl. No.	Description	POs
1	Acquire outstanding fundamental knowledge in the field of Construction Project Management.	P01
2	Encompass the ability to work in collaboration with interdisciplinary teams.	P02
3	Demonstrate creativity in the problem-solving process through professional quality graphic presentations and technical drawings.	P03
4	Acquire outstanding knowledge & software skills for design, construction, resources management and scheduling & Monitoring of projects.	P04
5	Understanding the diverse needs of values and systems of society and providing sustainable solutions.	P05
6	Demonstrate design solutions that integrate contextual, social, economic, cultural, ethical, environmental concerns.	P06
7	Ability to do independent/option-based research and exploration of advanced and emerging topics.	P07
8	Appraise professional standards and ethical responsibilities as a team member.	P08

Mapping of COs and POs:

	P01	P02	P03	P04	P05	P06	P07	P08
C01	H	M	L	H	0	0	L	M
C02	H	M	M	H	L	L	M	M
C03	H	M	L	H	M	0	M	M
C04	H	H	L	H	M	M	M	M
C05	H	H	M	H	M	M	M	H

H – High , M – Medium, L - Low

I Semester (Professional Core Course Lab)

GIS AND INFRASTRUCTURE PLANNING			
Course Code	2MCPML107C	CIE Marks	50
Teaching Hours/Week (L: T:P:TW+SL)	00:00:28:2	Term Work	50
Total Hours of Pedagogy	30 Hrs.	Total Marks	100
Credits	1	Exam Hours	00
Course Learning objectives: - To understand the basic concepts, components and applications of Geographic Information Systems (GIS). - To develop an understanding of GIS data, spatial data capture, coordinate reference systems and methods of data management. - To develop skills in using Google Earth and KML for site mapping, terrain analysis and geographical data representation. - To understand the creation, management and analysis of raster and vector GIS data for architectural, site and infrastructure planning applications. - To develop skills in terrain analysis, map composition, web-based GIS mapping and 3D map representation.			
Module-1			
INTRODUCTION TO GIS: Geographic Information System as hardware, software and application, GIS data, vector data, raster data, attribute data, data capture and methods, coordinate reference systems. Applications of GIS in architectural analysis, site and terrain analysis, landscape architecture, urban planning and infrastructure planning.			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. Discussions, demonstrations and case studies related to architectural and infrastructure planning applications.</i> <i>Blended learning: PowerPoint presentations, online tutorials and video demonstrations to elaborate on key topics.</i>		
Module-2			
INTRODUCTION TO GOOGLE EARTH: An overview of Google Earth and KML, Google Objects, descriptive HTML in placemarks, ground overlays, screen overlays, paths, manipulating a path and polygon, taking profiles of a site, creating KML files and exporting to GIS format.			
Teaching-Learning Process	<i>Direct method: Demonstration and practical exercises using Google Earth and KML to introduce the concepts and applications.</i> <i>Blended learning: PowerPoint presentations, online tutorials and video demonstrations to elaborate on key topics.</i>		
Module-3			
CREATING AND ANALYSING GIS DATA: Capturing survey data through handheld GPS or mobile applications, traversing the boundary of a site, bringing routes and waypoint data into GIS. Spatial data, loading raster files, mosaic raster, georeferencing raster and vector files, loading data from OGC web services and databases. Creating vector data layers, joining tabular data, topology errors and tools, analysing raster data, combining raster and vector data, raster surface through interpolation, leveraging the power of spatial databases, vector and raster analysis, vector spatial analysis using buffers and spatial analysis using interpolation.			
Teaching-Learning Process	<i>Direct method: Demonstration and hands-on practical exercises for capturing, importing, managing and analysing GIS data. Site-based exercises and application-oriented learning.</i> <i>Blended learning: PowerPoint presentations, online tutorials and video demonstrations to elaborate on key topics.</i>		

Module-4	
TERRAIN ANALYSIS AND SCIENTIFIC COMPUTING OF RASTER DATASET: Creating Digital Elevation Model (DEM) from point data, hill shade, slope and aspect.	
CREATING GREAT MAPS: Composing maps, vector styling, labelling, using Adobe Illustrator for composing multiple vector layers of maps, designing print maps and publishing GIS 2D maps on the web.	
Teaching-Learning Process	<i>Direct method: Demonstration and practical exercises for terrain analysis, map composition and preparation of GIS maps.</i> <i>Blended learning: PowerPoint presentations, online tutorials and video demonstrations to elaborate on key topics.</i>
Module-5	
CREATING 3D MAPS: Creating 3D maps in HTML format and navigating 3D maps through an internet browser.	
Teaching-Learning Process	<i>Direct method: Demonstration and practical exercises for creating and navigating 3D GIS maps.</i> <i>Blended learning: PowerPoint presentations, online tutorials and video demonstrations to elaborate on key topics.</i>
Assessment Details (CIE and Term Work) The weightage of Continuous Internal Evaluation (CIE) is 50% and Term Work is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in Term Work is 50% of the maximum marks. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/course if the student secures not less than 50% in the sum total of the CIE and Term Work marks taken together. Continuous Internal Evaluation: CIE marks shall be awarded based on the student's performance in practical exercises, assignments, class tests, presentations and continuous assessment throughout the semester. Term work will be evaluated for 100 Marks and scaled down to 50 Marks	
Suggested Learning Resources: Books 1. Graser, A., 2016. <i>Learning QGIS</i>. Packt Publishing. 2. Van Hoesen, J., Pirelli, L., Smith Jr., R., and Menke, K., 2016. <i>Mastering QGIS</i>. Packt Publishing. 3. Carson, T. and Baker, D.L., 2006. <i>Adobe Acrobat and PDF for Architecture, Engineering, and Construction</i>. Springer. 4. <i>Displaying and Analysing 3D Data in Surfer Software</i>.	
Web Links and Video Lectures (e-Resources): https://sites.duke.edu/envgis/tutorials/introduction-to-google-earth/	
Skill Development Activities Suggested • Practical exercises on GIS-based site and terrain analysis. • Capturing and mapping site boundary, route and waypoint data using GPS or mobile applications. • Preparation of GIS maps using raster and vector data. • Preparation of terrain analysis maps including DEM, slope, aspect and hill shade. • Preparation and presentation of a GIS-based site/infrastructure planning map.	

Course outcome (Course Skill Set)

At the end of the course the student will be able to :

Sl. No.	Description	Blooms Level
C01	Explain the basic concepts, components and applications of Geographic Information Systems.	L2
C02	Create and manage GIS data using Google Earth, KML, raster and vector data.	L2
C03	Apply GIS tools for spatial data capture, georeferencing, data management and spatial analysis.	L4
C04	Perform terrain analysis using Digital Elevation Models, slope, aspect and hill shade techniques.	L5
C05	Prepare and present 2D and 3D GIS maps for architectural, site and infrastructure planning applications.	L4

H - High , M - Medium, L - Low

Program Outcome of this course:

Sl. No.	Description	POs
1	Acquire outstanding fundamental knowledge in the field of Construction Project Management.	PO1
2	Encompass the ability to work in collaboration with interdisciplinary teams.	PO2
3	Demonstrate creativity in the problem-solving process through professional quality graphic presentations and technical drawings.	PO3
4	Acquire outstanding knowledge & software skills for design, construction, resources management and scheduling & Monitoring of projects.	PO4
5	Understanding the diverse needs of values and systems of society and providing sustainable solutions.	PO5
6	Demonstrate design solutions that integrate contextual, social, economic, cultural, ethical, environmental concerns.	PO6
7	Ability to do independent/option-based research and exploration of advanced and emerging topics.	PO7
8	Appraise professional standards and ethical responsibilities as a team member.	PO8

Mapping of COS and POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
C01	H	M	0	M	M	M	M	L
C02	H	M	M	H	M	M	M	L
C03	H	H	M	H	H	H	M	M
C04	H	M	M	H	H	H	M	L
C05	H	H	H	H	H	H	H	M

H - High , M - Medium, L - Low

I Semester (Professional Core Course Lab)

MS PROJECT			
Course Code	2MCPML107D	CIE Marks	50
Teaching Hours/Week (L: T:P:TW+SL)	00:00:28:2	Term Work	50
Total Hours of Pedagogy	30 Hrs.	Total Marks	100
Credits	1	Exam Hours	00
Course Learning objectives: - To understand the work environment of MS Project. - To create a project template and assign a calendar. - To Create a work breakdown structure. - To develop resources for project and assign them to activities and manage the resources. - Prepare a project baseline and compare them with actual progress.			
Module-1			
Getting Started with Microsoft Project: Identify Project Management Concepts Navigate the Microsoft Project Environment			
Teaching-Learning Process	<i>Blended learning: Power point presentation and webinars.</i>		
Module-2			
Defining a Project: Create a New Project Plan Define a Project Assign a Project Calendar.			
Teaching-Learning Process	<i>Blended learning: Power point presentation and webinars.</i>		
Module-3			
Creating and Organizing Tasks: Add Tasks to a Project Plan, Import Tasks from Other Programs Create a Work Break down Structure, Define Task Relationships , Schedule Tasks			
Teaching-Learning Process	<i>Blended learning: Power point presentation and webinars.</i>		
Module-4			
Managing Project Plan Resources: Add Resources to a Project Plan Create a Resource Calendar Enter Costs for Resources Assign Resources to Tasks, Resolve Resource Conflicts			
Teaching-Learning Process	<i>Blended learning: Power point presentation and webinars.</i>		
Module-5			
Finalizing a Project Plan: Optimize a Project Plan, Set a Baseline, and Share a Project Plan.			
Teaching-Learning Process	<i>Blended learning: Power point presentation and webinars.</i>		

Assessment Details (CIE and Term Work)

The weightage of Continuous Internal Evaluation (CIE) is 50% and Term Work is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in Term Work is 50% of the maximum marks. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/course if the student secures not less than 50% in the sum total of the CIE and Term Work marks taken together.

Continuous Internal Evaluation:

CIE marks shall be awarded based on the student's performance in practical exercises, assignments, class tests, presentations and continuous assessment throughout the semester.

Term work will be evaluated for 100 Marks and scaled down to 50 Marks

Suggested Learning Resources:**Books**

1. Marmel, E., 2011. Microsoft Project 2007 Bible (Vol. 767). John Wiley & Sons.
2. Larson, E. and Gray, C., 2013. Project management: The managerial process with MS project. McGraw-Hill Education.
3. Carson, T. and Baker, D.L., 2006. *Adobe Acrobat and PDF for Architecture, Engineering, and Construction*. Springer.
4. Ambriz, R. and Landa, M., 2014. *Dynamic Scheduling® With Microsoft® Project 2013: The Book By and For Professionals*. J. Ross Publishing.

Web Links and Video Lectures (e-Resources):**Video Tutorial**

https://www.youtube.com/watch?v=5v_42_4Vl2o Web Link

https://www.tutorialspoint.com/ms_project/index.htm

Skill Development Activities Suggested

- Guest Lecture from expert.
- Attending webinars.

Course outcome (Course Skill Set)

At the end of the course the student will be able to:

Sl. No.	Description	Blooms Level
CO1	Understand the Microsoft project software environment	L1
CO2	Develop project plan and assign calendars.	L6
CO3	Develop tasks and create work breakdown structure	L6
CO4	Create resources and modify it.	L6
CO5	Modify the project plan to reach the targets and create project baselines.	L6

Program Outcome of this course:

Sl. No.	Description	POs
1	Acquire outstanding fundamental knowledge in the field of Construction Project Management.	PO1
2	Encompass the ability to work in collaboration with interdisciplinary teams.	PO2
3	Demonstrate creativity in the problem-solving process through professional quality graphic presentations and technical drawings.	PO3
4	Acquire outstanding knowledge & software skills for design, construction, resources management and scheduling & Monitoring of projects.	PO4
5	Understanding the diverse needs of values and systems of society and providing sustainable solutions.	PO5
6	Demonstrate design solutions that integrate contextual, social, economic, cultural, ethical, environmental concerns.	PO6
7	Ability to do independent/option-based research and exploration of advanced and emerging topics.	PO7
8	Appraise professional standards and ethical responsibilities as a team member.	PO8

Mapping of COS and POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
C01	H	M	0	M	M	M	M	L
C02	H	M	M	H	M	M	M	L
C03	H	H	M	H	H	H	M	M
C04	H	M	M	H	H	H	M	L
C05	H	H	H	H	H	H	H	M

H – High , M – Medium, L - Low