Construction Planning & Scheduling

Detailed Course Content

Topic 1: Introduction

Outline:

- Steps in Executing Projects
- Models used for Planning, Scheduling, and Control
  - Bar Chart: Advantages and Disadvantages
  - Networks
  - CPM: Advantages and Disadvantages
- CPM-Based Project Management

Topic 2: Project Planning

Outline

- Planning Definition
- Activity Definition
- Types of Activities
  - o Production
  - o Procurement
  - o Management - related

Outline Contd..

- Breakdown of project into activities

i. Prerequisites

ii. Factors to consider

iii. Activities frequently omitted

iv. Degree of network details

Topic 3: Arrow Diagramming

Outline:

- Rules for Diagramming
  - Representation of activity.
  - Representation of relations.
    i. Dependent vs. Independent
    ii. Merge
    iii. Burst
    iv. Cross relation
  - Dependency
  - Continuity

Outline Contd..

- Dummy activities
- Numbering
- Efficiency

• Procedures for drawing the network

- Activity list
- Dependency
- Redundancy
- Approaches

•Example

• Homework Assignment # 3

Topic 4: Precedence Diagramming

Outline:

- Rules for Diagramming
  - Representation of activity.
  - Representation of relations:
    i. Dependent vs. Independent
    ii. Merge
    iii. Burst
    iv. Cross relation
  - Dependency
  - Continuity

Outline Contd..

- Dummy activities
- Numbering

- Procedures for drawing the network:
  - Activity list
  - Dependency
  - Redundancy
  - Sequence step no.

Outline Contd..

- Example
- Homework Assignment # 4

Topic 5: Time Computation – Arrow Network

Outline:

- Activity Consideration.
- Allowance for lost time.
- Normal Duration.
- Scheduling Computations (using activity time).
  - Forward Pass
  - Backward Pass
  - Critical Path
  - Floats

Outline Contd..

- Scheduling Computations (using event times)
  - Forward Pass
  - Backward Pass
  - Floats
  - Critical Path
- Examples.
- Homework Assignment #5.

Topic 6: Time Computation – Precedence Network

Outline:

- General Approach.
  i. Link Lag.
  ii. Floats.
  iii. Critical Activities.
- Methods
  i. Computation on the Network.
  ii. Computation on the Matrix.
- Examples.
- Homework Assignment # 6.

Topic 7: Methods of Communicating the Schedule

Outline:

- Verbal / Written Instructions
- Tabular Method
- Graphical Methods
  i. CPM Diagrams
  ii. Bar Charts
  iii. Time-scaled Diagrams
  iv. Mechanical Devices
- Examples
- Homework Assignment 7

Topic 8: Time-Cost Tradeoff: Simple Compression

Outline:

- Types of Cost
- Activity Time-Cost Relationship
- Utility Data Curve
  i. Characteristics of Utility Curve
  ii. Types of Utility Curves

- Project Time-Cost Relationship
  i. Project Compression – Procedures.
  ii. Project Compression – Example.

Topic 9-A: Complex Compression

Topic Outline:

- Definition
- Complex Compression with multi stage utility curves
- Example
- Comparison with simple compression
- Complex Compression with discrete utility curves
- Example.

Topic 9-B: Decompression

Topic Outline:

- Definition
- Comparison with compression
- Steps in Decompression
- Example

Topic 10: Resource Implications on Schedule

Outline:

- Scheduling considerations
  - Resource Considerations
    - Unrestricted availability
    - Restricted availability
  - Resource leveling
    - Objective
    - Criteria
    - Worksheet method
    - Minimum Moment Method

Outline Contd..

- Scheduling with Limited Resources
  - General Approach
  - Time scaled method
  - Example

Topic 11: Project Control

Outline:

- Objectives of Control
- Levels of Control
- Time (Progress) Control
  - Prerequisites
  - Monitoring

    - Sources of information

    - Overall Progress (S Curve & Earned Value)

    - By Activity

Outline Contd..

- Updating
  - Updating Intervals
  - General Procedure
- Financial Control
- Cost
- Liquidity

Topic 12: Precedence with Overlapping Relationship

Topic Outline

- Needs for Overlapping Relations
- Finish to Start with Lead Time
- Start to Start
- Finish to Finish
- Start to Finish
- Compound Relationship
- Formulas & Network Calculations
- Example.

Topic 13: Linear Scheduling

Outline

- Definition
- Application
- Basic Features
  - Production Rate Diagram
  - Time & Space Buffers
  - Conflict
  - Non-Repetitive Activities
- Homework Assignment # 12

Topic 14: Program Evaluation and Review Technique (PERT)

Topic Outline:

- CPM vs. PERT
- Statistics Review:
  - Central Tendency and Dispersion
  - Probability Distribution Functions
  - Central Limit Theorem
- PERT Assumptions
  - Activity Assumptions
  - Network Assumptions
- PERT Computations
- Examples.