

RO8791 MODELING AND SIMULATION

DETAILED SYLLABUS

OBJECTIVE:

- To provide an overview of how computers are being used in mechanical component design with the use of various CAD standards and to introduce the concepts of Mathematical Modelling of Engineering Problems using FEM with 2D scalar and vector variables problems respectively.

UNIT I MODELLING AND ASSEMBLY

Assembly modelling – interferences of positions and orientation – tolerance analysis-mass property calculations – mechanism simulation and interference checking

UNIT II CAD STANDARDS

Standards for computer graphics- Graphical Kernel System (GKS) - standards for exchange images- Open Graphics Library (OpenGL) - Data exchange standards - IGES, STEP, CALS etc. - communication standards

UNIT III INTRODUCTION TO ANALYSIS

Basic concepts of the Finite Element Method - Discretization -Meshing – Mesh refinement- Mesh Enrichment- Natural co-ordinate systems -Types of elements- Special Elements- Crack tip Element- Introduction to Analysis Software.

UNIT IV TWO-DIMENSIONAL SCALAR VARIABLE PROBLEMS

Second Order 2D Equations involving Scalar Variable Functions – Variational formulation – Finite Element formulation – Triangular elements – Shape functions and element matrices and vectors. Application to Field Problems - Thermal problems.

UNIT V TWO-DIMENSIONAL VECTOR VARIABLE PROBLEMS

Equations of elasticity – Plane stress, plane strain and axisymmetric problems – Body forces and temperature effects – Stress calculations - Plate and shell elements.

TEXT BOOKS:

1. Ibrahim Zeid “Mastering CAD CAM” Tata McGraw-Hill Publishing Co.2007
2. Rao, S.S., “The Finite Element Method in Engineering”, 5th Edition, Butterworth Heinemann, 2010

REFERENCES

1. Donald Hearn and M. Pauline Baker “Computer Graphics”. Prentice Hall, Inc, 1996.
2. Foley, Wan Dam, Feiner and Hughes - "Computer graphics principles & practice" Pearson, 2nd edition, 1995.

Diploma, Anna Univ UG & PG Courses

Notes

Syllabus

Question Papers

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www.AllAbtEngg.com

3. Robert D. Cook, David S. Malkus, Michael E. Plesha, Robert J. Witt, "Concepts and Applications of Finite Element Analysis", 4th Edition, Wiley Student Edition, 2002.