

Indian Institute of Technology, Kanpur

New Course Proposal

1. Course No: CEXXX

2. Course Title: Project Management and Control

3. Per Week: Lectures: 3 (L), Tutorial: 0 (T), Laboratory: 0 (P), Additional Hours: 0
Credits: $(3*L+0*T +P+A)$: 9 credits

Duration of Course: Full Semester Course

4. Proposing Department: Civil Engineering

5. Proposing instructor: Chirag Kothari

Level of the course (students who can take this course): PhD, Masters, and UG 3rd or 4th year.

6. Course Description

(A) Objectives:

A construction project requires significant investment in terms of time, money, and resources. This necessitates a need for effective construction project management skills that facilitate completing the projects within the stipulated time and budget limits while adhering to safety and quality standards. This course aims to equip students with the skills required for planning, scheduling, budgeting, coordinating, and supervising large-scale projects. Specific objectives include:

- To introduce students to basic project management concepts with a focus on applications in Civil engineering.
- To expose students to complexities involved in managing large-scale construction projects and provide them with the right tools and methods to manage these complexities.
- To provide students with a platform to sharpen the skills learned by applying these concepts on a real-life construction project.

(B) Course contents

Sr. No.	Broad Title	Topics	No. of Lectures*
1	Introduction to Project Management	What is a project? How are projects organized? Project life cycle and stakeholders Types of project plans – time/schedule, cost, material, plant and machinery, money	3

2	Project scheduling – Time management	Time management – Overview Activities, durations, and work breakdown structure Quantity estimation Network diagrams Fundamentals of scheduling Development of baseline schedules, Gantt chart, Critical path method, Precedence diagram method, Earned value method	12
3	Cost management	Preparing cost estimates Determining the working capital required for a project Project financing plan	4
3	Resource management	Material plan, Plant & machinery (P&M) plan, Workforce plan Resource scheduling, resource levelling, and schedule crashing Impact of levelling & crashing on direct and indirect costs; Time-cost trade-off	10
4	Project monitoring and control	Progress monitoring basics, daily progress reports, standard progress reports, data requirements	2
5	Updating and revising project schedules	Need for revising project plans, Revising project plans.	2
6	Uncertainty in project schedules	Concept of uncertainty Program Evaluation and Review Technique (PERT)	2
7	Construction contract evaluation with respect to Project Controls - Identifying construction claims	Delay analysis. Identifying construction claims. Delay Quantification Methods & Techniques	4

*50-minute lecture each, total of 39 lectures

(C) **Prerequisites, if any:** Instructor consent

(D) **Short summary for including in the Courses of Study Booklet:**

The course starts with an overview of project management discussing what is a project, who are the project stakeholders, the role of the project manager, the planning stages, and organizational structure. With this background and emphasis on construction projects, the course dives into introducing Construction project management, fundamentals of project planning and scheduling – Work breakdown structure (WBS), Network diagrams, Critical path method (CPM), Program evaluation and review technique (PERT), Precedence diagramming method (PDM), Earned Value Method (EVM) are discussed. Other aspects of project management such as cost management, resource management, quality management, and stakeholder management are also covered. Resource management on construction projects is discussed in detail (includes resource planning, resource allocation, resource levelling, and crashing of networks). Further, the importance of monitoring and control on construction projects is discussed including progress reporting requirements and methods for revising project plans. Lastly, construction contracts are reviewed through a project controls lens to learn how to perform delay analysis and identify construction claims.

7) **Recommended textbooks/references**

- James O'Brien and Fredric L. Plotnick, "*CPM in Construction Management*", 8th edition, McGraw Hill
- Jha K.N., "*Construction Project Management- theory and practice*", 2nd edition
- Srinath L.S., "*PERT and CPM, Principles and applications*", 3rd edition
- Saleh Mubarak, "*Construction project scheduling and control*", 2nd edition

8) **Other remarks:** This full course will replace the existing modular course offered by the Civil engineering department - CE641a: Project Management)

Dated: 17th April 2024

Proposer: Chirag Kothari

DPGC Convener: Chinmoy Kolay

The course is approved/not approved.

Chairman, SPGC

Dated: