



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Diploma Engineering

Level: Diploma

Branch: Mechanical Engineering

Subject Code: DI04019031

Subject Name: Engineering Costing and Plant Maintenance

w.e.f. Academic Year:	2025-26
Semester:	4 th
Category of the Course:	Professional Elective - II

Prerequisite:	Mathematics
Rationale:	This course is designed to develop students' ability to evaluate materials, consumables, and process costs in monetary terms. By doing so, it contributes to improving organizational productivity and promoting the conservation of valuable resources. The course also helps students build essential decision-making skills and learn how to plan, use, monitor, and control resources efficiently and economically. In addition, it provides fundamental knowledge and skills related to industrial maintenance problems, including their causes and possible remedies.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes
01	Understand the concept of estimation, costing and depreciation.
02	Apply break even analysis to get optimum production level.
03	Estimate cost for various conventional manufacturing processes.
04	Explain various maintenance practices, machine diagnostics methods, and fault analysis techniques.
05	Demonstrate understanding of industrial safety standards, hazard identification, and preventive safety practices.

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+(PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Tutorial/ Practical		
				ESE(E)	PA(M)	PA(I)	ESE(V)	
3	0	2	4	70	30	20	30	150



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Course Content:

Unit No.	Content	No. of Hrs	% of Weightage
1.	Introduction of Costing 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. Numerical problems.	08	18
2.	Break even analysis Classification of costs as fixed and variable costs. Relationship between the costs and quantity of production. 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. Numerical problems.	06	16
3.	Costing in Welding and Fabrication shop Estimation of fabrication cost of real time object like safety grill (e.g. windows, doors, etc.), gate, various shades, etc. (Sizes are given) Estimate Solar Roof Top costing for various capacities. It includes, cost of welding, framing, solar panel, labour, taxes, subsidies, etc. Estimate ONLY material cost in sheet metal work for various jobs. (Concept of development of solid surfaces to be used. Consider regular shapes like cylinder and prism only) Numerical problems.	08	18
4.	Costing in forging and casting Calculate volume of shapes of various combinations of cylinder, square, prism and sphere. Calculate mass and material cost of given component (shape of component should be combination of above basic shapes like I-section, T-section, L-section, etc.). Calculate various forging losses for given data.	08	18



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	Estimate forging cost (for given data) Estimate pattern making cost (for given data) For a given component, Estimate casting cost including all losses. Numerical problems.		
5.	Maintenance Concepts and Practices Introduction to Maintenance – Need, objectives, types of maintenance Preventive, Predictive and Breakdown Maintenance Condition-based maintenance – Vibration, temperature, lubrication checks Maintenance planning, scheduling and documentation Tools and equipment used in maintenance Maintenance records, history cards and checklists	05	10
6.	Machine Diagnostics and Fault Analysis Basics of machine diagnostics – Purpose and importance Common mechanical faults – misalignment, imbalance, wear, leakage and noise Vibration analysis – causes and interpretation Thermal analysis – overheating, friction, lubrication issues Fault tracing methods and troubleshooting procedure Root cause analysis (RCA) and corrective actions	05	10
7.	Industrial Safety Industrial hazards – mechanical, electrical, chemical and fire hazards Personal Protective Equipment (PPE) and safe working practices Fire triangle, fire extinguishers, PASS method Safety signs, signals and colour codes Machine guarding, lockout–tagout (LOTO) Workplace safety guidelines and emergency procedures Accident causes, reporting and prevention techniques Factory Act 1948 – key provisions	05	10
	Total	45	100

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
5	20	30	5	5	5

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)



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References/Suggested Learning Resources:

(a) Books:

1. Mechanical estimating and costing, Banga and Sharma, Khanna Publications.
2. Maintenance Engineering and Management, R. C. Mishra & K. Pathak, PHI Learning Pvt. Ltd.
3. Maintenance Engineering, Er. S. K. Srivastava, S. Chand & Company, (ISBN 9788121926447)

(b) Open source software and website:

1. <https://www.youtube.com/c/MechanicalEnggSubjectsGTU>
2. <https://youtu.be/7F1n5OgnK4I>
3. <https://youtu.be/btrxp4F-Q>
4. https://youtu.be/aTnDZF_C-XM
5. <https://youtu.be/hnfhU3iYb4>

Suggested Course Practical List:

Sr	Practical Exercises	Hrs
1	Break even analysis of given product <ul style="list-style-type: none">• Data should be gathered from market.	02
2	Costing of given forged component <ul style="list-style-type: none">• Calculate volume of shapes of various combinations of cylinder, square, prism and sphere.	02
3	Calculate mass and material cost of given component <ul style="list-style-type: none">• The shape of component should be combination of basic shapes like I-section, T-section, L-section, etc.	04
4	Estimation of fabrication cost <ul style="list-style-type: none">• It may be real time objects like safety grill (e.g. windows, doors, etc.), gate, various shades, etc.	04
5	Estimate Solar Roof Top costing for various capacities <ul style="list-style-type: none">• It includes cost of welding, framing, solar panel, labour, taxes, subsidies, etc.	04
6	Preparation of Preventive Maintenance Schedule Tasks: Select any workshop machine (lathe, milling, drilling, compressor). Identify machine parts requiring routine maintenance. Prepare Preventive Maintenance (PM) schedule including: <ul style="list-style-type: none">○ Daily / Weekly / Monthly PM tasks○ Lubrication chart○ Checklist format○ Spare parts required Prepare machine maintenance history card .	04



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7	Machine Fault Identification & Root Cause Analysis (RCA) Observe any rotating equipment (motor, pump, fan, lathe spindle). <ul style="list-style-type: none">Identify at least 3 possible faults, such as:<ul style="list-style-type: none">MisalignmentBearing wearImbalanceLubrication failurePerform step-by-step fault tracing.Prepare Root Cause Analysis (RCA) using:<ul style="list-style-type: none">Fishbone diagramFault treeSuggest corrective actions.	04
8	Demonstrate safety equipment and their methods use.	02
9	PPT Presentation (Any topic from the syllabus of this subject)	04
	Total	30
