

G H RAISONI COLLEGE OF ENGINEERING & MANAGEMENT, NAGPUR

(An Autonomous Institute Affiliated to Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur)

Accredited by NAAC with A+ Grade

Department of Civil Engineering

Name of Faculty	Mr. Rahul Hinge
Name of Subject-	Project Planning and Analysis
Subject Course Code-	UCEL401
Year/Semester	4^{th} / 7^{th} sem

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Course Title: Project Planning and Analysis										
Semester	VII	Teaching Scheme				Evaluation Scheme				
						Theory			Practical	
Term	ODD	Th	Tu	Pr	Credits	TAE	CAE	ESE	INT	EXT
Course Category	PCC1	3 Hrs.	-	-	3	10	15	50	-	-
Course Code	UCEL401									
Teaching Mode	Offline	3 Hrs.			Total	75			-	
Duration of ESE	3.00					75				

Course Objectives	To learn elements of management in civil engineering projects.
	To study project planning, project monitoring, cost planning, and resource allocation through network techniques.
	To understand engineering economics, market structures and project finance.
Course Outcomes	CO1: Understand the project life cycle and organization. .
	CO2: Solve problems related to Network and total duration of the project using different network techniques.
	CO3: Compare performance of construction projects.
	CO4: Understand market structure and sources of finance for construction projects.
	CO5: Evaluate the operational cost, owning and hiring cost of the equipment.

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Mapping

Course Outcomes	Program Outcomes and Program Specific Outcomes														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2		2		3		2	2	1	1	2	3		
CO2	2	3	2	2		1				2	3	3	3	2	
CO3	3	2			2	3			3	2	2	2	2	2	
CO4	2	1							2	2	2	2	2	1	
CO5	3	1	2		3			2	2	2	2	3	2	2	

Unit-1

ELEMENTS OF MANAGEMENT

Activities like, planning, organizing, controlling, coordinating and motivating are described as the fundamental functions of “Process of Management” or “Management Process”. These are the basic five elements of Process of Management Process

Planning: Deciding in advance what to do, how to do it, when to do it, and who is to do it; setting objectives and determining the best strategies to achieve them.

Organization: Organization as a process institutes the harmonious co-adjustment between the different factors of production as land, labor, capital of the business enterprise, so that ultimate goal is achieved.

Staffing: Staffing is the process of deciding the number and quality of manpower needed by an organization. To achieve its objectives efficiently recruiting, selecting, training, developing and appraising the newly recruited as well as the existing staff is the main focus of the unit. It can be seen as the function of “Human Resource Manager” but at a very smaller level.

Unit-1

ELEMENTS OF MANAGEMENT

Directing: Directing is primarily concerned with supervision, regulation, inspiration, inspection and guidance of the activities of the employees in such a manner so as to achieve the pre determined goals of the organization smoothly.

Control: Control is that process which keeps the whole system in check so that it moves as per the pre designated parameters or verifying the total movement of the business enterprise as per the plan and adopting corrective measures thereon for any deviation.

Unit-1

PROJECT LIFE CYCLE

Project life cycle is a series of phases of a project from initiation to completion. The life cycle gives a practical approach to problem solving applied to all aspects of a project.

Initiation: Defining the project's purpose, goals, feasibility, stakeholders, and high-level scope.

Planning: Developing a detailed roadmap, outlining tasks, resources, timelines, budget, and communication strategies.

Execution: Carrying out the planned work, developing deliverables, and managing the team and resources

Monitoring: Observing and measuring project activities, comparing actual progress to the baseline plan (schedule, budget, scope).

Closure: refers to the act of shutting something (like a factory or road), a device that seals a container (like a lid), or, most commonly, a psychological sense of finality after a significant event, providing resolution and peace

Unit-1

QUALITY CONTROL

Quality Control (QC) in Project Management, often part of a broader Quality Management System (QMS), involves inspecting and testing deliverables against defined standards to ensure they meet project requirements, focusing on corrective actions and preventing defects from reaching customers, with key processes including Quality Planning, Assurance, Control, and Improvement.

Key Concepts & Processes

Quality Planning: Defining project quality standards and how to meet them.
Quality Assurance (QA): Auditing processes to ensure they adhere to the quality plan (proactive).
Quality Control (QC): Monitoring, inspecting, and testing results to identify defects and trigger corrective actions (reactive).
Quality Improvement: Continuously improving processes and deliverables.

Unit-1

QUALITY CONTROL

Common QC Tools & Techniques

Control Charts: Visualizing process changes over time.

Acceptance Sampling: Inspecting a sample to decide if a whole batch meets quality.

Inspection & Testing: Verifying outputs meet acceptance criteria.

Unit-1

PHASES OF A PROJECT

Initiation: Defining the project idea, goals, feasibility, stakeholders, and securing initial approval.

Planning: Developing detailed schedules, resource allocation, risk assessment, scope definition, and creating the project plan.

Execution: Carrying out the planned tasks, building deliverables, and managing resources and teams.

Monitoring & Controlling: Tracking progress, managing performance, ensuring quality, and making necessary adjustments to the plan.

Closure: Finalizing all activities, handing over deliverables, releasing resources, documenting lessons learned, and formally closing the project.

Unit-1

AGENCIES INVOLVED

Agencies in construction projects include owners/clients, design professionals (architects, engineers), contractors (general, specialty), consultants (project, MEP, structural, legal, environmental), suppliers, regulatory bodies, and financiers, all working together to manage planning, design, execution, and oversight, ensuring adherence to budgets, timelines, and safety standards.

Project Initiation & Management

Owner/Client: The project initiator, defining scope, budget, and objectives.
Project Management Consultant (PMC): Manages and coordinates processes, ensuring compliance with quality, safety, and budget.
Construction Managers (CMs): Oversee the construction phase, sometimes involved in design advisory.

Unit-1

AGENCIES INVOLVED

Design & Engineering

Architects: Prepare plans and ensure legal compliance.

Engineers (Structural, MEP, etc.): Provide technical expertise for building systems (Mechanical, Electrical, Plumbing) and structural integrity.

Specialized Consultants: Landscape, hospital, or green building consultants.

Unit-1

AGENCIES INVOLVED

Execution & Labor

General Contractors (GCs): Manage the overall construction, hiring subcontractors.

Subcontractors: Perform specialized work (electrical, plumbing, etc.).

Suppliers & Equipment Lessors: Provide materials and machinery.

Unit-1

AGENCIES INVOLVED

Oversight & Finance

Regulatory Bodies: Government agencies for permits, zoning, safety (e.g., OSHA, fire marshals).

Financiers/Investors: Banks or firms providing capital, monitoring milestones.

Legal & Contractual Advisors: Manage contracts, disputes, and legal frameworks.

Unit-1

AGENCIES INVOLVED

Support Services

Recruitment Agencies: Find skilled personnel.

Testing & Certification Agencies (e.g., TUV): Ensure compliance with codes and standards.

Unit-1

INDIAN STANDARDS ON CONSTRUCTION

Indian construction standards are primarily set by the **Bureau of Indian Standards (BIS)**, with the **National Building Code (NBC)** serving as the overarching guideline for building design, safety (structural, fire, health), and services, integrating numerous specific Indian Standards (IS codes) for materials (like cement IS 269), practices (IS 456 for concrete), and management (IS 15883) to ensure quality and safety in the built environment.

Unit-1

INDIAN STANDARDS ON CONSTRUCTION

Key Bodies & Documents

Bureau of Indian Standards (BIS): The national standards body that develops and publishes Indian Standards (IS).

National Building Code (NBC): A comprehensive document that consolidates various IS codes into a unified set of regulations for building construction, revised periodically (latest version being NBC 2016).

Unit-1

INDIAN STANDARDS ON CONSTRUCTION

Key Areas Covered by Standards

Materials: Specifications for cement (IS 269, IS 8112), steel, aggregates, etc..
Structural Design: Guidelines for loads (IS 875 series), earthquake-resistant design (IS 1893 series), foundations (IS 1904), and concrete design (IS 456).
Construction Practices: Codes of practice for good construction, including installation, plumbing services (IS 15883 for management), and new technologies.
Safety: Provisions for fire safety, health, accessibility (for disabled/elderly), and public safety are integral to the NBC.
Project Management: Standards like IS 15883 provide guidelines for effective management of construction projects.

Unit-1

WORK BREAK-DOWN STRUCTURE ROLE OF CLIENT AND CONTRACTOR

Role of the Client

Defines Scope & Requirements: Initiates the WBS by clearly stating project goals, deliverables, and standards.
Approves WBS Structure: Reviews and accepts the WBS (especially the Contract Work Breakdown Structure - CWBS) to ensure it accurately reflects the contract.
Monitors Progress: Uses the WBS to track milestones and deliverables, ensuring the project aligns with expectations and contractual terms.
Provides Feedback: Offers input and approves changes, ensuring the contractor stays within the agreed-upon scope.

Unit-1

WORK BREAK-DOWN STRUCTURE ROLE OF CLIENT AND CONTRACTOR

Client's Role with WBS

Define Objectives & Scope: Clearly states what needs to be achieved and the boundaries of the project.
Approve WBS Structure: Reviews and agrees to the WBS levels and deliverables to ensure they meet their needs.
Define Acceptance Criteria: Sets standards for when deliverables are considered complete and satisfactory.
Stakeholder Engagement: Provides input and feedback, ensuring alignment with business goals.

Unit-1

WORK BREAK-DOWN STRUCTURE ROLE OF CLIENT AND CONTRACTOR

Contractor's Role with WBS

Decomposition: Breaks down major deliverables into smaller, manageable work packages and activities.
Resource Allocation: Assigns resources (people, budget, time) to specific work packages.
Scheduling & Budgeting: Develops detailed schedules and cost estimates from the WBS.
Risk Management: Uses WBS elements to identify, analyze, and track project risks.
Execution & Control: Manages the actual work, monitors progress against the WBS, and reports status.
Contract Basis: Uses the WBS to develop the Statement of Work (SOW) and specific contract line items.