GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

COURSE CURRICULUM
COURSE TITLE: ESTIMATING AND COSTING
(Code: 3341303)

Diploma Programme in which this course is offered	Semester in which offered
Environmental Engineering	4th Semester

1. RATIONALE

Knowledge and understanding of Estimating and Costing is very important for engineers in order to estimate correct quantity and cost of various civil engineering works. It is essential to carryout estimation and costing before execution of any projects. By studying this course the students will understand specifications of various civil works items, their rate analysis and also estimation of quantities and cost of the project. As the estimation includes calculation of quantities of various civil works items, the students will understand the detailed measurement aspects, specifications, different terminology used in the practice etc. The course is designed in such a manner so that the students get in-depth knowledge and understanding of estimation and costing. It is therefore an important course for environmental engineers who are supposed to design and execute civil structures/schemes for environment conservation upgradation.

2. COMPETENCY

The course content should be taught and curriculum should be implemented with the aim to develop required skills in the students so that they are able to acquire following competency:

- **Estimate the quantity of different materials and components required for a given civil structure/scheme and cost of the whole structure/scheme.**

3. COURSE OUTCOMES (COs)

The theory should be taught and practical should be carried out in such a manner that students are able to acquire required learning out comes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.

i. Develop the specification for the civil works.
ii. Carry out the rate analysis of various civil works items.
iii. Prepare estimate of civil engineering structures.
iv. Define the fundamentals of estimating and costing
v. Calculate the various quantities with accuracy and precision

4. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	ESE	PA	ESE	PA	
3	0	4	7	70	30	40	60	200

Legends: L - Lecture; **T -** Tutorial/Teacher Guided Student Activity; **P -** Practical; **C -** Credit; **ESE** - End Semester Examination; **PA** - Progressive Assessment

5. COURSE DETAILS

Unit	Major Learning Outcomes (Outcomes in cognitive domain)	Topics and Sub-topics
Unit-I. Introduction	1a. Explain the objective and importance of estimating and costing 1b. Interpret the drawings	1.1 Importance, Meaning & objectives of estimating & costing. 1.2 Skills required for a good estimator. 1.3 Fundamental component of the drawing 1.4 Liner dimension, area, volume etc.
Unit-II Mode of measurement	2a. Explain different provisions made in I.S.1200 for measurement of different construction item.	2.1 Purpose, accuracy, units, rules etc. 2.2 Mode of measurements for civil works items (As per I.S. 1200)
Unit-III Specification	3a. Explain the importance of specifications. 3b. Prepare the specification for civil works items.	3.1 Definition, purpose & importance of specifications 3.2 Types of specification. 3.3 Design and drafting of specifications 3.4 Specification writing for some useful items like 3.4.1 Excavation 3.4.2 Plain Cement Concrete 3.4.3 Reinforced Cement Concrete 3.4.4 Earthwork 3.4.5 Brick masonry 3.4.6 Stone masonry 3.4.7 Plaster 3.4.8 Pipe Joints(All) 3.4.9 Pipes 3.4.10 Manhole
Unit-IV Rate Analysis	4a. Describe the importance of rate analysis. 4b. Explain the factors affecting rate analysis. 4c. Compute rate analysis of various civil works items.	4.1 Definitions, Importance, purpose & factors affecting the rate analysis. 4.2 Task work, rate of materials and labour, water charges etc. 4.3 Rate analysis of various civil works items like 4.4 Excavation, Brick work, Plaster, R.C.C. works, P.C.C. work, pipe joints, manholes etc. 4.5 Introduction of Schedule of Rates (S.O.R.) and bills of quantities.
Unit-V Estimation	5a. Explain the different types of estimates and terminology 5b. Compute the quantities different construction works items. 5c. Prepare the measurement and abstract sheet.	5.1 Types of estimates: Preliminary and detail estimates 5.2 Define: Provisional sum, provisional item, prime cost, spot item, Day Work, Overhead charges, contingencies, water charges, establishment charges,

Unit	Major Learning Outcomes (Outcomes in cognitive domain)	Topics and Sub-topics
		contractor's profit. Administrative approval, Technical Sanction (Competent Authority), Work charged establishment. 5.3 Methods of computing the quantities 5.3.1 Center line method 5.3.2 Long wall and short wall method 5.4 Standard format of measurement sheet, abstract sheet and its use.
Unit-VI Organization	6a. Explain the types of organization 6b. Draw the staff structure of different engineering department and also explain the duties, powers and responsibilities at various position	6.1 Introduction 6.2 Organization 6.3 Types of organization, 6.4 Staff structure of Engg. Deptt. 6.5 Explain the duties, powers and responsibilities of 6.5.1 Executive Engineer 6.5.2 Deputy Executive Engineer 6.5.3 Section Officer/Additional Assistant Engineer

6. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Unit	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Introduction	**4**	2	3	2	7
II	Mode of measurement	**5**	4	3	3	10
III	Specification	**6**	2	2	3	7
IV	Rate Analysis	**5**	2	3	6	11
V	Estimation	**18**	7	7	14	28
VI	Organization	**4**	3	2	2	7
Total Hrs		**42**	**20**	**20**	**30**	**70**

Legends: R = Remember; U = Understand; A = Apply and above levels (Bloom's revised 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.

7. SUGGESTED LIST OF EXERCISES/PRACTICAL

The practical/exercises should be properly designed and implemented with an attempt to develop different types of skills **(outcomes in psychomotor and affective domain)** so that students are able to acquire the competencies/programme outcomes. Following is the list of practical exercises for guidance.

Note*: Here only outcomes in psychomotor domain are listed as practical/exercises. However, if these practical/exercises are completed appropriately, they would also lead to development*

*of certain outcomes in affective domain which would in turn lead to development of **Course Outcomes** related to affective domain. Thus over all development of **Programme Outcomes** (as given in a common list at the beginning of curriculum document for this programme) would be assured.*

Faculty should refer to that common list and should ensure that students also acquire outcomes in affective domain which are required for overall achievement of Programme Outcomes/Course Outcomes.

S. No.	Unit No.	Practical/Exercise (Outcomes' in Psychomotor Domain)	Approx Hrs. Required
1.	I	Interpret various Architectural and Structural drawings	04
2.	II	Measure units of different civil construction items	02
3.	III	Write the specification for different civil construction items.	04
4	IV	1. Calculate material & labour requirement for civil works 2. Prepare the rate analysis for different civil construction items	06
5	V	Prepare estimate from the given drawings: 1. Residential buildings up to plinth level 2. Estimate items of single storied residential building 3. Estimate the RCC items like footing, Column, Beam, Slab, Lintel, Weather shed. 4. Estimate items of RCC framed structure building 5. Estimate items of RCC Compound wall 6. Estimate items of RCC Retaining wall 7. Estimate items of Internal plumbing and house drainage 8. Estimate items of the environment related structure like manholes, chambers, low cost latrine, soak pit, pump house / rectangular sump	36
6	VI	Prepare the organizational structures for different civil engineering departments of State Govt.	04
		Total	**56 Hrs.**

8. SUGGESTED STUDENT ACTIVITIES

i. Collect the tenders and identity the different part of the estimates
ii. Use computer for rate analysis of at least any two items
iii. Prepare Organization Chart of water supply & sewage Board, Pollution control board, Gujarat Ecology Commission, Gujarat State Public Works Department.

9. SPECIAL INSTRUCTIONAL STRATEGIES (If any)

Start with exercises of estimating and costing for simple structures and then gradually give exercises for complex and big civil structures/schemes. Help students wherever they need help.

10. SUGGESTED LEARNING RESOURCES

A. List of Books

S. No.	Title of Book	Author	Publication
1.	Estimating & Costing in Civil Engg.	B.N. Dutta	UBSPD
2.	Estimating & Costing (Civil Engg.)	S. C. Rangwala	Charotar Publication
3.	Estimating & Costing	M. C. Chakraborthy	M Chakraborti
4.	A text book of Estimating & Costing	G. S. Birdie	Dhanpat Rai
5.	Estimating & Costing	Vazirani & Chandola	Khanna Publisher
6.	Construction Management and accounts	Vazirani & Chandola	Khanna Publisher
7.	Estimating & Costing in Civil Engg.theory and Practice	B. N. Dutta	UBSPD
8.	Construction Planning, equipment and methods	R. L .Peurifoy	McGraw-Hill
9.	Civil Estimating costing & valuation	Amarjit Aggarwal & A.K. Upadhay	S.K.Kataria
10.	PWD Hand books (Vol. I & Vol. II)	Govt.of Gujarat	Govt.of Gujarat
11.	. I.S. code 1200 (Part I to XXX)	BIS Delhi	B.I.S., Delhi

B. List of Suggested Equipment/instruments

Not Applicable

C. List of Suggested Software/Learning Websites

i. Software: QE.Pro

11. COURSE CURRICULUM DEVELOPMENT COMMITTEE

Faculty Members from Polytechnics

- **Prof. D. V. Jariwala,** Lecturer, Civil Engg Dept., G.P.Valsad

Coordinator and Faculty Members from NITTTR Bhopal

- **Prof. M. C. Paliwal, Professor,** Department of Civil and Environmental Engineering**.**
- **Dr S. Roy, Professor,** Department of Civil and Environmental Engineering**.**