



Fundamentals of Engineering Design

FED 101 ME

Required Materials

Textbooks:

1. **Fundamentals of Graphics Communication, 5th Edition**, Bertoline *et al*, WCB/McGraw-Hill, 2006. ISBN-13 978-0-07-313606-6
2. **Pro/ENGINEER Tutorial Wildfire 4.0**
Tutorial and Multimedia CD by Roger Toogood, SDC Publications.
ISBN: 978-1-58503-415-4

Reference:

The Engineering Design Process, Second Edition, Ertas *et al*, John Wiley & Sons, 1996.
Chapter 10– ENGINEERING ETHICS (p. 427 – 468)

- Ethics and the University
- The Foundation of Ethics
- Ethics in Engineering
- Legal and Responsibilities of Engineers
- Codes of Ethics
- Codes Rules and Interpretations
- The NSPE Code of Ethics for Engineers

Drawing Materials:

- Mechanical pencils
 - i. 0.7 mm with HB lead
 - ii. 0.5 mm with HB & 4H
- White plain (unlined) paper (8-1/2" X 11")
- Sheets of isometric lined paper.
- Scales / ruler, a set of triangles (30-60-90 and Isoceles).

Miscellaneous:

- NJIT Academic Honor Code will be upheld, and any violations will be brought to the immediate attention of the Dean of Students – visit <http://www.njit.edu/academics/honorcode.php>.
- For any modifications or deviations from the syllabus throughout the course of the semester, instructor will consult with students and the students must agree to.

Week Number:	TOPICS	Reading Assignment	Workbook Exercises/Quizzes Special Assignments
1	Lecture: <ul style="list-style-type: none"> • Introduction - Design Process & Technical Graphics used in the design process (p.1). • ENGINEERING ETHICS – Hand-out and Review • Overview of traditional drawing tools (p.21): pencils, compass, triangles, and etc. • ANSI Standard Sheet Sizes (p.23). • ANSI Standard Title Blocks and Borders 	Chapter 1, 2	Pro/ENGINEER CAD assignment

	<p>(p.73).</p> <ul style="list-style-type: none"> • CAD: Computer as technical drawing tool; Pro/ENGINEER as a solid modeling software package. <p>Lab:</p> <ul style="list-style-type: none"> • Introduction to Pro/ENGINEER 		
2	<p>Lecture:</p> <ul style="list-style-type: none"> • Alphabet of Lines (p.14). • Line Drawing Techniques. • Scales (p.23). • Hand and CAD Lettering a Technical Drawing (p.57). • Freehand Sketching Techniques (p.38-51). • Coordinate Space (p.80). • Classification of Geometric Elements and Construction (p.87). • 3-D Modeling (p.113). <p>Read Chapters 1-2, Chapter 3</p> <p>Lab:</p> <ul style="list-style-type: none"> • Pro/ENGINEER: Lesson 2 – Creating a Simple Object Part I 	Chapter 1, 2, and 3	Assignments on Isometric Sketches
3	<p>Lecture:</p> <ul style="list-style-type: none"> • Engineering Geometry Chapter 3 • Introduction to Projections – multiview, isometric (one type of axonometric), oblique, and perspective (p.196). <p>Lab:</p> <ul style="list-style-type: none"> • Pro/ENGINEER: Lesson 3 – Creating a Simple Object Part II (Hole, Chamfer, Round etc.) • Pro/ENGINEER: Lesson 3 – Implementing Design Intent using Relations (simple equations) 	Chapter 3, 5	<p>Quiz #1 covering Engineering ethics, Isometric Sketches and questions on Reading Assignments Chapters 1-2/Class Notes.</p> <p>Multiview Chapter 5 Problems.</p>
4	<p>Lecture:</p> <ul style="list-style-type: none"> • Visualizing a multiview drawing (p.199). • The Six Principal Views (p.202) – First and Third angle projections. • Multiview sketching (p.211). • Multiviews from 3-D CAD Models (p.220) <p>Lab:</p> <ul style="list-style-type: none"> • Pro/ENGINEER: Lesson 4 – Revolved Protrusions, Mirror Copies, Model Analysis 	Chapter 5	Handout Exercises
5	<p>Lecture:</p> <ul style="list-style-type: none"> • View Selection (p.220). • Fundamental Views of Edges and Planes for Visualization (p.223-232) <p>Lab:</p> <ul style="list-style-type: none"> • Pro/ENGINEER: Lesson 5 – Obtaining Information about the Model; Suppressing and Resuming Features; Modifying Feature Definitions; Insert Mode 	Chapter 5	Chapter 5 - Problems

6	<p>Lecture:</p> <ul style="list-style-type: none"> Multiview Representation for Sketches (p. 232-241). ANSI Standards for Multiview Drawings and Sketches (p.241) <p>Lab:</p> <ul style="list-style-type: none"> Pro/ENGINEER: Lesson 6 – Sketcher Tools and Datum Planes 	Chapter 5	Quiz #2 Chapter 5/ Multiview Drawings.
7	<p>Lecture:</p> <ul style="list-style-type: none"> Visualization for Design (p.246). Multiview Drawing Visualization (p.259) Dimensioning, Size and Location Dimensions, Detail Dimensioning & Dimensioning Techniques (p.434-455) <p>Lab:</p> <ul style="list-style-type: none"> Pro/ENGINEER: Lesson 7 – Patterns and Copies 	Chapter 5, 9	Assignments decided by Instructor
8	<p>Lecture:</p> <ul style="list-style-type: none"> Auxiliary View Projection Theory (p.312) Auxiliary View Classifications (p.315) Auxiliary View Applications (p.323) Auxiliary View in CAD <p>Lab:</p> <ul style="list-style-type: none"> Pro/ENGINEER: Lesson 8 – Engineering Drawings 	Chapter 6	Handout Ex.
9	<p>Lecture:</p> <ul style="list-style-type: none"> Pictorial Projections – Axonometric Projections (Isometric, Dimetric and Trimetric); Oblique Projections; Perspective Projections. Section Views in Isometric Drawings Isometric Assembly Drawings <p>Lab:</p> <ul style="list-style-type: none"> Pro/ENGINEER: Lesson 8 – Engineering Drawings (Continued ...) 	Chapter 7	Handout Ex.
10	<p>Lecture:</p> <ul style="list-style-type: none"> Section Views – Sectioning Basics, Section View Types and Special Sectioning Conventions. Section Views using 3-D CAD Techniques <p>Lab:</p> <ul style="list-style-type: none"> Pro/ENGINEER: Lesson 8 – Engineering Drawings (Continued ...) 	Chapter 8	Project Assignment
11	<p>Lecture:</p> <ul style="list-style-type: none"> Tolerancing – Interchangeability (p.455). <p>Lab:</p> <ul style="list-style-type: none"> Pro/ENGINEER: Lesson 9 – Assembly Fundamentals and Constraints 	Chapter 9	Working on Project
12	<p>Lecture:</p> <ul style="list-style-type: none"> Tolerance Representation 	Chapter 9	Working on Project

	<ul style="list-style-type: none"> Tolerances in CAD <p>Lab:</p> <ul style="list-style-type: none"> Pro/ENGINEER: Lesson 10 – Assembly Operations (Information, Part Modifications, Exploding Assembly, Create Sections etc.) 		
13	<p>Lecture:</p> <ul style="list-style-type: none"> Working Drawings and Assemblies – Basic Concepts; Working Drawings; Part Lists etc.) <p>Lab:</p> <ul style="list-style-type: none"> Pro/ENGINEER: Lesson 10 – Assembly Drawings 	Chapter 10	Quiz #3 Multiview Drawings/Dimensioning/Tolerancing
14	<p>Lecture:</p> <ul style="list-style-type: none"> Working Assembly Drawings. Using CAD to Create Production Assembly Drawings Review <p>Lab:</p> <ul style="list-style-type: none"> Pro/ENGINEER: Lesson 11 – Sweeps and Blends 	Chapter 10	Project Report/Drawings

Note: Assignments may vary as determined by your instructor.