<table>
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<tr>
<th>COURSE NUMBER AND NAME</th>
<th>ME 430 Introduction to Computer Aided Design</th>
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<tr>
<td>CREDITS AND CONTACT HOURS</td>
<td>3 credits and (2-2-3) (lecture hr/wk - lab hr/wk – course credits)</td>
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<tr>
<td>COURSE COORDINATOR</td>
<td>Herli Surjanhata</td>
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<td>REQUIRED MATERIALS</td>
<td>Lecture notes and tutorials are provided for download from instructor’s website.</td>
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<td>Other supplemental materials (not Required)</td>
<td>Zeid, I., Mastering CAD/CAM ; McGraw-Hill, New York, 2005</td>
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<td>COURSE DESCRIPTION</td>
<td>This course introduces the student to combined lecture and laboratory relating to the Computer Aided Design. Students study the basic concepts of CAD – Computer Aided Design as applied to Mechanical Engineering design problems; Topics include computer graphics, geometric modeling, design optimization, and databases for design. The laboratory uses current CAD software packages for mechanical design. Projects involve applications of the basic principles using student’s own as well as available software.</td>
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| PREREQUISITE(S) | CIS 101 – Computer Programming and Problem Solving  
Math 222 – Differential Equations |
| COREQUISITE(S) | None |
| Required, Elective or Selective Elective | Required |
| COMPUTER USAGE | Commercial Software Package: Creo by PTC Inc. and SolidWorks |
| COURSE LEARNING OUTCOMES/EXPECTED PERFORMANCE CRITERIA: | Course Learning Outcomes:  
Upon completing this course, students will be able to:  
1. **Relate and identify** the role of CAD to speed up and optimize design process.  
2. **Identify** the hardware and software configuration in CAD system that facilitates the design process  
3. **Generate** basic and advanced 3D solid models of mechanical parts  
4. **Select** model representation schemes, curves representations and solve geometric transformation using matrices  
5. **Define** the mathematical | SOs* | Expected Performance Criteria |
| | 1, 2 | **Homework Assignments**  
(80% of the students will earn a grade of 70% or better on these assignments) |
| | 1, 2, 5 | **Homework Assignments**  
(same as 1) |
| | 1, 2 | **Exam Questions**  
(70% of the students will earn a grade of 70% or better on these questions)  
**Homework Assignments** (same as 1) |
| | 1 | **Exam Questions**  
(70% of the students will earn a grade of 70% or better on these questions)  
**Exam Questions** (same as 4) |
relationships between working, model, and screen coordinate systems

6. Generate, compute mass properties of parts, and create an assembly and check interference etc. using CAD software
   | 1, 2 | Homework Assignments & Final Project (80% of the students will earn a grade of 70% or better on these assignments)

7. Solve problem related to motion analysis of mechanism, optimization, FEA structural and thermal analyses
   | 1, 2 | Homework Assignments & Exam Questions (80% of the students will earn a grade of 70% or better on these assignments)

8. Use of commercial software for structure, thermal type problems and standard exchange data between CAD Systems
   | 1 | Homework Assignments & Final Project (same as 6)

9. Generate detailed drawings, production drawing with Bill of Materials of an assembly
   | 1, 6 | Homework Assignments & Final Project (same as 6)

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**CLASS TOPICS**

2. CAD/CAM Hardware configurations.
3. CAD/CAM Software – Database Coordinate Systems and Sketch Planes (Systems and Projections).
5. Dimensioning & Tolerancing Techniques; Multi-view Projections & Auxiliary View; Type of Sectional Views.
7. Curves Representation – Analytical and Free Form Curves: Bezier, B-Spline & NURBS.
8. Assembly Design Modeling – Assembly constraints, optimization, and mechanism design.
9. Type of Joints and DOF in Mechanism Design.
10. Theory of Failures – von Mises Stress etc.
14. Hands on experience using available software through various parts creation and projects.

**Student Outcomes (Scale: 1-3)**

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3 – Strongly supported 2 – Supported 1 – Minimally supported

* Student Outcomes