VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Mechanical Engineering

GEOMETRIC MODELLING (Open Elective-I)
SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: **U18OE310ME**
Credits :02	CIE Marks:40	Duration of SEE:03Hours

COURSE OBJECTIVE	COURSE OUTCOMES *On completion of the course, students will be able to*	
The objective of this course is to understand wire-frame modelling & transformations, surface, solid modelling and assembly modelling techniques.	1	define various geometric modelling techniques and development of wire frame modelling for synthetic entities by using mathematical equations.
	2	formulate 2D transformations for geometric model by matrix approach.
	3	development of various surfaces using surface modelling.
	4	development of solid models using various solid modelling schemes and Study various Assembly constraints, Assembly tree and develop few assembled models.

UNIT-I: INTRODUCTION TO CAD
product life cycle, conventional design and computer aided design.
Wire Frame Modelling: wire frame entities and their definitions. Interpolation and approximation of curves. Concept of parametric and non–parametric representation of circle and helix curves, demonstration of 2D geometry through CAD software.

UNIT-II: SYNTHETIC CURVES
Parametric representation of cubic spline, Bezier and B– spline curves, continuity, properties and characteristics of splines. Concepts of NURBS, synthetic curves demonstration.
2D transformation and their mathematics: Translation, scaling, rotation, Homogeneous co-ordinates, Concatenated transformations.

UNIT-III: SURFACE MODELING
Analytical surfaces: Definitions of planar, surface of revolution, Tabulated cylinder. Synthetic surfaces: Cubic and Bezier surfaces, visualization of different surfaces.

UNIT-IV: SOLID MODELLING
C– rep and B– rep and feature instancing, Octree encoding, spatial enumeration, cell decomposition, sweeping approaches. Euler's representation of solid models, creation of solid model in CAD software.
ASSEMBLY MODELING: Assembly constraints, assembly tree, top down assembly, bottom up assembly, development of a history tree for a simple assembly, demonstration of simple assembly.

Learning Resources:

1. Ibrahim Zeid, "CAD/CAM- Theory and Practice", McGraw-Hill Inc. New York, 2011.
2. Steven Harrington, "Computer graphics: a programming approach", McGraw-Hill, 1987.
3. David Rogers, J. Alan Adams, "Mathematical elements for computer graphics", McGraw Hill, 1990.
4. McConnell, J. J. "Computer graphics theory into practice", Jones and Bartlett Publishers, 2006.

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1 No. of Internal Tests: 02 Max.Marks for each Internal Tests: 30

2 No. of Assignments: 03 Max. Marks for each Assignment: 05

3 No. of Quizzes: 03 Max. Marks for each Quiz Test: 05

Duration of Internal Test: **1 Hour 30 Minutes**