GUJARAT TECHNOLOGICAL UNIVERSITY

METALLURGY ENGINEERING (21)
ENGINEERING ESTIMATION AND COSTING
SUBJECT CODE:2182110
B.E. 8th SEMESTER

Type of course: Science & Engineering

Prerequisite: Knowledge of Metal Manufacturing Processes

Rationale: The present course aims to provide Metallurgical Engineer an exposure of various methods for estimating and costing of various product as well as processes of metal manufacturing. The subject will provide the better knowledge of calculating cost as well as estimating for an engineering product whose dimension scale ranges from small to extra-large. Since the knowledge of "Estimating and Costing" is essential to an engineer in industries to fabricate bulk storage and processing equipment's.
The subject focuses on knowledge and understanding of various costing techniques.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		ESE (V)		PA (I)	
					PA	ALA	ESE	OEP		
4	2	0	6	70	20	10	30	0	20	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	**INTRODUCTION**: Related terminology, Estimating - Importance and aim, objectives, functions, organizations of Estimating department, Estimating Procedure, Constituents of Estimation, Costing-Definition, aims, procedure of Costing, types of costs, Costing controls, Difference between Estimating and Costing, Control of Costs, Elements of PPC and Time & Motion studies, Allowance, Overheads, Profit and Pricing Policy.	**08**	**13**
2	**COSTING:** Elements of costs, Costing methodology for raw materials, Products and Services, Nature of costs - Direct, Traceable and Non traceable; Wastage, Determining of cost of raw materials, Manufactured products, Labour, Indirect expenses and depreciation, Customer as cost object, Micro-cost structure, Tracing costs to customers, Profit contribution by customer, Wage payment - Methods to arrive at wages, Incentives.	**08**	**14**
3	**COST MANAGEMENT**: Strategic analysis - raw materials, finished products, Customers, strategic and structural analysis, Value engineering, Cost variability, Value chain, Process and activity analysis, Continuous cost improvement, Performance evaluation, Capacity, Quality and Productivity Management.	**08**	**14**
4	**MENSURATION:** Areas of plane figures, areas of irregular figures, volumes & surface	**04**	**7**

	areas of solids, Guldinus rules- estimation of surface area & volume of solids of revolution.		
5	**ESTIMATION OF VARIOUS MANUFACTURING PROCESSES:** **ESTIMATION IN MACHINE SHOP:** Cutting speed, feed, depth of cut, lathe operations- turning, knurling, facing, drilling, boring, reaming, threading, tapping,. Milling operations- cutting, facing. Grinding operations- surface grinding, cylindrical grinding, shaping & planning, power consumption. **ESTIMATION IN SHEET METAL SHOP:** Operations in sheet metal shop, blank layouts, estimation of time, capacity for power process. **ESTIMATION IN PATTERN MAKING & FOUNDRY SHOPS:** Estimation of pattern cost, Estimation of foundry shop. Foundry cost.	**10**	**16**
6	**ESTIMATION IN FORGING SHOP:** Forging- hand forging, machine forging, forging operations, estimation procedure, and estimation of weight, losses & time. **ESTIMATION IN WELDING SHOP:** Types of welding joints**,** estimation of welding cost. Estimation of gas cutting cost, estimation of arc welding cost, factors affecting welding cost.	**08**	**13**
7	**BUDGET AND BUDGETARY CONTROL**: Budget, objectives, classification of budgeting, budgetary control, securing flexibilities of budgeting, limitations of budget; Operational and capital budgets, Cash flow schedules, Estimating cost, Preparing an annual budget for the Engineering Department.	**08**	**13**
8	**ENGINEERING CONTRACTS**: Introduction, types of contracts and similarities, Terms of payments, Firm price contracts, Cost reimbursable contracts, Target of cost contracts, Schedule of rate contracts, Bill of quantities contracts, Compound contracts, Contract policy, Legal rights and commercial interests	**06**	**10**
	Total	**60**	**100**

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	**20**	**45**	**10**	**10**	**05**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1. Process Planning & Cost Estimation Edited by Dennis Lock, B & H Ltd.
2. Handbook of Engineering Management Edited by Dennis Lock, B & H Ltd.
3. Mechanical Estimating and Costing by B. P. Sinha Tata McGraw Hill Publishing Co. Ltd.
4. Mechanical Estimating and Costing by T. R. Banga and S. C. Sharma, Khanna Publishers

Course Outcome:

After learning the course the students should be able to:
-Understand the procedure of Estimation & Budget cost estimation
-Distinguish various cost components.
-Apply basic calculation in manufacturing processes.
-Analyze the cost components.
-Estimate the Total cost from Raw materials to finished product including Power cost.
-Acquire knowledge to prepare budget & production planning.
-Determination of various Cost Accounting, Cost Control and Cost Reduction techniques
-Improved analytical skill about the practice engineering.

Design based Problems (DP)/Open Ended Problem:

-Calculate the dimensions, cost & quantity required for destructive testing of metals.
-Calculate the Power & fuel consumption in Welding /forging/foundry.
- Any assignments decided by subject faculty.

List of Open Source Software/learning website:

1. onlinelibrary.wiley.com/doi/10.1002/0471777463.ch16/summary
2. people.ucalgary.ca/~design/engg251/notes/cost_estimating.pdf
3. www.iasj.net/iasj?func=fulltext&aId=25453

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should be submitted to GTU.