

CET453	CONSTRUCTION PLANNING AND MANAGEMENT	CATEGORY	L	T	P	CREDIT	YEAR OF INTRODUCTION
		PEC	3	0	0	3	2019

Preamble: Construction Planning and Management is an elective course designed to provide in-depth knowledge in the planning and management of construction projects. The course details various operations encountered in a construction project in different phases throughout the lifecycle of a project, from planning, design, construction and operations. The course also helps students to develop the required skills to plan and manage various types of construction projects effectively and efficiently using the latest technologies like BIM.

Prerequisite: CET 309 Construction Technology and Management

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

Course Outcome	Description of Course Outcome	Prescribed learning level
CO1	Apply knowledge of Planning and Management for planning and execution of Construction Projects	Applying
CO2	Explain techniques for Project Planning, Scheduling, Construction Administration and Management	Understanding
CO3	Identify the criteria for selecting the appropriate method and tools as per the requirement of each project or site.	Understanding
CO4	Discuss the latest industry standards and technologies used in construction projects for planning and management.	Understanding
CO5	Explain the financial and legal aspects involved in a construction project.	Understanding

Mapping of course outcomes with program outcomes (Minimum requirement)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2				2				2		3	2
CO2	2	2		2			1		2		3	2
CO3	2	2	2		2	2	1		2	1	3	2
CO4	2	1		1	1	2	1		2	3	3	2
CO5	2	2	2	1	2		1	3	2		3	2

Assessment Pattern

Bloom's Category	Continuous Assessment Tests		End Semester Examination
	1	2	
Remember	10	10	10
Understand	30	30	70
Apply	10	10	20
Evaluate			
Analyse			
Create			

Mark distribution

Total Marks	CIE	ESE	ESE Duration
150	50	100	3 hours

Continuous Internal Evaluation Pattern:

Attendance : 10 marks
 Continuous Assessment Test (2 numbers) : 25 marks
 Assignment/Quiz/Course project : 15 marks

End Semester Examination Pattern: There will be two parts; Part A and Part B. Part A contain 10 questions with 2 questions from each module, having 3 marks for each question. Students should answer all questions. Part B contains 2 questions from each module of which student should answer any one. Each question carries 14 marks and can have maximum 2 sub-divisions.

Course Level Assessment (Sample) Questions**CO1: Apply knowledge of Planning and Management for planning and execution of Construction Projects**

1. How do you structure a team for a project? What do you consider?
2. What are the functions of construction management and give its applications?
3. What actions would you take if a project is falling behind schedule or exceeding the project's budget?
4. What would you do if some of your workers were not using the necessary safety equipment?

CO2: Explain techniques for Project Planning, Scheduling , Construction Administration and Management

1. List out the various network techniques in construction management.
2. Name the resource allocation methods and give the steps involved in any one

of the resource allocation methods.

3. Explain the different costs involved in material management for material, labour and expenses.

CO3: Identify the criteria for selecting the appropriate method and tools as per the requirement of each project or site.

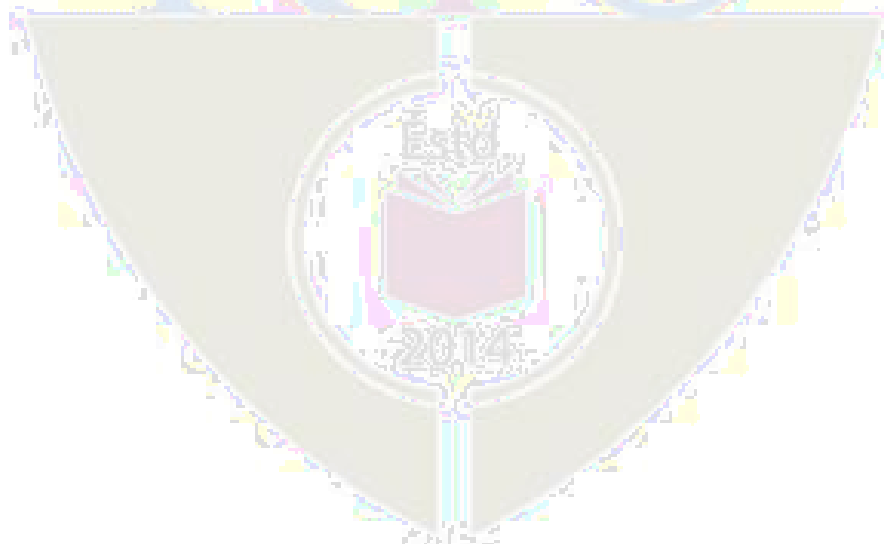
1. What methods do you use to monitor and track the progress of your construction project?
2. Elucidate the methods to prioritize the necessary tasks for a project.
3. How do you know when a construction project is well-executed and what do you look for in quality control?

CO4: Discuss the latest industry standards and technologies used in construction projects for planning and management.

1. What are some of the major uses of BIM?
2. What is the difference between Retained Logic & Override Logic in progress update?
3. What is Clash Detection? How does it help in Construction Projects?

CO5: Explain the financial and legal aspects involved in a construction project.

1. What factors would you consider before negotiating contracts or rates?
2. Explain the different laws relating to wages.
3. Explain legal and financial aspects of accidents in construction projects.



Syllabus

Module 1

Introduction: Objectives of construction planning and management. Importance of Management in Construction, Construction team- Roles, responsibilities and skills.

Organisation and Hierarchy in Construction Projects – Types, Characteristics, Functions and Flow charts.

Construction scheduling: Review of CPM and PERT (AoN network), Time-cost trade-off – Cost optimization through the crashing of a network, Resource smoothing and resources levelling – concept only.

Module 2

Introduction to BIM Technology: Define BIM and BIM model, Describe workflow in using BIM in the building lifecycle, Model-Based cost estimating, Perform Simulations, Apply BIM to reduce error and change orders in projects, Evaluate and communicate ideas related to the use of BIM in the building life cycle, BIM Benefits: Case Studies, Organizational Maturity and Dimensions, Construction Management and Planning using BIM

Labour Legislations pertaining to the construction industry, Payment of Wages Act, Minimum Wages Act, Contract Labour Act, Labour Welfare Fund Act, Workmen's Compensation Act.

Module 3

Human Resource Management: manpower estimation at various stages, recruitment, training, under and overmanning.

Materials Management: Materials of construction, classification codification, ABC analysis, estimation of materials procurement, inventory/stock control, Economic Order Quantity, purchase procedure, stores management

Quality control in Construction: Importance of quality, elements of quality, organization for quality control, quality assurance technique.

Construction Safety Management: Important causes of accidents on construction sites, safety measures, safety benefits to employees, employees and customers.

Module 4

Economics of Project Management: Economic analysis of projects – NPV, Rate of return analysis, cost-benefit analysis.

Tendering – E Tendering / Electronic Process.

Contract – Contract documents and conditions of Contract, Contract agreement

Technical terms only - Administrative approval, Technical Sanction, Secured Advance, Mobilization Advance, Heads of accounts in government organization, Earnest money deposit (EMD) and Security deposit (SD). Accounting- Terms only- Work Abstract, Cash book, Work register, Accounting for the materials, Measurement book, Muster roll and Record of Bills

Module 5

Budgetary Control Systems: Types of budgets, new approaches for budgeting, responsibility of accounting, profit centre approach.

Financial Management: Meaning and scope, financial statement analysis, financial ratio analysis, funds flow analysis.

Working Capital Management: Meaning, policy for working capital, estimating working capital needs. Capital investment decision, long term financing working of financial institutions in India and abroad, self-financing, financing mechanisms.

Text Books:

1. Srinath, L.S. PERT and CPM Principles and Applications, 3rd ed. Affiliated East-West Press, New Delhi 2015.
2. Kumar Neeraj Jha, Construction Project Management, 2nd ed Pearson, Dorling Kindersley (India) pvt. Ltd 2015
3. K. K. Chitkara, Construction Project Management Planning Scheduling & Controlling, Tata McGraw Hill, New Delhi 2014.

References:

1. Gupta, B.L. and Gupta, Amit. Construction Management, Machinery and Accounts, 3rd ed. Standard Pub, 2005.
2. Loraine, R.K. Construction Management in Developing Countries. Thomas Telford, London, 1993.
3. Singh, Harpal. Construction Management and Accounts 14th ed. Tata McGraw-Hill Pub., New Delhi, 1981.
4. Gould, E. Frederick and Joyce, E. Nancy. Construction Project Management. Prentice Hall, New Jersey, 2000.
5. Shrivastava, U.K. Construction Planning and Management, 3rd ed. Galgotia Pub., New Delhi, 2004
6. Brad Hardin, Dave McCool . BIM and Construction Management: Proven Tools, Methods, and Workflows Paperback – 2017 .

Course Contents and Lecture Schedule

Module	Topic Course	Course Outcomes Addressed	No. of Lectures
1	Module I : Total lecture hours : 7		
1.1	Introduction: Objectives of construction planning and management. Importance of Management in Construction, Construction team- Roles, responsibilities and skills.	CO2	1
1.2	Organisation and Hierarchy in Construction Projects -Types, Characteristics, Functions and Flow charts.	CO1, CO2	2
1.3	Review of CPM and PERT, Time-cost trade-off – Cost optimization through the crashing of a network, Resource smoothing and resources levelling – concept only.	CO1, CO2	4
2	Module II: Total lecture hours: 7		
2.1	Introduction to BIM Technology: Define BIM and BIM model, Describe workflow in using BIM in the building lifecycle, Model-Based cost estimating, Apply BIM to reduce error and change orders in projects	CO2, CO3, CO4	3
2.2	Evaluate and communicate ideas related to the use of BIM in the building life cycle, BIM Benefits: Case Studies, Organizational Maturity and Dimensions, Construction Management and Planning using BIM	CO1, CO3, CO4	2
2.3	Labour Legislations pertaining to the construction industry, Payment of Wages Act, Minimum Wages Act, Contract Labour Act, Labour Welfare Fund Act, Workmen’s Compensation Act.	CO2, CO5	2
3	Module III: Total lecture hours: 6		
3.1	Human Resource Management: manpower estimation at various stages, recruitment, training, under and overmanning.	CO1	1
3.2	Materials Management: Materials of construction, classification codification, ABC analysis, Estimation of materials procurement, inventory/stock control, Economic Order Quantity, purchase procedure, stores management.	CO1	2
3.3	Quality control in Construction: Importance of quality, elements of quality, organization for quality control, quality assurance technique.	CO1	1
3.4	Construction Safety Management: Important causes of accidents, safety measures, safety benefits to employees, employees and customers.	CO2	2
4	Module IV: Total lecture hours: 7		
4.1	Economics of Project Management: Economic analysis of ojects, – NPV, Rate of return analysis, cost-benefit	CO2, CO4	2

	analysis.		
4.2	Tendering – E Tendering / Electronic Process.	CO2, CO4	1
4.3	Contract – Contract documents and conditions of Contract, Contract agreement	CO2	2
4.4	Technical terms only - Administrative approval, Technical Sanction, Secured Advance, Mobilization Advance, Heads of accounts in government organization, Earnest money deposit (EMD) and Security deposit (SD). Accounting- Terms only- Work Abstract, Cash book, Work register, Accounting for the materials, Measurement book, Muster roll and Record of Bills	CO2	2
5	Module V: Total lecture hours: 8		
5.1	Budgetary Control Systems: Types of budgets, new approaches for budgeting, responsibility of accounting, profit centre approach.	CO2, CO5	2
5.2	Financial Management: Meaning and scope, financial statement analysis, financial ratio analysis, fund flow analysis.	CO2, CO5	2
5.3	Working Capital Management: Meaning, policy for working capital, estimating working capital needs. Capital investment decision	CO2, CO5	2
5.4	Long term financing working of financial institutions in India and abroad, self-financing, financing mechanisms.	CO2, CO5	2

Model Question Paper

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SEVENTH SEMESTER B. TECH DEGREE EXAMINATION, MONTH & YEAR**

Course Code: CET453

Course Name: CONSTRUCTION PLANNING AND MANAGEMENT

Marks : 100

Duration : 3 hrs

PART A

(Answer all Questions. Each Question carries 3 Marks)

1. Differentiate between resource smoothing and resource levelling.
2. List out members of the construction team and write the responsibilities.
3. Explain BIM Technology.
4. What is meant by Organizational Maturity of BIM?
5. Explain Economic Order Quantity.
6. List the important causes of accidents on construction sites.
7. Explain rate of return analysis.
8. What is meant by administrative approval?
9. Discuss any two types of construction budgets.
10. Explain the sources of long-term financing of construction projects.

PART B

(Answer one full question from each module, Each question carries 14 marks)

Module 1

11. a) Explain the Functions of construction project management.
b) Describe any two types of organisation structures for construction projects.
12. With an example, explain the procedure for the time-cost tradeoff.

Module 2

13. Explain any two labour legislations pertaining to the construction industry.
14. Explain the following
 - i) BIM Model
 - ii) Clash Detection
 - iii) Model Based Cost Estimating
 - iv) Dimensions of BIM

Module 3

15. Explain the need for Quality assurance and Quality control in construction projects.
16. Discuss in detail ABC analysis for Material Management

Module 4

17. a) Give the salient features of the contract document.
b) Explain any two important conditions of the contract.
18. Discuss the major steps involved in E Tendering and the process of awarding the contract.

Module 5

19. Analyse the important benefits of the following:
 - i) Fund Flow Analysis
 - ii) Financial Ratio Analysis
20. Explain, with examples, the different Methods for Estimating Working Capital Requirement.

