Programme Name/s : Civil Engineering/ Civil & Rural Engineering/ Construction Technology/ Civil & Environmental Engineering/

Programme Code : CE/ CR/ CS/ LE

Semester : Fourth

Course Title : ESTIMATING, COSTING AND VALUATION

Course Code : 314313

I. RATIONALE

In the construction of any civil engineering structure, estimating, costing, and valuation are the fundamental processes that provide valuable insights and support to project planning, budgeting, resource allocation, decision-making, contract negotiation, compliance, performance evaluation, and investment analysis. Today being the era of technology, a provision is also required to be made to implement the above mentioned processes through the use of the various software for achieving the speedy determination of quantities with inbuilt accuracy and precision. This course is specifically designed to develop the basic competencies among the learners to discharge their duties in the field with high efficiency and effectiveness to mitigate risks in projects and thereby to achieve the strategic objective.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

Estimate for the given construction materials, labor, and resources required for construction projects accurately.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Use the relevant modes of measurements for the given item of work.
- CO2 - Prepare approximate estimate of a civil engineering works.
- CO3 - Prepare detailed estimate of a civil engineering works.
- CO4 - Fix the rate for the given item of work using relevant rate analysis technique.
- CO5 - Conduct the process of the valuation for the specified purpose.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/ s	Learning Scheme					Credits	Assessment Scheme											
				Actual Contact Hrs./Week			SLH	NLH		Paper Duration	Theory				Based on LL & TL				Based on SL		Total Marks
															Practical						
				CL	TL	LL					FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
											Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
314313	ESTIMATING, COSTING AND VALUATION	ECV	DSC	4	-	4	-	8	4	4	30	70	100	40	50	20	25#	10	-	-	175

Total IKS Hrs for Sem. : 0 Hrs

Abbreviations: CL- ClassRoom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's)aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 Justify the importance of an Administrative Approval and Technical Sanction in civil engineering projects. TLO 1.2 Perform the role of an estimator in civil engineering projects TLO 1.3 Write the detailed specifications for the given construction project. TLO 1.4 Undertake the relevant modes of measurement as per IS 1200 TLO 1.5 Apply the rule of deduction for the given construction work as per IS: 1200 TLO 1.6 Use the various formats of measurements and bill of quantities for the given work.	**Unit - I Basics of Estimating and costing** 1.1 Introduction: Estimating, Types and purpose, costing, Administrative Approval, Technical Sanction and Budget provision. 1.2 Roles and responsibility of Estimator. 1.3 SSR: Meaning, Purpose, Checklist and Detailed Specification of items of work in load bearing and framed structure as per the Execution. 1.4 Modes of measurement and desired accuracy in measurements of different items of work as per IS: 1200. 1.5 Rules for deduction in Masonry work, Plastering and Pointing and Painting work as per IS: 1200. 1.6 Standard formats of Measurement sheet, Abstract sheet, Face sheet.	Lecture Using Chalk-Board Presentations Video Demonstrations
2	TLO 2.1 Specify the purpose of an approximate estimate in the given civil engineering project. TLO 2.2 Use relevant type of method to prepare an approximate estimate TLO 2.3 Prepare an approximate estimate for the given civil engineering structure.	**Unit - II Approximate Estimate** 2.1 Approximate estimate: Definition, Purpose, types. 2.2 Methods of approximate estimate: Service unit method, Plinth area rate method, Cubical content method, Typical bay method, Approximate quantity method. (Numerical on any one method out of Service unit method, Plinth area rate method, Typical bay method). 2.3 Approximate estimate for roads, Railways, bridges/culvert, irrigation projects and water supply projects.	Lecture Using Chalk-Board Presentations Flipped Classroom

Sr.No	Theory Learning Outcomes (TLO's)aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
3	TLO 3.1 Explain the procedure of the detailed estimate for the given project. TLO 3.2 Classify the detailed estimate based on the purpose of civil work. TLO 3.3 Propose the relevant method of detailed estimate for the given project. TLO 3.4 Determine the quantities for given Load bearing structure. TLO 3.5 Calculate the quantities of given component of RCC framed structure. TLO 3.6 Prepare the bar bending schedule for the given component of RCC project. TLO 3.7 Estimate the steel requirement of given building component. TLO 3.8 Prepare the bill of quantity for the given civil work. TLO 3.9 Calculate the earthwork quantity for the given civil Engineering work.	**Unit - III Preparation of Detailed Estimate** 3.1 Detailed Estimate: Definition and Purpose, Data required for detailed estimate, Procedure of preparation of detailed estimate, taking out quantities and Abstracting in prescribed format. 3.2 Types and Uses of detailed Estimates: Revised estimate, supplementary estimate, revised and supplementary estimate, repair and maintenance estimate. 3.3 Methods of Detailed Estimate- a) Unit quantity method and total quantity method. b) Long wall and Short wall method (out to out and in to in method or PWD method), Centre line method. 3.4 Calculate the quantities of the given items for the given load bearing structure. 3.5 Calculate the quantities of the given items for the given RCC framed structure. 3.6 Bar bending schedule, Rebar: Meaning, Purposes. 3.7 Steel requirement for footing, column, beam, Lintel, chajja and slab, Determination of rebar quantities as per IS 2502:1963. 3.8 Provisions in detailed estimate: contingencies, work charged establishment, centage charges, water supply and sanitary Charges and electrification charges. 3.9 Earthwork : Quantities for roads, Bunds and canal by Mid sectional area method, Mean sectional area method, Prismoidal formula method and trapezoidal formula method.	Lecture Using Chalk-Board Presentations Video Demonstrations Site/Industry Visit Case Study
4	TLO 4.1 Explain the importance of rate analysis in civil engineering. TLO 4.2 Justify the importance of sundry charges in the estimate of the civil work TLO 4.3 Fix the market rate of a given item of work using relevant rate analysis method TLO 4.4 Assign different skilled labor for different items TLO 4.5 Deploy the relevant type of manpower for the specified work. TLO 4.6 Prepare rate analysis for the given items of work.	**Unit - IV Rate Analysis** 4.1 Rate Analysis: Definition, purpose, importance and factors affecting. 4.2 Sundry Expenses: Lead (Standard and Extra), lift, overhead charges, water charges and contractors profit. 4.3 Procedure of rate analysis market rate determination etc. 4.4 Task work- Definition, factors Affecting, types, Task work of different skilled labor for different items. 4.5 Categories of labors, their daily wages, types and number of labors for different items of work. 4.6 Preparing rate analysis of different items of work: PCC, RCC work in (column, beam, lintel, slab), brick masonry, stone masonry, Vitrified tile flooring, plastering.	Lecture Using Chalk-Board Presentations Video Demonstrations Flipped Classroom
5	TLO 5.1 Explain the purpose of valuation of the given civil structure. TLO 5.2 Differentiate between the terms, â€œcost, value and priceâ€ with their significance in civil engineering. TLO 5.3 Classify the value of the given structure. TLO 5.4 Calculate the depreciation of the cost of the given structure using relevant method of depreciation. TLO 5.5 Compute the capitalized value of the structure based on given data. TLO 5.6 Calculate monthly rent of the given building as per PWD norms. TLO 5.7 Signify the importance of the terms, â€œLease and Mortgageâ€.	**Unit - V Valuation** 5.1 Definition and purpose of Valuation, role of valuer. 5.2 Define: Cost, Price and Value, Characteristics of Value, Factors Affecting Value. 5.3 Types of Value: Book Value, Scrap Value, Salvage Value, Speculative Value, Distress Value, Market Value, monopoly Value, Sentimental Value. 5.4 Depreciation, Obsolescence, Sinking Fund. Methods of Calculation of Depreciation : Straight Line Method, Sinking Fund Method, Constant Percentage Method. 5.5 Computation of capitalized value, Gross income, Outgoings, Net Income, Year Purchase, Types of outgoings. 5.6 Fixation of rent as per PWD Norms and Practice. 5.7 Lease : types of lease, lease hold property and free hold property, Mortgage : Mortgage deed, precautions to be taken while making mortgage.	Presentations Case Study Site/Industry Visit

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Prepare the check list of items to be executed with market rates and units for detailed estimate of the given structure from the given drawing.	1	Prepare the checklist of items from given drawing.	2	CO1
LLO 2.1 Analyze the SSR of into relevant categories and subcategories of construction activities.	2	*Analysis of SSR for any five item of construction.	2	CO1
LLO 3.1 Prepare the approximate estimate for the given civil engineering works. (service unit method)	3	*Prepare approximate estimate by using service unit method.	2	CO2
LLO 4.1 Prepare the approximate estimate for the given civil engineering works. (Typical bay method)	4	*Prepare approximate estimate by using Typical bay method.	2	CO2
LLO 5.1 Use long wall short wall method to determine the quantity of items of work (Excavetion,PCC ,UCR,DPC) using standard measurement sheet for 1BHK load bearing residential Building (Part-I).	5	*Determine the quantities for Excavation, PCC ,UCR, DPC of 1BHK load bearing residential building using long wall short wall method. (Part I)	2	CO3
LLO 6.1 Use long wall short wall method to determine the quantity of items of work (Brick Work,Plastering, flooring, slab)using standard measurement sheet for 1BHK load bearing residential Building (Part-II	6	*Determine the quantities for Brick Work, Plastering, flooring, slab of 1BHK load bearing residential building using long wall short wall method. (Part II)	2	CO3
LLO 7.1 Use Center line method to determine the quantity of items of work (Excavetion,PCC ,UCR,DPC) using standard measurement sheet for 1BHK load bearing residential Building. (Part-I)	7	Determine the quantities for Excavation, PCC ,UCR,DPC of 1BHK load bearing residential building using Center line method (Part I).	2	CO3
LLO 8.1 Use Center line method to determine the quantity of items of work (Brick Work,Plastering, flooring, slab)using standard measurement sheet for 1BHK load bearing residential Building (Part-II)	8	Determine the quantities for Brick Work, Plastering, flooring, slab of 1BHK load bearing residential building using Center line method (Part II).	2	CO3
LLO 9.1 Prepare detailed estimate for RCC (G+1) residential framed structure from the given drawing. (Part-I)	9	*Prepare detailed estimate with abstract for RCC (G+1) residential framed structure. (Part I) (Manual)	2	CO3
LLO 10.1 Prepare detailed estimate for RCC (G+1) residential framed structure from the given drawing. (Part-II)	10	*Prepare detailed estimate with abstract for RCC (G+1) residential framed structure. (Part II) (Manual)	2	CO3
LLO 11.1 Use the relevant open source software to prepare detailed estimate for RCC (G+1) residential framed structure from the given drawing. (Part-I)	11	*Prepare detailed estimate with abstract for RCC (G+1) residential framed structure using relevant available open source Software.(Part-I)	2	CO3
LLO 12.1 Use the relevant open source software to prepare detailed estimate for RCC (G+1) residential framed structure from the given drawing. (Part-II)	12	Prepare detailed estimate with abstract for RCC (G+1) residential framed structure using relevant available open source software.(Part-II)	2	CO3
LLO 13.1 Calculate the reinforcement quantities for footing of a room size for 4 m X 5 m from the given set of drawings.	13	Prepare the bar bending schedule with reinforcement estimate for the footing of given structure.	2	CO3
LLO 14.1 Calculate the reinforcement quantities for column of a room size for 4 m X 5 m from the given set of drawing.	14	*Prepare the bar bending schedule with reinforcement estimate for the column of given structure.	2	CO3
LLO 15.1 Calculate the reinforcement quantities for beam of a room size for 4 m X 5 m from the given set of drawing.	15	Prepare the bar bending schedule with reinforcement estimate for the beam of given structure.	2	CO3
LLO 16.1 Calculate the reinforcement quantities for slab of a room size for 4 m X 5 m from the given set of drawing.	16	*Prepare the bar bending schedule with reinforcement estimate for the slab of given structure.	2	CO3
LLO 17.1 Estimate the steel quantity from the given drawing using IS code 2502-1963 for rebaring of beam structural members.	17	Prepare the bar bending schedule with reinforcement estimate for rebaring of beam to be extended.	2	CO3
LLO 18.1 Estimate the steel quantity from the given drawing using IS code 2502-1963 for rebaring of column structural members.	18	Prepare the bar bending schedule with reinforcement estimate for rebaring of column to be extended.	2	CO3
LLO 19.1 Use the Trapezoidal method to determine the earth work quantity in embankment and cutting.	19	*Determine the earth work quantity in embankment and cutting using Trapezoidal method.	2	CO3
LLO 20.1 Use the Prismoidal method to determine the earth work quantity in embankment and cutting.	20	Determine the earth quantity in embankment and in cutting using Prismoidal method.	2	CO3
LLO 21.1 Use the mid sectional area method to determine the earth work quantity in embankment and cutting	21	*Determine the earth work quantity in embankment and in cutting using mid sectional area method.	2	CO3

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 22.1 Use the mean area method to determine the earth work quantity in embankment and cutting.	22	Determine the earth work quantity in embankment and cutting using mean area method.	2	CO3
LLO 23.1 Use the relevant open source software to prepare detailed estimate of the WBM Road. (Part I)	23	Prepare the detailed estimate of W.B.M. Road using relevant open source software (Part I)	2	CO3
LLO 24.1 Use the relevant open source software to prepare detailed estimate of the WBM Road. (Part II)	24	Prepare the detailed estimate of W.B.M. Road using relevant open source software (Part II)	2	CO3
LLO 25.1 Prepare the detailed estimate for small septic tank from given set of drawing.	25	Prepare the detailed estimate for small septic tank	2	CO3
LLO 26.1 Prepare the rate analysis for the given five item of work.	26	*Prepare the rate analysis for the given five item of work.	2	CO3
LLO 27.1 Carry out survey of different categories of labor it's types, and no of labor for different item of work on site and prepare its report..	27	*Carry out survey and prepare a report on different Categories and types of labor required for completion of various items of work on site. (visit and compare any three sites).	2	CO4
LLO 28.1 Prepare the chart reflecting all values pertaining to valuation of residential building with their significance.	28	Create a chart reflecting all values pertaining to valuation of residential building with their significance.	2	CO5
LLO 29.1 Determine the valuation of a given structure and submits the valuation report in prescribed formats.	29	*Prepare the valuation report for the given building.	2	CO5
LLO 30.1 Determine the monthly rent of the given area of the building from the given data.	30	*Determine the monthly rent of the given area of building from the given data.	2	CO5

Note : Out of above suggestive LLOs -

- '*' Marked Practicals (LLOs) Are mandatory.
- Minimum 80% of above list of lab experiment are to be performed.
- Judicial mix of LLOs are to be performed to achieve desired outcomes.

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)

Micro project

- Enlist the minimum ten salient provisions made in IS:1200 with special reference to load bearing structure.
- Enlist the minimum ten salient provisions made in IS:1200 with special reference to Framed structure.
- Prepare detailed estimate of minimum one load bearing structure using available open source software.
- Rate analysis by analyzing no of labor required for different items of civil works such as 10 cu. m excavation, cement concrete in foundation, Bricks work, rubble stone masonry works. Etc. and 100 m2 12mm thick plastering, 20 mm thick Damp proof course, cement pointing, white washing etc.
- Collect the rebar reinforcement drawings of minimum one building and interpret the drawings with report.

- Prepare rate analysis of Painting work for OBD, Plastic emulsion, Oil paint, luster paint having minimum 150 m2 area.
- Prepare approximate estimate of minimum one residential building.
- Prepare valuation report of minimum one residential building.
- Workout quantities of cement, sand and bricks for 30 m3,40m3.50m3,60m3 in cement mortar 1:6

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicial mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Computer systems with internet connection	3
2	Available Software of estimating and Costing.	3

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Basics of Estimating and costing	CO1	6	2	4	0	6
2	II	Approximate Estimate	CO2	8	0	4	4	8
3	III	Preparation of Detailed Estimate	CO3	24	6	14	10	30
4	IV	Rate Analysis	CO4	12	4	4	6	14

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
5	V	Valuation	CO5	10	2	4	6	12
Grand Total				**60**	**14**	**30**	**26**	**70**

X. ASSESSMENT METHODOLOGIES/TOOLS

Formative assessment (Assessment for Learning)

- Two-unit tests of 30 marks will be conducted and average of two-unit test considered.for formative assessment of exercises writing 50 marks.each exercises will be assessed considering appropriate % weightage to process and product and other instructions of assessments.

Summative Assessment (Assessment of Learning)

- Term Work, Practical Exam, Oral and Written End semester Exam

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO- 1	PSO- 2	PSO- 3
CO1	2	-	1	1	1	1	2			
CO2	2	3	2	1	1	3	3			
CO3	3	3	3	3	1	3	3			
CO4	3	3	2	2	1	3	3			
CO5	3	2	1	3	3	2	3			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	Datta, B.N.	Estimating and Costing in Civil engineering	UBS Publishers Distributors Pvt. Ltd. New Delhi. ISBN:9788174767295
2	Chakraborti,M.	Estimating and costing, specification and valuation in civil engineering	Monojit Chakraborti, Kolkata (2006) ISBN-10: 818530436X ISBN-13: 978-8185304366
3	Patil, B.S.	Civil Engineering Contracts and Estimates	Orient Longman, Mumbai, Ed.2010 ISBN: 9788173715594, 8173715599
4	Rangwala,S.C.	Valuation of Real Properties	Charotar Publishing House Pvt. Limited (2008) ISBN:9788185594774, 8185594775

Sr.No	Author	Title	Publisher with ISBN Number
5	Birdie,G.S.	Estimating and Costing	Dhanpat Rai Publishing Company(P) Ltd.NewDelhi110002 ISBN : 978-93-84378-13-4

XIII . LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://mjp.maharashtra.gov.in/schedule-rate-dsr/	Schedule Rate (DSR) Maharashtra Jeevan Pradhikaran
2	https://mjp.maharashtra.gov.in/schedule-rate-dsr/	CPWD in house codes, manuals, schedules, technical specifications, design manuals and technical publications.
3	https://www.microsoft.com/en-in/microsoft-365/excel	Microsoft Excel 365 open source software
4	https://www.youtube.com/watch?v=IoBd5UhGifs	Full Building Estimation in Excel sheet
5	https://youtube.com/playlist?list=PLMCExauCXvoOGL3nP49ee_-Uatf1PAJ8q&si=N4gNlyNL3PzLvRTx	Estimating, Costing and Valuation
6	https://www.youtube.com/watch?v=iry2zEoPvsU	Sinking Fund / Book Value / Scrap Value / Market Value / Salvage Value / Valuation
7	https://www.youtube.com/watch?v=C6O09yOa45c	Rate Analysis Of Civil Work | How to Prepare Rate Analysis | Rate Analysis for 1000 sqft house plan
8	https://www.youtube.com/watch?v=H5qIwRCOFn4&list=PLv20kpHlalH1zD-oueYjooR-KdO6q_NLa&index=4	Administrative approval, Technical sanction and Budget provision
9	https://www.youtube.com/watch?v=ZAnIaZIMGtw&list=PLv20kpHlalH1zD-oueYjooR-KdO6q_NLa&index=5	Types of estimates - Approximate estimate and Detailed estimate
10	https://www.youtube.com/watch?v=-BRwUs27ByY	Valuation of a Property / What is the purpose of Valuation / What factors affecting Valuation
11	http://acl.digimat.in/nptel/courses/video/124105015/lec40.pdf	Rebar Detailing

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students