ESTIMATION, QUANTITY SURVEYING AND CONSTRUCTION MANAGEMENT

Course Code: 20CE1122	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

Pre-requisites: Building Planning, Surveying, Building Materials and Concrete Technology

Course Outcomes:

At the end of the course, the student will be able to:

CO1: Apply basic concepts of estimation in evaluating construction cost (L3)

CO2: Apply standard specifications to carry out rate analysis. Prepare bar bending schedule for different RC elements (L3)

CO3: Prepare valuation of building using principles of valuation and estimate the quantities for road work items (L3)

CO4: Explain construction organization, construction planning and scheduling for projects (L2)

CO5: Design networks using CPM and PERT and Compose resource planning and Optimization (L3).

UNIT-I **(10 Lectures)**

INTRODUCTION:

General items of work in Building – Standard Units –Types of Estimates- Principles of working out quantities for detailed and abstract estimates –Methods of Estimates of Buildings – Detailed estimates of buildings (up to three roomed building).

Learning outcomes:

At the end of the unit, the student will be able to

1. Discuss the principles of estimation (L2)
2. Summarize different types of estimates (L2)
3. Estimate the quantities of building components (L3)

UNIT-II **(10 Lectures)**

SPECIFICATIONS, RATE ANALYSIS AND BAR BENDING SCHEDULE:

Specifications: General and Standard- Standard specifications for different items of building construction. Rate Analysis – Purpose- Factors affecting Rate Analysis- Definitions: Work charged Establishment, overhead and contingent charges- Working out data for various items of work. Reinforcement bar bending schedules for slabs and beams.

Learning outcomes:

At the end of the unit, the student will be able to

1. Select different types of specifications according to importance (L2)
2. Apply knowledge to prepare rate analysis (L3)
3. Estimate and prepare bar bending schedule (L3)

UNIT-III **(10 Lectures)**

VALUATION OF BUILDINGS, ROAD WORK ESTIMATION:

Valuation- Definition– Technical terms- Purpose and Principles of valuation –Factors affecting valuation– Methods of valuation- Road work items- Definitions: Lead, Lift- Methods of estimating volume- Longitudinal section and cross-section of road.

Learning outcomes:
At the end of the unit, the student will be able to
1. Explain the purpose of valuation (L2)
2. Compare different methods for determination of valuation of a property (L3)
3. Estimate road work item quantities (L3)

UNIT-IV **(10 Lectures)**

PLANNING, SCHEDULING AND RESOURCE MANAGEMENT FOR CIVIL ENGINEERING PROJECT:

Definition of Planning- Objectives of planning – Stages of Planning- Advantages and limitations to client, contractor and engineer- Definition of Scheduling- Preparation of Scheduling– Advantages – Classification – methods of scheduling.
Basics of Networks- Definitions of Activity, Event, Dummies – Basic assumptions in creating a network – Rules for drawing networks – Fulkerson's rule for numbering the events.
Resource Management: Definition – Need for resource management – Optimum utilization of resources- finance, materials, machinery, human resources – Resources planning – Types- resource leveling and its objectives – time – cost trade off – Types of costs- Time Vs Cost optimization curve- Crashing – Need for crashing an activity – methods & tips for crashing — Cost slope – its significance in crashing.

Learning outcomes:
At the end of the unit, the student will be able to
1. Discuss the process of scheduling and planning (L2)
2. Explain the rules of drawing networks (L2)
3. Explain the types of resource leveling (L2)

UNIT-V **(10 Lectures)**

PROJECT MANAGEMENT THROUGH NETWORKS:

PERT – time estimates – earliest expected time – latest allowable occurrence time – slack, standard deviation, and variance.

PRECEDENCE NETWORKS:

Creating network logic, Relationship Types – Finish start, start to start, finish to finish, starting to finish, critical path method – ES, EF, LS, LF and Floats – significance of critical path.

Learning outcomes:
At the end of the unit, the student will be able to
1. Distinguish between PERT and CPM (L2)
2. Determine the duration of an activity (L3)
3. Apply the logic of precedence networks (L3)

Text Books:

1. B.N. Dutta, "Estimating and Costing", 27th Edition, UBS Publishers, 2017.
2. A.K. Upadhyay, "Civil Estimating and Costing", 10th Edition, S.K. Kataria and Sons Publishers, 2013.
3. Sengupta.B, & H.Guha, "Construction Management and Planning", Tata Mc Graw Hill Publishing Company Ltd., New Delhi, 2015.

4. Seetharaman. S, “Construction Engineering & Management”, 5th Edition, Umesh Publications, NaiSarak, New Delhi, 2017.

References:

1. Standard Schedule of Rates and Standard Data Book by Public Works Department, 2018.
2. IS. 1200 (Parts I to XXV – 1992, “Method of Measurement of Building and Civil Engineering works”, B.I.S.)
3. National Building Code - 2016.
4. M. Chakraborthi; “Estimation, Costing and Specifications”, 24thEdition, Laxmi Publications, 2010.
5. Rangwala.S.C, “Construction of Structures and Management of Works”, 5th Edition, Charotar Publishing House, 2018.