

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme	Diploma Engineering				Branch	Mechanical Engineering			
Semester	V				Version	1.0.0.0			
Effective from Academic Year		2020-21			Effective for the batch Admitted in			July 2018	
Subject code	1ME2504	Subject Name			Estimating Costing and Contracting				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	2		1		3	Theory	40	60	100
Hours	2		2		4	Practical	30	20	50

Pre-requisites:
Basic knowledge of manufacturing engineering.

Course Learning Outcomes:
The course content should be taught and implemented with an aim to develop different skills leading to the achievement of the following competencies and course learning outcomes:
After completions of this course, students will able to:
CO1. Calculate material cost of given component/product.
CO2. Identify and estimate elements of cost in various processes.
CO 3. Perform break even analysis to calculate break even quantity.
CO 4. Investigate the problem of cost and suggest their solution using cost reduction techniques.
CO 5. Interpret given model of balance sheet and profit loss account.

Course Content						
Name of UNIT	Unit Content		Unit Learning Outcomes		Marks	Hrs.
Chapter –1 Introduction	1.1	Need, Scope & importance of ECC in industries.	1a.	Explain the terminology of ECC cost elements, overheads, selling price and catalogue price.	7	4
	1.2	Difference between costing and estimating.	1b.	Explain need, scope & importance of ECC in industries.		
	1.3	Terminology associated with various cost elements and their classification.	1c.	Compare costing and estimating.		
	1.4	Terminology associated with overheads, their classification and allocation.	1d.	Select appropriate method of depreciation and calculate it.		
	1.5	Determination of selling price and catalogue price.				
	1.6	Depreciation and obsolescence: Definition, types, different methods of calculating depreciation.				
	1.7	numeric examples.				
	2.1	Classification of costs as fixed and variable costs.	2a.	Classify costs.		

<p>Chapter –2 Break even analysis.</p>	<p>2.2 Relationship between the costs and quantity of production. 2.3 Definition of Break Even Chart (BEC) and its needs in industry. 2.4 Procedure of construction of Break Even Chart. 2.5 Assumptions made in constructing Break even chart. 2.6 Calculation of BEP analytically and graphically. 2.7 Margin of safety, its importance and its derivation. 2.8 Effect of changing various parameters on BEP. 2.9 Numeric examples.</p>	<p>2b. Construct break even chart and determine break even quantity from given data.</p>	<p>7</p>	<p>3</p>
<p>Chapter – 3 Cost estimation of welding.</p>	<p>3.1 Elements of cost in arc and gas welding. 3.2 Factors effecting arc welding cost. 3.3 Estimating cost elements for Consumables in arc welding and gas cutting. 3.4 Estimation of production cost of given welding job. 3.5 Numeric examples.</p>	<p>3a. List Factors effecting arc welding cost. 3b. Estimate cost of consumables and production for gas cutting and welding of a given job.</p>	<p>8</p>	<p>6</p>
<p>Chapter – 4 Cost estimation of forging.</p>	<p>4.1 Cost terminology associated with forging shop. 4.2 The procedure of calculating material cost of a product for forging shop (including input weight, cut weight, forged weight etc.). 4.3 Procedure of estimating forging cost. 4.4 estimate forging cost for forged component.</p>	<p>4a. Estimate cost of material, forging dies and production cost for a forging component. 4b. Estimate cost of material, pattern and production for a forging component.</p>	<p>10</p>	<p>4</p>
<p>Chapter – 5 Cost estimation of machined part.</p>	<p>5.1 Procedure of estimating cost of machined part for following operations: 5.2 Lathe operations (Facing, outside/inside turning, boring, drilling on lathe, grooving and outside threading). 5.3 Drilling operations (Drilling, reaming, tapping). 5.4 Shaping operations. 5.5 Milling operations (Face milling, side and face cutting, end milling, key way milling and gear forming).</p>	<p>5a. Estimate the machined part cost for lathe, drilling, milling and shaping operations.</p>	<p>8</p>	<p>4</p>

Chapter –6 Estimation of process cost.	6.1	Understand importance of estimating various process costs.	a.	Identify the elements required to estimate the process cost.	10	4
	6.2	Procedure and steps to estimate cost for Producing power using diesel generating set (cost per hour and cost per unit).	6b.	Estimate the cost of processes required based on given set of input.		
	6.4	Procedure and steps to estimate cost for Power produced at thermal power plants. (Cost per unit).				
	6.5	Procedure and steps to estimate cost for Pouch packaging. (Cost per pouch).				
	6.7	Procedure and steps to estimate cost for Ice plant. (Cost per unit weight).				
Chapter –7 Budgeting and contracting.	7.1.	Define budget and budgetary control.	7a.	Explain various budgetary and accounting terminologies.	10	5
	7.2	Purpose of budget.				
	7.3	Various types of budgets.				
	7.4	Benefits of budget.	7b.	Prepare simple budget.		
	7.5	Prepare simple budget given Required input data.				
	7.6	Explain various accounting terminology like book value, Net Present Value, Work in progress, Gross Domestic Product (GDP), balance sheet terminology, etc.				
	7.7	Define contracts, its characteristics and advantages.	7c.	Interpret given contract terms and conditions.		
	7.8	Types of contract.	7d.	Select parameters, terms and conditions to be included in contract.		
	7.9	Tendering, manual tendering and E-tendering.				
	7.10.	Provision of different conditions in a contract.				
	7.11.	Documents required in an engineering contract.				
				Total	60	30

List of Practical		
No.	Unit	Name of Practical
1	Chapter No. 1	Preparatory activity: a. Write various equations to calculate area and volume of commonly used shapes. b. List densities of commonly used materials. c. Collect market rates for various consumables like diesel, welding rods, gas, cutting tools, electricity rates, etc.
2		Collection of parts:

	Chapter No. 2	<p>a. Collect the finished parts from industries/market/scrap merchants consisting:</p> <p>i. Welded parts (Minimum THREE).</p> <p>ii. Casted parts (Minimum THREE).</p> <p>iii. Forged parts (Minimum TWO).</p> <p>iv. Parts having five to six machining operations like cutting, turning, threading, grinding, milling, shaping, drilling, etc.(Minimum FIVE).</p> <p>b. Measure and prepare production drawings of all the parts using A4 size paper (Manually).</p>
3	Chapter No. 3	<p>Welding estimation:</p> <p>a. Determine raw material volume for all welded parts.</p> <p>b. Select welding rod to be used. Estimate quantity of welding rod required.</p> <p>c. Determine material and consumables costs.</p> <p>d. Derive total cost of the part.</p>
4	Chapter No. 4	<p>Casting estimation:</p> <p>a. Determine raw material volume for all casted parts (calculate input weight, cut weight, net weight, losses etc.).</p> <p>b. Estimate pattern cost.</p> <p>c. Determine material and consumables costs.</p> <p>d. For each part, estimate casting cost. Show the assumptions and steps followed to estimate casting cost.</p> <p>e. Derive total cost of the part.</p>
5	Chapter No. 5	<p>Forging estimation:</p> <p>a. Determine raw material volume for all forged parts.</p> <p>b. Prepare die drawings (production drawings with all dimensions, surface finishes, allowances, etc.) for all parts.</p> <p>c. Estimate dies cost.</p> <p>d. Determine material and consumables costs.</p> <p>e. For each part, estimate forging cost. Show the assumptions and steps followed to estimate forging cost.</p> <p>f. Derive total cost of parts.</p>
6	Chapter No. 6	<p>Machining estimation:</p> <p>a. Determine raw material volume for all machined parts.</p> <p>b. For each part, tabulate operation, cutting tool/s to be used and cutting parameters (speed, feed and depth of cut) to be used.</p> <p>c. Estimate raw material cost.</p> <p>d. For each part, estimate machining cost. Show the assumptions and steps followed to estimate machining cost.</p> <p>e. Derive total cost of parts.</p>

List of Instruments/Equipment/TrainerBoard

1	Vernier calliper, 150mm.
2	Micrometre, 0-25mm and 25-50mm.
3	Bevel protector.
4	Thread gauges.

Link of Text Books

No	Title of Books	Authors	Publication
1	Mechanical estimating and costing.	Banga and Sharma	Khanna Publication

List of Reference Books

No	Title of Reference Books	Authors	Publication
1	Mechanical estimating and costing.	Shrimali and Jain	Khanna Publishers.

3	Mechanical costing and estimation.	Singh and Khan	Khanna Publishers
4	Learning package in ECC.	NITTTR, Bhopal	NITTTR, Bhopal.
Link of Learning Web Resource			
1	https://www.slideshare.net/srinivas2036/estimation-and-costing-contracts		
2	http://nptel.ac.in		
3	https://youtu.be/JlBk6ndltg		
4	https://youtu.be/UQxzSqSRbxw		

PO & CO Mapping							
Sr. No.	Name of PO	Description	Co1	Co2	Co3	Co4	Co5
1	PO 1	Acquire fundamental knowledge of mathematics, science, and mechanical engineering.	High	High	High	High	High
2	PO 2	Design and conduct experiments, as well as analyze and interpret data.	Moderate	High	Moderate	Moderate	Moderate
3	PO 3	Use the techniques, skills, and modern engineering tools necessary for engineering practice	High	High	High	High	High
4	PO 4	Function in multi-disciplinary teams and identify, formulate, and solve engineering problems.	High	Moderate	Moderate	Moderate	Moderate
5	PO 5	Clear understanding of his duties and responsibilities as a mechanical engineer.	Slight	Slight	Slight	Slight	Slight
6	PO 6	Develop effective communication skill and provide leadership for professional development.	None	None	None	None	None
7	PO 7	Engage in life-long learning in mechanical engineering field and comprehend issues related to environment and sustainable development.	Slight	Slight	Slight	Slight	Slight
8	PO 8	Graduate will demonstrate knowledge of professional and ethical responsibilities.	Slight	Slight	Slight	Slight	Slight
9	PO 9	Incorporate economics and business practice including project and risk management.	Moderate	Moderate	Moderate	Moderate	Moderate
10	PO 10	Graduated are able to share their knowledge to the industries as well as society.	Moderate	Moderate	Moderate	Moderate	Moderate
11	PO 11	Graduated will be able to apply their skill and knowledge for the sustainable development of nation.	None	None	None	None	None
12	PO 12	Graduated are able to learn to work with the team and also with the inter discipliners.	Moderate	Moderate	Moderate	Moderate	Moderate