Course Introduction

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Outline

- Introduction
  - Course Information
  - Lecture Outline
  - T.A.
  - Students; Background, Interests, & Expectations
Project Management

- Focus of Class – Construction Projects;
  Primarily Infrastructure Projects
The Course is divided in three parts:
- Part 1: Project Finance
- Part 2: Project Evaluation
- Part 3: Project Organization

There will be a few Guest Lecturers
Term Project (1.401)

- Step 1: Preliminary Project Proposals
- Step 2: Project Details
- Step 3: Deliverables
  - Report
  - Presentation
Construction Phases & Class Topics

- Feasibility Analysis
- Design
- Development
- Closeout
- Operations
- Divestment

Project Management
Construction Phases

- **Strategic Planning**, or conceptualization: The need for a project is identified, so that specific Objectives are achieved. Alternative projects (including the do-nothing option) are examined.

- **System Design**: The approach for addressing the organization’s strategic concerns is established during systems design. The requirements are translated into specific technical specifications.

- **Detailed Design**: is the phase in which the optimal systems design is translated into a detailed technical implementation scheme.

- **Development**: refers to the implementation of the detailed design.

- **Operations and Lifecycle Support**: represents the period during which the project yields benefits to the organization.

- **Divestment**: The initial design again determines the potential for proper divestment in the context of the sociopolitical and natural environment.
Feasibility Studies and Preliminaries

- Understanding project finance and evaluation
  - Helps understand economic challenges faced by owner and contractor
- Risk management
- Deciding on fundamentals of contract
  - Delivery systems (organizational method)
  - Contract type (how pay?)
  - Award method (how decide who hired?)
Construction Phases

- Feasibility Analysis
- Design
- Development
- Closeout
- Operations
- Divestment

PROJECT MANAGEMENT
Design Phase

- **Estimation**
  - Successive estimates produced

- **Planning & Scheduling**
  - WBS – Web Based Scheduling
  - Deterministic & probabilistic scheduling
  - Resource planning
  - Simulation
Project Dynamics

- As-planned vs. as-built (e.g., errors and changes)
- Significance of feedbacks - Counter-intuitive effects of policies (e.g., overtime)
Project Management

1. The phases of
   - Development
   - Close Out

- Resource Scheduling
- Simulation
- Basics of Project Monitoring and Control
- Changes and Claims
- Earned Value Analysis
- Quality Reviews and Audits
Project Management

1. The phases of
   - Development
   - Close Out

Resource Scheduling
- How to allocate resources ($, time, etc.) to execute a given task efficiently
- Trade offs between conflicting/competing resources
Tools: graphical analyses, programming (linear, integer, heuristic, etc.)
1. The phases of
- Development
- Close Out

Simulation
- Involves mathematical description/representation of the management process
- Helps identify optimal schedules and decisions
- Helps to quickly determine impact of alternative schedules
- Tools: algorithms implemented on computers

Resource Scheduling
Basics of Project Monitoring and Control
Changes and Claims
Earned Value Analysis
Quality Reviews and Audits
Project Management

1. The phases of
   - Development
   - Close Out

   Project Monitoring and Control
   - How to track your project costs, schedule (time), and other resources
   - Helps ascertain whether targets are being met
   - Needed so that due changes can be made to schedule as and when necessary
Project Management

1. The phases of
  - Development
  - Close Out

Changes and Claims
- What are the causes of time delays, cost overruns, change orders?
- How can such problems be prevented or mitigated
- Conflict resolution

- Resource Scheduling
- Simulation
- Basics of Project Monitoring and Control
- Changes and Claims
- Earned Value Analysis
- Quality Reviews and Audits
1. The phases of
- Development
- Close Out

Earned Value Analysis
- is a snapshot in time (as the project is in progress)
- compares work plan vs. actual work progress
- is a standard method of (a) measuring project progress at any given point in time, (b) updating forecasts of completion date and final cost,
- is an early warning system to detect deficient or endangered progress.
Project Management

1. The phases of
   - Development
   - Close Out

Quality Reviews and Audits

- Quality Control (typically done by owner’s inspectors at the end of major production phases.
- Quality Assurance (typically done by contractor throughout the production, incl. raw materials
- Audits and QA/QC Reviews (retrospective in nature)
Project Management

1. The phases of
   - Development
   - Close Out

2. Related Topics
   - Risk and Uncertainty, etc.