

# कार्यालय प्राचार्य, शासकीय पॉलीटेक्निक जशपुर (छ.ग.)

ग्राम-झरगोव, पोस्ट- घोलेग, तह. जशपुर, जिला- जशपुर (छ.ग.) पिन कोड -496338

Website: www.gpjashpur.ac.in

E-Mail: govtpolyjashpur@gmail.com

## LESSON PLAN SESSION JUL – DEC -24

SUBJECT: Machine Design, Estimation & Costing SEMESTER: 5<sup>th</sup>

BRANCH: - Mechanical Engineering

UNIT NUMBER	NAME OF THE TOPIC	NO OF CLASS REQUIRED	REMARK
Unit 1.0 Fundamentals of Machine Components Design	1.1 Basic concepts of design in general. 1.2 Factors to be considered in design of machine components a. Selection of Mechanism b. Material c. Loading and Forces on the elements d. Size, shape and space requirements e. Manufacturing f. Operating requirement g. Reliability and safety aspects h. Inspectability i. Maintenance, cost and aesthetics of the designed product j. Failure criterion	02	
	1.3 Codes and Standards in Machine Design 1.4 Engineering Materials a. Properties and applications of common engineering materials.	01	
	1.4 b. Important mechanical properties of materials: Elasticity, Plasticity, Hardness, Ductility, Malleability, Brittleness, Resilience Toughness, Creep etc.	02	
Unit 2.0 Design for Static Loading	2.1 Types of loads, Types of stresses, strains and strengths.	02	
	2.2 Factor of safety and stress concentration factor.		
	2.3 Design under static single axial loading conditions.	01	
	2.4 Theories of failure.	02	
	2.5 Design under static Multiaxial loading conditions.	01	
Unit 3.0 Design of Shaft, Axle, Keys and Couplings	3.1 Types of shafts, Shaft materials, Standard sizes.	01	
	3.2 Design of solid and hollow Shaft and Axles under twisting moment (TM), Bending Moment (BM). a. Geometric Layout b. Deflection and Rigidity	01	
	3.2 c. Design procedure of solid and hollow shaft based on strength d. Design procedure of solid and hollow shaft based on stiffness.	02	
	3.3 Types of keys, effect of keyway on the strength of shaft, design of rectangular and square sunk key.	02	
	3.4 Design of Couplings (Muff coupling and Rigid Protected Flange coupling)	02	
	Unit 4.0 Design of fasteners	4.1 Advantages and disadvantages of riveted Joints 4.2 Methods of riveting, types of rivet heads, Rivet material and properties, kinds of riveted joints	01
4.3 Failure of riveted joints, Design of riveted joints, efficiency of riveted joints (including eccentrically loaded)		02	
4.4 Boiler joints		01	
4.5 Types of welded joints, representation of welds			
4.6 Design of welded joints for static loads		02	

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E-Mail: [govtpolvjashpur@gmail.com](mailto:govtpolvjashpur@gmail.com)

	4.7 Strength of welded joints at varying loads		
	4.8 Introduction to threaded joints, types of screw fastening, profile of screw threads, materials for fasteners	01	
	4.9 Design of bolted joints in various loading conditions (including eccentrically loaded)		
Unit 5.0 Antifriction Bearings	5.1 Classification of Bearings – Sliding contact and rolling contact.	01	
	5.2 Terminology of Ball and Roller bearings – life load relationship, basic static load rating and basic dynamic load rating.	02	
	5.3 Selection of ball bearings using manufacturer's catalogue.	02	
Unit 6- Fundamentals of Estimating and Costing	6.1 Definition and aims of Estimating, Functions of Estimating and role of Estimating department.	01	
	6.2 Estimating Procedure and constituents of Estimation.		
	6.3 Definition and aims of Costing.	01	
	6.4 Difference between Estimating and Costing.		
	6.5 Procedure of Costing, Costing Methods.		
	6.6 Advantages of efficient costing	01	
Unit-7.0 Estimation and Costing Applications	6.7 Elements of Cost- Material, labour, Expenses.		
	6.8 Direct and Indirect cost: Factory expenses, administrative expenses, selling expenses and distribution expenses.	01	
	6.9 Components of cost		
Unit-7.0 Estimation and Costing Applications	7.1 Terminology used in machine shop like cutting speed, feed and depth of cut	01	
	7.2 Lathe Operations- Turning, Facing, Knurling, Drilling, Boring, Reaming, Threading and Tapping		
	7.3 Estimation of volume and weight of material	02	
	7.4 Use of formula to calculate actual machining time for different machining operations	02	
	7.5 Estimation of time related to Welding shop	01	
	7.6 Estimation of time related to Forging shop	01	
	7.7 Estimation of time related to Pattern making and Foundry shops	01	
Total Class Required		45	

Lecturer Name & Sign. -

*P. K. Gupta*

HOD Sign: -