Devi Ahilya University, Indore, India Institute of Engineering & Technology				**II Year B.E. (Mechanical Engg.) (Full Time)**			
Subject Code & Name	**Instructions Hours per Week**			**Credits**			
MER4C3 Machine Design & Drawing	**L**	**T**	**P**	**L**	**T**	**P**	**Total**
	3	**1**	**2**	**3**	**1**	**1**	**5**
Duration of Theory Paper: 4 Hrs							

Learning Objectives:
1. To develop in students, machine drawing skills for communication of design concepts, ideas and design of engineering products
2. To expose them to existing national standards related to drawings of machine parts.
3. To introduce the concept of design procedure of simple machine elements.

Prerequisite(s): Engineering Drawing.

COURSE CONTENTS

UNIT-I
Design Practice Introduction: Introduction, Classification, General Considerations and Procedure of Machine Design, Design Stress, Factor of Safety, Stress and Deflection Analysis, Engineering Materials and Applications, Design of Pins / Keys, Cotter and Knuckle.

UNIT-II
Design of Permanent Joint: Design of Riveted Joints for Boiler, Structures and Eccentric Loading. Design of Welded Joints for Direct and Eccentric loading.

UNIT-III
Design of Temporary Joints: Design of Screw Fasteners for Direct and Eccentric loading. Design of Shafts and Couplings.

UNIT-IV
Machine Drawing Concepts and Practices: Introduction, Classification of Machine Drawings - Assembly Drawing, Part Drawing, Detailed Drawing, Catalogues Drawing, Drawing for Instruction Manuals, Schematic Representation, Patent Drawing. Principles of Drawings, Sectioning, Dimensioning, Limits, Fits and Tolerance, Symbols and Conventional Representation. Assembly Drawings – Introduction, Types of Assembly, Importance of BOM, Assembly procedures, Assembly of Engine Parts.

UNIT-V
Assembly Drawing Concepts and Practices and Introduction to CAD: Assembly of Machine Tools Parts, Assembly of Boiler Mountings. Production Drawings - Definitions, Difference with Normal Drawings, Method of amendment of Corrections. Reproduction of Drawing - Blue printing, Ammonia Printing, Xeroxing, Printing, Plotting. Introduction of Computer Aided Drafting - Computer Aided Drafting and Design, Advantages of Computer Aided Drafting and Design, CAD Software.

Learning Outcomes:
Upon Completing the Course, Student will able to:
1. Perform free hand sketching of machine parts with standard of machine drawing.
2. Select engineering materials based on their mechanical properties.
3. Design and draw the simple machine elements such as keys, cotters, knuckles, riveted joints, welded joints.
4. Design and draw the simple machine elements such as keys, cotters, knuckles, riveted joints, welded joints and couplings using CAD/CAM software.

Books Recommended:
[1]. V B Bhandari, *Design of Machine Elements*, 3/e, McGraw Hill Education, 2015.
[2]. N D Bhatt and V M Panchal, *Machine Drawing*, Charotar Publishing House, 2015.
[3]. K. Mahadevan, K. Balaveera Reddy, *Design Data Hand Book*, CBS Publishers & Distributors, New Delhi, 2015.
[4]. V B Bhandari, *Design Data Hand Book*, McGraw Hill Education, 2015.
[5]. PSG, *Design Data: Data Book of Engineers* by PSG college –Kalaikathir Achchagan- Coimbatore.

[6]. P S Gill, *A Text Book of Machine Drawing*, S K Kataria & Sons, 2015.
[7]. P C Gope, *Machine Design: Fundamentals and Applications*, 1/e PHI, 2015.
[8]. R L Norton, *Machine Design: An Integrated Approach*, Pearson Education, 2015.

LIST OF PRACTICAL ASSIGNMENT

1. Draw the Symbols and Conventional Representation and Sections of Simple Machine Elements.
2. Design and Conventional Drawing / Computer Aided Drawing of Cotter Joint and Knuckle Joint.
3. Design and Conventional Drawing / Computer Aided Drawing of Couplings.
4. Design and Conventional Drawing / Computer Aided Drawing of Riveted Joints.
5. Design and Conventional Drawing / Computer Aided Drawing of Welded Joints.
6. Design and Conventional Drawing / Computer Aided Drawing of Screw Fasteners.
7. Conventional Drawing / Computer Aided Drawing of Engine Parts.
8. Conventional Drawing / Computer Aided Drawing of Machine Tool Parts.
9. Conventional Drawing / Computer Aided Drawing of Boiler Mountings.
10. Design / Analyse a mechanical structure which may involve different components included in syllabus. Prepare assembly and production drawings

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