

**Course Name:**

Project and Construction Management

**Course Number:**

20309

**Credit:**

3

**Corequisite:**

Construction Equipment and Methods

**Course Description (Objectives):**

In this course, various important aspects of construction project management are investigated:

- State-of-art theory, methods and quantitative tools utilized to efficiently plan and develop construction projects;
- Efficient management methods revealed through practice and research;
- Practical project management knowledge from real-world situations.

To achieve this, a basic project management framework will be analyzed in which the project life cycle is broken into organizing, planning, implementing, monitoring, controlling and learning from old and current construction projects. Within this framework, students will enhance their understanding about the methodologies and tools necessary for each aspect of the process as well as the theories upon which these are built. By the end of this semester, students will be able to adapt and apply the framework to effectively manage a construction project in an Architecture/Engineering/Construction (A/E/C) organization.

**Course Content (outline):**

- **Structure of the Construction Industry**  
Project Life Cycle, Major Types of Construction, Professional Services Selection, Construction Contractors, Financing of Constructed Facilities, Legal and Regulatory Requirements, Changing Environment of the Construction Industry, Role of Project Managers
- **Organizing for Project Management**  
Trends in Modern Management, Strategic Planning and Project Programming, Effects of Project Risks on Organization, Organization of Project Participants, Traditional Designer-Constructor Sequence, Professional Construction Management, Leadership and Motivation for the Project Team
- **Feasibility Studies**  
Process of conducting a feasibility study, Economic Feasibility, Technical Feasibility, Financial Feasibility, Environmental Feasibility

- **Design and Construction Process**  
Design and Construction as an Integrated System, Innovation and Technological Feasibility, Innovation and Economic Feasibility, Design Methodology, Value Engineering, Construction Planning, Industrialized Construction and Pre-fabrication
- **Contracting Principles**  
Project Delivery Systems, Procurement Methods, Contracts Types, Payment Agreements
- **Cost Estimation**  
Costs Associated with Constructed Facilities, Approaches to Cost Estimation, Type of Construction Cost Estimates, Effects of Scale on Construction Cost, Unit Cost Method of Estimation, Methods for Allocation of Joint Costs, Historical Cost Data, Cost Indices, Applications of Cost Indices to Estimating, Estimate Based on Engineer's List of Quantities, Allocation of Construction Costs Over Time
- **Construction Planning**  
Basic Concepts in the Development of Construction Plans, Key Elements of Construction Plans Including Project Charter, Project Management Plan, Scope of Work, Statement of Work (SOW), Work Breakdown Structure (WBS), Cost Breakdown Structure (CBS), Organization Breakdown Structure (OBS)
- **Fundamental Scheduling Procedures**  
Relevance of Construction Schedules, Critical Path Method, Calculations for Critical Path Scheduling, Activity Float and Schedules, Presenting Project Schedules, Critical Path Scheduling for Activity-on-Node
- **Cost and Time Control and Monitoring**  
Cost Control Problem, Forecasting for Activity Cost Control, Control of Project Cash Flows, Schedule Control, Schedule and Budget Updates, Relating Cost and Schedule Information
- **Construction Risk Management**  
Sources of Risk in Construction Projects, Process of Risk Management

#### **References:**

- Project management for construction: Fundamental concepts for owners, engineers, architects, and builders, C. Hendrickson and T. Au, 1989.
- Construction management. D. W. Halpin, John Wiley & Sons, 2010.
- Project management: a systems approach to planning, scheduling, and controlling. H. R. Kerzner, John Wiley & Sons, 2013.
- System and Project Management. Peña-Mora, Anumba, Lyneis, Soibelman, Park, Samii, and Kalligeros, MIT/Prentice Hall Textbook Series on Civil, Environmental and Systems Engineering.
- A Guide to Project Management Body of Knowledge (PMBOK® Guide) Project Management Institute, 2013.
- Project management: techniques in planning and controlling construction projects. H. N. Ahuja, S. P. Dozzi, and S. M. AbouRizk, John Wiley & Sons, 1994.

- Construction project management. R. H. Clough, G. Sears, and S. K. Sears, John Wiley & Sons, 2000.