



## ENGR 1300

**Division:** Natural Science and Mathematics

**Department:** Engineering and Computer Science

**Course:** ENGR 1300

**Title:** Engineering Graphics & Design

**Catalog Description:**

Students will learn visualization techniques and procedures to facilitate the engineering design process. The course will include technical sketching, orthographic projection, dimensioning, tolerancing, and modeling of objects in both two and three-dimensions. Solid modeling will be enhanced by the use of computer-aided drafting and design software while exploring engineering design and analysis.

**General Education Requirements:** N/A

**Semesters Offered:** TBA

**Credit/Time Requirement:** Credit: 3; Lecture: 3; Lab: 0

**Clock/Hour Requirements:** 0

**Offered for Non-Credit:** No

**Prerequisites:** Trigonometry (Math 1060 or Math 1080)

**Corequisites:** N/A

**Justification:**

This course is designed to provide students with a basic understanding of graphical design procedures used in engineering applications. The course will provide students studying civil, mechanical, and other engineering disciplines the fundamental knowledge necessary to visually represent the engineering process. Students will utilize these skills in subsequent engineering courses and when they enter the workforce as engineers. Similar courses are required by students studying in engineering programs such as those at the University of Utah and Utah State University. The course will be considered elective for the Associate of Pre-Engineering degree. Most students seeking a degree in civil or mechanical engineering will complete the course in either the freshman or sophomore year.

**Student Learning Outcomes:**

Upon successful completion of this course, students will be able to:

- sketch drawings utilizing technical drafting techniques
- apply multi-view and orthographic projection techniques to generate drawings
- dimension and tolerance drawings according to industry standards
- utilize design techniques to create solid-models using state-of-the-art software
- employ the graphical design process while creating engineering projects

**Content:**

This course includes:

- introduction to freehand technical sketching
- overview of design layout including multi-view and orthographic projection
- usage of two-dimensional designs to model three-dimensional objects
- utilization of computer-aided-drafting applications in the creation of solid model designs
- utilization of computer-aided-design applications in analyzing and optimizing solid model designs
- implementation of standardized dimensioning and tolerancing
- tolerance analysis
- variational geometry
- exploration of the engineering design process

**General Education Outcomes:**

6) Apply computational skills to a variety of contexts.

Engineering students must be able to visually represent the engineering design process via technical sketching and computer-aided design applications. This outcome will be assessed by testing and the instructor's evaluation of working drawings created by the student.

**Key Performance Indicators:**

Students will demonstrate mastery of the Student Learning Outcomes for the course by:

- completion of homework and drawing constructions
- tests and quizzes
- instructor evaluation of student's final project consisting of a solid-model design

**Representative Text and/or Supplies:**

Texts will be selected as appropriate to the engineering design and solid modeling software employed for the course. Software will be chosen which meets the criteria of being state-of-the art and consistent with software utilized by the University of Utah and/or Utah State University.

**Optimum Class Size:** 12

**Maximum Class Size:** 15

**Signatures:**

I hereby submit this course syllabus:

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Brian Newbold, M.S., Associate Professor

I hereby find this course consistent with the goals and resources of the Engineering and Computer Science Department:

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Garth O. Sorenson, MS, Associate Professor, Chair

I hereby find this course consistent with the goals and resources of the Natural Science and Mathematics Division:

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Dan Black, EdD, Associate Professor, Dean

I have discussed the need for library resources related to this class with the person submitting the syllabus:

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Lynn Anderson, MLIS, Technical Services Librarian (Main Campus)

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Michelle Olsen, MLS, Campus Librarian (Richfield Campus)