

SCHEME OF COURSE WORK

Course Title	: Computer Graphics		
Course Code	: 13ME2120	L T P C	: 4 0 0 3
Program:	: M.Tech.		
Specialization:	: CAD/CAM		
Semester	: II		

Course Outcomes (COs):

At the end of the course, the student will be able to

1	Devise transformations such as translation, rotation and reflection etc. of objects
2	Generate Bezier curves, Bezier surfaces and B-spline curves
3	Generate and construct meshes
4	Differentiate CSG and B-rep solid modellers
5	Develop algorithms to remove hidden surfaces, render and shade objects

Program Outcomes (POs)

At the end of the program, the students in CAD/CAM will be able to

1. acquire fundamental knowledge in of CAD/CAM
2. apply innovative skills and analyze computer aided design and manufacturing problems critically
3. identify, formulate and solve design and manufacturing problems
4. carry out research related to design and manufacturing
5. use existing and recent CAD/CAM software
6. collaborate with educational institutions, industry and R&D organizations in multidisciplinary teams
7. apply project and finance management principles in engineering projects
8. prepare technical reports and communicate effectively
9. engage in independent and life-long learning and pursue professional practice in their specialized areas of CAD/CAM
10. exhibit accountability to society while adhering to ethical practices
11. act independently and take corrective measures where necessary

Course Outcome versus Program Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	S	S	M	S	M	M			M			
CO-2	S	S	M	S	S	M			M			
CO-3	S	S	M	S	S	M			M			
CO-4	S	S	M			M			M			
CO-5	S	S	M	M	M	M			M			

S - Strongly correlated, *M* - Moderately correlated, *Blank* - No correlation

S - Strongly correlated, *M* - Moderately correlated, *Blank* - No correlation

Teaching-Learning and Evaluation

WEEK	TOPIC / CONTENTS	COURSE OUTCOMES	SAMPLE QUESTIONS	TEACHING-LEARNING STRATEGY	ASSESSMENT METHOD & SCHEDULE
1	Transformation of objects on the computer screen	CO1	<ol style="list-style-type: none"> 1. Write the three dimensional transformation matrices used for various transformations. 2. Explain about 3-D object representation 3. Explain various transformations of the objects 	Lectures, PPT, Seminar	Assignment (7 weeks)
2	scaling, translation, rotation				
3	zooming, reflection, concatenation				
4	Surface generation: Shape description requirements,	CO2	<ol style="list-style-type: none"> 1. How to generate Bezier curves 2. What are B-Spline Methods 3. How surfaces are generated 	Lectures, PPT, Seminar	
5	parametric functions				
6	Bezier methods, Bezier curves, Bezier surfaces,				
7	B-Spline methods				
	Mid-Test 1	CO1, CO2			
8	Mesh generation: Meshes, Mesh elements, types of mesh operations ,mesh representation, traversal operations ,	CO3	<ol style="list-style-type: none"> 1. What are the principles of mesh generation 2. What are mesh operations 3. How to construct a mesh data structure? 	Lectures, PPT, Seminar	Seminar (9 weeks)
9	Face based mesh representation, Half edge data structures, Constructing a mesh data structure, constructing a half edge base mesh data structure,				

10	sub division of surfaces, subdivision of splines, Constructing rules, Examples.				
11	Solid modeling: Introduction to solid modelling	CO4	<ol style="list-style-type: none"> 1. Distinguish between B-rep and CSG solid model representations 2. What are primitives 3. Explain Boolean operations used in solid modelling 	Lectures, PPT, Seminar	
12	Implicit representation: primitives and skeletal elements, combination of fields – Boolean operations,				
13	polygonization, Solids modeling by boundary representation and CSG.				
14	Rendering and shading algorithms: Rendering	CO5	<ol style="list-style-type: none"> 1. Explain about shading models 2. How do you create shaded objects and shadows 3. Explain hidden surface removal algorithms 4. Explain about rendering models 5. Distinguish between Phong's shading and Gourand shading 	Lectures , PPT, Seminar	
15	Hidden line removal algorithms, surface removal algorithms, painters, Warnock, Z-buffer algorithm				

16	Shading algorithms - Constant intensity algorithm, Phong's shading algorithm, Gourand shading algorithm, comparison of shading algorithms				
17	Mid-Test 2	CO3, CO4, CO5			
18	END EXAM	All Cos			