COMPUTER AIDED DESIGN

I Semester

Course Code: 19ME2101 **L P C**

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Course Outcomes: At the end of the course, the student will be able to
CO1: Explain CAD system and curve representation techniques.
CO2: Describe representation techniques for various surface entities.
CO3: Discuss different solid modeling techniques and translate different formats of CAD/CAM data.
CO4: Use various design applications of machine components and appraise the collaborative engineering.
CO5: Apply expert systems in CAD.

UNIT-I **(10-Lectures)**

CAD system: Product cycle, scope and applications of CAD/CAM, coordinate systems, basic features, datum features, modeling strategies.

Curves: curve entities, curve representation, parametric representation of analytic and synthetic curves, Hermite cubic spline, Bezier curve, B-spline curve, curve manipulation.

Learning outcomes:

1. Identify basic features and applications of CAD/CAM. (L1)
2. Describe various types of analytic and synthetic curves. (L2)
3. Modify different types of curves. (L6)

UNIT-II **(10-Lectures)**

Surface modeling: Surface entities, surface representation, surface analysis, analytic surface, synthetic surface, Hermite Bi-cubic surface, Bezier surface, B-Spline surface, coons surface, blending surface, surface manipulation.

Learning outcomes:

1. Explain different surface representation techniques and surface analysis. (L2)
2. Develop various types of analytic and synthetic surfaces. (L6)
3. Illustrate surface manipulation techniques. (L4)

UNIT-III **(10-Lectures)**

Solid modeling: Solid entities, solid representation, boundary representation, constructive solid geometry, sweep representation.
CAD/CAM data exchange: Types of translators, IGES, STEP, processors.

Learning outcomes:

1. Discuss solid modeling and entities. (L2)
2. Demonstrate different types of solid representation schemes. (L3)
3. Interpret various types of translators and processors. (L2)

UNIT-IV **(10-Lectures)**

Design applications: Mass properties on CAD system, assembly modeling, mating conditions, bottom-up and top-down assembly approach.

Collaborative engineering: Distributed computing, virtual reality modelling language, collaborative design.

Learning outcomes:

1. Illustrate mass properties on CAD system. (L3)
2. Design assembly modeling with various approaches. (L6)
3. Identify the collaborative engineering design. (L1)

UNIT-V **(10-Lectures)**

Expert systems: Artificial intelligence in CAD, application of artificial intelligence in design, structure of expert system, building an expert system, strategies of knowledge acquisition, knowledge representation, Inference process, neural network.

Learning outcomes:

1. Summarize application of artificial intelligence in CAD. (L5)
2. Build an expert system for CAD. (L6)
3. Illustrate strategies of knowledge acquisition, representation and neural network. (L3)

TEXT BOOKS:

1. Ibrahim Zeid, *Mastering CAD/CAM*, McGraw Hill, 2015.

2. Sadhu Singh, *Computer Aided Design and Manufacturing*, Khanna Publisher, 2015.

REFERENCE BOOKS:

1. Ibrahim Zeid, *CAD/CAM Theory and Practice*, 2nd Edition, McGraw Hill International, 2016.

2. P N Rao, *CAD/CAM*, 2nd Edition, Tata McGraw Hill, 2010.