<table>
<tr><td>COURSE NUMBER</td><td>FED 101</td></tr>
<tr><td>COURSE TITLE</td><td>Fundamentals of Engineering Design (ME)</td></tr>
<tr><td>COURSE STRUCTURE</td><td>(2-1-2) (lecture hours/week - lab hour/week – course credits)</td></tr>
<tr><td>COURSE COORDINATOR</td><td>B. S. Mani</td></tr>
<tr><td>COURSE DESCRIPTION</td><td>Study technical graphics and the computer as a technical drawing tool;
Introduction to projections and multi-view drawings and visualization;
Discuss geometry commonly used in engineering design graphics, orthographic projections;
Dimensioning techniques, tolerancing and introduction to auxiliary and sectional views;
Apply software program Pro/ENGINEER to various problems.</td></tr>
<tr><td>PREREQUISITE(S)</td><td>None</td></tr>
<tr><td>COREQUISITE(S)</td><td>None</td></tr>
<tr><td>REQUIRED, ELECTIVE OR SELECTED ELECTIVE</td><td>Required</td></tr>
<tr><td>REQUIRED MATERIALS</td><td>Fundamentals of graphics communication by Gary R. Bertoline, Eric N. Wiebe ISBN: 978-0-07-352263-0 (0-07-352263-5); 6th Edition, McGraw Hill 2010.
2. Pro/Engineer Creo Parametric 2.0 Tutorial by Roger Toogood ISBN: 978-1-58503-815-2, Schroff Development Corporation 2011</td></tr>
<tr><td>Other supplemental materials (not Required)</td><td>The Engineering Design Process, Second Edition, Ertas et al, John Wiley & Sons, 1996. Chapter 10– engineering ethics (p. 427 – 468)</td></tr>
<tr><td>COMPUTER USAGE</td><td>Creo Parametric 2.0 (Previously called Pro/Engineer Wildfire)</td></tr>
<tr><td>COURSE LEARNING OUTCOMES/ EXPECTED PERFORMANCE CRITERIA:</td><td>
<table>
<tr><th>Course Learning Outcomes</th><th>SOs*</th><th>Expected Performance Criteria</th></tr>
<tr><td>1 describe the design process and technical graphics used in the mechanical engineering design process.</td><td>a, e</td><td>Prepare Design Intent Planning (DIP) sheets for each model created: 70% of students will earn a grade of 70% or better on this project</td></tr>
<tr><td>2. read and construct basic mechanical engineering models and drawings.</td><td>a, k</td><td>Build more than 25 models submitted through the semester: 80% of students will earn a grade of 60% or better on this project</td></tr>
<tr><td>3. use modern solid modeling CAD software to generate model, assembly, and detailed drawing</td><td>a, e, f, k</td><td>Build the Midterm exam model: 80% of students will earn a grade of 60% or better on this question. Answer a question on</td></tr>
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			engineering ethics in the Midterm exam: 60% of the students will earn a grade of 60% or better on this question.
	4. ***acquire*** a practical understanding of product design process as practiced in industry through *reverse engineering*	a, e, g, j, k	**Complete a reverse engineering Project and showcase to an audience including engineers from industry:** 80% of students will earn a grade of 75% or better on this project.

CLASS TOPICS

1. Introduction, design process & technical graphics used in the design process. Engineering ethics. Overview of traditional drawing tools. ANSI Standard Sheet Sizes, Title Blocks & Borders. CAD. Pro/Engineer (Pro/E) as a solid modeling software package.
2. Alphabet of Lines, line drawing techniques, scales & 3-D Modeling. Pro/E: Creating a simple object Part I.
3. Engineering geometry, introduction to projections, multiview, isometric, oblique, and perspective. Pro/E: Creating a simple object Part II (Hole, Chamfer, Round etc.)
4. Implementing design intent using relations Visualizing a multiview drawing, the Six Principal Views, Multiview from 3-D CAD Model. Pro/E: Revolved protrusions, mirror copies, model analysis.
5. Fundamental views of edges & planes for visualization. Pro/E: Obtain information, suppress, resume insert, modify features.
6. Multiview Representation, ANSI Standards. Pro/E: Sketcher Tools & Datum Planes.
7. Visualization of multiview drawings, & dimensioning. Pro/E: Pattern and Copy.
8. Auxiliary View, applications. Auxiliary view in CAD. Pro/E: Engineering Drawings.
9. Pictorial, Oblique, Perspective Projections. Section views. Pro/E: Engineering drawings
10. Section views basics & by using 3-D CAD techniques. Pro/E: Engineering Drawings
11. Tolerancing, Interchangeability & tolerance representation. Pro/E: Assembly Fundamentals and Constraints;
12. Working drawings, assemblies & part lists. (1 hour) Pro/E: Creating assembly drawing, sweep & blend.
13. Final project which includes *reverse engineering*, technical report writing and oral public presentation with poster (30 hours - spread in the 14 weeks).

STUDENT OUTCOMES (SCALE: 1-3)

a	b	c	d	e	f	g	h	i	j	k
3				2	1	1			1	2

3 – Strongly supported 2 – Supported 1 – Minimally supported

* Student Outcomes