

II - SEMESTER

BUILDING MANAGEMENT (Studio-2)			
Course Code	2MCPM201	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 understand the service aspects of high-rise buildings. • To analyze the operation and maintenance of such services. . • To prepare time schedules for installation services in the building. • To prepare a work breakdown structure for services			
Module-1			
Introduction to Building Bye laws and the building services (Electrical, building automation and infrastructure services) by the faculty and book review.			
Teaching-Learning Process	<i>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.</i>		
Module-2			
Case studies and industrial visits related to the building techniques, building services and operation and maintenance, analyzing the details.			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concept of HVAC and fire fighting and</i> <i>ICT and Digital support: Video to demonstrate the process of HVAC and fire fighting. Power point presentation to elaborate Modelling of HVAC.</i> <i>Site visit: To understand the installation and other planning parameters.</i>		
Module-3			
Preparation of time schedules related to the installation of services in the building. Preparation of work breakdown structure (WBS)			
Teaching-Learning Process	<i>ICT and Digital support: Video to demonstrate the BIM modelling .Power point presentation to elaborate Modelling of BIM.</i> <i>Collaborative and Cooperative learning: Students should work as group work. Preparation of time schedules for activities</i>		
Module-4			
Preparation of estimates. Energy audit of selected buildings.			
Teaching-Learning Process	<i>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.</i> <i>ICT and Digital support: Video to demonstrate the process of integrated building system. Power point presentation to elaborate integrated building system.</i>		
Module-5			
Final presentation			

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: 5.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. 6. 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. 7. 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. 8. 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 8. Introduction to the Design and Analysis of Building Electrical Systems 9. Electrical Design Guide for Commercial Buildings. Book by William H. Clark 10. Energy-Efficient Electrical Systems for Buildings Book by Moncef Krarti 11. Intelligent Buildings and Building Automation. Book by Shengwei Wang 12. Construction and Building Automation: From Concepts to ...Book by Benny Raphael	
Web links and Video Lectures (e-Resources): Video Tutorial: https://www.youtube.com/watch?v=0LNklcBhl_Q&list=PLp6ek2hDcoNCb0R8gwk1WzpTN94eXs9vb Web Link https://guides.smartbuildingsacademy.com/building-automation-system 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	Identify and understand the major building services and their application in high-rise buildings.	L1
C02	Analyse the operation, maintenance and installation requirements of building services through case studies and site visits.	L2
C03	Devise a work breakdown structure for the packages	L4
C04	Prepare time schedules for the installation of building services.	L4
C05	Conduct an energy audit of selected buildings and present the integrated project work.	L5

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	M	M	L	M
C02	H	H	M	H	H	H	M	M
C03	H	M	M	H	M	M	M	M
C04	H	H	M	H	M	M	M	M
C05	H	H	H	H	H	H	H	H

H – High , M – Medium, L - Low

II-SEMESTER

RESOURCE MANAGEMENT			
Course Code	2MCPM102	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 know the process of planning, maintaining and replacement of construction • to study the concepts of inventory management and store management. • To know the types of construction used in the projects. • To study the human resources aspects of construction projects. • To know about wage rates and resources productivity. • To study about effective communication management between project team members.			
Module-1			
Earth Moving Operations: Types of Earthwork Equipment: Tractors, Motor Graders, Scrapers, Front-end Loaders, Earth Movers. Equipment for Dredging, Trenching, Tunnelling, Drilling, Blasting; Equipment for Compaction; Erection Equipment; Types of pumps used in construction. Equipment for Dewatering and Grouting, Foundation and Pile Driving Equipment, Forklifts and Related Equipment, Portable Materials Bins Conveyors, Hauling Equipment			
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			
CONSTRUCTION EQUIPMENT MANAGEMENT: Identification Planning Equipment Management in Projects Maintenance Managements Replacement Cost Control of equipment Depreciation Analysis Safety Management. Equipment owning types, Breakeven point ownership, cost and maintenance cost, Salvaging. Fundamentals of earthwork operations.			
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			
CONSTRUCTION MATERIAL MANAGEMENT: Importance of material Management Classification and Codification of materials, Inventory Control Managing the Inventory and Flow of raw materials, Work in Process, Finished Goods, and supplies to ensure/enhance the organizatins comprtiteness and profitability, application of ABC Analysis in inventory control, Inventory Management Safety Stock, Stock Outs. Stores Management: Quality control, Use of (MMS) Materials Management Systems			
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 to elaborate more on key topics.</i>		
Module-4			
HUMAN RESOURCE DEVELOPMENT Introduction Organization Fulcrum of the modern enterprise informal groups Management Employees Human resource management. INDUSTRIAL RELATIONS AND LABOUR LAWS Labour legislation nature and scope Indian constitution and labour labour laws for the building Industry laws regulating			

wages and payments to workers social security laws industrial relations laws miscellaneous laws- Industrial relations and trade unions.	
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/newspaper reading and inferences from the same Blended learning: Power point presentation and webinars.
Module-5	
MANAGING PERSONNEL AND RELATIONS: Personnel management nature and scope personnel plan personnel department manpower planning, recruitment and selection. In-service training Training Inputs Principles Types Assessments. Wages and salary administration Wage rate Wage payment methods Incentive plan Fringe benefits Productivity earnings and profit sharing Bonus payment Wage legislation Wage administration. Productivity in construction measuring productivity Factors affecting productivity Responsibility for productivity. Employees relation in an organization Characteristics of groups Roles of project manager Communication Types of communication - Communication process Effective communication the art of listening Motivating employees Hierarchy of motivation.	
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) 7. First test at the end of 5th week of the semester 8. Second test at the end of the 10th week of the semester 9. Third test at the end of the 13th week of the semester Two assignments each of 10 Marks 10. First assignment at the end of 4th week of the semester 11. 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) 12. 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)

3. The question paper will have ten questions. Each question is set for 20 marks.

4. 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

8. Peurifoy, R.L., Ledbetter, W.B. and Schexnayder, C., Planning, Equipment and 5th Edition, McGraw Hill, Singapore, 1995.
9. Sharma S.C. Equipment and Khanna Publishers New Delhi, 1988.
10. Deodhar, S.V. Equipment and Job Khanna Publishers New Delhi, 1988.
11. Dr. Mahesh Varma, Equipment and its Planning and Metro Politan Book Company, New Delhi, 1983 5.
12. Journals such as Civil Engineering and Construction Review (CE&CR), New building materials and Construction world (NBM &CW).
13. "Materials of construction" by Ghose, Tata McGraw Hill Publication.
14. Handbook of Materials Management Gopalkrishnan, Prentice Hall Publication.
- 15.

Web links and Video Lectures (e-Resources):

Video Tutorial

<https://www.youtube.com/watch?v=2B7DhQvL8kw&list=PLwdnzlV3ogoVGSUhjx4VzW-dGz7DqQFoi>

Web Link

<https://lecturenotes.in/subject/202/construction-equipments-planning-and-management-cepm/note>

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	Describe the planning strategies in the procurement of	L1
CO2	Explain the process and control of inventory and stores management	L1
CO3	Classify the construction used in the projects.	L2
CO4	Explain about the organization setup and human resource management	L1
CO5	Describe about the ways of managing wages and man power requirement	L1
CO6	Explain about the ways of implementing effective communication	L2

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	L	L	H	0	0	L	0
C02	H	L	L	H	0	0	L	0
C03	H	L	L	M	0	0	L	0
C04	H	M	L	0	0	L	L	L
C05	H	M	L	L	0	0	L	L
C06	H	H	L	L	0	0	L	0

H – High , M – Medium, L - Low

II-SEMESTER

BUILDING ENERGY ANALYSIS MANAGEMENT			
Course Code	2MCPM203	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 introduce the need for energy management and energy audit in buildings - To achieve higher standards in building design and operation with a solid foundation of energy engineering and sustainability principles. - To use building performance modelling as an investigative tool to improve overall energy efficiency of the building			
Module-1			
INTRODUCTION Energy sources - energy demand and supply, energy crisis, future scenario, Alternate sources of energy - Energy system efficiency, energy conservation aspects, Principles of Energy management and Audit - General principles, planning and program - Introduction to Energy Audit -Types and Methodology, site surveys, energy systems survey, Instrumentation and measurement, analysis of data and results.			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concept of energy sources and energy management. , Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</i>		
Module-2			
ENERGY AND BUILDING SERVICES Thermal performance characteristics of building elements/enclosure; Energy efficiency in design and operation of building services; Energy audit in different types of buildings and Energy Management; Recycling and reuse of water products, Concepts of Green and Sustainable Buildings.			
HVAC: HEATING AND COOLING MANAGEMENT General principles of energy management in HVAC systems; Energy management opportunities; Modelling of heating and cooling loads in buildings.			
ELECTRICAL LOAD AND LIGHTING MANAGEMENT General Principles; Illumination and human comfort; Lighting systems; equipment; Energy management opportunities; Electrical load analysis; Peak load controls. Process energy Management: Principles; Modelling of electrical and lighting loads in buildings.			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concept of HVAC and Electrical load and lighting management</i> <i>ICT and Digital support: Video to demonstrate the process of HVAC and Electrical load and lighting management. Power point presentation to elaborate Modelling of HVAC, electrical and lighting loads in buildings. .</i>		
Module-3			
BUILDING INFORMATION MODELING (BIM) Use of computers, building information management of energy with environment aspects - Building information modelling (BIM) - Facilitates documentation - design exploration - model-based quantity take off and estimating - interference checking - construction coordination and sequencing - digital fabrication and 3-D building information capture and visualization. - Examine geometry - spatial relationships - building information - quantities and properties of building components - Integrating people systems - business structures and practices for maximizes efficiency through all phases of design fabrication - construction and life cycle of the structure.			

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 on BIM model as group work. The research and learning to be share with the class.
Module-4	
INTEGRATED BUILDING SYSTEMS General principles - environment conformation - Passive design considerations - integration of building system - energy storage - cold storage techniques - Economic analysis, economic aspects of energy management - Economic analysis methods - life-cycle costing - break even analysis - benefit cost analysis - payback period analysis - present worth analysis - equivalent annual cost analysis	
Teaching-Learning Process	Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concept of integrated building system ICT and Digital support: Video to demonstrate the process of integrated building system. Power point presentation to elaborate integrated building system.
Module-5	
COMPREHENSIVE LEARNING Based on understanding of above Units the students are expected to perform various simulation analysis on Energy load, life cycle analysis etc., through BIM of a small project emphasizing on Energy efficiency design.	
Teaching-Learning Process	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 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) 7. First test at the end of 5th week of the semester 8. Second test at the end of the 10th week of the semester 9. Third test at the end of the 13th week of the semester. Two assignments each of 10 Marks 10. First assignment at the end of 4th week of the semester 11. 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) 12. 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)

3. The question paper will have ten questions. Each question is set for 20 marks.

4. 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

6. Clive Beggs. (2009). Energy: Management, Supply and Conservation, Routledge.
7. Douglas Harris. (2011). A Guide to Energy Management in Buildings, Routledge.
8. Koenigsberger, O.H, Ingersoll, T. G., Mayhew. A, Szokolay.S.V.(2004). Manual of Tropical Housing and Building Part 1
9. LalJayamaha. (2006). Energy-Efficient Building Systems: Green Strategies for Operation and Maintenance, McGraw-Hill Professional.
10. Steve Doty and Wayne C. Turner. (2012) Energy Management Handbook, Fairmont Press.
11. Tarik Al-Shemmeri (2011). Energy Audits: A Workbook for Energy Management in Buildings, Wiley.
12. W R Murphy, G Mckay. (1981). Energy Management, Butterworth-Heinemann Ltd.

Web links and Video Lectures (e-Resources):

NPTEL Lecture 12 - Energy Efficiency and Stimulation :
<http://www.digimat.in/nptel/courses/video/105107156/L12.html>

NPTEL Lecture 16- Energy Efficiency, Acoustics and Day lighting in Buildings:
<https://www.digimat.in/nptel/courses/video/105102175/L16.html>

Skill Development Activities Suggested

- Guest Lecture from expert.
- Case Studies :
 - 1) The Energy and Resources Institute (TERI) Bangalore
 - 2) Titan new corporate campus (GRIHA Rating: 5 Stars) Bangalore
 - 3) Mahindra World City in Chennai, India (certified under the Indian Green Building Council's (IGBC) Green Townships rating system.
 - 4) DLF Cyber city in Chennai LEED Platinum certified project.

Course outcome (Course Skill Set)

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

Sl. No.	Description	Blooms Level
CO1	Interpret the understanding of energy sources, principles of energy management and energy auditing.	L2
CO2	Interpret the understanding of the thermal performance of buildings.	L2
CO3	Develop the knowledge to demonstrate an understanding of energy efficiency in design and operation of building services.	L3
CO4	Develop the model using energy simulation software tools and generate building energy information its performance.	L3
CO5	Develop an integrated building system approach to energy management using passive design techniques.	L3
CO6	Evaluate energy efficiency design through a simulation analysis approach.	L4

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	O	L	O	M	H	M	M
C02	H	H	M	O	M	M	M	L
C03	H	L	L	M	H	L	H	M
C04	O	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

II- SEMESTER

AI IN PROJECT MANAGEMENT			
Course Code	2MCPM204	CIE Marks	50
Teaching Hours/Week (L: T:P:TW+SL)	56:00:00:64	VIVA Marks	50
Total Hours of Pedagogy	120 Hrs	Total Marks	100
Credits	04	Exam Hours	00
Course Learning objectives: - To introduce the basic concepts of Artificial Intelligence and Generative AI relevant to Construction Project Management. - To understand the application of AI in project planning, scheduling, estimation, cost and risk management. - To introduce AI applications in BIM, construction monitoring, safety and quality management. - To develop practical skills in using AI tools for construction project documentation, analysis and decision-making. - To understand the ethical, professional and practical limitations of AI in construction.			
Module-1			
INTRODUCTION TO AI IN CONSTRUCTION PROJECT MANAGEMENT Introduction to Artificial Intelligence, Machine Learning and Generative AI; evolution of digital technologies in construction; applications of AI in Architecture, Engineering and Construction; construction project data and its sources; BIM, project schedules, cost data, site photographs and project documents; role of AI in project planning and decision-making; opportunities and limitations of AI in construction.			
Teaching-Learning Process	<i>Direct method: Lectures supported by presentations and discussions to introduce the basic concepts of AI and its applications in construction.</i> <i>ICT and Digital Support: Demonstration of commonly used AI and Generative AI tools through simple construction-related examples.</i> <i>Case Study: Study of selected AI applications in real construction projects.</i>		
Module-2			
AI FOR PROJECT PLANNING, SCHEDULING AND COST MANAGEMENT AI-assisted project planning and scheduling; construction activity and resource analysis; AI-assisted quantity estimation; cost estimation and cost forecasting; prediction of cost overruns; resource and material forecasting; AI applications in 4D and 5D BIM; project progress analysis; scenario and what-if analysis for project decision-making.			
Teaching-Learning Process	<i>Direct method: Lectures and discussions on AI applications in project planning, scheduling and cost management.</i> <i>ICT and Digital Support: Demonstration of AI tools, project scheduling software and BIM-based 4D/5D workflows.</i> <i>Practical Exercise: Students shall use AI tools to prepare a simple construction schedule, cost estimate and project analysis.</i>		
Module-3			
AI FOR RISK, RESOURCE AND CONSTRUCTION MANAGEMENT AI-based risk identification and prediction; risk classification and prioritisation; resource allocation and optimisation; workforce and equipment management; construction logistics and site planning; material flow optimisation; AI-assisted decision-making; scenario analysis and project performance prediction.			

Teaching-Learning Process	Direct method: Lectures supported by construction case studies and discussions. ICT and Digital Support: Demonstration of AI-based risk analysis, resource planning and construction decision-making. Collaborative Learning: Students shall work in groups to identify project risks and develop AI-assisted mitigation strategies for a selected construction project.
Module-4	
AI FOR SITE MONITORING, SAFETY AND QUALITY Introduction to computer vision in construction; AI-based progress monitoring using photographs, videos and drone imagery; construction activity and productivity monitoring; AI-based worker and PPE detection; safety hazard identification; equipment monitoring; AI-assisted quality inspection and defect detection; IoT and sensor-based construction monitoring.	
Teaching-Learning Process	Direct method: Lectures and discussions on AI applications in construction site monitoring. ICT and Digital Support: Demonstrations and videos of computer vision, drone monitoring, IoT sensors, safety monitoring and defect detection. Case Study: Analysis of real-world applications of AI for construction safety, progress monitoring and quality control.
Module-5	
GENERATIVE AI, DOCUMENTATION AND FUTURE OF PROJECT MANAGEMENT Generative AI for construction project documentation; preparation of reports, minutes, checklists and project correspondence; AI-assisted RFI and submittal management; AI applications in contracts and procurement; supply-chain and material management; Digital Twins and AI-enabled project management; AI-assisted project reporting and decision-making; ethical, legal, contractual, privacy and professional considerations; limitations and responsible use of AI.	
Teaching-Learning Process	Direct method: Lectures and discussions on the practical applications and limitations of Generative AI in project management. ICT and Digital Support: Demonstration of Generative AI for project documentation, reporting, data analysis and project communication. Practical Exercise: Students shall prepare selected project documents using AI and critically review the accuracy and reliability of the generated information.

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:

5. 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.
6. 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.
7. 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.
8. 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

12. Darko, A., Chan, A.P.C., Adabre, M.A., Edwards, D.J., Hosseini, M.R. and Ameyaw, E.E., 2020. *Artificial Intelligence in the AEC Industry: Scientometric Analysis and Visualization of Research Activities*. Automation in Construction, 112, 103081.
13. Kensek, K., 2014. *Building Information Modeling: BIM in Current and Future Practice*. Routledge.
14. Sacks, R., Girolami, M. and Brilakis, I., 2020. *Building Information Modelling, Artificial Intelligence and Construction Tech*. Developments in the Built Environment, 4, 100011.
15. Fang, W., Ding, L., Love, P.E.D., Luo, H., Li, H., Peña-Mora, F., Zhong, B. and Zhou, C., 2020. *Computer Vision Applications in Construction Safety Assurance*. Automation in Construction, 110, 103013.
16. Sacks, R., Brilakis, I., Pikas, E., Xie, H.S. and Girolami, M., 2020. *Construction with Digital Twin Information Systems*. Data-Centric Engineering, 1, A32.
17. Abioye, S.O., Oyedele, L.O., Akanbi, L., Ajayi, A., Delgado, J.M.D., Bilal, M., Akinade, O.O., Ahmed, A. and Owolabi, H.A., 2021. *Artificial Intelligence in the Construction Industry: A Review of Present Status, Opportunities and Future Challenges*. Journal of Building Engineering, 44, 103299.

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
- Attending webinars, conferences and workshops related to AI in construction.

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 and applications of Artificial Intelligence and Generative AI in Construction Project Management.	L2
C02	Apply AI-based tools for construction planning, scheduling, estimation and cost management.	L3
C03	Analyse construction risks, resources and project performance using AI-assisted approaches.	L4
C04	Analyse AI applications in construction site monitoring, safety and quality management.	L4
C05	Evaluate the use of Generative AI for construction documentation, reporting and project decision-making considering ethical and professional limitations.	L5

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	M	L	L	H	M
C02	H	M	M	H	M	L	H	M
C03	H	H	M	H	M	M	H	M
C04	H	H	M	H	M	M	H	H
C05	H	H	M	H	M	M	H	H

H - High, M - Medium, L - Low

II – SEMESTER (Professional Elective Course - III)

AIRPORT PLANNING AND DESIGN			
Course Code	2MCPM205A	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 concepts of infrastructure management with respect to airports. • To understand the planning and design requirements of airport components. • To understand airport planning, site selection and future air traffic demand. • To analyse wind direction and determine runway orientation using wind rose diagrams. • To understand the principles of runway, taxiway, airport lighting, marking and Air Traffic Control (ATC).			
Module-1			
Introduction Airports, STOLport, Heliports, Aircraft components which affects planning and design of airports			
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			
Airport components: Terminal building, apron area, Taxi-way, High speed exit, Run -way, Holding apron and hanger, Number of runway, runway orientation, parallel runway and other runway configurations, Air Traffic control (ATC),Gate positions, Special requirements for international services like security check, Immigration area, passport control, customs control and other features. Domestic Airports and its requirements.			
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			
Airport planning: Master plan, regional planning, Selection of site, Survey and drawings to be prepared (including future expansion and suitable land acquisition), Demand for future air traffic growth and planning (Passenger and cargo)			
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			
Wind Rose Diagram: Direction and orientation of runway based on wind direction, duration, intensity, runway numbering and plotting wind rose diagram.			
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	
Runway Design: Basic runway length, correction to elevation, gradient and temperature to obtain total runway length and problems, Airport classification, Taxiway Design: Taxiway radius, taxiway width and exit taxiway principle. Airport control: Airport lighting, Marking and Air Traffic Control(ATC)	
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 (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 9. Airport planning and design – S K Khanna, MG Arora and SS Jain 10. Planning and design – Horonjeff ICAO Practices and provisions and AAI standards	

Web links and Video Lectures (e-Resources):**Skill Development Activities Suggested**

- Guest Lecture from expert.
- Case study of airport terminal planning and airport components.

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 of airport infrastructure, planning and design.	L2
C02	Identify and analyse the major components and functional requirements of airports.	L4
C03	Apply the principles of airport planning for site selection, master planning and future expansion.	L3
C04	Analyse wind direction and prepare wind rose diagrams for determining runway orientation.	L4
C05	Apply the principles of runway and taxiway design and understand airport lighting, marking and Air Traffic Control systems	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	L	H	M	M	L	M
C02	H	H	M	H	M	M	M	M
C03	H	M	M	H	H	H	M	M
C04	H	M	M	H	M	M	H	M
C05	H	H	H	H	M	H	M	H

H – High , M – Medium, L - Low

II – SEMESTER (Professional Elective Course - III)

INFRASTRUCTURE MANAGEMENT – AIRPORTS, TUNNELLING, MARINE/OFFSHORE CONSTRUCTION			
Course Code	2MCPM205B	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: - At the end of the course, the student will be able to: - Understand the concept of infrastructure Management with respect Airports, Tunnelling, Marine/ Offshore, Road and Highway infrastructure management.			
Module-1			
Introduction to Infrastructure Management and its processes. Types of Infrastructure Management: Airport, Tunnelling, Marine/ Offshore, Roads and Highways. Difference between Infrastructure Management and Construction Management			
Teaching-Learning Process	ICT and Digital support: PowerPoint presentations and videos to understand the infrastructure management and process.		
Module-2			
Land Sourcing and its Processes for Infrastructure Projects.			
Teaching-Learning Process	ICT and Digital support: PowerPoint presentations and videos to understand the land sourcing process.		
Module-3			
Investment and Financing for Infrastructure Projects. Viability Gap Funding, JV-PPP, Swiss-Challenge Model, etc.			
Teaching-Learning Process	Collaborative and Cooperative learning: Group assignments and case studies to be presented to learn the types of financing for infrastructure projects.		
Module-4			
Project Planning and Control for Infrastructure Projects..			
Teaching-Learning Process	ICT and Digital support: Project scheduling using software		
Module-5			
Site Safety& Traffic Management for Infrastructure Projects. Labour, Material & Movement scheduling.			
Teaching-Learning Process	ICT and Digital support: Labour and material management with the help of software.		

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. Das, P.C. ed., 1999. Management of highway structures. Thomas Telford.
2. Adetola, A. and Goulding, J., 2016. Collaborative framework for road infrastructure management. Infrastructure Asset Management, 3(2), pp.71-80.
3. Kazda, A. and Caves, R.E., 2007. Airport design and operation. Amsterdam: Elsevier.
4. Kapur, A., 1995. Airport infrastructure: The emerging role of the private sector. The World Bank.
5. Frangopol, D. and Tsompanakis, Y. eds., 2014. Maintenance and safety of aging infrastructure: Structures and infrastructures book series (Vol. 10). CRC press.
6. Beulen, E., Van Fenema, P. and Currie, W., 2005. From application outsourcing to infrastructure management: Extending the offshore outsourcing service portfolio. European Management Journal, 23(2), pp.133-144.

Web links and Video Lectures (e-Resources):

NTPEL lecture on infrastructure management:

https://youtu.be/W3yOD_XM5-4

Stanford Webinar: Infrastructure Project Finance

<https://youtu.be/Qwsi3qln1pE>

Skill Development Activities Suggested

- Guest Lecture from expert.
- Case studies of live infrastructure projects
- Webinars / seminars on infrastructure management

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 concept of infrastructure management	L2
C02	Distinguish difference between infrastructure and construction management	L2
C03	Develop the process for land sourcing	L3
C04	Determine the financing methods for infrastructure projects	L3
C05	Develop the traffic management plan for the implementation of infrastructure construction Develop the traffic management plan for the implementation of infrastructure construction	L3
C06	Estimate and develop a detailed schedule to manage labour and material movement	L5

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	H	L	M	H	H	M	H
C02	H	H	M	M	M	H	H	H
C03	H	H	H	H	H	H	H	H
C04	H	H	H	H	H	H	H	H
C05	H	H	M	H	H	H	H	H
C06	H	H	M	H	H	H	H	H

H – High , M – Medium, L - Low

II – SEMESTER (Professional Elective Course - III)

RENEWABLE ENERGY INFRASTRUCTURE			
Course Code	2MCPM205C	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 basic concepts and importance of renewable energy infrastructure. - To familiarize with different renewable energy resources and technologies. - To understand the planning and infrastructure requirements of renewable energy projects. - To study the integration of renewable energy systems with buildings and urban infrastructure. - To understand the project management, operation and maintenance aspects of renewable energy infrastructure.			
Module-1			
INTRODUCTION TO RENEWABLE ENERGY INFRASTRUCTURE Introduction to renewable energy; need and importance of renewable energy infrastructure; conventional and renewable energy sources; classification of renewable energy resources; solar energy, wind energy, hydropower, biomass and geothermal energy; renewable energy potential and resource assessment; role of renewable energy in sustainable development.			
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			
RENEWABLE ENERGY SYSTEMS Solar photovoltaic systems and solar thermal systems; wind energy systems; hydropower systems; biomass energy systems; geothermal energy systems; components and infrastructure requirements of renewable energy systems; comparison of renewable energy technologies and their applications.			
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 presentations, videos and demonstrations to elaborate renewable energy systems and technologies.</i>		
Module-3			
PLANNING AND DESIGN OF RENEWABLE ENERGY INFRASTRUCTURE Site selection and resource assessment; feasibility studies; land requirements and site planning; solar and wind resource assessment; infrastructure requirements; access roads, transmission and distribution infrastructure, substations and utility infrastructure; grid connectivity; energy storage; environmental and social considerations in project planning.			
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 presentations, videos and demonstrations related to site assessment and infrastructure planning.</i> <i>Collaborative and Cooperative Learning: Students shall work in groups to study the planning and infrastructure requirements of selected renewable energy projects.</i>		
Module-4			
RENEWABLE ENERGY PROJECT MANAGEMENT Project development and feasibility; project planning and scheduling; Work Breakdown Structure (WBS); resource planning; cost estimation and budgeting; procurement and contract management; construction and installation management; quality control; health and safety management; risk management; environmental assessment; regulatory approvals and project monitoring.			

Teaching-Learning Process	Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. Blended learning: PowerPoint presentation, videos and case studies to elaborate project planning and management.
Module-5	
INTEGRATION AND MANAGEMENT OF RENEWABLE ENERGY INFRASTRUCTURE Integration of renewable energy with buildings and urban infrastructure; rooftop solar systems; distributed energy generation; microgrids and smart grids; battery energy storage systems; energy management systems; operation and maintenance; performance monitoring; life-cycle assessment; environmental and economic aspects; recycling and end-of-life management; emerging trends in renewable energy infrastructure.	
Teaching-Learning Process	Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. Blended learning: PowerPoint 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 • 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 • Boyle, G., 2012. <i>Renewable Energy: Power for a Sustainable Future</i>. Oxford University Press. • Twidell, J. and Weir, T., 2015. <i>Renewable Energy Resources</i>. Routledge. • Kalogirou, S.A., 2014. <i>Solar Energy Engineering: Processes and Systems</i>. Academic Press. • Patel, M.R., 2006. <i>Wind and Solar Power Systems: Design, Analysis, and Operation</i>. CRC Press. • Kothari, D.P., Singal, K.C. and Ranjan, R., 2011. <i>Renewable Energy Sources and Emerging Technologies</i>. PHI Learning.	
Web links and Video Lectures (e-Resources):	
Ministry of New and Renewable Energy (MNRE), Government of India – Renewable energy resources, policies, programmes and developments. https://mnre.gov.in/	
NPTEL – Physics of Renewable Energy Systems – Lectures covering renewable energy sources and energy systems. NPTEL – Physics of Renewable Energy System	
NPTEL – Renewable Energy Engineering: Solar, Wind and Biomass Energy Systems – Video lectures on solar, wind and biomass energy systems. NPTEL Renewable Energy Engineering Video Lectures	

Skill Development Activities Suggested

- Guest Lecture from expert.
- Attending webinars.
- Case studies of renewable energy infrastructure projects.
- Site visit to renewable energy 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 basic concepts, resources and importance of renewable energy infrastructure.	L2
C02	Analyse different renewable energy technologies and their infrastructure requirements.	L4
C03	Apply principles of site selection, feasibility assessment and planning for renewable energy infrastructure projects.	L3
C04	Analyse project planning, cost, risk, procurement and management aspects of renewable energy infrastructure.	L4
C05	Evaluate the integration, operation, maintenance and sustainability of renewable energy infrastructure.	L5

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	L	M	H	M	M	M
C02	H	M	M	H	H	M	M	M
C03	H	M	M	H	H	H	H	M
C04	H	H	M	H	M	M	H	H
C05	H	H	M	H	H	H	H	H

H – High , M – Medium, L - Low

II – SEMESTER (Professional Elective Course - III)

FUNCTIONAL EFFICIENCY OF BUILDINGS			
Course Code	2MCPM205D	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 the concepts of climatic behaviour on the building. - To study different shading devices available to avoid penetration of solar radiation in buildings. - To know the fundamentals of ventilation, wind effects on buildings. - To study basics of acoustics and design consideration for treatment in lecture halls, Theatres etc. - To familiarize about Indian Green Building Council , LEED and its rating system.			
Module-1			
THERMAL BEHAVIOUR OF BUILDINGS: Introduction to concept of Effective Temperature Corrected Effective Temperature Procedures- Comfort zone Overheated Period design of shading devices resistance and conductance transmittance thermal gradient Periodic heat flow Time lag and decrement factor Procedures - Thermal exchange in buildings Building heat gain and heat loss.			
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			
PLANNING FOR VENTILATION: Functions of ventilation Stack effect calculations provision for Air movement air flow through buildings calculation of indoor air velocity ventilation rate - orientation, external features, cross ventilation position of openings, size of openings, controls of openings- calculations- air flow around buildings humidity 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/news paper reading and inferences from the same</i> <i>Blended learning: Power point presentation and webinars.</i>		
Module-3			
DAYLIGHTING: Principles of light- transmission, reflection, and absorption illumination day lighting concepts - day lighting in the tropics daylight requirements daylight protractor calculations distribution of daylight			
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			
ACOUSTICS: Acoustic considerations in Open plan offices, Lecture rooms, Lecture Halls, Seminar halls, Recording Studios, Broadcasting studios, Opera House, Worship places. Acoustic considerations in ancient theatres, basic theatre stages, performance spaces and types. Design principles for Auditoriums- side wall, rear wall & ceiling treatment, sound reinforcing systems home theatres, digital media auditorium & auditorium for the future.			

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	
GREEN BUILDINGS: Indian Green Building Council, Green Building Moment in India, Benefits Experienced in Green Buildings, Launch of Green Building Rating Systems, Residential Sector, Market Transformation; Green Building Opportunities and Benefits: Opportunities of Green Building, Green Building Features, Material and Resources, Water Efficiency, Optimum Energy Efficiency, Typical Energy Saving Approach in Buildings, LEED India Rating System and Energy Efficiency.	
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 - 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: - Koenigsberger, O. H., Ingersoll, T. G., Mayhew. A, Szokolay. S.V, Manual of Tropical Housing and Building, Part 1 Climatic - Design, Orient Longman Pvt. Ltd, Chennai, 2004 - Martin Evans, Housing, Climate and Comfort, Architectural Press, London, 1980 - Arvind Krishnan, Nick Baker, Simons Yannas, S V Szokolay, Climatic Responsive Architecture- A Design Handbook for - Energy Efficient Buildings, Tata Mc Graw Hill Publishing Company Ltd, New Delhi, 2001 - BIS, SP 41: Handbook on Functional Requirements of Buildings (Other than Industrial Buildings), 1987 - David Egan. M, Concepts in Thermal Comfort, Prentice Hall, 1975 - Baruch Givoni, Climate considerations in building and urban design, John Wiley & Sons, New York, 1998	
Web Links and Video Lectures (E-Resources) VideoTutorial https://www.youtube.com/watch?v=Rk1OF2qB5Ag&list=PLccFEq6jzqernMuP0HmIsGz37Tm9T7vgO Web Link https://cementconcrete.org/building-construction/functional-components-building-structure/3246/	
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	Explain the effects of climate and its factors on build environment.	L1
C02	Describe the fundamentals and concepts of ventilation on built environment	L1
C03	Describe the fundamentals and concepts of daylighting	L1
C04	Explain the acoustical treatment for theatres, recording studios and broadcasting studios.	L1
C05	Summarize the IGBC and LEED building codes for specific building typologies.	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	0	L	L	0	0	M	0
C02	H	0	L	L	0	0	M	0
C03	H	0	L	L	0	0	M	0
C04	H	0	M	L	0	0	M	0
C05	H	L	M	L	0	0	M	0

H - High , M - Medium, L - Low

II- SEMESTER (Professional Elective Course – IV)

PROJECT FORMULATION AND APPRAISAL			
Course Code	2MCPM206A	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 study and understand the formulation, costing of construction projects, appraisal, finance and private sector participation.			
Module-1			
Project Formulation Project – Concepts- Capital investments - Generation and Screening of Project Ideas - Project identification Preliminary Analysis, Market, Technical, Financial, Economic and Ecological - Prefeasibility Report and its Clearance, Project Estimates and Techno-Economic Feasibility Report, Detailed Project Report Different Project Clearances required.			
Teaching-Learning Process	ICT and digital support: Power point presentations to analyze the market trend and investments as per the public demand. Sample project clearance report Environmental clearance, CRZ etc.		
Module-2			
Project Costing & Appraisal Project Cash Flows - Time Value of Money - Cost of Capital. NPV -BCR – IRR- ARR- Urgency- Pay Back Period - Assessment of Various Methods- Indian Practice of Investment Appraisal- International Practice of Appraisal - Analysis of Risk -Different Methods -Selection of a Project and Risk Analysis in Practice			
Teaching-Learning Process	Direct method: Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concept of NPV, BCR, IRR and ARR.		
Module-3			
Project Financing Project Financing - Means of Finance - Financial Institutions - Special Schemes - Key Financial Indicators - Ratios			
Teaching-Learning Process	ICT and digital support: Power point presentations to explain the concepts of project finance and available schemes.		
Module-4			
Private Sector Participation Private sector participation in Infrastructure Development Projects - BOT, BOLT, BOOT - Technology Transfer and Foreign Collaboration - Scope of Technology Transfer.			
Teaching-Learning Process	Collaborative method: Case studies of various infrastructure project to understand the type of the project and dealing with projects having foreign collaboration.		

Module-5	
Students must study and submit a Journal review/ Net study/ live study on any of the topics outlined in the syllabus	
Teaching-Learning Process	Collaborative method: Students can work in groups to submit journal review.
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 • Barcus, S.W. and Wilkinson.J.W., "Hand Book of Management Consulting Services", McGraw Hill, New York, 1986. • Joy P.K., "Total Project Management - The Indian Context", New Delhi, Macmillan India Ltd., 1992 • Prasanna Chandra, "Projects Planning, Analysis, Selection, Implementation McGraw Hill Publishing Company Ltd., New Delhi. 2006 • "United Nations Industrial Development Organization (UNIDO) Manual" for the Preparation of Industrial Feasibility Studies, (IDBI Reproduction) Bombay, 1987. • Harold Kerzner (2013), Project Management: A Systems Approach to Planning, Scheduling, and Controlling , Wiley India, New Delhi • Mohamed Hegab (2014), Public Private Partnerships for Highway Projects: Project Selection and Decision Analysis, Create space Independent Publisher, USA. • Jeffery delmon (2016), Private Sector Investment in Infrastructure: Project Finance, PPP Projects and PPP Frameworks, Kluwer Law International. Web links and Video Lectures (e-Resources): 1. NPTEL LECTURE: Project appraisal https://youtu.be/IOnerkINAO https://youtu.be/2Ow8JUgRC1Q 2. NPTEL LECTURE: Project Finance https://youtu.be/KCoytFTpHdk	
Skill Development Activities Suggested • Prepare detailed case study about different metros, highways, high rise buildings, Port construction etc., related to infrastructure development.	

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 process of various feasibility studies required for project formulation	L4
C02	Describe the project cash flows and concepts of time value of money	L2
C03	Appraise the selection of projects through payback period calculations	L4
C04	Identify the PPP model and understand the stakeholders and their roles	L2

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	L	L	L	H	H	M	H
C02	H	M	L	H	H	M	M	M
C03	H	L	L	H	H	H	M	M
C04	H	H	L	M	H	H	M	H

H – High , M – Medium, L - Low

II- SEMESTER (Professional Elective Course – IV)

PROJECT RECOVERY			
Course Code	2MCPM206B	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 causes and characteristics of project failure. - To identify business, governance, sponsorship and technical factors contributing to project failure. - To understand the impact of project politics, software failures, safety issues and scope creep on project performance. - To familiarize students with project health checks and techniques for recovering failing projects. - To develop the ability to analyse project failures and identify appropriate recovery strategies.			
Module-1			
UNDERSTANDING PROJECT SUCCESS AND FAILURE Understanding project success and failure; causes of project failure; identification of early warning signs; common reasons for project failure; project performance and failure analysis.			
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			
BUSINESS CASE, SPONSORSHIP AND GOVERNANCE FAILURES Business case failure; failure of project objectives and business justification; sponsorship failures; governance failures; decision-making and accountability; impact of ineffective governance on project performance.			
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, case studies and videos to elaborate project governance and business case failures.</i>		
Module-3			
PROJECT POLITICS AND SOFTWARE FAILURES Project politics and its impact on project performance; organisational conflicts; stakeholder interests; communication failures; software failures; technology-related project failures; impact of inadequate systems and technology on project delivery.			
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 case studies.</i> <i>Collaborative and Cooperative Learning: Students shall work in groups to analyse selected project failure cases and identify the factors responsible for failure.</i>		
Module-4			
SAFETY CONSIDERATIONS AND SCOPE CREEP Safety considerations in projects; safety-related project failures; risk and safety management; scope creep; causes of uncontrolled scope changes; impact of scope creep on time, cost and quality; scope management and change control.			
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 presentations, videos and case studies related to safety management and scope control.</i>		

Module-5	
PROJECT HEALTH CHECKS AND RECOVERY OF FAILING PROJECTS Project health checks; assessment of project performance; identification of troubled projects; project recovery process; techniques for recovering failing projects; recovery planning and implementation; monitoring recovered projects; lessons learned.	
Teaching-Learning Process	Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts. Blended learning: PowerPoint presentation, webinars and case studies. Collaborative and Cooperative Learning: Students shall analyse a failing project and prepare a project recovery strategy.
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: 5. Kerzner, H., 2014. <i>Project Recovery: Case Studies and Techniques for Overcoming Project Failure</i>. John Wiley & Sons. 6. Anthopoulos, L.G., Kostavara, E. and Pantouvakis, J.P., 2013. An effective disaster recovery model for construction projects. <i>Procedia - Social and Behavioral Sciences</i>, 74, pp.21–30. 7. Schultmann, F. and Sunke, N., 2007. Energy oriented deconstruction and recovery planning. <i>Building Research & Information</i>, 35(6), pp.602–615. 8. Havelka, D. and Rajkumar, T.M., 2006. Using the troubled project recovery framework: Problem recognition and decision to recover. <i>E-Service Journal</i>, 5(1), pp.43–73.	
Web links and Video Lectures (e-Resources): Project Management Institute (PMI) – Project management standards, guidelines and resources. PMI – Standards and Publications	
Skill Development Activities Suggested: • Guest lectures • Case studies of live projects • Webinars / seminars	

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 causes and characteristics of project success and failure.	L2
C02	Analyse business case, sponsorship and governance failures affecting project performance.	L4
C03	Analyse the impact of project politics, stakeholder issues and software failures on project outcomes	L4
C04	Evaluate safety considerations and scope creep and their impact on project performance.	L5
C05	Apply project health check and recovery techniques to failing projects.	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	M	M	M	M	M
C02	H	H	M	M	M	M	H	H
C03	H	H	M	H	M	M	H	H
C04	H	M	M	H	H	M	H	H
C05	H	H	M	H	M	H	H	H

H – High , M – Medium, L - Low

II- SEMESTER (Professional Elective Course – IV)

PROJECT FAILURE AND SUCCESS			
Course Code	2MCPM206C	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 concepts of project success and project failure in construction projects. - To identify the major factors responsible for project success and failure. - To understand the influence of project planning, management, stakeholders, cost, time and quality on project performance. - To analyse project risks, failures and early warning indicators. - To develop strategies for improving project performance and achieving successful project outcomes.			
Module-1			
UNDERSTANDING PROJECT SUCCESS AND FAILURE Concept of project success and failure; project success criteria; project performance indicators; dimensions of project success; causes of project failure; project objectives and performance; success and failure factors in construction projects; lessons from successful and failed 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: PowerPoint presentation and webinars.</i>		
Module-2			
PROJECT PLANNING AND MANAGEMENT FACTORS Project planning and project success; project scope, time and cost management; resource planning; project scheduling; Work Breakdown Structure (WBS); communication management; leadership and decision-making; project organisation and management practices; impact of poor planning and management on project performance.			
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, videos and case studies to elaborate project planning and management practices.</i> <i>Case Study-based Learning: Analysis of successful and failed construction projects.</i>		
Module-3			
STAKEHOLDER, RISK AND GOVERNANCE FACTORS Stakeholder management and project success; stakeholder identification and engagement; project governance; roles and responsibilities; communication and coordination; risk identification and assessment; risk response strategies; contractual and organisational risks; impact of stakeholder conflicts and ineffective governance on project outcomes.			
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 case studies.</i> <i>Collaborative and Cooperative Learning: Students shall work in groups to analyse stakeholder and risk-related factors affecting project success and failure.</i>		
Module-4			
PROJECT PERFORMANCE AND FAILURE ANALYSIS Project monitoring and control; performance measurement; cost and schedule performance; quality management; safety management; change management and scope creep; project delays and cost overruns; identification of early warning indicators; project health checks; analysis of project failure and root causes..			
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 presentations, project monitoring tools, videos and case studies related to project performance and failure analysis.</i>		

Module-5	
PROJECT SUCCESS STRATEGIES AND LESSONS LEARNED Strategies for successful project delivery; project recovery and corrective actions; continuous monitoring and improvement; effective leadership and communication; stakeholder collaboration; risk and change management; lessons learned; post-project evaluation; benchmarking and best practices; case studies of successful construction projects.	
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 - 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 - Kerzner, H., 2017. <i>Project Management: A Systems Approach to Planning, Scheduling, and Controlling</i>. John Wiley & Sons. - Pinto, J.K., 2019. <i>Project Management: Achieving Competitive Advantage</i>. Pearson. - Jha, K.N., 2015. <i>Construction Project Management: Theory and Practice</i>. Pearson Education India. - Chitkara, K.K., 1998. <i>Construction Project Management: Planning, Scheduling and Controlling</i>. Tata McGraw-Hill. - Hughes, B., Cotterell, M. and Mall, R., 2017. <i>Software Project Management</i>. McGraw-Hill Education. ☐ Cooke-Davies, T., 2002. The “real” success factors on projects. <i>International Journal of Project Management</i>, 20(3), pp.185–190.	
Web links and Video Lectures (e-Resources):	
Project Management Institute (PMI) – Project management resources, standards and project performance guidance: PMI – Standards and Publications	
Skill Development Activities Suggested - Guest Lecture from expert. - Case Studies :	

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 concepts and criteria of project success and failure in construction projects.	L2
C02	Analyse the influence of project planning, scheduling, cost, scope and resource management on project performance.	L4
C03	Analyse the impact of stakeholders, risks, governance and communication on project success and failure.	L4
C04	Evaluate project performance and identify early warning indicators and root causes of project failure.	L5
C05	Develop strategies and corrective measures for improving project performance and achieving successful project outcomes.	L6

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	M	L	M	M	M	M	M
C02	H	M	M	H	M	M	M	M
C03	H	H	M	H	H	M	H	H
C04	H	M	M	H	M	M	H	H
C05	H	H	M	H	H	H	H	H

H – High , M – Medium, L -LOW

II- SEMESTER (Professional Elective Course – IV)

ECONOMIC AND FINANCE MANAGEMENT			
Course Code	2MCPM206D	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 familiarize students with the fundamentals of financial management concepts and their applications in various phases of the construction project cycle. - To provide basic knowledge of financial feasibility of construction projects and evaluation of project investment decisions. - To understand budgeting, estimation, cash flow analysis and financial control in construction projects. - To understand project finance, financing methods and financial considerations in construction projects. - To introduce construction claims, disputes, escalation and financial aspects of claims management.			
Module-1			
PRINCIPLES OF FINANCIAL MANAGEMENT Nature of financial management; objectives and principles; various financing decisions; business firms and their financing; types of business units; sources of capital and capital structure; marginal cost of capital; optimum capital structure.			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts of financial management. Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</i> <i>Blended learning: PowerPoint presentation and case studies to elaborate key topics.</i>		
Module-2			
BUDGETING AND ESTIMATION Budget as a management control technique; requirements of a good budget; budget planning; budget process; cash budget; cash flow analysis; financial ratio analysis; interpretation and return on investment; contract costing; estimation of profit; percentage completion method; completed contract method; basis of accounting for tax reporting and financial reporting purposes; methods of recording – cash method and accrual method; taxation on construction contracts.			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to explain budgeting and estimation. Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</i> <i>ICT and Digital Support: PowerPoint presentations, spreadsheets and case studies to demonstrate budgeting, cash flow and financial analysis.</i>		
Module-3			
PROJECT EVALUATION Evaluation of alternatives; present value method; rate of return method; time value of money; Net Present Value (NPV) method; Profitability Index; Internal Rate of Return (IRR) method; Cost-Volume-Benefit analysis; life cycle costing; structural cost; finishing cost; operating cost.			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to explain project evaluation techniques. Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.</i> <i>ICT and Digital Support: PowerPoint presentations and spreadsheet-based exercises to demonstrate NPV, IRR, profitability index and life cycle costing.</i>		
Module-4			
PROJECT FINANCE Stages of project finance management; methods of recording – cash method, accrual method, percentage of completion method and completed contract method; financing international projects; project cash flow; progress			

payments and expenditures; risks in international contracts; accounting and economic exposure; joint ventures and Build-Operate-Transfer (BOT) projects.

Teaching-Learning Process

Direct method: Lecture supported by conventional method of Blackboard and chalk to explain project finance and financing methods. Discussions, Debate, Industry interactions, and research paper/news paper reading and inferences from the same.

Blended learning: PowerPoint presentations, case studies and webinars related to project finance and international construction projects.

Module-5

CONSTRUCTION CLAIMS MANAGEMENT

Construction claims; classification of claims; claim forms; disputes and arbitration; contractual remedies; court cases; management of escalation; price escalation provisions; general methodology; critical analysis.

Teaching-Learning Process

ICT and Digital Support: PowerPoint presentations and case studies to explain construction claims management.

Collaborative and Cooperative Learning: Selected topics shall be given as seminar/group work. Students shall research and share their findings with the class.

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

- Andrew Ross, & Williams, P. (2012). Financial Management in Construction Contracting. Wiley & Blackwell,
- Levinson, M. (2001). Guide to financial markets. London: Economist Profile Books.
- Madura, J. (2008). Financial markets and institutions. Ohio: Thomson Publications.
- Steven J. Peterson , (2012), Construction Accounting & Financial Management, Pearson, USA
- Tenah, K. A., & Guevara, J. M. (1985). Fundamentals of Construction Management and organization, Brady Company.
- Block. Stanley, B. and Geoffrey, A. (2001), Foundations of financial management. London: McGraw- Hill.
- Chandra. P. (2008). Financial management -Theory of practice. New Delhi: Tata McGraw - Hill.
- Hill. 29. Damodaran, A. (2008). Corporate finance theory and practice. New Delhi.: Wiley India.
- Khan. M. and Jain. P. (2008). Financial management. New Delhi. Tata McGraw-Hill,
- Myers, B.. Allen, S. and Mohanty, P. (2010). Principles of corporate finance. New Delhi. Tata McGraw -Hill,
- Pandey, 1. (2009). Financial management. New Delhi. Vikas Publishing House,
- Van. Home, J. and Wachowicz, J. (2005). Fundamentals of Financial management. New Delhi. Pearson,
- Vishwanath, S. (2007). Corporate Finance them and practice. Response Books, New Delhi
- Steven J. Peterson , (2012), Construction Accounting & Financial Management, Pearson, USA

Web links and Video Lectures (e-Resources):**1. NTPEL Lec-03 Basics of Financial Management - Part 1**https://youtu.be/Sx-dy96_tCQ**2. NTPEL Lec-04 Basics of Financial Management - Part 2**<https://youtu.be/FEGbjCrxiAA>**3. Mod-02 Lec-05 Basics of Financial Management - Part 3**<https://youtu.be/S05LAOR4ur8>4. <https://corporatefinanceinstitute.com/resources/knowledge/finance/internal-rate-return-irr/>**Skill Development Activities Suggested**

- Tally prime accounting software
- Budgeted cost and actual cost comparison using software.

Course outcome (Course Skill Set)

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

Sl. No.	Description	Blooms Level
CO1	Explain the principles of financial management and their application in construction projects.	L2
CO2	Analyse budgeting, estimation, cash flow and financial control methods for construction projects.	L4
CO3	Analyse project investment alternatives using NPV, IRR, Profitability Index and life cycle costing techniques.	L4
CO4	Evaluate project financing methods, project cash flows and financial considerations in domestic and international construction projects.	L5
CO5	Analyse construction claims, disputes, escalation and financial aspects of claims management.	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	H	M	L	H	M	M	M	M
C02	H	M	M	H	M	M	H	M
C03	H	M	M	H	H	M	H	M
C04	H	H	M	H	H	H	H	H
C05	H	H	M	H	H	H	H	H

H – High , M – Medium, L - Low

II-Semester (Professional Core Course – Lab (AEC Lab))

PM Software (PRIMAVERA)			
Course Code	2MCPML1207	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	01	Exam Hours	00
Course Learning objectives: • To know the work environment of Primavera • 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			
Introduction to Primavera and its frame work Data, Navigating, and Layouts Enterprise Project Structure Creating a Project Creating a Work Breakdown Structure.			
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			
Adding Activities Creating Relationships Scheduling Assigning Constraints.			
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/newspaper reading and inferences from the same. Blended learning: Power point presentation and webinars.		
Module-3			
Maintaining the Project Documents Library Formatting Schedule Data, Roles and Resources Assigning.			
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/newspaper reading and inferences from the same. Blended learning: Power point presentation and webinars.		
Module-4			
Assigning Resources and Costs Analyzing, Resources Optimizing the Project Plan			
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			
Baselining the Project Plan, Project Execution and Control Reporting Performance			
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 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

REFERENCES:

6. Harris, P.E., 2016.Planning&ControlUsingOraclePrimaveraP6 Versions 8, 15 & 16 PPM Professional. Eastwood Harris Pty Ltd.
7. Winter, R.M., 2003.Construction Scheduling with Primavera Project Planner. Cost Engineering, 45(10), p.24.
8. Williams, D.L., 2012.Oracle primavera P6Version8: Project and portfolio management. Packt Publishing Ltd.
9. Kelly, S.D., 2012.Oracle Primavera Contract Management BiVersion14.PacktPublishing Ltd.

Web links and Video Lectures (e-Resources):

Video Tutorial

<https://www.youtube.com/watch?v=c6GbKT10hZ8>

Web Link

<https://mindmajix.com/primavera-p6-tutorial>

Skill Development Activities Suggested

- Guest Lecture from expert.
- Attending webinars.

Course outcome(Course Skillset)

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

Sl. No.	Description	Blooms Level
CO1	Understand the Primavera software environment	L4
CO2	Develop project plan and assign calendars.	L2
CO3	Develop tasks and create work breakdown structure	L3
CO4	Create resources and modify it.	L4
CO5	Modify the project plan to reach the targets and create project baselines	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	L	H	0	L	L	0
C02	H	0	L	H	0	L	L	0
C03	H	0	L	H	0	L	L	0
C04	H	0	L	H	0	0	L	0
C05	H	0	L	H	0	0	L	0

H – High , M – Medium, L - Low

II-SEMESTER (Professional Elective Course – II)

DISSERTATION PHASE – I			
Course Code	2MPRJ208	CIE Marks	50
Teaching Hours/Week (L: T:P:TW+SL)	28:28:00:34	Viva Marks	50
Total Hours of Pedagogy	90 Hrs.	Total Marks	100
Credits	03	Exam Marks	00
Course Learning objectives: • The objective of the dissertation is to provide an opportunity to the students to prepare independent and original study of a special project of his/her own choice. • The project provides students an opportunity for academic research to cultivate specialization in the areas of their own interest under the overall guidance of the faculty. • The objective of the seminar work is to train the students to prepare state of art report by assimilation of concepts / ideas on a chosen topic in the area of Building Engineering and Management.			
COURSE CONTENT			
Dissertation Stage-1: Students in consultation with the guide/s shall carry out literature survey/ visit industries to finalize the topic of the Project. Subsequently, the students shall collect the material required for the selected project, prepare synopsis and narrate the methodology to carry out the project work. Students in consultation with the guide/co-guide if any, shall pursue literature survey and complete the preliminary requirements of selected Project work. Each student shall prepare relevant introductory project document, and present a seminar			
Seminar: Each student, under the guidance of a faculty, is required to • Present the seminar on the selected project orally and/or through power point slides. • Answer the queries and involve in debate/discussion. • Submit two copies of the typed report with a list of references. The participants shall take part in discussion to foster friendly and stimulating environment in which the students are motivated to reach high standards and become self-confident.			
Teaching-Learning Process	1. Guest lectures, webinars, site visits to acquire subject knowledge related to the selected topic. 2. Critical review with constructive suggestions / feed backs has to be provided by the Guide/ co-guide during the progress of the dissertation.		
Assessment Details (CIE Marks) 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 Dissertation Stage -1, shall be based on the progress of the student throughout the semester, presentation skills in seminars and submission of the synopsis of the Dissertation topic finalized.			
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 Dissertation Stage -I,			

shall be based on the evaluation of synopsis submission, presentation skill and performance in Question-and-Answer session in the ratio 30:10:10.

3. 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:

- Ranjith Kumar (2005.) Research Methodology- A step by step guide for beginners, California: Sage Publications.
- John W Creswell, (2002). Research design: Qualitative, Quantitative and Mixed method approaches. California: Sage Publications.
- Kate Turabian. (2018) A Manual for Writers of Research Papers, Theses, and Dissertations. Chicago: Chicago Guides to Writing, Editing, and Publishing.

Web links and Video Lectures (e-Resources):

Thesis Format | Dissertation Format | Paper, Structure, Sample | Leverage Edu

Skill Development Activities Suggested

- Guest lecture
- Review of research papers
- Site visits

Course outcome(Course Skillset)

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

Sl. No.	Description	Blooms Level
CO1	summarize an extensive literature study and data collection from the field and presentation in the form of drawings, relevant details/codes, schematic charts, reports and photographs	L5
CO2	Propose problem identification, formulation, and solution.	L6
CO3	Develop a sound technical knowledge of their selected project topic.	L3
CO4	Design engineering solutions to complex problems utilising a systems approach	L6

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	H	H	H	M	M	M	H
C02	H	H	H	M	H	H	H	H
C03	H	M	H	H	H	M	M	H
C04	H	H	L	L	M	M	H	H

H - High , M - Medium, L - Low

III – SEMESTER (Professional Elective Course – V)

FACILITY MANAGEMENT			
Course Code	2MCPM301A	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	03	Exam Hours	00
Course Learning objectives: - To understand the need of Facility Management and its applications. - To attain the knowledge in maintenance and service of building services. - To achieve high performance of buildings and building services.			
Module-1			
Facility management (FM) as part of Construction Management			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to understand the importance of facility management.</i>		
Module-2			
Role and administrative functions of Supervisors. Fire fighting - Basic requirements for the fire fighting system, various components of the fire fighting system, maintenance required for the system, fire fighting in high-rise buildings, commercial/industrial complexes, public buildings, checklist for fire safety, fire fighting.			
Teaching-Learning Process	<i>Collaborative and Cooperative learning: Students should work on case studies of different building typologies and the extend of fire fighting services provide. The frequency of maintenance and services provided for the same.</i>		
Module-3			
Lifts / elevators, escalators, permissions & procedures legal formalities for Elevators, various types of lifts, working mechanisms of lift and escalators. Indian standard codes for planning & installations of elevator, inspection & maintenance of lifts.			
Teaching-Learning Process	<i>ICT and Digital support: Video to demonstrate the planning and installation of lifts.</i> <i>Collaborative and Cooperative learning: case studies of lift installation, operation and maintenance.</i>		
Module-4			
Plumbing Services: Basics of Plumbing systems, Requirement of Plumbing works, Agency, Activity Flow chart for Plumbing work, Quality, checking of materials. Water Supply distribution system in high-rise buildings & other complexes, pumps and pumping mechanism, operation & maintenance of fittings & fixtures of w/s.Do's & for water pipe networks. Modern Sewage Treatment Plants. Landscaping & Horticulture, Building maintenance management.			
Teaching-Learning Process	<i>ICT and Digital support: Video and to explain the basics of plumbing and water distribution system.</i> <i>Collaborative and Cooperative learning: case studies of water treatment plants and maintenance.</i>		
Module-5			
Air - Conditioning and Heating: Flowcharts of air conditioning & heating. Centralized systems, monitoring working of the equipment, checklist of Inspection, Performance testing. Waterproofing, Damp proofing & Termite proofing. Working Procedure & stages of work of waterproofing for W.C., bathrooms. Terrace, Sloping roof, Basements, tanks.			

Teaching-Learning Process	ICT and Digital support: Video and to explain the concept of air- conditioning and heating. Working mechanism of centralized air conditioning system. Collaborative and Cooperative learning: case studies of centralized AC plant to understand the working mechanism and maintenance. Direct Method: Lecture supported by conventional method of Blackboard and chalk to explain the stages of waterproofing.
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: 9.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. 10. 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. 11.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. 12. 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 13. Jensen, P.A. and van der Voordt, T. eds., 2016. Facilities management and corporate real estate management as value drivers: how to manage and measure adding value. Taylor & Francis. 14. Rondeau, E.P., Brown, R.K. and Lapides, P.D., 2012. Facility management. John Wiley & Sons. 15. Roper, K. and Payant, R., 2014. The facility management handbook. Amacom.	
Web links and Video Lectures (e-Resources): ○ Lecture on facility management https://youtu.be/ekFYSjGzBFo ○ Lift installation process: https://youtu.be/JgKlR3SR1UI ○ NPTEL Lecture : Water distribution system https://youtu.be/5NzMt6PErYo	

Skill Development Activities Suggested

- Site visits
- Seminars on building services by industry experts.
- Certification course offered by NTPEL

Course outcome (Course Skill Set)

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

Sl. No.	Description	Blooms Level
C01	Determine the roles and responsibilities of a facility manager	L3
C02	Illustrate the basic requirements for installation of fire fighting system and lifts.	L3
C03	Apply the standard codes for planning and installation of services in buildings	L3
C04	Experiment on the sewage treatment plants and the usage of treated water to cater to sustainable concept.	L4
C05	Analyse the performance of air conditioning system.	L4
C06	Develop the application of water proofing, damp proofing termite proofing.	L5

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	M	H	H	M	H	H	H	H
C02	H	H	H	M	M	M	H	M
C03	H	M	H	H	M	M	M	H
C04	H	M	H	L	M	H	M	H
C05	L	M	H	M	M	M	M	H
C06	H	H	H	H	H	H	H	H

H – High , M – Medium, L - Low

III – SEMESTER (Professional Elective Course – V)

REAL ESTATE MANAGEMENT			
Course Code	2MCPM301B	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	03	Exam Hours	00
Course Learning objectives: - To offer hands-on experience that is vital to excel in the marketplace by understanding the principles and practices of real estate. - To comprehensively understand real estate practice, financial markets, legal aspects and marketing management. - To formulate and appraise capital investments for developers for different types of projects and to be able to prepare DPRs. - To acquire competence in managing real estate and infrastructure assets and interpretation of valuation methods.			
Module-1			
REAL ESTATE MARKET Real Estate Scope; classification of real estate activities and peculiarities; Factors affecting real estate market; Role of Government in real estate market; Statutory provisions, Laws, rules, and regulation, land use controls in property development, registration And licensing requirements Knowledge base for assessment and forecasting the Real Estate market environmental issues related to Real Estate Transactions.			
Teaching-Learning Process	Direct method: <i>Lecture supported by conventional method of Blackboard and chalk to understand the practices of real estate.</i>		
Module-2			
PARTICIPANTS AND STAKE HOLDERS Role, Scope, working characteristics and principal functions of real estate participants and stakeholders; real estate consultants and their activities, role and responsibilities of property managers; Code of ethics for Real Estate participants; Good practices and managerial responsibilities.			
Teaching-Learning Process	Direct method : <i>Direct method: Lecture supported by conventional method of Blackboard and chalk to understand the function and role and responsibility of various participants stakeholders.</i>		
Module-3			
REAL ESTATE DEVELOPMENT PRACTICE Development control regulations; Zoning; Rent control Act; Building byelaws; Permissions; Changing land use; Real estate types; Location selection; relevant ownership flats/apartments act; Planning for single, mixed use, planned use, specialized Special Economic Zones (SEZ) projects; Choosing vendors, contract terms; Facilities mix management; Integrating environmental issues in development.			
Teaching-Learning Process	Collaborative and Cooperative learning: <i>Students should present seminars on assigned topics and share the knowledge of the current practices in the real estate field.</i>		
Module-4			
VALUATION AND ASSET MANAGEMENT OF PROPERTIES Value, valuation and importance of Value, Appraisal/valuation cycle, Valuation principles and factors, Major Approaches to Valuation-Market approach, Cost approach and Income approach, Valuation techniques/methods Valuation for Contemporary Issues viz., Energy and Environment, Contemporary issues in valuation. Asset			

management strategy and objectives; Overview of asset management standards: British Standard Institution (BSI), Publicly Available Specification (PAS) 55.ISO 55000; Asset management policy, Deterioration modeling; Maintenance - objectives models and maintenance requirements determination; Life cycle costing; Economic life of asset; Replacement analysis; Decision tools for asset management; Prioritization and optimization; System Reliability.	
Teaching-Learning Process	ICT and collaborative learning: videos and ppt to teach the concepts of valuation. Collaborative and cooperative learning: case studies to understand asset management, maintenance and deterioration modelling.
Module-5	
CONSTRUCTIVE ASSIGNMENTS Individual assignments on valuation, EIA, cash flow, project formulation, DPR and case study analysis.	
Teaching-Learning Process	Collaborative and Cooperative learning: critical analysis of project formulation and DPR through case studies.
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: 13. 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. 14. 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. 15.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. 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**

16. Madura, J. (2008). Financial markets and institutions. Ohio: Thomson Publications.
17. Levinson, M. (2001). Guide to financial markets. London: Economist Profile Books.
18. Ishkin, F., Eakins, S. (2009). Financial markets and institutions. New Delhi: Pearson Education,
19. Verma, J. (1997). Venture capital financing in India. New Delhi: Response Books.
20. Kotler, P. and Armstrong, G. (2008). Principles of marketing. New Delhi: Prentice-Hall of India.
21. Kotler, P. and Keller, K. (2009). Marketing Management. New Delhi: Prentice- Hall of India.
22. Porter, M. (1992). Competitive strategy. New York: Free Press.

Web links and Video Lectures (e-Resources):

- https://www.researchgate.net/publication/304580462_Management_of_Real_Estate_Principles_of_Real_Estate_Development_Management
- Real Estate Training Course - Online Video Lessons | Study.com
- 110105144.pdf - Google Drive

Skill Development Activities Suggested

- Site visits
- Seminars by industry experts
- Certification courses by NPTEL

Course outcome (Course Skill Set)

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

Sl. No.	Description	Blooms Level
CO1	Summarize the scope of the existing real estate industry in the current business environment and to classify the various statutory and legal regulations applicable to real estate market.	L1
CO2	Determine the roles, responsibilities, rights and liabilities of different real estate stakeholders	L1
CO3	Discover the various documentation procedures for different real estate transactions, appraisals and valuation of properties.	L2
CO4	Apply quantitative methodology used in different transactions.	L1
CO5	Compute the project development process, compare the different sources of real estate funds and classify the risks.	L1
CO6	Formulate a real estate project by assessing its feasibility and evolving strategies for effective management.	L2

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	M	H	M	H	H	H	H
C02	H	H	M	M	H	H	H	H
C03	H	H	M	M	H	H	H	H
C04	H	M	M	H	H	M	M	H
C05	H	H	M	H	H	H	M	H
C06	H	H	M	H	M	M	H	H

H – High , M – Medium, L - Low

III – SEMESTER (Professional Elective Course – V)

SUPPLY CHAIN AND LOGISTICS MANAGEMENT			
Course Code	2MCPM301C	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	03	Exam Hours	00
Course Learning objectives: - To understand the fundamentals of Supply Chain Management and Logistics and their application in construction projects. - To understand procurement, supplier management, inventory, transportation and material management. - To understand supply chain planning, coordination, performance measurement and information technology applications. - To understand construction logistics, supply chain risks and strategies for improving project supply chain performance.			
Module-1			
Fundamentals of Supply Chain Management Introduction to Supply Chain Management – Definition, objectives and importance of Supply Chain Management – Stages of Supply Chain – Supply Chain processes and flows – Material, information and financial flows – Supply Chain drivers and obstacles – Supply Chain strategies – Strategic fit – Integrated Supply Chain planning – Supply Chain networks – Supply Chain management in the construction industry – Construction supply chain characteristics and stakeholders.			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to understand the concepts, processes, drivers and strategies of Supply Chain Management.</i>		
Module-2			
Procurement and Supplier Management Procurement and purchasing in Supply Chain Management – Sourcing strategies – Procurement strategies – Supplier selection and evaluation – Supplier relationship management – Supply scheduling – Purchasing aspects of Supply Chain – Subcontracting – Supply-chain-oriented contracts – Global sourcing – Strategic management of construction procurement.			
Teaching-Learning Process	<i>Collaborative and Cooperative learning: Case studies of procurement methods, supplier selection, sourcing strategies and supplier relationships in construction projects.</i>		
Module-3			
Construction Logistics and Material Management Construction logistics – Role of logistics management within construction – Transportation of materials and equipment – Transportation modes and costs – Distribution logistics – Warehousing and storage – Material handling – Inventory management – Inventory control – Just-in-Time delivery – Off-site manufacture and assembly – Lean supply onto site – Logistics planning and coordination.			
Teaching-Learning Process	<i>ICT and Digital support: Use of digital resources and case studies to understand transportation, logistics planning, inventory management and material flow.</i> <i>Collaborative and Cooperative learning: Case studies of construction material delivery, storage, handling and Just-in-Time supply.</i>		
Module-4			

Supply Chain Planning and Performance Management

Supply Chain planning – Demand and supply planning – Demand forecasting – Supply Chain performance – Performance measurement – Performance metrics – Supply Chain coordination – Bullwhip effect – Strategic alliances and outsourcing – Supply Chain risks – Framework agreements – Supply Chain improvement strategies

Teaching-Learning Process

Collaborative and Cooperative learning: Case studies to understand supply chain performance, coordination, risks, outsourcing and improvement strategies.

Module-5

Information Technology and Global Supply Chain Management

Role of Information Technology in Supply Chain – Computer-based information systems – Enterprise Resource Planning – Information management in construction – E-procurement – Supply Chain integration – Global logistics – Global Supply Chain Management – Global sourcing – Global purchasing – Supply Chain Management in construction projects – Case studies.

Teaching-Learning Process

ICT and Digital support: Use of digital resources to understand information technology, ERP, e-procurement and information management in Supply Chain Management.

Case study method: Case studies of global sourcing, supply chain integration and information technology applications in construction.

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:

16. 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.

17. 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.

18. 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.

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**

13. Pryke, S., 2009. *Construction Supply Chain Management: Concepts and Case Studies*. Wiley-Blackwell.
14. O'Brien, W.J., Formoso, C.T., Vrijhoef, R. and London, K.A., 2009. *Construction Supply Chain Management Handbook*. CRC Press.
15. Lundesjo, G., 2015. *Supply Chain Management and Logistics in Construction*. Kogan Page
16. Chopra, S., Meindl, P. and Kalra, D.V., *Supply Chain Management: Strategy, Planning, and Operation*. Pearson.

Web links and Video Lectures (e-Resources):**Skill Development Activities Suggested**

- Site visits to understand construction logistics and material movement.
- Case studies on construction supply chains.
- Case studies on inventory management and Just-in-Time delivery.
- Seminars by industry professionals on construction supply chain 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 concepts, processes, drivers and strategies of Supply Chain Management in construction projects.	L2
C02	Apply procurement and supplier management strategies for construction projects.	L2
C03	Analyse logistics, transportation, inventory, storage and material management requirements in construction projects.	L3
C04	Evaluate supply chain performance, coordination, risks and improvement strategies.	L3
C05	Apply information technology and information management systems for supply chain integration.	L3
C06	Analyse global sourcing, logistics and supply chain management practices applicable to 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	H	H	M	H	M	M	H	H
C02	H	H	H	H	M	M	H	H
C03	H	H	H	H	H	M	H	H
C04	H	H	H	H	H	H	H	H
C05	H	H	H	H	M	M	H	H
C06	H	H	M	H	H	H	H	H

H – High , M – Medium, L - Low

III – SEMESTER (Professional Elective Course – V)

PROJECT MANAGEMENT INFORMATION SYSTEM			
Course Code	2MCPM301D	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	03	Exam Hours	00
Course Learning objectives: - To gain the necessary skills needed to develop a Management Information System for a corporate organisation and for various functions of construction management. - To understand the application of information systems and technology in construction management. - To understand the use of information systems for financial and project management.			
Module-1			
Evaluation of information system technology. Cash flow forecasting of projects. Prerequisites for cash flow forecasting, Preparations for cash flow statement, Use of S-curve, Composite cash flow statements (Multiple Projects), Cost of borrowing, Self-financing contracts.			
Teaching-Learning Process	Direct method: Lecture supported by conventional method of Blackboard and chalk to understand information system technology and cash flow management.		
Module-2			
Definition and components of Working Capital, Cash Management, Receivable Management, Payable Management, Inventory Management, Estimating Working Capital Requirements, and Working Capital Management of Construction Companies			
Teaching-Learning Process	Collaborative and Cooperative learning: Students should study and analyse working capital management practices of construction companies through relevant case studies.		
Module-3			
Management Information System: Definition, Concept, Role and impact. System development, data processing and flow chart.			
Teaching-Learning Process	ICT and Digital support: Use of digital resources to understand Management Information Systems, system development and data processing. Collaborative and Cooperative learning: Case studies of Management Information Systems used in construction and corporate organisations.		
Module-4			
Computer application, file design, DBM, data communication, Documentation, System design specifications, System analysis and design. Information processing technology: Data processing technology, communication technology distributed processing and emerging information technology.			
Teaching-Learning Process	ICT and Digital support: Digital demonstrations to understand computer applications, data communication and information processing technology. Direct Method: Lecture supported by conventional method of Blackboard and chalk to explain system analysis, system design and information processing technology.		

Module-5	
Development and implementation of MIS; Long range plan, Management of quality, MIS factors of success and failure, impact of computer application. Case studies of MIS at corporate and project level.	
Teaching-Learning Process	ICT and Digital support: Use of digital resources and case studies to understand the development and implementation of MIS. Collaborative and Cooperative learning: Case studies of MIS applications at corporate and project level.
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: - 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. - 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. - 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 the sealed cover through the Principal of the institution.	
Suggested Learning Resources Books - Hardin, B. and McCool, D., 2015. <i>BIM and Construction Management: Proven Tools, Methods, and Workflows</i>. John Wiley & Sons. - Paulson Jr, B.C., 1994. <i>Computer Applications in Construction</i>. McGraw-Hill, Inc. - Olson, D., 2014. <i>Information Systems Project Management</i>. Business Expert Press. - Schwalbe, K., 2015. <i>Information Technology Project Management</i>. Cengage Learning.	

Web links and Video Lectures (e-Resources):**Skill Development Activities Suggested**

- Site visits to understand the application of MIS in construction projects.
- Seminars on information systems and computer applications in construction management.
- Case studies of MIS at corporate and project level.
- Certification courses related to information technology and project management.
- Case studies on working capital management.
- Preparation of cash flow statements and S-curves.

Course outcome (Course Skill Set)

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

Sl. No.	Description	Blooms Level
C01	Identify the concepts and components of Management Information Systems and their applications in construction management.	L3
C02	Apply information system technology for cash flow forecasting and financial management of construction projects.	L3
C03	Analyse working capital management, cash management, receivable management, payable management and inventory management in construction companies	L4
C04	Apply computer applications, data processing, communication technology and system analysis and design in construction management.	L3
C05	Evaluate the development, implementation, success and failure factors of Management Information Systems.	L4
C06	Analyse the application of MIS at corporate and project level for effective construction project management.	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	H	H	H	H	M	M	H	H
C02	H	H	H	H	M	M	M	H
C03	H	H	M	H	M	M	H	H
C04	H	H	H	H	M	M	H	H
C05	H	H	M	H	M	H	H	H
C06	H	H	H	H	H	H	H	H

H - High, M - Medium, L - Low

III – SEMESTER (Professional Elective Course – VI)

ENTREPRENEURSHIP DEVELOPMENT			
Course Code	2MCPM302A	CIE Marks	50
Teaching Hours/Week (L: T:P:TW+SL)	42:00:00:48	Viva Marks	50
Total Hours of Pedagogy	90 hrs.	Total Marks	100
Credits	03	Exam Hours	00
Course Learning objectives: - To understand the concepts, characteristics and development process of entrepreneurship. - To develop the ability to identify entrepreneurial opportunities and prepare business plans. - To understand the management challenges of MSMEs and entrepreneurial ventures. - To develop knowledge of marketing, pricing, branding and growth strategies for new ventures. - To understand strategic growth, business incubation, technology entrepreneurship and women entrepreneurship.			
Module-1			
Entrepreneurial Perspectives Introduction to Entrepreneurship – Evolution - Concept of Entrepreneurship - Types of Entrepreneurs - Entrepreneurial Competencies, Capacity Building for Entrepreneurs. Entrepreneurial Training Methods - Entrepreneurial Motivations - Models for Entrepreneurial Development - The process of Entrepreneurial Development.			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method to understand the concepts, competencies, motivations and development process of entrepreneurship.</i>		
Module-2			
New Venture Creation Introduction, Mobility of Entrepreneurs, Models for Opportunity Evaluation; Business plans – Purpose, Contents, Presenting Business Plan, Procedure for setting up Enterprises, Central level - Startup and State level - T Hub, Other Institutions initiatives.			
Teaching-Learning Process	<i>Collaborative and Cooperative learning: Students shall study business plans and analyse models for opportunity evaluation and procedures for setting up enterprises.</i>		
Module-3			
Management of MSMEs and Sick Enterprises Challenges of MSMEs, Preventing Sickness in Enterprises – Specific Management Problems; Industrial Sickness; Industrial Sickness in India – Symptoms, process and Rehabilitation of Sick Units.			
Teaching-Learning Process	<i>Case study method: Case studies of MSMEs and sick enterprises to understand management problems, causes of industrial sickness and rehabilitation measures.</i>		
Module-4			
Managing Marketing and Growth of Enterprises Essential Marketing Mix of Services, Key Success Factors in Service Marketing, Cost and Pricing, Branding, New Techniques in Marketing, International Trade.			
Teaching-Learning Process	<i>Collaborative and Cooperative learning: Students shall study marketing strategies, pricing, branding and growth strategies through relevant case studies.</i>		

Module-5	
Strategic Perspectives in Entrepreneurship Strategic Growth in Entrepreneurship, The Valuation Challenge in Entrepreneurship, The Final Harvest of New Ventures, Technology, Business Incubation, India way – Entrepreneurship; Women Entrepreneurs – Strategies to develop Women Entrepreneurs, Institutions supporting Women Entrepreneurship in India.	
Teaching-Learning Process	ICT and Digital support: Use of digital resources to understand business incubation, technology entrepreneurship and emerging entrepreneurial practices. Collaborative and Cooperative learning: Case studies of successful entrepreneurs, business incubation models and women entrepreneurship in India.
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 a. Charantimath, P.M., <i>Entrepreneurship Development and Small Business Enterprises</i>, 2e, Pearson, 2014. b. Kuratko, D.F. and Rao, T.V., <i>Entrepreneurship: A South – Asian Perspective</i>, 3e, Cengage, 2012. c. Kumar, A., <i>Entrepreneurship</i>, 4e, Pearson, 2015. d. Desai, V., <i>The Dynamics of Entrepreneurial Development and Management</i>, Himalaya Publishing House, 2015.	

Web links and Video Lectures (e-Resources):		
Skill Development Activities Suggested • Case studies on successful entrepreneurs. • Study of MSMEs and entrepreneurial ventures. • Seminars by entrepreneurs and industry experts.		
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 concepts, types, competencies and development process of entrepreneurship.	L2
C02	Apply entrepreneurial concepts in evaluating opportunities and developing business plans.	L3
C03	Analyse the challenges and management issues of MSMEs and sick enterprises.	L4
C04	Apply marketing, pricing, branding and growth strategies for entrepreneurial ventures.	L3
C05	Evaluate strategic growth, business incubation and technology opportunities in entrepreneurship.	L4
C06	Analyse the role of institutions and strategies supporting women entrepreneurship in India.	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	H	H	M	M	M	M	H	H
C02	H	H	H	H	M	M	H	H
C03	H	H	M	H	H	H	H	H
C04	H	H	H	H	H	H	H	H
C05	H	H	H	H	M	H	H	H
C06	H	H	M	M	H	H	H	H

H – High , M – Medium, L - Low

III – SEMESTER (Professional Elective Course – VI)

LEGAL FRAMEWORK AND LABOUR LAWS			
Course Code	2MCPM302B	CIE Marks	50
Teaching Hours/Week (L: T:P:TW+SL)	42:00:00:48	Viva Marks	50
Total Hours of Pedagogy	90 hrs.	Total Marks	100
Credits	03	Exam Hours	00
Course Learning objectives: - To provide an overview of laws and regulations related to construction projects at various stages of the project cycle. - To understand building regulations, land development laws, construction contracts and statutory requirements. - To understand labour laws, environmental regulations and legal provisions applicable to the construction industry. - To understand construction disputes, arbitration, conciliation and mechanisms for dispute resolution.			
Module-1			
Land acquisition, Act (1894, 1984 & 2012/13) lease & easement rights, property acts and Gunthewari acts. City Master Plans, Zoning regulations and building byelaws.			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method to understand land acquisition, property rights, development regulations, zoning regulations and building byelaws.</i>		
Module-2			
National Building Code, Role of Zilla Parishad & IRDP in rural housing. Permits and approval for construction activities; statutory requirements and clearance related to environment impact, urban form, fire regulation, completion certificate.			
Teaching-Learning Process	<i>ICT and Digital support: Use of digital resources and case studies to understand statutory approvals, building regulations, environmental clearances and fire regulations.</i>		
Module-3			
Laws and legislation related to construction Industry labour laws & consumer protection Act, MRTP act. Interpretation of various revenue documents such as: RTC, Survey Records, Pahani, Tippani, Akarbandh etc. Consumer Forum, RERA Act and its implications. NGT regulations, Restrictions on Non-Agriculturist purchasing of Land, Land Ceiling act.			
Teaching-Learning Process	<i>Collaborative and Cooperative learning: Case studies to understand construction-related legislation, revenue documents, RERA, consumer protection and land regulations.</i>		
Module-4			
The building and construction workers (regulation of employment and conditions of service) Act, 1996, workmen's compensation Act. Payment of wages Act, The employee's provident fund and Miscellaneous provisions Act 1995 etc. Indemnity & guarantee, Industrial act and Labour laws, Environmental laws. Types of disputes in construction contracts and methods of dispute resolution processes. Alternative dispute resolution and dispute review mechanisms. Arbitration and conciliation Act 1996.			
Teaching-Learning Process	<i>Collaborative and Cooperative learning: Case studies of labour laws, construction contracts, disputes and alternative dispute resolution mechanisms.</i>		

Module-5	
Managerial approach to dispute minimization, Conduct of Arbitration proceedings, Making of Arbitration award and Termination proceedings, powers of arbitrator, case studies of arbitration award, setting aside of awards and enforcement of awards, appeal and revision and court proceedings, introduction to civil & criminal procedure code with special reference to laws & order at project sites, project police relations.	
Teaching-Learning Process	ICT and Digital support: Use of relevant case studies and digital resources to understand arbitration proceedings, awards, enforcement and legal procedures related to construction projects.
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 7. The Arbitration and Conciliation Act, 1996. 8. Makranda, P.C., <i>Building and Engineering Contracts Law and Practice</i>. 9. Kelley, G., 2012. <i>Construction Law: An Introduction for Engineers, Architects, and Contractors</i>. John Wiley & Sons. 10. Adriaanse, M.J., 2016. <i>Construction Contract Law</i>. Macmillan International Higher Education. Web links and Video Lectures (e-Resources): Skill Development Activities Suggested • Site visits to understand statutory compliance and legal requirements in construction projects. • Case studies on construction contracts and disputes. • Study of building regulations and statutory approvals. • Case studies on RERA and construction-related legislation. • Seminars by legal professionals and construction industry experts. • Certification courses related to construction law and labour laws.	

Course outcome (Course Skill Set)

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

Sl. No.	Description	Blooms Level
C01	Identify the laws, regulations and statutory provisions applicable to construction projects.	L3
C02	Apply building regulations, land development laws and statutory approval requirements in construction projects.	L3
C03	Analyse labour laws, environmental laws, RERA provisions and legal requirements applicable to the construction industry.	L4
C04	Analyse construction contracts and identify appropriate mechanisms for dispute resolution, arbitration and conciliation.	L4
C05	Apply legal principles and procedures related to arbitration proceedings, awards and enforcement in construction disputes.	L3
C06	Evaluate legal and managerial approaches for minimising disputes and maintaining law and order at construction project sites	L5

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	H	M	M	H	H	H	H
C02	H	H	H	H	H	H	M	H
C03	H	H	M	H	H	H	H	H
C04	H	H	H	H	M	H	H	H
C05	H	H	H	H	M	H	H	H
C06	H	H	H	H	H	H	H	H

H – High , M – Medium, L - Low

III – SEMESTER (Professional Elective Course – VI)

GEOSPATIAL TECHNIQUES IN PRACTICE			
Course Code	2MCPM302C	CIE Marks	50
Teaching Hours/Week (L: T:P:TW+SL)	42:00:00:48	Viva Marks	50
Total Hours of Pedagogy	90 hrs.	Total Marks	100
Credits	03	Exam Hours	00
Course Learning Objectives: - To understand the fundamentals of geospatial techniques and their applications in the construction industry. - To understand modern surveying, GNSS, remote sensing and geospatial data acquisition techniques. - To understand GIS, spatial data models, mapping and spatial analysis. - To understand the application of geospatial technologies in construction projects and decision-making.			
Module-1			
Geospatial Technology and Surveying Geospatial in day-to-day life, spatial thinking, evolution of location technology and importance of geography and maps. Need for spatial information, terminologies, logic, language and formats of spatial technology. Location perspective of construction industry, overview of geospatial technology in tenders, design and execution and construction lifecycle management. Fundamentals and components of Geospatial Engineering, surveying and conventional survey equipment versus modern surveying equipment, components and digital land surveying.			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to understand the fundamentals of geospatial technology, surveying and their applications in construction.</i>		
Module-2			
Total Station and Global Navigation Satellite System (GNSS) Basics of surveying, introduction to survey and mapping, geospatial surveying equipment, Total Station, setting out and mapping. Advanced geospatial solutions, overview of components, working and signal structure of Global Navigation Satellite System. Applications of GNSS in surveying and mapping.			
Teaching-Learning Process	<i>ICT and Digital support: Demonstration of Total Station and GNSS equipment and their applications in surveying and mapping.</i> <i>Collaborative and Cooperative learning: Case studies of surveying and mapping applications in construction projects.</i>		
Module-3			
Remote Sensing and Geospatial Technologies Remote Sensing Technologies, types of remote sensing, sensors and their types, application of sensors and platforms, image acquisition and applications of Remote Sensing. 3D scanning, principles and science behind Photogrammetry, LiDAR, RADAR and SONAR. Introduction to platforms and their working.			
Teaching-Learning Process	<i>ICT and Digital support: Use of digital resources and demonstrations to understand Remote Sensing, Photogrammetry, LiDAR, RADAR and 3D scanning technologies.</i>		
Module-4			
Geographical Information System Basics of GIS, vector and raster data models, types and components of a map. Hardware for GIS, DEM and TIN data products, attribute data types. Basic GIS data conversions, conversions from non-spatial formats to spatial formats. Conversion of Excel to GIS, conversion of CAD to GIS, downloading and geo-referencing topographic sheets and raster files.			

Teaching-Learning Process	ICT and Digital support: Demonstration of GIS software and basic conversion of spatial and non-spatial data. Collaborative and Cooperative learning: Students shall work on basic GIS mapping and geo-referencing exercises.
Module-5	
Applications and Future Trends of Geospatial Technologies Application of GIS – Spatial Analysis, Catchment Area delineation, Overlay Analysis, Cluster Analysis, Hotspot Analysis, Viewshed Analysis. Future Trends of Geospatial Technologies. Case Study 1 – Benefit Realization. Case Study 2 – Advancements in Modern Survey & Mapping Technologies, Advancements in Spatial Analytics – Geo Intelligence, Future Trends, Geospatial Technology – Way Forward.	
Teaching-Learning Process	Collaborative and Cooperative learning: Case studies on spatial analysis, geospatial applications and modern survey and mapping technologies.
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 • Lillesand, T.M., Kiefer, R.W. and Chipman, J.W., <i>Remote Sensing and Image Interpretation</i>. • Burrough, P.A. and McDonnell, R.A., <i>Principles of Geographical Information Systems</i>. • Lo, C.P. and Yeung, A.K.W., <i>Concepts and Techniques of Geographic Information Systems</i>. • Jensen, J.R., <i>Remote Sensing of the Environment: An Earth Resource Perspective</i>.	
Web links and Video Lectures (e-Resources):	

Skill Development Activities Suggested

- Site visits to understand geospatial surveying and mapping applications.
- GIS mapping and geo-referencing exercises.
- Case studies on Remote Sensing, LiDAR and Photogrammetry.
- Spatial analysis exercises using GIS.

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 fundamentals of geospatial techniques and their applications in construction projects.	L2
C02	Apply surveying and GNSS techniques for establishing locations, distances and alignments in construction projects.	L3
C03	Analyse the applications of Remote Sensing, Photogrammetry, LiDAR and other geospatial technologies.	L4
C04	Apply GIS data models, geo-referencing and spatial data conversion techniques for construction-related mapping.	L3
C05	Analyse spatial data using GIS-based spatial analysis techniques.	L4
C06	Evaluate modern geospatial technologies and their applications in construction surveying, mapping and decision-making.	L5

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	H	M	H	M	M	H	H
C02	H	H	H	H	M	M	H	H
C03	H	H	H	H	H	M	H	H
C04	H	H	H	H	M	M	H	H
C05	H	H	H	H	H	H	H	H
C06	H	H	H	H	H	H	H	H

H - High , M - Medium, L - Low

III – SEMESTER (Professional Elective Course – VI)

CLOUD ADOPTION AND MANAGEMENT TECHNIQUES			
Course Code	2MCPM302D	CIE Marks	50
Teaching Hours/Week (L: T:P:TW+SL)	42:00:00:48	Viva Marks	50
Total Hours of Pedagogy	90 hrs.	Total Marks	100
Credits	03	Exam Hours	00
Course Learning objectives: - To understand the fundamentals of cloud computing and cloud adoption. - To understand cloud adoption strategies, frameworks and readiness assessment. - To understand cloud migration needs, processes and assessment. - To understand cloud management, operations, governance and cloud economics.			
Module-1			
Cloud Adoption Overview Introduction to IT and Cloud concepts, Cloud Computing, Cloud adoption overview, need for cloud adoption, benefits and challenges of cloud adoption, cloud adoption strategy, cloud adoption framework, cloud transformation and organisational considerations.			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to understand cloud concepts, adoption strategies and cloud adoption framework.</i>		
Module-2			
Cloud Readiness Assessment Cloud readiness assessment, assessment of existing IT environment, business and technical assessment, application and workload assessment, cloud readiness considerations, cloud assessment and outcomes, identifying cloud adoption requirements, cloud adoption planning.			
Teaching-Learning Process	<i>Collaborative and Cooperative learning: Case studies to understand cloud readiness assessment, application assessment and outcomes of cloud adoption</i>		
Module-3			
Cloud Migration Needs and Process Cloud migration needs, cloud migration process, migration strategy, migration planning, migration assessment, migration and deployment options, workloads and applications for migration, migration priorities, security and data considerations, cloud migration challenges and risks.			
Teaching-Learning Process	<i>ICT and Digital support: Use of digital resources to understand cloud migration processes, strategies and assessment techniques.</i> <i>Collaborative and Cooperative learning: Case studies of cloud migration and identification of migration requirements and risks.</i>		
Module-4			
Manage and Operate Cloud management, cloud operations, cloud operating models, roles and responsibilities in cloud management, monitoring and management of cloud services, security and compliance, governance and policies, risk management, business continuity and disaster recovery, managing and operating cloud environments.			
Teaching-Learning Process	<i>ICT and Digital support: Use of digital resources to understand cloud operations, monitoring, governance and security.</i> <i>Case study method: Case studies on managing and operating cloud environments and addressing operational risks.</i>		

Module-5	
Cloud Economics and Optimisation Cloud economics, cloud cost considerations, cost assessment, cloud pricing and expenditure, cost management, cost optimisation, business value of cloud adoption, measuring cloud adoption outcomes, cloud adoption best practices, case studies of cloud adoption and management.	
Teaching-Learning Process	ICT and Digital support: Use of digital resources to understand cloud economics, cost management and optimisation. Collaborative and Cooperative learning: Case studies to evaluate cloud adoption outcomes, costs and management strategies.
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: 15. Erl, T., Puttini, R. and Mahmood, Z., <i>Cloud Computing: Concepts, Technology & Architecture</i>. 16. Kavis, M.J., <i>Architecting the Cloud: Design Decisions for Cloud Computing Service Models</i>. 17. Fehling, C., Leymann, F. and Mietzner, R., <i>Cloud Computing Patterns: Fundamentals to Design, Build, and Manage Cloud Applications</i>. 18. Srinivasan, A. and Suresh, J., <i>Cloud Computing: A Practical Approach for Learning and Implementation</i>, Pearson.	
Web Links and Video Lectures (E-Resources) • Microsoft Cloud Adoption Framework – Cloud adoption, governance and cloud operations resources. • L&T EduTech – Cloud Adoption and Management Techniques.	
Skill Development Activities Suggested • Case studies on cloud adoption strategies. • Case studies on cloud management and operations. • Study of cloud governance, security and risk management. • Seminars by industry experts on cloud adoption and 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 concepts of cloud computing, cloud adoption and cloud adoption frameworks.	L2
C02	Apply cloud readiness assessment techniques to evaluate organisational requirements for cloud adoption.	L3
C03	Analyse cloud migration needs, processes, strategies and associated risks.	L4
C04	Apply cloud management, operations, governance and security practices.	L3
C05	Evaluate cloud economics, cost management and optimisation strategies.	L4
C06	Analyse cloud adoption outcomes and recommend appropriate cloud adoption and management strategies.	L4

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	H	M	H	M	M	H	H
C02	H	H	H	H	M	M	H	H
C03	H	H	H	H	H	M	H	H
C04	H	H	M	H	H	H	H	H
C05	H	H	M	H	H	H	H	H
C06	H	H	H	H	H	H	H	H

H - High , M - Medium, L - Low

III – SEMESTER (Multidisciplinary Elective Courses)

PUBLIC POLICIES FOR YOUNG PROFESSIONAL			
Course Code	2MCPM303A	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	--
Course Learning objectives: - To understand the importance and role of public policy in achieving social outcomes. - To understand public policy tools, concepts and decision-making processes. - To understand the political, administrative, financial and regulatory systems in India - To develop an understanding of policy challenges and the role of young professionals in addressing them			
Module-1			
Introduction to Public Policy Need for public policy – Importance of public policy in achieving social outcomes – Public policy tools and concepts – Public policy decision-making processes – Interaction of economics, sociology and political science in public policy.			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to understand the fundamentals, concepts and importance of public policy.</i>		
Module-2			
Public Policy Implementation Implementation of public policy – Strategic dimensions of public policy implementation – Policy decision-making – Political, administrative, financial and regulatory systems – Challenges in policy implementation.			
Teaching-Learning Process	<i>Case-based learning: Case studies and real-life examples to understand public policy implementation and strategic dimensions of policy implementation.</i>		
Module-3			
Public Policy Challenges in India Public policy challenges for India – Major challenges in society – Approaches to addressing social outcomes – Decision-making in addressing public policy challenges – Role of data in policy decisions.			
Teaching-Learning Process	<i>Collaborative and Cooperative learning: Case studies of public policy challenges in India and discussions on alternative approaches to addressing these challenges.</i>		
Module-4			
Sector Perspectives in Public Policy Sector perspectives – Infrastructure – Urbanisation – Education – Health – Banking and capital markets – Policy issues and challenges across sectors.			
Teaching-Learning Process	<i>Case study method: Real-life examples and case studies to understand public policy perspectives in infrastructure, urbanisation and other sectors.</i>		

Module-5	
Emerging Challenges and Public Policy Emerging challenges in public policy – Role of markets in solving challenges – Role of technology in delivering public service – Influencing public policy – Data-backed decision-making – Role of young professionals in addressing public challenges.	
Teaching-Learning Process	ICT and Digital support: Use of digital resources and real-life examples to understand the role of technology and data in public service. Case-based learning: Case studies to examine emerging public policy challenges and the role of markets and technology in addressing them.
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 • Bardach, E. and Patashnik, E.M., <i>A Practical Guide for Policy Analysis: The Eightfold Path to More Effective Problem Solving</i>. • Dunn, W.N., <i>Public Policy Analysis</i>. • Anderson, J.E., <i>Public Policymaking: An Introduction</i>. • Weimer, D.L. and Vining, A.R., <i>Policy Analysis: Concepts and Practice</i>.	
Web links and Video Lectures (e-Resources): 1. L&T EduTech – Public Policy for Young Professionals. L&T EduTech Course 2. Indian School of Public Policy – Public Policy programmes and resources. Indian School of Public Policy	
Skill Development Activities Suggested • Case studies on public policy implementation. • Case studies on infrastructure and urbanisation policies. • Analysis of public policy challenges in India. • Group discussions on emerging public policy challenges. • Study of the role of markets in solving public challenges. • Presentations on sector-specific public policy issues.	

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 importance, concepts and tools of public policy and its role in achieving social outcomes.	L2
C02	Explain the processes and strategic dimensions involved in public policy implementation	L2
C03	Analyse major public policy challenges and evaluate approaches to addressing social outcomes.	L4
C04	Analyse public policy perspectives related to infrastructure, urbanisation, education, health, banking and capital markets	L4
C05	Evaluate the role of markets and technology in addressing public policy challenges and delivering public services.	L5
C06	Apply data-backed decision-making approaches to public policy challenges and identify the role of young professionals in addressing them.	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	H	M	M	H	H	H	H
C02	H	H	M	M	H	H	H	H
C03	H	H	H	M	H	H	H	H
C04	H	H	H	H	H	H	H	H
C05	H	H	M	H	H	H	H	H
C06	H	H	M	H	H	H	H	H

H – High , M – Medium, L - Low

III – SEMESTER (Multidisciplinary Elective Courses)

ORGANIZATIONAL BEHAVIOUR			
Course Code	2MCPM303B	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	--
Course Learning objectives: - To understand the concepts and importance of Organizational Behaviour. - To understand individual and group behaviour in organizations. - To understand motivation, leadership, communication and conflict management. - To understand organizational culture, change and organizational effectiveness in construction organizations.			
Module-1			
Introduction to Organizational Behaviour Definition, nature and scope of Organizational Behaviour – Importance of Organizational Behaviour – Disciplines contributing to Organizational Behaviour – Models of Organizational Behaviour – Challenges and opportunities of Organizational Behaviour – Organizational context and behaviour in construction organizations.			
Teaching-Learning Process	<i>Direct method: Lecture supported by conventional method of Blackboard and chalk to understand the fundamentals, scope and importance of Organizational Behaviour.</i>		
Module-2			
Individual Behaviour Foundations of individual behaviour – Personality – Determinants of personality – Perception – Factors influencing perception – Learning and learning process – Attitudes and values – Job satisfaction – Individual decision making.			
Teaching-Learning Process	<i>Collaborative and Cooperative learning: Case studies to understand individual behaviour, personality, perception, attitudes and job satisfaction in organizational settings.</i>		
Module-3			
Group Behaviour, Motivation and Leadership Group behaviour – Types of groups – Group formation and development – Group dynamics – Group cohesiveness – Team building – Motivation – Theories of motivation – Maslow's theory – Herzberg's two-factor theory – McGregor's Theory X and Theory Y – Leadership – Leadership styles – Leadership theories.			
Teaching-Learning Process	<i>Case study method: Case studies on group dynamics, motivation and leadership in construction project teams.</i> <i>Collaborative and Cooperative learning: Group activities to understand team building, leadership and motivation.</i>		
Module-4			
Communication, Conflict and Negotiation Communication – Importance and process – Types and directions of communication – Interpersonal and organizational communication – Barriers to communication – Improving organizational communication – Conflict – Types of conflict – Causes of conflict – Conflict management – Negotiation – Team coordination and collaboration.			
Teaching-Learning Process	<i>Collaborative and Cooperative learning: Case studies and role-play exercises to understand communication, conflict management and negotiation in project teams.</i>		

Module-5	
Organizational Culture, Change and Development Organizational culture – Organizational climate – Organizational change – Resistance to change – Managing change – Organizational development – Organizational effectiveness – Work stress – Stress management – Work-life balance – Emerging challenges in Organizational Behaviour – Case studies of organizational behaviour in construction projects.	
Teaching-Learning Process	Case study method: Case studies of organizational culture, organizational change, stress management and organizational effectiveness in construction organizations.
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: 9. Robbins, S.P. and Judge, T.A., <i>Organizational Behavior</i>, Pearson. 10. Luthans, F., <i>Organizational Behavior</i>, McGraw Hill. 11. . Daniel King, Scott Lawley, (2016) <i>Organizational Behaviour</i> Oxford University press, New Delhi 12. David Buchanan, Andrzej Huczynski, (2016), <i>Organizational Behaviour</i>, 9th edition, Pearson.	
Web links and Video Lectures (e-Resources): NPTEL – Organizational Behaviour: Individual Dynamics in Organization. nptel.ac.in/courses/110103433?utm	
Skill Development Activities Suggested: • Case studies on Organizational Behaviour in construction organizations. • Role-play exercises on leadership and conflict management. • Seminars on leadership and human behaviour in construction. • Site visits to understand organizational structure and team coordination in 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 concepts, nature, scope and importance of Organizational Behaviour in construction organizations.	L2
C02	Analyse individual behaviour with respect to personality, perception, attitudes, learning and job satisfaction.	L4
C03	Apply theories of motivation and leadership to manage individuals and project teams effectively.	L3
C04	Analyse communication processes, conflicts and negotiation within construction project teams.	L4
C05	Evaluate organizational culture, change, stress and organizational effectiveness.	L5
C06	Apply Organizational Behaviour concepts to improve teamwork, coordination and effectiveness in construction organizations.	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	H	M	H	M	M	H	H
C02	H	H	H	M	H	M	H	H
C03	H	H	H	H	H	H	H	H
C04	H	H	H	H	H	H	H	H
C05	H	H	M	H	H	H	H	H
C06	H	H	H	H	H	H	H	H

H – High , M – Medium, L - Low

III – SEMESTER (Multidisciplinary Elective Courses)

CRITICAL THINKING, DESIGN THINKING, LEADERSHIP AND TEAMWORK			
Course Code	2MCPM303C	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	--
Course Learning objectives: - To develop critical thinking and effective decision-making skills. - To understand the principles and process of Design Thinking. - To develop creativity and innovative problem-solving abilities. - To develop leadership, communication and teamwork skills.			
Module-1			
Design Thinking Fundamentals Introduction to Design Thinking – Design Thinking for complex problem solving – Stages of Design Thinking – Exploring solution space – Empathy building – Empathy maps – User journey mapping – Storyboarding – Design Thinking practices – Design Thinking for professional skills – Design Thinking in industrial projects.			
Teaching-Learning Process	<i>Collaborative and Cooperative learning: Case studies and group activities to understand Design Thinking principles and their application in problem solving.</i>		
Module-2			
Design Thinking in Creativity and Innovation Unique characteristics of Design Thinking – Creativity and Innovation – Categories and misconceptions of creativity – Resilience in problem-solving – Analytical Thinking driven by Design Thinking – Waterfall models and Design Thinking – Agile Development models – Agile process integrated with Design Thinking – Design Thinking based product development – Design methodology – Prototyping – UX design – Value proposition.			
Teaching-Learning Process	<i>ICT and Digital support: Use of digital resources and case studies to understand creativity, innovation, prototyping and Design Thinking.</i>		
Module-3			
Critical Thinking Introduction to Critical Thinking – Styles and challenges of Critical Thinking – Benefits of Critical Thinking – Identifying and clarifying issues and arguments – Types of arguments – Deductive reasoning – Inductive reasoning – Reasoning with statistics – Fallacies of relevance – Fallacies of insufficient evidence – Evaluating arguments – Critical Thinking models – Principles of decision making – De Bono's Thinking Hats – Effective argument writing – Critical Thinking based case study analysis.			
Teaching-Learning Process	<i>Case-based learning: Case studies and problem-solving exercises to develop critical thinking, reasoning and decision-making skills.</i>		
Module-4			
Leadership Defining leaders and leadership – Types of leaders and leadership styles – Understanding people, personalities and abilities – Active listening – Non-verbal communication – Feedback – Clarity – Effective leadership – Psychology of change for individuals and teams – Personal resilience and well-being – Feedback and feed-forward.			
Teaching-Learning Process	<i>Collaborative and Cooperative learning: Case studies, discussions and activities to understand leadership, communication, resilience and professional behaviour.</i>		

Module-5	
Teamwork Effective teams – Stages of team development – Leaders and teams – Working effectively towards common goals – Role of integrity in leadership – Growth mindset in leadership – Conflict resolution – Managing team dynamics – Team communication – Collaboration and coordination.	
Teaching-Learning Process	Collaborative and Cooperative learning: Group activities and team exercises to develop communication, collaboration, coordination, conflict resolution and teamwork skills.
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 7. Thwaites, G. and Butterworth, J., <i>Thinking Skills: Critical Thinking and Problem Solving</i> 8. Bassham, G., Irwin, W., Nardone, H. and Wallace, J.M., <i>Critical Thinking: A Student's Introduction.</i> 9. Northouse, P.G., <i>Leadership: Theory and Practice.</i> 10. Cross, N., <i>Design Thinking: Understanding How Designers Think and Work.</i> 11. Paul, R. and Elder, L., <i>Critical Thinking: Tools for Taking Charge of Your Learning and Your Life.</i> 12. Covey, S.R., <i>The 7 Habits of Highly Effective People.</i> 13. Johnson, S., <i>Where Good Ideas Come From.</i> 14. Christensen, C., <i>The Innovator's Dilemma.</i> 15. Harvard Business Review – <i>Innovation resources.</i>	
Web links and Video Lectures (e-Resources): • NPTEL – Design Thinking and Innovation. nptel.ac.in/courses/110106124 • NPTEL – Leadership and Teamwork. nptel.ac.in/courses/110107159	
Skill Development Activities Suggested • Role-play activities on communication and conflict resolution. • Presentations on leadership and teamwork. • Critical Thinking and problem-solving exercises. • Group discussions and case studies. • Leadership activities. • Team-building exercises.	

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 principles, stages and applications of Design Thinking for complex problem solving.	L2
C02	Apply Design Thinking approaches to creativity, innovation, prototyping and problem solving.	L3
C03	Analyse issues, arguments and information using Critical Thinking and reasoning techniques.	L4
C04	Apply appropriate leadership principles, communication and decision-making skills in professional situations	L3
C05	Analyse team dynamics, communication and conflicts for effective teamwork	L4
C06	Develop collaborative problem-solving, leadership and teamwork skills for professional practice.	L6

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	H	H	M	H	H	H	M
C02	H	H	H	H	H	H	H	M
C03	H	H	H	M	H	H	H	H
C04	H	H	M	H	H	H	M	H
C05	M	H	H	H	H	H	M	H
C06	M	H	H	H	H	H	H	H

H – High , M – Medium, L -LOW

III – SEMESTER (Multidisciplinary Elective Courses)

FOREIGN LANGUAGE			
Course Code	2MCPM303D	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	--
Course Learning objectives: - To develop basic communication skills in a foreign language. - To develop the ability to understand and use commonly used words and expressions - To develop basic reading, writing, listening and speaking skills. - To develop language skills useful for professional and international communication.			
Module-1			
Introduction to the Foreign Language Alphabet and pronunciation – Basic vocabulary – Greetings and introductions – Numbers – Days, dates and time – Common expressions – Personal information – Basic sentence formation.			
Teaching-Learning Process	<i>Direct method: Lecture, pronunciation practice and interactive exercises to develop basic vocabulary and sentence formation.</i>		
Module-2			
Everyday Communication Common words and expressions – Asking and answering questions – Describing people and places – Directions and locations – Daily activities – Basic conversations – Reading and understanding simple texts.			
Teaching-Learning Process	<i>Collaborative and Cooperative learning: Pair activities, conversations and role-play exercises to develop basic communication skills.</i>		
Module-3			
Grammar and Vocabulary Nouns and pronouns – Articles – Verbs – Adjectives – Adverbs – Basic sentence structures – Present, past and future forms – Question formation – Negation – Common vocabulary and expressions.			
Teaching-Learning Process	<i>ICT and Digital support: Audio-visual resources and language-learning applications to develop vocabulary, grammar and pronunciation.</i>		
Module-4			
Professional Communication Professional vocabulary – Workplace expressions – Introducing oneself professionally – Telephone conversations – Making appointments – Giving and receiving information – Reading notices, instructions and simple professional documents – Basic email communication.			
Teaching-Learning Process	<i>Role-play and Collaborative learning: Role-play exercises based on workplace situations and professional communication.</i>		
Module-5			
Foreign Language for Architecture and Construction Practice Basic terminology related to architecture, construction and project management – Construction site vocabulary – Building materials and components – Project team and professional roles – Basic instructions and communication at project sites – Simple conversations related to meetings, site visits and professional situations.			

Teaching-Learning Process	<i>Case-based and Activity-based learning:</i> Language exercises, vocabulary activities and role-play based on architectural, construction and project-management situations.
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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

- Beginner-level textbook prescribed for the selected foreign language.
- Basic foreign language grammar and vocabulary reference book.
- Foreign language–English dictionary.
- Foreign language communication and conversation handbook.
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Web links and Video Lectures (e-Resources):

1. NPTEL – Foreign Language and Communication related learning resources.

Skill Development Activities Suggested

- Vocabulary-building exercises.
- Professional communication exercises.
- Construction-site vocabulary exercises.
- Presentation in the selected foreign language.
- Reading and translation exercises.

Course outcome (Course Skill Set)

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

Sl. No.	Description	Blooms Level
CO1	Demonstrate basic vocabulary, pronunciation and expressions in the selected foreign language.	L3
CO2	Use basic grammatical structures and sentence patterns for everyday communication.	L3
CO3	Communicate in simple spoken situations and understand basic conversations.	L3
CO4	Read and interpret simple professional texts, notices and instructions.	L3
CO5	Apply basic foreign-language vocabulary in architecture, construction and project-management situations.	L3
CO6	Demonstrate basic foreign-language communication skills required for professional and international interactions.	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	H	M	M	H	M	M	H
C02	H	H	M	M	H	M	M	H
C03	H	H	M	M	H	M	M	H
C04	H	H	M	M	H	M	H	H
C05	H	H	H	H	H	H	M	H
C06	H	H	H	H	H	H	H	H

H – High , M – Medium, L - Low

III-SEMESTER

DISSERTATION PHASE – II			
Course Code	2MPRJ304	CIE Marks	50
Teaching Hours/Week (L: T:P:TW+SL)	42:28:00:50	Viva Marks	50
Total Hours of Pedagogy	120 Hrs.	Total Marks	100
Credits	04	Exam Marks	00
Course Learning objectives: - The dissertation's objective is to provide the students an opportunity to prepare independent and original study of a special project of his/her own choice. - The project provides students an opportunity for academic research to cultivate specialization in the areas of their own interest under the overall guidance of the faculty. - The objective of the seminar work is to train the students to prepare state of art report by assimilation of concepts / ideas on a chosen topic in the area of Building Engineering and Management.			
COURSE CONTENT			
Research Content: The dissertation/ thesis is an individual research project that is a major piece of work undertaken by the students. It is a continuation of the Dissertation phase-1 of the previous semester. They are expected to select a topic on a live problem in the industry or a macro-issue having a bearing on performance of the real estate, construction or urban infrastructure industry. The topic should be researchable and involve scientific design of a study, collection and analysis. The aim is to prepare state of art report on the chosen topic and develop hypothesis to be tested through the research methodology designed for the purpose. The thesis proposal should include an overview of the proposed plan of work, including the general scope of your project, your basic research questions, research methodology, and the overall significance of your study. In short, the proposal should explain what to study, how to study this topic, why this topic needs to be studied. Thesis proposals are designed to - Justify and plan (or contract for) a research project. - Show how your project contributes to existing research. - Demonstrate to your advisor and committee that you understand how to conduct discipline specific research within an acceptable time-frame. - Recommend future study areas for research. Research Process: Students are required to test their outcome proposals through various methods, including questionnaire surveys and case studies. Students must create an innovative insight on the specific issues. Thesis work includes processes such as: Research area identification; hypothesis of research topic; literature sourcing and search; aim and objective definition; formulation of methodology; field study planning; survey data collection, analysis and result presentation; literature study; conceptual an empirical :compilation and inference drawing; research study validation through case studies, field application and simulation models; discussion of findings of research findings; study conclusion and recommendation formulations. The progress of the Thesis work is presented and discussed by the student periodically in the classroom environment and progress monitored continuously. This work develops the comprehension and presentation skills of the students. The students are provided guidance from the faculty to channelize their thoughts. Area of Research: The subject for special study may be conceptual or practical but pertaining to Building Engineering and Management in areas like Building Engineering, Construction technology ,Structural systems , Energy efficient building materials & techniques , Construction project management, Time management, Cost management, Quality management, Safety management, Contract Administration, Design management, Construction financial management, Human resource management, Quantitative techniques, Energy management, Building services, Building management systems, Infrastructure services , Management information systems , Project planning and feasibility and Disaster management Presentation: The dissertation Project shall be submitted in the form of drawings, project report, models, slides etc. Relevant details/codes, schematic charts, reports and photographs.			

Teaching-Learning Process	- Guest lectures, webinars, site visits to acquire subject knowledge related to the selected topic. - Critical review with constructive suggestions / feed backs has to be provided by the Guide/ co-guide during the progress of the dissertation.
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 Dissertation Stage -2, shall be based on the progress of the student throughout the semester, presentation skills in seminars and submission of the Dissertation report. Viva-voce Examination: - 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. - 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. - The viva-voce marks awarded for Dissertation Stage -2, shall be based on the evaluation of Dissertation report submission, presentation skill and performance in 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 the sealed cover through the Principal of the institution.	
Suggested Learning Resources: Books: - Ranjith Kumar (2005.) Research Methodology- A step by step guide for beginners, California: Sage Publications. - John W Creswell, (2002). Research design: Qualitative, Quantitative and Mixed method approaches. California: Sage Publications. - Kate Turabian. (2018) A Manual for Writers of Research Papers, Theses, and Dissertations. Chicago: Chicago Guides to Writing, Editing, and Publishing.	
Web links and Video Lectures (e-Resources): Thesis Format Dissertation Format Paper, Structure, Sample Leverage Edu	
Skill Development Activities Suggested - Guest lecture - Review of research papers - Site visits / Case studies	

Course outcome(Course Skillset)

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

Sl. No.	Description	Blooms Level
C01	Prepare an extensive literature study and data collection from the field and presentation in the form of drawings, relevant details/codes, schematic charts, reports and photographs	L3
C02	Develop a hypothesis to be tested through the research methodology designed for the purpose with innovative insight on specific issues thereby undertaking academic research independently.	L3
C03	Experiment with research processes.	L4
C04	Propose areas for further research and development	L5

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	H	H	H	H	H	H	H
C02	H	M	H	H	H	M	H	H
C03	M	H	H	H	H	H	H	H
C04	M	H	H	H	H	H	H	H

H – High , M – Medium, L - Low

INTERNSHIP			
Course Code	2MINT401	CIE Marks	--
Teaching Hours/Week (L: T:P:TW+SL)	00:00:00:00	Viva Marks	200
Total Hours of Pedagogy	-	Total Marks	200
Credits	18	Exam Marks	00
Course Learning objectives: • To undergo professional training in a construction/project management organisation and gain practical experience in handling live construction projects. • To understand project planning, scheduling, cost, resource, quality and construction management practices. • To understand project coordination, contract administration and communication with project stakeholders. • To identify construction project risks, delays and challenges and understand appropriate mitigation measures.			
COURSE CONTENT			
INTERNSHIP: A candidate has to undergo practical training for 15 weeks in an approved Construction Project Management / Project Management Organisation involved in construction, property development or infrastructure projects. During this period, the student shall study and participate in live projects and gain practical exposure to project planning, scheduling, estimation and costing, resource management, procurement, quality control, site management, contract administration, risk management, progress monitoring and stakeholder coordination. The training internship is intended to provide students with practical insights into the professional management of construction projects. The final internship report shall comprise documentation and analysis of the activities undertaken in the form of project schedules, charts, reports, relevant drawings, photographs, project documentation, observations, comments and suggestions.			
Teaching-Learning Process	ICT and Digital support: Listening to webinars and online seminars relevant to construction project management and related topics.		
Assessment Details (SEE Marks) The Semester End Examination (SEE) shall carry 100% of the total marks and shall be conducted in the form of a Viva-Voce Examination. The minimum passing mark in the SEE shall be 50% of the maximum marks. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to the course if the student secures not less than 50% in the SEE/Viva-Voce examination. 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 internship shall be based on the evaluation of internship report, internship 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.			

Web links and Video Lectures (e-Resources):**Skill Development Activities Suggested**

- Site visits to understand the working procedure of activities on site.
- Preparing project schedule.
- Estimation and costing of projects.
- Certification courses by NTPEL.

Course outcome(Course Skillset)

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

Sl. No.	Description	Blooms Level
C01	Identify concepts or skills with access to leading experts with specialized knowledge and experience.	L5
C02	Apply basic knowledge using an effective performance management system in managing technical projects effectively.	L3
C03	Manage projects using a proven, effective performance measurement technique	L5
C04	Analyse and recommend project decisions concerning scope, cost and schedule parameters faster, more effectively and more confidently.	L4
C05	Plan schedules, budgets, workloads and human resources issues and delegate practically and fairly.	L5
C06	Identify the pitfalls of project management by quickly tracing the potential project risks and mitigate them as early as possible.	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	H	H	H	M	M	H	H
C02	H	H	H	H	M	M	M	H
C03	H	H	M	H	M	M	H	H
C04	H	H	H	H	H	M	H	H
C05	H	H	H	H	M	H	H	H
C06	H	H	H	H	H	H	H	H

H - High , M - Medium, L - Low