MEC135:BASICS OF MECHANICAL ENGINEERING

L:2 T:1 P:0 Credits:3

Course Outcomes: Through this course students should be able to

CO1 :: understand the fundamentals of engineering drawing including usages of drawing tools, line-types, dimensioning, letter-writing, scales and other conventions.

CO2 :: recognize and apply the conceptual framework of orthographic projections and acquire visualization skills.

CO3 :: learn the techniques to draw the isometric projections of objects.

CO4 :: describe and analyze the forces and their several effects on rigid bodies in equilibrium.

CO5 :: understand the importance of centrod, center of gravity and moment of inertia of areas and pertinent calculations.

CO6 :: acquaint with the concepts of trusses and their designing pertinent to force calculations.

Unit I

Fundamentals of Engineering Drawing : Principles of engineering drawing and its importance, drawing instruments, line-types with applications, dimensioning, single stroke vertical Gothic letter writing, plane and diagonal scales, BIS norms

Unit II

Orthographic Projections : Introduction, principles, orthographic projections in first angle and third angle projections systems, practice

Unit III

Isometric Projections : Introduction, principles, terminology, isometric scale, isometric drawings and projections of stepped, inclined, oblique, and cylindrical blocks, isometric dimensioning, practice

Unit IV

Mechanics and Analysis of Forces : Introduction, fundamentals of forces and force systems, free body diagrams, coplanar concurrent forces, 2D force components and their resultant, fundamentals of moment of forces with applications, couples, equations of static equilibrium, numerical case studies

Unit V

Centroid, Center of Gravity and Moment of Inertia : Introduction, centroid of areas, composite area, cut-out sections and lines, theorems of moment of inertia, moment of inertia of laminas, channels, composite sections and cut-out sections, mass moment of inertia of thin plates, numerical case studies

Unit VI

Analysis of Trusses : Introduction, basic concepts, plane trusses, analysis of truss by method of joint and method of sections, numerical case studies

Text Books:

1. ENGINEERING DRAWING WITH AN INTRODUCTION TO AUTOCAD by DHANANJAY JOLHE, MC GRAW HILL

2. VECTOR MECHANICS FOR ENGINEERS: STATICS AND DYNAMICS by FERDINAND P. BEER, E. RUSSELL JOHNSTON, PHILLIP J. CORNWELL, SANJEEV SANGHI, MC GRAW HILL

References:

1. ENGINEERING GRAPHICS FOR DEGREE by K.C. JOHN, PRENTICE HALL

2. ENGINEERING DRAWING by N. D. BHATT, CHAROTAR PUBLISHING HOUSE PVT. LTD.

3. ENGINEERING MECHANICS: STATICS by ANDREW PYTEL, CENGAGE LEARNING

4. ENGINEERING MECHANICS: PRINCIPLES OF STATICS AND DYNAMICS by R. C. HIBBELER, PEARSON