

ME 1670 Introduction to Engineering Graphics and Design (Required)

Catalog Description

Introduction to engineering graphics and visualization including sketching, line drawing, and solid modeling. Development and interpretation of drawings and specifications for product realization.

Course information

- prerequisites and co-requisites* *none*
- (2-0-3-3) *2 hours of lecture per week, 3 hours of supervised lab, 3 credit hours*

Textbook and Learning Materials

- *Students are required to watch online training modules accessible from Lynda.com (GT Login required). “SolidWorks 2016 Essential Training” and “SolidWorks Rendering with PhotoView 360.”*
- *SolidWorks 2016 available from <http://software.oit.gatech.edu>*
- *Sketching supplies*
- *Other references:*
 - *Visualization, Modeling and Graphics for Engineering Design, 2016 (2nd Ed), Lieu and Sorby, Delmar, Cengage Learning*
 - *Rapid Visualization: Hanks and Belliston, 2006.*

Course coordinator

Dr. Denis Dorozhkin

Topics Covered

- 1. Introduction: need for spatial representation and visualization.*
- 2. Drawing projections: multiview orthographic, isometric, etc.*
- 3. Three dimensional representations and model construction processes.*
- 4. Graphic and written requirements for product realization*

Course Outcomes:

Outcome 1: To train the student to be able to understand the major manufacturing processes

- 1.1 Students will demonstrate the ability to identify, describe, and analyze the major manufacturing processes, and their capabilities and limitations*
- 1.2 Students will demonstrate knowledge of process capabilities of major manufacturing processes*

Outcome 2: To train the student to convert design requirements into selection constraints and objectives

2.1 Students will demonstrate the ability to convert design requirements into constraints and objectives for selection of manufacturing processes

Outcome 3: To train the student to select manufacturing processes based upon design requirements and process analysis

3.1 Students will demonstrate the ability to select manufacturing processes under single and multiple constraints based upon process analysis

3.2 Students will demonstrate the ability to select manufacturing processes under single and multiple objectives based upon process analysis

3.3 Students will demonstrate the ability to make use of process capability information to select and/or synthesize manufacturing processes and systems

Course Learning Outcomes:

1. Visualize objects and ideas;
2. Use and understand technical drawing terminology;
3. Interpret technical drawings
4. Establish and explain methods used for decision making;
5. Communicate ideas in a visual medium;
6. Sketch pictorials and various views of objects;
7. Create both orthographic and perspective drawings of objects and 3D CAD models;
8. Participate constructively in a team engineering activity;
9. Establish and maintain a well-organized, detailed notebook (physical or digital);
10. Develop skills to support lifelong learning

Course Outcomes

Outcome 1: Students gain familiarity with the elements of 3D visualization and good sketching technique.

- 1.1 Students are able to prepare elementary sketches of 3D objects with correct interpretation of 3D geometry and topology and comprehend a sketch.

Outcome 2: Students gain familiarity with the basic structure and content of engineering drawings.

- 2.1 Students are able to sketch and use 2-D computer-aided design software to draw multiview orthographic and other projections including isometric, auxiliary, and sectional views, and are able to properly provide dimensions and tolerances and common drawing notation to a drawing.

Outcome 3: Students get hands-on experience with solid modeling and visualization.

- 3.1 Students are able to generate 3-D parametric, feature-based solid models and generate two dimensional views from these three dimensional solids.

- 3.2 Students are able to generate assembly models and use rendering techniques and create simulations and animations of the moving parts of an assembly.

Outcome 4: Students are exposed to the visual, written, and team work requirements associated with engineering product realization.

- 4.1 Students understand requirements for complete product specifications (e.g., drawings and technical specifications) and can read, understand, and interpret drawings (e.g., assembly, articulation, quantity take-offs).
- 4.2 Students are able to work in a team project and understand the importance of communication, scheduling, and attainment of project goals.