

**B.E. Civil Engineering Semester: VII**  
**Subject Name: Construction Management & Equipment**  
**Subject Code: (CV 702)**

**A. Learning objectives:**

- To develop concepts related with Construction management & Equipment management which involves Planning, scheduling, controlling, organizing of project and Execution of the project with economic development & prosperity.
- To learn basic principles of Construction Management & Various networking techniques of project controlling in the context of various construction aspects.
- To study Scheduling of the project & resource allocating in terms of site management.
- To finalize quantities of items, Equipment and resource requirement of civil engineering Works
- To know the co-relation of client, consultant and contractor for the construction project with practical aspects

**B. Teaching scheme (credits and hours):**

Teaching Scheme				Credit Scheme			Evaluation Scheme				
Lect Hrs	Tut Hrs	Pract. Hrs	Total	Theory	Pract/TW	Total	UE	IE	CIA	PRAC/VIVA	Total
03	02	00	05	03	02	05	70	30	20	30	150

**C. Detailed Syllabus:**

Detail Syllabus	
1.	<b>Construction Management:</b> Introduction, Objectives and Scope of Construction Management. Work break down structure for various projects, Construction Resources
2.	<b>Management Techniques:</b> PMC and Conventional Methods: Gantt Bar chart, Mile stone chart, Line of balance (L O B) technique, Introduction of PMC
3.	<b>Network Analysis: Critical Path Method (CPM) :</b> Introduction , Basic assumption made for creating a Network, Terminology, Types of networks , Network Rules, CPM, Bar chart, Type of floats and their significance, Time grid diagram, Updating of networks and Time cost Optimization, Terms and definitions : Event, Activity, Dummies,

	Interrelationship of Events, Interrelationship of Activity
4.	<b>Resource allocation and Resource Scheduling:</b> Various schedules i.e. Material, labour, equipment etc. Resource allocation models with and without constraints. Difference between PERT and CPM
5.	<b>Program Evaluation and Review Technique (PERT):</b> Activities and project time estimates for probabilistic model, Time Estimates: TL, TE, Evaluation of project completion time probabilities. Comparison between Deterministic and Probabilistic Approaches.
6.	Cash Flow analysis and expenditure schedules. Cash flow for Owner and Contractor, Job Lay out, Supervision and Safety in Large Construction Projects.
7.	<b>Construction Equipment:</b> Introduction to Construction Equipment: Their contribution and importance in construction Industry. Classification of Equipment, Financial aspects related to construction equipments: Discounted present worth analysis, Depreciation, Cost of owning and operating construction equipment, Basics of equipment replacement policy.
8.	<b>Engineering fundamentals:</b> Related to performance of IC engines, rim pull, drawbar pull, Coefficient of traction, Gradability, Soil fundamentals.
9.	<b>Excavating Equipment:</b> Power Shovels, Draglines, Hoes, Clam Shells and trenching machines, their basic Parts, Operation, Output estimation, Factors influencing output and methods to enhance it, Tractors and related equipment: Bulldozers, Rippers, Scrapers & overview of other Equipment
10.	<b>Belt conveyor system:</b> Terminology, Classification, Components, Power requirement estimation and design.
11.	<b>Hauling equipment:</b> Trucks and wagons, operation and guideline for selection and deployment.

#### D. Lesson Planning:

Unit No	Topics	Lectures (Hours)	Weightage (%)
1.	Construction Management	5	12
2.	Management Techniques	4	8
3.	Network Analysis: Critical Path Method (CPM)	7	17
4.	Resource allocation and Resource Scheduling	2	4
5.	Programme Evaluation and Review Technique (PERT)	4	8

6.	Cash Flow analysis and expenditure schedules, Job Lay out, Supervision and Safety in Large Construction Projects.	4	8
7.	Construction Equipment	4	8
8.	Engineering fundamentals	4	8
9.	Excavating Equipment	6	12
10.	Belt conveyer system	3	8
11.	Hauling equipment	2	4

### E. Term Work :

Sr.	Name of the Tutorials & Assignment
1.	Introduction to Construction management
2.	Construction Management Techniques
3.	Elements of Network
4.	Resource allocation and Resource Scheduling
5.	Programme Evaluation and Review Technique (PERT)
6.	Cash flow analysis & Job layout
7.	Introduction to Construction Equipment
8.	Engineering Fundamental for Equipment
9.	Earthwork and machine
10.	Belt conveyer System & Hauling Equipment

### F. Instructional Method and Pedagogy (Continuous Internal Assessment (CIA) Scheme)

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Lecture may be conducted with the aid of multi-media projector, black board, OHP etc.
- Attendance is compulsory in lectures and practical which carries marks.
- At regular intervals assignments will be given. Students should submit all assignments during given period.
- Classroom participation and involvement in solving the problems in Tutorial rooms Carries Marks
- Internal exam of 30 marks will be conducted as a part of Mid semester evaluation.

- The course includes a practical, where students have an opportunity to build an appreciation for the concept being taught in lectures.

## **G. Students Learning Outcomes:**

At the end of the course,

- Adopting the ethical knowledge for Construction & project management.
- The students will get the experience to make proper site management & specification for equipment for construction work.
- The student will get in depth knowledge of resource & contract management & cost management on site .

## **H. Recommended Study Materials**

### **A. Reference & Text Books:**

1. Sharma, M.R., Fundamentals of Construction Planning and Management, S.K. Kataria & Son, New delhi, 2012.
2. Seetharaman, S., Construction Engineering & Management, Umesh Publications, 2007.
3. Srinath, L.S., PERT & CPM Principles and Applications, Tata McGraw Hill, New Delhi.
4. Peurifoy, L., Schexnayder, C.J. and Shapira, A., Construction Planning, Equipment and Methods, McGraw Hill, New Delhi, 8th Edition, 2010.
5. Punamia, B.C. and Khandelwal, K.K., Project Planning and Control with PERT and CPM, Laxmi Publications, New Delhi, 20
6. R.L. Peurifoy and W.B. Ledbetter, "Construction Planning, Equipments and Methods" McGraw-Hill Publishers. New Delhi.
7. D. Weist and F.K. Levy, "A Management Guide to PERT/ CPM", Prentice Hall of India Pvt. Ltd.
8. B.C. Punmia and K.K Khandelwal, "Project Planning and control with PERT &
9. CPM" Laxmi Publication Pvt. Ltd. New Delhi.
10. P.S. Gahlot and B.M. Dhir, "Construction Planning and Management", New Age International Pvt. Ltd., New Delhi.
11. Sharma, S.C., Construction Equipment & Management, Khanna Publications, New Delhi, 1988.
12. Sengupta and Guha, Construction Management and Planning, Tata McGraw Hill, New Delhi.
13. Chitkara, K. K., Construction Project Management Planning, Scheduling and Controlling, Tata McGraw Hill, New Delhi.
14. Chitkara, K. K., Construction Project Management Techniques and Practices, Tata McGraw Hill, New Delhi, 2004

**B. Web Materials:**

1. [http://nptel.iitm.ac.in/courses/IITMADRAS/Infrastructure\\_Planning\\_Management/index.php](http://nptel.iitm.ac.in/courses/IITMADRAS/Infrastructure_Planning_Management/index.php)
2. [http://www.deere.com/en\\_US/cfd/construction/deere\\_const/media/pdf/attachments.pdf](http://www.deere.com/en_US/cfd/construction/deere_const/media/pdf/attachments.pdf)
3. [http://www.fta.dot.gov/documents/Construct\\_Proj\\_Mangmnt\\_CD.pdf](http://www.fta.dot.gov/documents/Construct_Proj_Mangmnt_CD.pdf)
4. <http://www.netmba.com/operations/project/pert/>
5. <http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT-20Guwahati/cpm/index.html>
6. <http://www.youtube.com/watch?v=wJ8HZ7hqUs8>
7. <http://www.youtube.com/watch?v=IOOn-erkINAo>
8. <http://www.youtube.com/watch?v=2Ow8JUgRC1Q>
9. <http://www.youtube.com/watch?v=UEXrsZ3vkx0>
10. <http://www.youtube.com/watch?v=6cCaY3zBhcs>
11. <http://www.youtube.com/watch?v=HPC41WTMjRM>
12. <http://www.youtube.com/watch?v=RYnUDLey-g4>