GUJARAT TECHNOLOGICAL UNIVERSITY

ENVIRONMENTAL ENGINEERING (13)
ESTIMATING, SPECIFICATIONS & PROJECT MANAGEMENT
SUBJECT CODE: 2161303
B.E. 6th SEMESTER

Type of course: Applied Science

Prerequisite: --

Rationale: Estimating the cost for construction of treatment plant structures along with the mechanical equipments and the project management techniques

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		ESE (V)		PA (I)	
					PA	ALA	ESE	OEP		
3	2	0	5	70	20	10	30	0	20	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	**Construction Technology:** a. Subsurface investigation b. Foundations c. Masonry Construction d. Plain and Reinforced Concrete construction e. Plastering	4	10
2	**(a) Elements of Estimating and Costing:** Types of estimate: Detailed estimate and approximate estimate, Methods of estimate: Long wall short wall method and centre line method , Units of measurement: Modes and units of measurement for different types of trades Quantity survey, Uses of estimates. **(b) Rate Analysis:** Prerequisites, factors affecting rate analysis; procedure for rate analysis; schedule of rates; task work; revision of rates. (c) Detailed estimation of water treatment/sewage treatment/effluent treatment plant units.	14	32
3	**Specifications:** Importance: requisites of good specifications; classification of specifications; specifications of typical items; standard specification.	4	10
4	**Contracts:** Meaning and important legal aspects of contracts; types of contracts and	4	10

	their suitability; contract documents; termination of contracts; contractual disputes and arbitration, standing contracts.		
5	**Conditions Of Contract:** Important requisites of conditions of contract; subject matter of conditions of contract; typical conditions of contract.	**4**	10
6	**Tenders:** Meaning, types, content, procedure, tender documents, unbalanced tender; scrutiny and acceptance of tender	**2**	5
7	**Project Management with Network Technique:** Project planning, scheduling, controlling, bar chart and mile stone charts, elements of network, development of network, time estimates, time computation, network analysis-PERT and CPM .	**10**	23

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
5	**15**	**20**	**15**	**15**	**0**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1. Estimation & Costing in civil Engineering - B.N. Dutta.
2. Project Planning and Control with PERT & CPM- Dr. B.C. Punamia.
3. Elements of Estimation & Costing – Rangwala.
4. Estimation, costing, specification & valuation in Civil Engg. By M.Chakroborti.

Course Outcome:

After learning the course the students should be able to:

1. Workout the quantities of materials used in environmental engineering units.
2. Prepare rate analysis using the schedule of rates.
3. Prepare an estimate of the total cost for each unit.
4. List out the specifications and Conditions of contract.
5. Apply the Bar chart, CPM and PERT network analysis method in environmental engineering project.

List of Experiments:

1. Construction Technology: Sketches related to brick masonry, Foundation
2. Methods of Quantity estimates : Long-wall short wall method and centre line method
3. Examples based on Rate Analysis
4. Specifications relating to civil works
5. Contracts and condition of contracts
6. Tenders
7. Project management: PERT,CPM (examples)

Design based Problems (DP)/Open Ended Problem:

Detailed estimate of full scale water treatment/sewage treatment/effluent treatment plant.

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.