

5.3 ESTIMATION & COSTING

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RATIONALE

Diploma holders in Civil Engineering are supposed to prepare material estimates for various Civil Engineering works namely; buildings, irrigation works, public health works and roads etc. In addition, they must have basic knowledge regarding analysis of rates, contracting, and principles of valuation. Therefore, this subject has great importance for diploma holders in Civil Engineering.

COURSE OUTCOMES

After undergoing the subject, the students will be able to:

- CO1 Explain different units of measurement for different items
- CO2 Calculating quantities of materials and prepare the material chart
- CO3 Prepare detailed and abstract of estimates from drawings
- CO4 Prepare tender document of different civil engineering items by using C.S.R. rates with premium
- CO5 Use principles of valuation for valuation of a building

DETAILED CONTENTS

UNIT-I

- 1.1 Introduction to quantity surveying and its importance.
- 1.2 Duties of quantity surveyor
- 1.3 Types of estimates
 - 1.3.1 Preliminary estimates: - Plinth area estimate and Cubic content estimate
 - 1.3.2 Detailed estimates: - Concept, difference between preliminary and detailed estimate

- 1.3.3 Stages of preparation – details of measurement and calculation of quantities and abstract

UNIT-II

- 2.1 Measurement
 - 2.1.1 Units of measurement for various items of work as per BIS: 1200
 - 2.1.2 Rules for measurements
 - 2.1.3 Different methods of taking out quantities – centre line method and long wall and short wall method
- 2.2 Analysis of Rates
 - 2.2.1 Steps involved in the analysis of rates. Requirement of material, labour, sundries, contractor's profit and overheads
 - 2.2.2 Analysis of rates for finished items when data regarding labour, rates of material and labour is given:
 - a) Earthwork in excavation in hard/ordinary soil and filling
 - b) Concept of lead and lift
 - c) RCC in roof slab/beam/lintels/columns,
 - d) Brick masonry in cement mortar Cement Plaster, White washing, painting

UNIT-III

- 3.1 Contractor ship- Meaning of contract
- 3.2 Essentials of a contract
- 3.3 Various Conditions of contractors
- 3.4 Types of contracts, their advantages, disadvantages and suitability, system of payment
- 3.5 Single and two cover-bids; tender, tender forms and documents, tender notice, submission of tender and deposit of earnest money, security deposit, retention money, maintenance period
- 3.6 Classification and types of contracting firms/construction companies

UNIT-IV

- 4.1 Introduction to CSR, HSR and calculation of cost based on premium on CSR & HSR

- 4.2 Preparation of Tender Document based on common schedule rates and Haryana schedule rates (CSR & HSR)
- 4.3 Various Condition of contractors
- 4.4 Exercises on writing detailed specifications of different types of building works from excavation to foundations, superstructure and finishing operation

UNIT-V

- 5.1 Valuation
- 5.2 Purpose of valuation, principles of valuation
- 5.3 Definition of various terms related to valuation like depreciation, sinking fund, salvage and scrap value, market value, fair rent, year's purchase etc.
- 5.4 Methods of valuation (i) replacement cost method (ii) rental return method
- 5.5 Preparation of comparative statement for item rate contract.

PRACTICAL EXERCISES

1. Preparation of Detailed and Abstract Estimates from Drawings by following (CSR & HSR) rates for:
 - 1.1 A small residential building with a flat roof comprising of two rooms with W.C., bath, kitchen and verandah
 - 1.2 Earthwork for unlined channel
 - 1.3 WBM road and pre-mix carpeting
 - 1.4 Single span RCC slab culvert
 - 1.5 Earthwork for plain and hill roads
 - 1.6 RCC work in beams, slab, column and lintel, foundations
 - 1.7 10 users septic tank
2. Calculation of quantities of materials for
 - 2.1 Cement mortars of different proportion
 - 2.2 Cement concrete of different proportion
 - 2.3 Brick/stone masonry in cement mortar of different proportion
 - 2.4 Plastering, pointing and painting
 - 2.5 D.P.C. and flooring
3. Exercises on preparing tender documents for the following
 - 3.1 Earth work
 - 3.2 Construction of a small house as per given drawing

- 3.3 RCC works
- 3.4 Pointing, plastering and flooring
- 3.5 White-washing, distempering and painting
- 3.6 Wood work including polishing
- 3.7 Sanitary and water supply installations
- 3.8 False ceiling, aluminum (glazed) partitioning
- 3.9 Tile flooring including base course

RECOMMENDED BOOKS

1. Estimating, Costing and Valuation (Civil)” by Pasrija, HD, Arora, CL and S. Inderjit Singh; New Asian Publishers, Delhi,
2. “Estimating and Costing” by Rangwala, S.C ; Charotar Book Stall, Anand
3. “Estimating and Costing by Dutta, BN
4. “Estimating and Costing” by Mahajan Sanjay; Satya Parkashan, Delhi
5. e-books/e-tools/relevant software to be used a recommended by AICTE/HSBTE/NITTTR.

RECOMMENDED WEBSITES

1. <https://swayam.gov.in/>
2. <https://www.udemy.com/>
3. <https://www.upgrad.com/>

INSTRUCTIONAL STRATEGY

This is an applied engineering subject. Teachers are expected to provide working drawings for various Civil Engineering works and students be asked to calculate the quantities of materials required for execution of such works and use of relevant software for preparing estimates. Teachers should conceptualize making analysis of rates for different items of works. It will be advantageous if students are given valuation reports for reading. This subject contains five units of equal weightage.