SCHEME OF COURSE WORK

Course Title	: Computer Aided Design		
Course Code	: 19ME2101	L T P C	: 3 0 0 3
Program:	: M.Tech.		
Specialization:	: CAD/CAM		
Semester	: I		

Course Outcomes (COs):

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

1	Explain CAD system and curve representation techniques.
2	Describe representation techniques for various surface entities.
3	Discuss different solid modeling techniques and translate different formats of CAD/CAM data.
4	Use various design applications of machine components and appraise the collaborative engineering.
5	Apply expert systems in CAD.

Program Outcomes (POs)

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

1. acquire fundamentals in the areas of computer aided design and manufacturing
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	M	M	M						
CO-2	S	S	S	M	S	M	M		M			
CO-3	S	S	S	S	S	M	M		M			
CO-4	S	M							M			
CO-5	M		M	M	M	M			M			

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

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Teaching-Learning and Evaluation

WEEK	TOPIC / CONTENTS	COURSE OUTCOMES	SAMPLE QUESTIONS	TEACHING-LEARNING STRATEGY	ASSESSMENT METHOD & SCHEDULE
1	CAD system: Product cycle, scope and applications of CAD/CAM	CO1	1. Describe the different phases of product life cycle overlaid with CAD/CAM. 2. Discuss the various types of modeling approaches. 3. Differentiate between world coordinate system and working coordinate system. 4. Derive the parametric equation of Bezier curve.	Lectures, CAD software, PPT, Seminar	Seminar (week 3-7)
2	coordinate systems, basic features, datum features, modeling strategies	CO1			
3	parametric representation of analytic and synthetic curves, Hermite cubic spline	CO1			
4	Bezier curve, B-spline curve, curve manipulation.	CO1			
5	Surface modeling: Surface entities, surface representation, surface analysis,	CO2	1. Explain the boundary condition of Bi-cubic surface patch. 2. Derive the parametric equation of ruled surface. 3. Draw 5X4 Bezier surface. 4. Differentiate between trimming and segmentation in surface manipulation.	Lectures, CAD software, PPT, Seminar	
6	analytic surface, ruled surface, surface of revolution, spherical surface, plane surface	CO2			
7	synthetic surface, Hermite Bi-cubic surface, Bezier surface	CO2			
8	, B-Spline surface, coons surface, blending surface, surface manipulation.	CO2			
9	Mid-Test 1	CO-1, CO-2			

10	Solid modeling: Solid entities, solid representation, boundary representation, constructive solid geometry, sweep representation.	CO3	1. Explain the effect of topology and geometry on boundary models. 2. Differentiate between CSG and B-rep. 3. Explain the different types of translators. 4. Discuss the general structure of IGES file.	Lectures , CAD software, PPT, Seminar	
11	CAD/CAM data exchange: Types of translators, IGES, STEP, processors.	CO3			
12	Design applications: Mass properties on CAD system, assembly modeling,	CO4	1. What are the different types of mating conditions? Explain with example. 2. What is bottom-up assembly approach? 3. With one example, explain the top-down assembly approach. 4. Discuss about virtual reality modelling language.	Lectures , CAD software, PPT, Seminar	Seminar (week 11-16)
13	mating conditions, bottom-up and top-down assembly approach.	CO4			
14	Collaborative engineering: Distributed computing, virtual reality modelling language, collaborative design.	CO4			
15	Expert systems: Artificial intelligence in CAD, application of artificial intelligence in design,	CO5	1. Explain the basic structure of expert system. 2. Discuss the strategies of knowledge acquisition. 3. Explain the various application of artificial intelligence in design. 4. Write a notes on neural network application in design.	Lectures , CAD software, PPT, Seminar	
16	structure of expert system, building an expert system, strategies of knowledge acquisition	CO5			
17	, knowledge representation, Inference process, neural network.	CO5			
18	Mid-Test 2	CO-3, CO-4, CO-5			

19/20	END EXAM	All Cos			