



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Diploma Engineering

Level: Diploma

Branch: Civil Engineering

Subject Code : DI04006021

Subject Name: Estimation & Costing

w. e. f. Academic Year:	2025-26
Semester:	4 th
Category of the Course:	PCC

Prerequisite:	Students should be comfortable reading civil engineering drawings and confident with math and measurement skills.
Rationale:	<p>Accurate estimation helps engineers figure out the total construction cost, wisely allocate resources, and set realistic budgets—essential steps before any project starts. In construction, a cost are shaped not just by material specification but also by equipment rentals and labor charges, so carefully calculating quantities and creating clear specifications is key to keeping expenses under control and avoiding surprises.</p> <p>As green building practices become more common, knowing how to estimate the costs of sustainable materials and methods is increasingly valuable. Additionally, using estimation software streamlines the process, improves accuracy, and makes it easier to update budgets as project details change.</p> <p>This course equips diploma civil engineers with hands-on skills in all these areas—traditional estimating, green building costing, and software tools—so they're ready for the challenges of today's construction projects.</p>

Course Outcome:

After Completion of the Course, the Student will able to:

No	Course Outcomes	RBT Level
01	Use appropriate measurement methods for various types of works.	R & U
02	Perform rate analysis for different items associated with various projects.	R, U, & A
03	Draft approximate estimation for various civil infrastructural projects.	U, & A
04	Prepare detailed estimate of various civil infrastructural projects.	A
05	Use appropriate programs/software's for estimating the quantity and cost of items.	U & A

*Revised Bloom's Taxonomy (RBT)



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Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Tutorial / Practical		
				ESE (E)	PA (M)	PA (I)	ESE (V)	
03	00	02	04	70	30	20	30	150

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1	<p>Fundamentals of Estimating and Costing:</p> <p>1.1 Estimating and Costing- Meaning, purpose, Administrative approval, Technical Sanction and Budget provision.</p> <p>1.2 Classification of estimates- Approximate and Detailed estimate.</p> <p>1.3 Types and Uses of Estimates: Revised estimate, Supplementary estimate, Repair and maintenance estimate, renovation estimate.</p> <p>1.4 Approximate estimate- Definition, Purpose.</p> <p>1.5 Methods of approximate estimate – Service unit method, Plinth area rate method, Cubical content method, Typical bay method, Approximate quantity method (with simple numericals)</p> <p>1.6 Approximate estimate for roads, Railways, bridges/culvert, irrigation projects and water supply projects.</p> <p>1.7 Roles and responsibility of an Estimator.</p> <p>1.8 Checklist of items in load bearing and framed structure.</p> <p>1.9 Standard formats of Measurement sheet, Abstract sheet, Face sheet.</p> <p>1.10 Modes of measurement and desired accuracy in measurements for different items of work as per IS: 1200 – Earthwork, Brickwork, Concrete work, Stone work, Roof work, Floor work, Plastering, Doors and windows, Wood work, Steel work, Whitewashing and distemping, Painting, etc.</p> <p>1.11 Rules for deduction in different category of work as per IS: 1200 – Opening for masonry work, Deduction for lintels over openings Deduction for plastering</p>	07	12
2	<p>Specifications of civil engineering works:</p> <p>2.1 Importance and types specification</p> <p>2.2 Principles of writing specification</p> <p>2.3 Description / specification of items of building work as per PWD/R&B – Earthwork, Brickwork, Concrete work, Stone work, Roof work, Floor work, Plastering, Doors and windows, Wood work, Steel work, Whitewashing and distemping, Painting, etc.</p>	04	08



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3	<p>Detailed Estimate:</p> <p>3.1 Detailed Estimate – Definition and Purpose, Data required for detailed estimate- Civil cost, GST, Contingencies, Supervision charges, Agency charges, Procedure for preparation of detailed estimate- Taking out quantities and Abstracting.</p> <p>3.2 Methods of Detailed Estimate- Unit quantity method and total quantity method (with simple numericals)</p> <p>3.3 Longwall and Short wall method, Centre line method.</p> <p>3.4 Bar bending schedule for footing, column, beam, Lintel, chajja and slab elements</p> <p>3.5 Provisions in detailed estimate: contingencies, work charged establishment, percentage charges, water supply and sanitary Charges and electrification charges etc.</p> <p>3.6 Prime cost, Provisional sum, Provisional quantities, Bill of quantities, Spot items or Site items.</p>	18	40
4	<p>Estimate for Civil Engineering Works:</p> <p>4.1 Earthwork- Quantities for roads, Embankment and canal by- Mid sectional area method, mean sectional area method, Prismoidal and trapezoidal formula method.</p> <p>4.2 Detailed estimate for septic tank, Community well.</p> <p>4.3 Use of computer / softwares / programmes for detailed estimate Preparation of Civil Engineering Works</p>	08	20
5	<p>Rate Analysis:</p> <p>5.1 Rate Analysis: Definition, purpose and importance.</p> <p>5.2 Lead (Standard and Extra), lift, overhead charges, water charges and contractors' profit,</p> <p>5.3 Procedure for rate analysis</p> <p>5.4 Task work- Definition, types. Task work of different skilled labour for different items.</p> <p>5.5 Categories of labours, their daily wages, types and number of labours for different items of work.</p> <p>5.6 Transportation charges of materials- Lead and Lift, Hire charges of machineries and equipments.</p> <p>5.7 Preparing rate analysis of different items of work pertaining to buildings and roads considering sustainable materials – Earth work, Concrete work, RCC work and First class brick work.</p>	08	20
Total		45	100

Suggested Specification Table with Marks (Theory): (in %)

Distribution of Theory Marks (in %)					
R Level	U Level	A Level	N Level	E Level	C Level
20	40	40	-	-	-



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Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

S. No.	Title of Book	Author	Publication with place, year, and ISBN
1	Estimating, Costing and Valuation	Dr. Sandeep Panchal	Khanna Book Publishing Co. (P) Ltd, New Delhi, ISBN: 978-93-55384-96-6 https://ekumbh.aicte-india.org/dbook.php
2	Estimating and Costing in Civil Engineering	B. N. Dutta	UBS Publishers Distributor Pvt. Ltd. New Delhi ISBN:9788174767295
3	Civil Engineering Contracts and Estimates	B. S. Patil	Orient Longman, Mumbai, Ed.2010 ISBN: 9788173715594, 8173715599
4	Estimating construction cost (fifth edition),	Peurifoy, Robert L.Oberlender, Garold,	McGraw Hill Education, New Delhi
5	Estimating and Costing in Civil Engineering	S. C. Rangwala	Charotar Publishing House PVT. LTD., Anand (Gujrat) Pin 388001 ISBN: 9789385039058
6	Estimating and Costing	G. S. Birdie	Dhanpat Rai Publishing Company (P) Ltd. New Delhi-110002 ISBN : 9789384378134
7	Estimating and Costing	Prof. V. N. Vazirani and Prof. S. P. Chandola	Khanna Publishers ISBN-10 : 8174091270 ISBN-13 : 978-8174091277
8	Estimating and costing, specification and valuation in civil engineering	M. Chakraborti	Monojit Chakraborti, Kolkata (2006) ISBN-10: 818530436X ISBN-13: 9788185304366
9	CPWD Schedule of Rates	CPWD	Published under the Authority of Director General, CPWD, New Delhi
10	R & B Schedule of Rates	R & B, Gujarat State	R & B, Gujarat State



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(b) Open-source software and website:

1. <https://ekumbh.aicte-india.org/dbook.php>
2. https://cpwd.gov.in/Documents/cpwd_publication.aspx
3. <https://watersupply.gujarat.gov.in/documents/folder/sor-schedule-of-rates-10>
4. <https://www.nptel.iitm.ac.in>
5. <https://www.youtube.com/@NOUCS-vd4mc/videos>

Suggested Course Practical List:

Exp No.	List of Practicals	Unit No.	Approx. Hrs. required
1	Prepare the list of items to be executed with units for detailed estimate of a given structure from the given drawing.	1,3	1
2	Prepare a report on market rates for given material , labour wages, hire charges of tools & equipments required to construct the given structure as mentioned in at Serial number 1 above.	1,3 & 5	1
3	Study of items with specification given in the R&B SOR (any four items) – Earthwork, Brickwork, Concrete work, Stone work, Roof work, Floor work, Plastering, Doors and windows, Wood work, Streeel work, Whitewashing and distempering, Painting, etc.	2	2
4	Recording in Measurement Book (MB) for any four items as mentioned in at Serial number 3 above.	3	1
5	Prepare bill of quantities of given item from actual measurements (any four items) as mentioned in at Serial number 3 above.	3	1
6	Prepare approximate estimate for the given civil engineering works – Roads, Railways, bridges/culvert, irrigation projects and water supply projects.	2	2
7	Calculate the quantity of items of work from the given set of drawings using standard measurement sheet for load bearing residential structure using description of item from R&B SOR (1 BHK Building with staircase).	3	2
8	Prepare detailed estimate from the given set of drawings using “standard measurement and abstract format” for RCC framed structure using description of item from R&B SOR along with face sheet and prepare quarry chart, lead statement (G+1	3	4
9	Calculate the reinforcement quantities from the given set of drawings for a room size of 3 m x 4 m with bar bending schedule (footing, column, beam, lintel with chajja, slab)	3	4
10	Prepare rate analysis for Earth work, Concrete work, RCC work and First class brick work.	5	2



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11	Prepare detailed estimate of road of one kilometer length from the given drawing.	4	2
12	Prepare detailed estimate of small Septic tank from the given set of drawings.	4	2
13	Prepare detailed estimate of well from the given set of drawing.	4	2
14	Use the relevant software to prepare detailed estimate of a Road.	4	2
15	Use the relevant software to prepare detailed estimate of a residential building.	4	2
		Total	30

List of Laboratory/Learning Resources Required:

S. No.	Equipment/Resource Name	Practical No.
1	Computer system (A computer system with latest configuration)	14 & 15
2	Estimator software, REVIT and MS Excel	14 & 15

Suggested Project List: As per the Suggested Course Practical List

Suggested Activities for Students:

- Prepare seminar on relevant topic
- Site visit of residential building, Road work, Canal, Well, Septic tank
- Collect current SOR from CPWD / R&B and prepare report on it
- Undertake micro project
- Prepare models of various civil engineering works and building components

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