



## **C.U.SHAH UNIVERSITY – Wadhwan City**

**FACULTY OF:** - Technology and Engineering (Diploma Engineering)

**DEPARTMENT OF:** - Mechanical Engineering

**SEMESTER:** - VI **CODE:** - 2TE06ECC1

**NAME OF SUBJECT:** - Estimating, Costing and Contracting

### **Teaching & Evaluation Scheme:-**

Subject Code	Name of the Subject	Teaching Scheme				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hours	Marks	Hours	Pr/Viva	TW	Pr	
<u>2TE06ECC1</u>	Estimating, costing and contracting	2	0	2	4	3	30	1.5	70	3	--	20	30	150

### **1. Objective: -**

This course is designed to develop the ability in the students to evaluate materials, consumables and process costs in the monetary units. Hence, it will help to increase the productivity of the organization and conservation of valuable resources. This course will also help in developing the skills required in the process of decision making and to plan, use, monitor and control resources optimally and economically. This will also be helpful in budgeting. The realm of this course is enlarged to estimate the process costs for fluid and thermal applications also.

The course content should be taught and implemented with the aim to develop different types of skills so that students are able to acquire following competencies:

- Plan, use and control resources optimally and economically.
- Estimate production/operation cost for budgeting and analysis.

### **2. Prerequisites: -**

- Manufacturing engineering-I, Manufacturing engineering-II, Material science etc.

### **Course outline:-**

Sr. No.	Course Contents	No. of Hours
1	<b>Introduction</b> Need, Scope & importance of ECC in industries. Difference between costing and estimating. Terminology associated with various cost elements and their classification. Terminology associated with overheads, their classification and allocation. Determination of selling price and catalogue price. Depreciation and obsolescence: Definition, types, different methods of calculating depreciation, numeric examples. Concept of Machine Hour Rate (MHR) and process hour rate (PHR). Method to calculate MHR for any machine/machine tool. Method and example to calculate MHR of Lathe, Milling, Drilling, Grinding and Press tool. Method to calculate PHR for any process. Method and example to calculate PHR of running diesel generating set, running air conditioner, running refrigerator, welding and gas cutting.	03
2	<b>Break Even Analysis</b> Classification of costs as fixed and variable costs. Relationship between the costs and quantity of production. Break Even Chart : Definition of Break Even Point (BEP) and its needs in industry, Procedure of construction of Break Even Chart, Assumptions made in constructing Break even chart, Calculation of BEP analytically and graphically, Margin of safety, its importance and its derivation, Effect of changing various parameters on BEP, Numeric examples.	03

3	<b>Cost Estimation of Welding</b> Elements of cost in arc welding, Factors effecting arc welding cost, Estimating cost elements for: Consumables in arc welding and gas cutting, Gas cutting and Arc welding, Estimation of production cost of given welding job for above methods.	03
4	<b>Cost Estimation of Forging and Casting</b> Cost terminology associated with forging shop, The procedure of calculating material cost of a product for forging shop (including input weight, cut weight, forged weight etc.), Procedure of estimating cost of forging dies, Procedure of estimating forging cost. Given the forged component, estimate forging cost. Cost terminology associated with foundry shop. The procedure of calculating material cost of a product for foundry shop. Procedure of estimating cost of pattern making. Procedure of estimating foundry cost. Given the casting component, estimate foundry cost.	06
5	<b>Cost Estimation of Machined Part</b> The terminology associated with machine shop estimation. Procedure to estimate material cost, Procedure of estimating cost of machined part for following operations: Lathe operations (Facing, outside/inside turning, boring, drilling on lathe, grooving and outside threading). Drilling operations (Drilling, reaming, tapping). Shaping operations. Milling operations (Face milling, side and face cutting, end milling, key way milling and gear forming). Cylindrical grinding operations (Plain cylindrical grinding). For given machined part, estimate material cost and machining cost.	05
6	<b>Estimation of Process Cost</b> Understand importance of estimating various process costs. Procedure and steps to estimate cost for following processes: Producing power using diesel generating set (cost per hour and cost per unit), Power produced at thermal power plants. (Cost per unit), Pouch packaging (Cost per pouch), Heat exchanger- cooling or heating (Cost per hour) and Ice plant (Cost per unit weight). Given the required set of input, estimate the cost of processes specified above.	04
7	<b>Budgeting</b> Define budget and budgetary control, Purpose of budget, Various types of budgets, Benefits of budget, With given example, interpret industrial budget, Prepare simple budget given required input data, Explain various accounting terminology like book value, Net Present Value, Work in progress, Gross Domestic Product (GDP), balance sheet terminology etc.	02
8	<b>Contracting</b> Define contracts, its characteristics and advantages, Types of contract, Tendering, manual tendering and E-tendering. Provision of different conditions in a contract, Documents required in an engineering contract (explain). Prepare a contract for a given input situation.	02

#### **Suggested List of Exercises/Practicals**

- Preparatory activity
- Collection of parts from the industries/market/scrap merchants (Welded, casted, forged machined)
- Welding estimation
- Casting estimation
- Forging estimation
- Machining estimation
- Process estimation

#### **Suggested List of Student Activities**

- Do market survey and find prevailing hourly rates of lathe, milling drilling machines and diesel generating sets (Specify output - HP or kW).
- Do market survey and find prevailing rates of commonly used engineering materials like MS, brass, copper, stainless steel, Aluminum, etc.

#### **Suggested Learning Resources**

##### **(A) List of Books:**

- Mechanical estimating and costing- Banga and Sharma
- Mechanical estimating and costing- Shrimali and Jain
- Mechanical costing and estimation- Singh and Khan
- Learning package in ECC- NITTTR, Bhopal

##### **(B) List of Software/Learning Websites:**

- <http://calculatoredge.com/index.htm#mechanical>