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. O.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:** • 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.73). • CAD: Computer as technical drawing tool; Pro/ENGINEER as a solid modeling software package. **Lab:** • Introduction to Pro/ENGINEER		
2	**Lecture:** • 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). Read Chapters 1-2, Chapter 3 **Lab:** • Pro/ENGINEER: Lesson 2 – Creating a Simple Object Part I	Chapter 1, 2, and 3	Assignments on Isometric Sketches
3	**Lecture:** • Engineering Geometry Chapter 3 • Introduction to Projections – multiview, isometric (one type of axonometric), oblique, and perspective (p.196). **Lab:** • 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	Quiz #1 covering Engineering ethics, Isometric Sketches and questions on Reading Assignments Chapters 1-2/Class Notes. Multiview Chapter 5 Problems.
4	**Lecture:** • 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) **Lab:** • Pro/ENGINEER: Lesson 4 – Revolved Protrusions, Mirror Copies, Model Analysis	Chapter 5	Handout Exercises
5	**Lecture:** • View Selection (p.220). • Fundamental Views of Edges and Planes for Visualization (p.223-232) **Lab:** • Pro/ENGINEER: Lesson 5 – Obtaining Information about the Model; Suppressing and Resuming Features; Modifying Feature Definitions; Insert Mode	Chapter 5	Chapter 5 - Problems

6	**Lecture:** • Multiview Representation for Sketches (p. 232-241). • ANSI Standards for Multiview Drawings and Sketches (p.241) **Lab:** • Pro/ENGINEER: Lesson 6 – Sketcher Tools and Datum Planes	Chapter 5	Quiz #2 Chapter 5/ Multiview Drawings.
7	**Lecture:** • Visualization for Design (p.246). • Multiview Drawing Visualization (p.259) • Dimensioning, Size and Location Dimensions, Detail Dimensioning & Dimensioning Techniques (p.434-455) **Lab:** • Pro/ENGINEER: Lesson 7 – Patterns and Copies	Chapter 5, 9	Assignments decided by Instructor
8	**Lecture:** • Auxiliary View Projection Theory (p.312) • Auxiliary View Classifications (p.315) • Auxiliary View Applications (p.323) • Auxiliary View in CAD **Lab:** • Pro/ENGINEER: Lesson 8 – Engineering Drawings	Chapter 6	Handout Ex.
9	**Lecture:** • Pictorial Projections – Axonometric Projections (Isometric, Dimetric and Trimetric); Oblique Projections; Perspective Projections. • Section Views in Isometric Drawings • Isometric Assembly Drawings **Lab:** • Pro/ENGINEER: Lesson 8 – Engineering Drawings (Continued …)	Chapter 7	Handout Ex.
10	**Lecture:** • Section Views – Sectioning Basics, Section View Types and Special Sectioning Conventions. • Section Views using 3-D CAD Techniques **Lab:** • Pro/ENGINEER: Lesson 8 – Engineering Drawings (Continued …)	Chapter 8	Project Assignment
11	**Lecture:** • Tolerancing – Interchangeability (p.455). **Lab:** • Pro/ENGINEER: Lesson 9 – Assembly Fundamentals and Constraints	Chapter 9	Working on Project
12	**Lecture:** • Tolerance Representation	Chapter 9	Working on Project

	• Tolerances in CAD **Lab:** • Pro/ENGINEER: Lesson 10 – Assembly Operations (Information, Part Modifications, Exploding Assembly, Create Sections etc.)		
13	**Lecture:** • Working Drawings and Assemblies – Basic Concepts; Working Drawings; Part Lists etc.) **Lab:** • Pro/ENGINEER: Lesson 10 – Assembly Drawings	Chapter 10	Quiz #3 Multiview Drawings/Dimensioning/ Tolerancing
14	**Lecture:** • Working Assembly Drawings. • Using CAD to Create Production Assembly Drawings • Review **Lab:** • Pro/ENGINEER: Lesson 11 – Sweeps and Blends	Chapter 10	Project Report/Drawings

Note: Assignments may vary as determined by your instructor.