



**Government of Karnataka**  
**DEPARTMENT OF COLLEGIATE AND TECHNICAL EDUCATION**

<b>Programme</b>	Civil Engineering	<b>Semester</b>	Fourth Semester
<b>Course Code</b>	20CE42P	<b>Type of Course</b>	Programme Core
<b>Course Name</b>	Building Estimation & Valuation	<b>Contact Hours</b>	8 hours/week 104 hours/semester
<b>Teaching Scheme</b>	L:T:P :: 3:1:4	<b>Credits</b>	6
<b>CIE Marks</b>	60	<b>SEE Marks</b>	40

**1. Rationale:** The procedure of calculating the measures as per the working drawings and cost of various construction items is called an Estimate. Before initiating the construction works, the contractor/ owner should have thorough knowledge of the amount of work which is to be done and it's costing. For this purpose, it is very essential to have an estimated quantity of work and the total amount it is going to cost. Estimation helps us in knowing the quantity of work, labour, materials and funds that will be required for the entire project thus enabling us to be prepared beforehand. Valuation is the technique of estimation or determining the fair price or value of property such as land, a building, a factory, other engineering structures of various types, etc. Valuation of building or property is the method of calculating the present marketable cost of a building. Valuation of a building depends on the sort of building, its structure, durability, location, size, shape, and the width of roads, frontage, types and quality of building materials used and the cost of these materials. It is expected the students should know the basics of the same to apply it in the field. Through this course students will develop the desired skills and competencies which are expected from them for Estimation and valuation related works.

**2. Course Outcomes/Skill Sets:** At the end of the semester student will be able to:

CO-01	Study the importance of estimation and detailed specifications for the various items required for construction of different types of structures.
CO-02	Analyse the rates and study factors affecting the rates for all works by applying standard rates for a given construction project.
CO-03	Prepare Bill of materials, Bill of Quantities and valuation report for a given construction project.
CO-04	Prepare contract documents for a given construction project with Negotiation and project financing skills

### 3. Course Content

Week	CO	PO	Lecture (Knowledge Criteria)	Tutorial (Activity Criteria)	Practice (Performance Criteria)
			3 hours/week	1 hour/week	4 hours/week(2 hours/batch twice in a week)
1	1,2	1,2,4,7	<p>1.INTRODUCTION TO ESTIMATION Types of estimates. Roles and responsibility of estimator, Different items of works, unit of measurement and units of payment of different items of work, Bill of Quantities</p> <p>2.ANALYSIS OF RATES, purpose, importance and Procedure for rate analysis, rates of different construction materials, Categories of labours and their skills, number of labours and daily wages for different items of work,</p> <p>3.Load carrying capacity of different types of vehicles, transportation of materials and their hiring charges., GST charges, lead, lift, overhead charges, water charges and contractor's profit. factors affecting rate analysis</p>	<p>1. Prepare detailed report on Specifications of different items of work and study the importance of specification in Bill of Quantities</p> <p>2. Analyse the rates for reusable materials in different construction activities</p>	<p>1. SPECIFICATIONS Earthwork in excavation for foundation, Cement concrete in foundation, Brick masonry, R.C.C Work, Plastering in Cement mortar, pointing with cement mortar, Cement concrete flooring, Granite / Vitrified / Marble flooring</p> <p>2. Centering and shuttering works, Distempering, Exterior painting (Cement), Woodwork for windows and doors, Painting woodwork and steel, Glazing works for building, waterproofing systems</p>
2	2	1,2,4,7	<p>Method of Analysis of rates for the following items of works</p> <p>1. a) Earthwork excavation and filling b) Cement concrete bed in foundation c) Size stone masonry in Cement mortar for substructure</p> <p>2. a) Brick masonry in C.M for superstructure b) Hollow concrete block masonry in Cement Mortar c) Solid concrete blocks masonry in Cement mortar for superstructure</p> <p>3. a) Pointing with cement mortar b) Plastering with cement mortar c) Waterproofing - Terrace, bathrooms and toilets.</p>	<p>1. Conduct market analysis on the present rate of materials, Daily wages of labours, number of labours, transportation charges, hire charges for tools and equipment's for different items of work and Compare with the Standard</p>	<p>1 &amp;2. Collect the present detailed Schedule of Rates and execute rate analysis in spreadsheet (For the lecture content for week 2)</p>

				Schedule of rates	
3		1,2,4,7	<p>Method of Analysis of rates for the following items of works</p> <p>1. a) CC Flooring, Granite / Vitrified / Marble flooring b) Painting of wall surface c) Painting of old and new wood work</p> <p>2. a) Painting of Steel work b) Panelled and glazed doors</p> <p>3.a) Panelled and glazed windows b) R.C.C roof slab c) Corrugated galvanized iron sheet roofing.</p>	1.Prepare the rate analysis for different items of work by changing cost of materials and profit percentage and compare	1 &2. Collect the present detailed Schedule of Rates and execute rate analysis in spreadsheet (For the lecture content for week 3)
4	3	1,2,4,7	<p>1.Introduction to methods of estimation: long wall short wall method and centre line method of estimation, Standard Format for measurement sheet, Rules for deduction of doors, windows and opening in Masonry work, Plastering and Painting work</p> <p>2. One room building- Ground floor with flat RCC roof (Long wall short wall method)</p> <p>3. Two room building- Ground floor with pitched roof (Centre line method)</p>	<p>1. Extract measurements from existing AUTOCAD drawing file</p> <p>2.Compare between long wall short wall method and centre line method of estimation</p>	<p>1. Execute the detailed and abstract estimate using long wall short wall method using spreadsheet for One room building- Ground floor with flat RCC roof (Long wall short wall method)</p> <p>2. Execute the detailed and abstract estimate using long wall short wall method using spreadsheet for Two room building- Ground floor with pitched roof (Centre line method)</p>
5	3	1,2,4,7	<p>Explain the methodology of Quantity estimation of the following.</p> <p>1. Detailed and abstract estimate of buildings using long wall short wall Method - 1BHK Residential building - Ground floor with Pitched roof with load bearing wall.</p> <p>2. Detailed and abstract estimate of buildings using long wall short wall Method -2BHK Residential building - Ground floor with flat RCC roof having semi-circular/ Hexagonal room walls (load bearing walls).</p>	<p>1. Prepare the BOQ for the residential building drawing from real time projects (ongoing construction projects) using Spreadsheet</p> <p>2. Extract measurements from existing</p>	<p>1. Execute the detailed and abstract estimate using long wall short wall method using spreadsheet for 1 BHK Residential building - Ground floor with Pitched roof with load bearing wall.</p> <p>2. Execute the detailed and abstract estimate using long wall short wall method using spreadsheet for 2BHK Residential building - Ground floor</p>



			3. Detailed and abstract estimate of buildings using long wall short wall Method -2BHK Residential building - Ground floor with flat RCC roof with portico / canopy.	AUTOCAD drawing file.	with flat RCC roof for with portico / canopy having semi-circular/ Hexagonal room walls
6	3	1,2,4,7	<p>Explain the methodology of Quantity estimation of the following.</p> <p>1.Detailed and abstract estimate of buildings using long wall short wall Method for Commercial building – Ground floor with flat RCC roof involving Aluminium Composite panels for facing</p> <p>2 &amp; 3: Detailed and abstract estimate of buildings using long wall short wall Method Industrial building – (Ground floor +1) with flat RCC roof and framed structure</p>	<p>1.Prepare the BOQ for the Commercial building drawing from real time projects (ongoing construction projects) using Spreadsheet</p> <p>2. Extract measurements from existing AUTOCAD drawing file</p>	<p>1. Execute the detailed and abstract estimate using long wall short wall method in using spreadsheet for School building – Ground floor with flat RCC roof</p> <p>2. Execute the detailed and abstract estimate using long wall short wall method using spreadsheet for Industrial building – (Ground floor +1) with flat RCC roof and framed structure</p>
7	3	1,2,4,7	<p>Explain the methodology of Quantity estimation of the following.</p> <p>1. Detailed and abstract estimate of buildings using Centre Line Method - 1BHK Residential building - Ground floor with Pitched roof with load bearing wall.</p> <p>2.Detailed and abstract estimate of buildings using Centre Line Method - 2BHK Residential building - Ground floor with flat RCC roof having semi-circular/ Hexagonal room walls (load bearing walls)</p> <p>3. Detailed and abstract estimate of buildings using Centre Line Method - 2BHK Residential building - Ground floor with flat RCC roof with portico / canopy</p>	<p>1. Prepare the BOQ for the Industrial building drawing from real time projects (ongoing construction projects) using Spreadsheet</p> <p>2. Extract measurements from existing AUTOCAD drawing file</p>	<p>1. Execute the detailed and abstract estimate using the Centre Line method using spreadsheet for 1 BHK Residential building - Ground floor with Pitched roof with load bearing wall.</p> <p>2. Execute the detailed and abstract estimate using Centre Line Method in using spreadsheet for 2BHK Residential building - Ground floor with flat RCC roof with portico / canopy having semi-circular/ Hexagonal room walls</p>
8	3	1,2,4,7	Explain the methodology of Quantity estimation of the following.	1.Prepare comparison statement with BOQ of	1. Execute the detailed and abstract estimate using centre line method using spreadsheet for School

			<p>1.DETAILED AND ABSTRACT ESTIMATE OF BUILDINGS USING Centre line Method Commercial building – Ground floor with flat RCC roof involving structural glazing for facing</p> <p>2 &amp; 3: DETAILED AND ABSTRACT ESTIMATE OF BUILDINGS USING Centre Line Method Industrial building – (Ground floor +1) with flat RCC roof and framed structure</p>	<p>residential, commercial and industrial buildings</p> <p>2. Study on application of various softwares used for estimation and demonstrate</p>	<p>building – Ground floor with flat RCC roof</p> <p>2. Execute the detailed and abstract estimate using centre line method using spreadsheet for Industrial building – (Ground floor +1) with flat RCC roof and framed structure</p>
9	3	1,2,4,7	<p>Prepare the Bill of materials for the following in residential building</p> <ol style="list-style-type: none"> <li>1. Water supply fittings and fixtures</li> <li>2. Sanitary Fittings and fixtures</li> <li>3. Electrical Fittings and fixtures and fire fighting system</li> </ol>	<p>1. Conduct market analysis and prepare the rate analysis for plumbing, electrical and firefighting fixtures and fittings work</p> <p>2. Extract measurements from existing AUTOCAD drawing file</p>	<p>1. Execute the detailed and abstract estimate using spreadsheet for Plumbing layout (Water supply and sanitary fittings ) for residential building</p> <p>2. Execute the detailed and abstract estimate using spreadsheet for Electrical and fire fighting fittings for residential building</p>
10	3	1,2,4,7	<p>Prepare the Bill of materials for the following in Commercial building</p> <ol style="list-style-type: none"> <li>1. Water supply fittings and fixtures</li> <li>2. Sanitary Fittings and fixtures</li> <li>3. Electrical Fittings and fixtures and fire fighting system</li> </ol>	<p>Prepare the Bill of materials, detailed and abstract estimate for the following in Industrial building</p> <ol style="list-style-type: none"> <li>1. Water supply fittings and fixtures</li> <li>2. Sanitary Fittings and fixtures</li> <li>3. Electrical Fittings and fixtures and fire fighting system</li> </ol>	<p>1. Execute the detailed and abstract estimate using spreadsheet for Plumbing layout (Water supply and sanitary fittings) for commercial building</p> <p>2. Execute the detailed and abstract estimate using spreadsheet for Electrical and firefighting fittings for commercial building</p>

1 1	3	1,2 ,4, 7	<p>Prepare the Bill of materials for the following for a residential building</p> <ol style="list-style-type: none"> <li>1. Septic tank with soak pit</li> <li>2. Manhole</li> <li>3. Rain water harvesting unit</li> </ol>	1.Prepare Bill of materials, detailed and abstract estimate for rainwater harvesting unit in college campus	<ol style="list-style-type: none"> <li>1. Execute the detailed and abstract estimate using spreadsheet for) for septic tank with soak pit and manhole</li> <li>2. Execute the detailed and abstract estimate using spreadsheet for Rain water harvesting unit for a residential building</li> </ol>
1 2	4	1,2 ,4, 7	<ol style="list-style-type: none"> <li>1. Quotation preparation, Importance of Specification, rate analysis and quantity estimation in preparation of quotation, Negotiation with stakeholder in terms of estimation, Factors affecting negotiation</li> <li>2. Project Financing: Factors affecting project financing, different types of loans for project , Loan agreement and Agreement with the stakeholder, Documents to be produced to stakeholder and loan approval, Repayment of loan</li> <li>3.Work order, Payment Schedule: Advance payment, payment according to area of work, payment according to floor wise work, Retention details</li> </ol>	1. Conduct a Detailed study about Negotiation and Project financing for an ongoing project and prepare a report	1. Preparation of complete report having survey drawings, working drawings, BOQ, detailed and abstract estimate, payment schedule and work order for project
1 3	5	1,2 ,4, 7	<p>VALUATION</p> <ol style="list-style-type: none"> <li>1.Necessity of valuation, Important terms used in valuation, Scrap value, Salvage value, Market value, Book value and sinking fund.</li> <li>2. Depreciation, Classification of buildings based on the life of a building and depreciation.</li> <li>3. Methods of valuation &amp; Fixation of rents.</li> </ol>	1. Study factors for real time valuation of building / land and prepare report	<ol style="list-style-type: none"> <li>1.Execute the calculations of sinking fund and valuation of building using depreciation method using spreadsheet</li> <li>2. Execute the calculation of rent fixation using spreadsheet</li> </ol>
Total in hours			39	13	52

**NOTE 1:** NOTE 1: The course content shall be delivered through lectures, PowerPoint presentations, video demonstrations and field visits



**NOTE 2:** The TUTORIAL (Activity criteria) shall be conducted / executed by the student (Minimum ONE suggested activity from each week) and to be submitted in portfolio evaluation of activities through rubrics to the faculty.

**NOTE 3:** The PRACTICE (Performance criteria) shall be conducted by the student and observations and report to be submitted at the end of each session to the faculty

#### 4. CIE and SEE Assessment Methodologies

Sl. No	Assessment	Test Week	Duration In minutes	Max marks	Conversion
1.	CIE-1 Written Test	5	80	30	Average of three tests 30
2.	CIE-2 Written Test	9	80	30	
3	CIE-3 Written Test	13	80	30	
4.	CIE-4 Skill Test-Practice	6	180	100	Average of two skill test reduced to 20
5	CIE-5 Skill Test-Practice	12	180	100	
6	CIE-6 Portfolio continuous evaluation of Tutorial sessions through Rubrics	1-13		10	10
Total CIE Marks					60
Semester End Examination (Practice)			180	100	40
<b>Total Marks</b>					<b>100</b>

#### 5. Format for CIE written Test

Course Name	Estimation & Valuation	Test	I/II/III	Sem	III/IV
Course Code	20CE42P	Duration	80 Min	Marks	30
Note: Answer any one full question from each section. Each full question carries 10 marks.					
Section	Assessment Questions		Cognitive Levels	Course Outcome	Marks
I	1				
	2				
II	3				
	4				
III	5				
	6				
Note for the Course coordinator: Each question may have one, two or three subdivisions. Optional questions in each section carry the same weightage of marks, Cognitive level and course outcomes.					

## 6. Rubrics for Assessment of Activity (Qualitative Assessment)

Sl. No.	Dimension	Beginner	Intermediate	Good	Advanced	Expert	Students Score
		2	4	6	8	10	
1		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	8
2		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	6
3		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2
4		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2
	Average Marks= (8+6+2+2)/4=4.5						5

*Note:* Dimension and Descriptor shall be defined by the respective course coordinator as per the activities

## 7. Reference:

Sl. No.	Description
1	Dutta B N, " <i>Estimation and costing in civil engineering theory and practice</i> ", 27 edition, UBS Publishers Distributors (P) Ltd New Delhi. Chakra barty M, " <i>Estimating, costing and specifications in Civil Engineering</i> "-2006.
2	D.D.Kohli Ar.R.C.Kohli, " <i>Estimating and Costing(CIVIL)</i> "2013 edition, S.CHAND Publications
3	IS: 1200 Part 1 to 28, <i>Method of Measurement of Building and Civil Engineering Works</i> .
4	Rangwala S C, " <i>Valuation of Real properties</i> "Charotar Publishing House -2008.
5	Full building estimation in spreadsheet <a href="https://www.youtube.com/watch?v=ocZu5wjh-88">https://www.youtube.com/watch?v=ocZu5wjh-88</a>

## 8. a. CIE Skill Test 1- Scheme of Evaluation

SL. No.	Particulars/Dimension	Marks
1	Portfolio evaluation for practice sessions -Performance criteria (Observations and report)	10
2	Prepare rate analysis using present rates in spreadsheet for the given item of work	20



3	Prepare the Bill of Quantities in spreadsheet for the given Residential building drawing – For any FIVE given items of works using long wall short wall method.	30
4	Prepare the Bill of Quantities in spreadsheet for the given Commercial / Industrial building drawing – For any FIVE given items of works using long wall short wall method.	30
5	Viva-Voce	10
<b>Total Marks</b>		<b>100</b>

#### 8. b. CIE Skill Test 2- Scheme of Evaluation

SL. No.	Particulars/Dimension	Marks
1	Portfolio evaluation for practice sessions -Performance criteria (Observations and report)	10
2	Prepare the Bill of Quantities in spreadsheet for the given Residential/ Commercial / Industrial building drawing – For any FIVE given items of works using Centre line method	20
3	Prepare the Bill of materials and Bill of Quantities in spreadsheet for the given Residential/ Commercial service layout drawing – (Water supply / Sanitary Electrical / Firefighting layout)  Bill of materials - 10 marks Bill of Quantities - 20 marks	30
4	Prepare the Bill of materials and Bill of Quantities in spreadsheet for the given drawing – (Septic tank with soak pit / Manhole / Rain water harvesting unit)  Bill of materials - 10 marks Bill of Quantities - 20 marks	30
5	Viva-Voce	10
<b>Total Marks</b>		<b>100</b>

### 8. c. SEE Scheme of Evaluation

SL. No.	Particulars/Dimension	Marks
1	Prepare rate analysis using present rates in spreadsheet for the given item of work	10
2	Prepare the Bill of Quantities in spreadsheet for the given Residential/ Commercial / Industrial building drawing – For any FIVE given items of works using Centre line / Long wall short wall method.	30
3	Prepare the Bill of materials and Bill of Quantities in spreadsheet for the given Residential/ Commercial service layout drawing –  a. Water supply / Sanitary Electrical / Firefighting layout  <b>OR</b>  b. Septic tank with soak pit / Manhole / Rain water harvesting unit  Bill of materials - 10 marks  Bill of Quantities - 20 marks	30
4	Execute the valuation of building / valuation of land / rent fixation in spreadsheet for the given data.	10
5	Viva-Voce	20
<b>Total Marks</b>		<b>100</b>

**Note for the External Examiner:**

1. The choice between the questions 3a and 3b shall be done by the external examiner.

### 9. Equipment/software list with Specification for a batch of 20 students

Sl. No.	Particulars	Specification	Quantity
1	Computers with Latest Configuration	8 GB RAM, 512GB HARD DRIVE, i5 and above 2.5 GHz PROCESSOR	1/STUDENT
2	licensed MS OFFICE	Latest version	1/COMPUTER
3	Power Backup	BATTERY + INVERTER	1