



INSTITUTE OF AERONAUTICAL ENGINEERING

(AUTONOMOUS)

Dundigal, Hyderabad - 500 043

CIVIL ENGINEERING

COURSE DESCRIPTION FORM

Course Title	ESTIMATION AND COSTING			
Course Code	A70138			
Regulation	R09 15– JNTUH			
Course Structure	Lectures	Tutorials	Practical's	Credits
	3	1	-	3
Course Coordinator	Mr. Gude Ramakrishna, Associate Professor, Department of CE			
Team of Instructors	Mr. .K. Tarun Kumar, Assistant Professor, Department of CE			

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. PREREQUISITE(S):

Level	Credits	Periods/ Week	Prerequisites
UG	4	5	Building Materials and Construction Planning.

III. MARKS DISTRIBUTION:

Sessional Marks	University End Exam marks	Total marks
Midterm Test There shall be two midterm examinations. Each midterm examination consists of essay paper, objective paper and assignment. The essay paper is for 10 marks of 60 minutes duration and shall contain 4 questions. The student has to answer 2 questions, each carrying 5 marks. The objective paper is for 10 marks of 20 minutes duration. It consists of 10 multiple choice and 10 fill-in-the blank questions, the student has to answer all the questions and each carries half mark. First midterm examination shall be conducted for the first four units of syllabus and second midterm examination shall be conducted for the remaining portion.	75	100

Sessional Marks	University End Exam marks	Total marks
<p>Five marks are earmarked for assignments. There shall be two assignments in every theory course. Assignments are usually issued at the time of commencement of the semester. These are of problem solving in nature with critical thinking.</p> <p>Marks shall be awarded considering the average of two midterm tests in each course.</p>		

IV. EVALUATION SCHEME:

S. No	Component	Duration	Marks
1.	I Mid Examination	80 minutes	20
2.	I Assignment	-	5
3.	II Mid Examination	80 minutes	20
4.	II Assignment	-	5
5.	External Examination	3 hours	75

V. COURSE OBJECTIVES:

At the end of the course, the students will be able to:

- I. Classify Basic concepts, techniques and applications of Estimation and costing.
- II. Understand how to prepare a detailed estimate for a residential building and calculate the quantities for various items of work.
- III. Analyse the rates for various items of work and to prepare a abstract estimate
- IV. Identify the preparation of bar bending schedule for reinforcement works.
- V. Create various Tender documents for bidding purpose.

VI. COURSE OUTCOMES:

After completing this course the student must demonstrate the knowledge and ability to:

1. Understand the preparation of an Abstract Estimate for a Residential Building
2. Analyse the units for various quantities of items of work.
3. Understand the preparation of detailed estimation of building.
4. Demonstrate the calculation of earth work quantity for roads and canals.
5. Evaluate the rates for various items of work
6. Design and Prepare Bar bending schedule for reinforcement works.
7. Calculate the quantities of steel for different items of work.
8. Understand how to prepare a Notice inviting tender document for bidding.
9. Analyse the building as per new estimated cost.
10. Demonstrate knowledge of professional and ethical responsibilities and the impact of engineering solutions on the society and also be aware of contemporary issues.
11. Create new technologies to develop concrete estimating methods for more ethical and enhanced usage.
12. Evaluate the valuation of building for different specifications.

VII. HOW PROGRAM OUTCOMES ARE ASSESSED:

Program Outcomes		Level	Proficiency assessed by
PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.	H	Assignments, Tutorials, Exams
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences	H	Lectures, Assignments, Exams
PO3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.	S	Mini Projects
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.	-	-
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.	-	-
PO6	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.	-	-
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	-	-
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.	-	-
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	-	-
PO10	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.	S	Mini Projects
PO11	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	-	-
PO12	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	-	-

S – Supportive

H - Highly Related

VIII. HOW PROGRAM SPECIFIC OUTCOMES ARE ASSESSED:

Program Specific Outcomes		Level	Proficiency assessed by
PSO1	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.	H	Lectures, Assignments
PSO2	BROADNESS 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.	S	Labs, Projects
PSO3	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.	-	-

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IX. SYLLABUS:

UNIT – I

GENERAL ITEMS OF WORK IN BUILDING - Standard Units, Principles of working out quantities for detailed and abstract estimates – Approximate method of Estimating. Earthworks for roads and canals.

UNIT - II

EARTHWORKS FOR ROADS AND CANALS.

UNIT – III

RATE ANALYSIS- Working out data for various items of work over head and contingent charges.

UNIT – IV

REINFORCEMENT BAR BENDING and bar requirement schedules. Contracts - Types of contracts - Contract Documents - Conditions of contract

UNIT – V

VALUATION OF BUILDINGS- standard specifications for different items of building construction

Textbooks:

1. B. N. Dutta (2000), Estimating and Costing, UBS publishers, New Delhi, India.
2. G. S. Birdie (1982), Estimating and Costing, DhanpatRai publications, New Delhi, India.

Reference Books:

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

X. COURSE PLAN:

At the end of the course, the students are able to achieve the following course learning outcomes:

Lecture No.	Topics to be covered	Course Learning Outcomes	References
1-2	Introduction to General items of work in Building	Units of different quantities, procedure of estimating.	T1: 1.1 -1.2
3-4	Principles of working out quantities	Principles of working out quantities for detailed and abstract estimate	T1: 1.2-1.3
5-6	Preparation of quantities for abstract estimate.	Problems related to estimation of quantities for abstract estimates by approximate method of estimating	T1: 1.4
7-8	Preparation of quantities for detailed estimate	Problems related to estimation of quantities for detailed estimates by approximate method of estimating	T1:1.5- 1.6
9-10	Estimates of building	Different types of estimates	T1:2.1-2.2
11-12	Different methods of estimation	Description of Long wall short wall method of estimation and Centre Line method of Estimation	T1:2.3-2.4
13-14	Long wall short wall method	Problems related to long wall and short method for a single room building	T1:2.5-2.6
14-15	Long wall short wall method	Problems related to long wall short wall method for a Two room building & Residential building	T1:2.6.1-2.6.3
15-16	Centre line Method	Problems related to centre line method for a single room building	T1:2.7.1-2.7.2
17-18	Centre line Method	Problems related to Centre line method for a Two room building & Residential building	T1: 2.7.3-2.7.4
19-20	Road Estimating	Introduction ,cross section of typical road in Banking and Cutting	T1: 7.1-7.3
21-22	Different Methods of Road Estimating	Mid-sectional area method, Mean Sectional area method, Prismoidal formula method	T1: 7.4-7.6
23-24	Problems on Road Estimating	Problems related to Mid-sectional area method	T1: 7.7
25-26	Problems on Road Estimating	Problems related to Mid- area method	T1: 7.8

27-28	Problems on Road Estimating	Problems related to Prismoidal formula method	T1: 7.9
29-30	Irrigation and Canal works	Introduction to earth work of canals, different cases of canal section and their cross section	T1: 9.1-9,2
31-32	Problems on Canal works	Problems related to earthwork of canals for fully Excavation case	T1: 9.3
33-34	Problems on Canal works.	Problems related to earthwork of canals for Partly Excavation & Partly embankment case	T1: 9.4
35-36	Problems on Canal works	Problems related to earthwork of canals for fully embankment case	T1:9.5-9.6
37-38	Rate analysis	Introduction to rate analysis, material required for various items of work , rates of various quantizes , material , labour	T1:11.1-11.2
39-40	Analysis of rates for Cement Concrete for different mix proportions	Problems on analysis of rates for Cement Concrete of 1:2:4; 1:3:6 & 1:5:10 mix	T1: 11.3-11.4
41-42	Analysis of rates for Cement mortar for different mix proportions	Problems on analysis of rates for Cement Mortar of 1:2 ; 1:3 & 1:5 mix	T1: 11.5-11.6
42-43	Analysis of rates for plastering	Analysis of rates for Plastering for different mix proportions	T1: 11.7-11.8
44-45	Bar Bending Schedule	Reinforcement bar bending schedule	T2: 13.1-13.2
46-47	Bar Bending Schedule.	Problems related to reinforcement bar bending and bar bending schedule	T2: 13.3-13.4
48-49	Contracts	Introduction to Contracting, contract document, types of contract.	T2: 17.1-17.2
50-51	Different types of Contracts	Requirements of contract, types of contract ,	T2: 17.3-17.7
52-53	Contract document	Security performance of contract, conditions of contract, labour contract, negotiated contract , Earnest money deposit & Security deposit	T2: 17.8-17.15
54-55	Conditions of Contract	Types of tenders, Scrutinizing of tender, Accepting Tenders, Notice Inviting tender	T2: 17.16-17.21
56-58	Valuation of buildings	Introduction, Valuation of buildings, standard specification for different items of work	T1: 15.1-15.4
59-60	Valuation of buildings	Sinking Fund, Deprecation, method of valuation	T1: 15.5-15.6
61-63	Valuation of buildings	Mortgage lease, fixation of rent , problems related to it	T1: 15.7-15.8

XI. MAPPING COURSE OBJECTIVES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Objectives	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I	H									H			H	S	
II	S	H	S										H	S	
III	H	H	S							H					
IV		H	S							S				S	
V	H		H							H			H	S	
VI	S		S										H		
VII	H	H	S							H			H	S	

S – Supportive

H - Highly Related

XI MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Outcomes	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	S	S								H			H	S	
2	H		S							S			H	S	
3	H	S	S							H					
4		S												S	
5	H	S	S							S			H	S	
6	H									H			H		
7		S												S	
8	S	S	S							H					
9	H		S										H	S	
10		S	S							S			H		
11	H	S	S							H				S	
12		S	S							H			H	S	

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Prepared by: Mr .Gude Ramakrishna, Associate Professor .

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