



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad -500 043

CIVIL ENGINEERING

COURSE DESCRIPTOR

Course Title	ESTIMATION AND COSTING				
Course Code	ACE017				
Programme	B. Tech				
Semester	VII	CE			
Course Type	Core				
Regulation	IARE - R16				
Course Structure	Theory			Practical	
	Lectures	Tutorials	Credits	Laboratory	Credits
	3	1	4	-	-
Chief Coordinator	Mr. CH.Venugopal Reddy, Assistant Professor				
Course Faculty	Mr. CH.Venugopal Reddy, Assistant Professor Mr. K.Tarun kumar, Assistant Professor				

I. COURSE OVERVIEW:

Estimation is the technique of calculating or computing the various quantities and the expected expenditure to be incurred on a particular work or project. Before sanction or approval of any project or work, its estimated cost worked out and necessary funds are sanctioned by the competent authority. The rate of each item should also be reasonable and workable. The rates in the estimate provide for the complete work, which consist of the cost of materials, cost of transport cost of scaffolding, cost of tools and plants, cost of water, taxes, establishment and supervision cost, reasonable cost, reasonable profit of contractor, etc.

II. COURSE PRE-REQUISITES:

Level	Course Code	Semester	Prerequisites	Credits
UG	ACE007	IV	Building Materials and Construction Planning	4

III. MARKS DISTRIBUTION:

Subject	SEE Examination	CIA Examination	Total Marks
Estimation and Costing	70 Marks	30 Marks	100

IV. DELIVERY / INSTRUCTIONAL METHODOLOGIES:

✗	Chalk & Talk	✓	Quiz	✓	Assignments	✗	MOOCs
✓	LCD / PPT	✓	Seminars	✗	Mini Project	✗	Videos
✗	Open Ended Experiments						

V. EVALUATION METHODOLOGY:

The course will be evaluated for a total of 100 marks, with 30 marks for Continuous Internal Assessment (CIA) and 70 marks for Semester End Examination (SEE). Out of 30 marks allotted for CIA during the semester, marks are awarded by taking average of two CIA examinations or the marks scored in the make-up examination.

Semester End Examination (SEE): The SEE is conducted for 70 marks of 3 hours duration. The syllabus for the theory courses is divided into five modules and each module carries equal weightage in terms of marks distribution. The question paper pattern is as follows. Two full questions with “either” or “choice” will be drawn from each module. Each question carries 14 marks. There could be a maximum of two sub divisions in a question.

The emphasis on the questions is broadly based on the following criteria:

50 %	To test the objectiveness of the concept.
50 %	To test the analytical skill of the concept OR to test the application skill of the concept.

Continuous Internal Assessment (CIA):

CIA is conducted for a total of 30 marks (Table 1), with 25 marks for Continuous Internal Examination (CIE), 05 marks for Quiz / Alternative Assessment Tool (AAT).

Table 1: Assessment pattern for CIA

Component	Theory		Total Marks
	CIE Exam	Quiz / AAT	
CIA Marks	25	05	30

Continuous Internal Examination (CIE):

Two CIE exams shall be conducted at the end of the 8th and 16th week of the semester respectively. The CIE exam is conducted for 25 marks of 2 hours duration consisting of two parts. Part–A shall have five compulsory questions of one mark each. In part–B, four out of five questions have to be answered where, each question carries 5 marks. Marks are awarded by taking average of marks scored in two CIE exams.

Quiz / Alternative Assessment Tool (AAT):

Two Quiz exams shall be online examination consisting of 25 multiple choice questions and are to be answered by choosing the correct answer from a given set of choices (commonly four). Marks shall be awarded considering the average of two quizzes for every course. The AAT may include seminars, assignments, term paper, open ended experiments, five minutes video and MOOCs.

VI. HOW PROGRAM OUTCOMES ARE ASSESSED:

Program Outcomes (POs)		Strength	Proficiency assessed by
PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.	2	Presentation on real-world problems
PO 6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.	2	Guest lectures
PO 8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.	1	Assignments
PO 10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	1	Seminars

3 = High; 2 = Medium; 1 = Low

VII. HOW PROGRAM SPECIFIC OUTCOMES ARE ASSESSED:

Program Specific Outcomes (PSOs)		Strength	Proficiency assessed by
PSO 1	Engineering knowledge: Graduates shall demonstrate sound knowledge in analysis, design, laboratory investigations and construction aspects of civil engineering infrastructure, along with good foundation in mathematics, basic sciences and technical communication.	1	Assignments

Program Specific Outcomes (PSOs)		Strength	Proficiency assessed by
PSO 2	Breadth and diversity: Graduates will have a broad understanding of economic, environmental, societal, health and safety factors involved in infrastructural development, and shall demonstrate ability to function within multidisciplinary teams with competence in modern tool usage.	1	Guest Lectures
PSO 3	Self-learning and service: Graduates will be motivated for continuous self-learning in engineering practice and/or pursue research in advanced areas of civil engineering in order to offer engineering services to the society, ethically and responsibly.	-	-

3 = High; 2 = Medium; 1 = Low

VIII. COURSE OBJECTIVES :

The course should enable the students to:	
I	Summarize the basic principal and standard methods for working out quantities in estimating.
II	Demonstrate the detailed estimate of buildings and workout rate analysis of the various items of work.
III	Understand the material requirements as per specified norms and standards.
IV	Assess the valuation of buildings and provide practical knowledge of standard specifications of items of building construction.

IX. COURSE OUTCOMES (COs):

COs	Course Outcome	CLOs	Course Learning Outcome
CO 1	Understand the preparation of an Abstract Estimate and detailed estimate of building.	CLO 1	Interpreting the preparation of an Abstract Estimate for a Residential Building.
		CLO 2	Organizing the units for various quantities of items of work.
		CLO 3	Associating the preparation of detailed estimation of building.
		CLO 4	Demonstrate the calculation of earth work quantity for roads and canals.
CO 2	Determine earth work quantity for roads and canals.	CLO 5	Evaluate the quantity of earth work.
		CLO 6	Understand how to prepare a Notice inviting tender document for bidding.
		CLO 7	Analyze the building as per new estimated cost.
		CLO 8	Have knowledge on specifications and tendering process for contracts.
CO 3	Understand preparation of notice inviting tender document for bidding, tendering process and examining rate analysis of civil works.	CLO 9	Examining the rate analysis of various items of civil works.
		CLO 10	Create new technologies to develop concrete estimating methods for more ethical and enhanced usage.
		CLO 11	Calculate the quantities for different items of work.
		CLO 12	Identify specifications and tendering process for contracts.
CO 4	Design bar bending schedule for reinforcement works, Identify specifications and	CLO 13	Classify the types, formation, terms and conditions in contracts and arbitration.
		CLO 14	Prepare a bid analysis for a given sub trade.
		CLO 15	Create various Tender documents for bidding purpose.

COs	Course Outcome	CLOs	Course Learning Outcome
	tendering process for contracts and create various tender documents for bidding purpose.	CLO 16	Design and Prepare Bar bending schedule for reinforcement works and steel calculation.
CO 5	Evaluate the valuation of building for different specifications and create new technologies to develop concrete estimating methods.	CLO 17	Evaluate the valuation of building for different specifications.
		CLO 18	Possess the knowledge and skills for employability.
		CLO 19	Will able to value a property, price escalation recommendations and auditing.
		CLO 20	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

X. COURSE LEARNING OUTCOMES (CLOs):

CLO Code	CLO's	At the end of the course, the student will have the ability to:	PO's Mapped	Strength of Mapping
ACE017.01	CLO 1	Interpreting the preparation of an Abstract Estimate for a Residential Building.	PO1, PO 6, PO8, PO10	2
ACE017.02	CLO 2	Organizing the units for various quantities of items of work.	PO1, PO6, PO8,	1
ACE017.03	CLO 3	Associating the preparation of detailed estimation of building.	PO1, PO8, PO10	2
ACE017.04	CLO 4	Demonstrate the calculation of earth work quantity for roads and canals.	PO1, PO6, PO 8, PO10	1
ACE017.05	CLO 5	Evaluate the rates for various items of work.	PO1, PO 6, PO 8, PO10	3
ACE017.06	CLO 6	Understand how to prepare a Notice inviting tender document for bidding.	PO1, PO 6, PO 8, PO10	1
ACE017.07	CLO 7	Analyze the building as per new estimated cost.	PO1, PO 6,	2
ACE017.08	CLO 8	Have knowledge on specifications and tendering process for contracts.	PO1, PO10	1
ACE017.09	CLO 9	Examining the rate analysis of various items of civil works.	PO1, PO10	2
ACE017.10	CLO 10	Create new technologies to develop concrete estimating methods for more ethical and enhanced usage.	PO1, PO 8, PO10	2
ACE017.11	CLO 11	Calculate the quantities for different items of work.	PO1, PO10	1
ACE017.12	CLO 12	Identify specifications and tendering process for contracts.	PO1, PO 8, PO10	3
ACE017.13	CLO 13	Classify the types, formation, terms and conditions in contracts and arbitration.	PO 6, PO10	2
ACE017.14	CLO 14	Prepare a bid analysis for a given sub trade.	PO1, PO 6, PO10	3
ACE017.15	CLO 15	Create various Tender documents for bidding purpose.	PO1, PO 6, PO 8, PO10	1
ACE017.16	CLO 16	Design and Prepare Bar bending schedule for reinforcement works and steel calculation.	PO1, PO 6,	2
ACE017.17	CLO 17	Evaluate the valuation of building for different specifications.	PO1, PO 6, PO 8, PO10	1
ACE017.18	CLO 18	Possess the knowledge and skills for employability.	PO1, PO 6, PO10,	1
ACE017.19	CLO 19	Will able to value a property, price escalation recommendations and auditing.	PO1, PO 6, PO 8, PO10	2
ACE017.20	CLO 20	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	PO1, PO 6 PO 8, PO10	1

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XI. MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES

Course Outcomes (COs)	Program Outcomes (POs)					
	PO 1	PO 6	PO 8	PO 10	PSO 1	PSO 2
CO 1	1	1	1	1	1	1
CO 2	2	2	2	2	1	1
CO 3	2	1	2	1	1	1
CO 4	2	2	1	2	1	1
CO 5	1	1	1	1	1	1

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XII. MAPPING COURSE LEARNING OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Learning Outcomes (CLOs)	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CLO 1	2					2		2		2			3	1	
CLO 2	1					1		1					1	1	
CLO 3	2							2		2			1	1	
CLO 4	1					1		1		1				1	
CLO 5	3					3		3		3			1	2	
CLO 6	1					1		1		1			1	1	
CLO 7	2					2				2					
CLO 8	1									1			2	1	
CLO 9	2									2			1	1	
CLO 10	2							2		2				1	
CLO 11	1									1			1		
CLO 12	3							3		3					
CLO 13						2				2					
CLO 14	3					3				3					
CLO 15	1					1		1		1			1	1	
CLO 16	2					2									

Course Learning Outcomes (CLOs)	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CLO 17	1					1		1		1			1		
CLO 18	1					1				1				1	
CLO 19	2					2		2		2					
CLO 20	1					1		1		1					

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XIII. ASSESSMENT METHODOLOGIES – DIRECT

CIE Exams	PO1, PO6, PO8, PO10, PSO1, PSO2	SEE Exams	PO1, PO6, PO8, PO10, PSO1, PSO2	Assignments	PO1, PO6,	Seminars	PO1, PO6
Laboratory Practices	-	Student Viva	-	Mini Project	-	Certification	-
Term Paper	-						

XIV. ASSESSMENT METHODOLOGIES - INDIRECT

✓	Early Semester Feedback	✓	End Semester OBE Feedback
✗	Assessment of Mini Projects by Experts		

XV. SYLLABUS

UNIT-I	GENERAL ITEMS OF WORK IN BUILDING
General items of work in building – Standard units principles of working out quantities for detailed and abstract estimates – Approximate method of estimating. Detailed estimates of buildings.	
UNIT - II	EARTHWORKS
Earthwork for roads and canals.	
UNIT-III	RATE ANALYSIS
Rate analysis - Working out data for various items of work over head. Rate analysis - Contingent charges.	
UNIT- IV	REINFORCEMENT BAR BENDING
Reinforcement bar bending and bar requirement schedules. Contracts – Types of contracts – Contract documents – Conditions of contract.	
UNIT-V	VALUATION
Valuation of buildings, standard specifications for different items of building construction.	
Text Books	
1. B. N. Dutta, “Estimating and Costing”, UBS publishers, 2000. 2. G. S. Birdie., “Estimating and Costing”, Dhanpat Rai publications, 1988.	

Reference Books

1. Standard schedule of rates and standard data book by public works department, 2015.
2. I.S. 1200 (Parts I to XXV – 1974/method of measurement of building and Civil Engineering works – B.I.S)
3. M. Chakraborti, “Estimation, costing and specifications”, Laxmi publications, 1982.
4. National building code, 2015.

XVI. COURSE PLAN:

The course plan is meant as a guideline. Probably there may be changes.

Lecture No	Topics to be covered	Course Learning Outcomes (CLOs)	Reference
1-2	Introduction to General items of work in Building.	CLO 1	T1: 1.1 -1.2
3-4	Principles of working out quantities.	CLO 1	T1: 1.2-1.3
5-6	Preparation of quantities for abstract estimate.	CLO 1	T1: 1.4 R1:1.2
7-8	Preparation of quantities for detailed estimate.	CLO 2	T1:1.5-1.6
9-10	Estimates of building, different types of estimates.	CLO 2	T1:2.1-2.2
11-12	Different methods of estimation.	CLO 2	T1:2.3-2.4
13-14	Long wall short wall method for a single room building.	CLO 3	T1:2.5-2.6
15-16	Long wall short wall method for a Two room building & Residential building.	CLO 3	T1:2.6.1-2.6.3
17-18	Centre line Method for a single room building.	CLO 2	T1:2.7.1-2.7.2
19-20	Centre line Method for a two room building & Residential building.	CLO 3	T1:2.7.3-2.7.4
21-22	Road Estimation cross section of typical road in Banking and Cutting.	CLO 4	T1: 7.1-7.3 R1:2.4
23-24	Different Methods of Road Estimation Mid-sectional area method, Mean Sectional area method, Prismoidal formula method	CLO 4	T1: 7.4-7.6 R2: 2.2
25-26	Problems on Road Estimating, Problems related to Mid-sectional area method.	CLO 4	T1: 7.7
27-28	Problems on Road Estimation.	CLO 5	T1: 7.8
29-30	Problems on Road Estimating, Problems related to Prismoidal formula method.	CLO 5	T1: 7.9
31-32	Irrigation and Canal works, different cases of canal section and their cross section.	CLO 6	T1: 9.1-9,2
33-34	Problems on Canal works- related to earthwork of canals for fully Excavation case.	CLO 6	T1: 9.3
35-37	Problems on Canal works- related to earthwork of canals for Partly Excavation & Partly embankment case.	CLO 7	T1: 9.4
38-39	Problems on Canal works- related to earthwork of canals for fully embankment case.	CLO 7	T1:9.5-9.6
40-41	Rate analysis material required for various items of work, rates of various quantizes, material, labour.	CLO 7	T1:11.1-11.2
42-43	Analysis of rates for Cement Concrete for different mix proportions.	CLO 8	T1:11.7-11.8
44-45	Reinforcement bar bending schedule.	CLO 8	T2:13.1-13.2
46-47	Problems related to reinforcement bar bending and bar bending schedule	CLO 9	T2: 13.313.4

Lecture No	Topics to be covered	Course Learning Outcomes (CLOs)	Reference
48-49	Introduction to Contracting, contract document, types of contract.	CLO 9	T2:17.117.2
50-51	Different types of Contracts.	CLO 9	T1:7.2.5
52	Contract document- Security performance of contract, conditions of contract	CLO 11	T2: 17.3
53	Contract document- labour contract, negotiated contract.	CLO 11	T2: 17.4
54	Contract document- Earnest money deposit & Security deposit.	CLO 12	T2: 17.5-17.15
55	Conditions of Contract- Types of tenders.	CLO 13	T2:17.16- 17.18
56	Conditions of Contract- Scrutinizing of tender.	CLO 14	T2:17.18-17.20
57	Conditions of Contract- Accepting Tenders, Notice Inviting tender.	CLO 15	T2:17.
58	Valuation of buildings- standard specification for different items of work	CLO 16	T1:15.1-15.4
59	Valuation of buildings- Sinking Fund, Deprecation, method of valuation.	CLO 17	T1:15.5-15.6
60	Valuation of buildings, Mortgage lease, fixation of rent.	CLO 18	T1:15.7-15.8
61	Valuation of buildings, Free hold & lease hold property.	CLO 19	T1:15.7-15.9
62	Valuation of buildings, Government buildings.	CLO 20	T1:15.7-15.10

XVII. GAPS IN THE SYLLABUS-TO MEET INDUSTRY / PROFESSION REQUIREMENTS:

S No	Description	Proposed actions	Relevance with POS	Relevance with PSOS
1	Understand the preparation of an Abstract Estimate for a Residential Building.	Seminars	PO 1	PSO 1
2	Analyze the units for various quantities of items of work.	Guest Lecture	PO 2	PSO 1
3	Demonstrate the calculation of earth work quantity for roads and canals.	NPTEL	PO 2	PSO 1

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