

## Engineering Fundamentals

### ENG 1001 - Engineering Problem Solving

Introduction to the engineering problem solving method and to modern tools used to solve problems.

**Credits:** 2.0

**Lec-Rec-Lab:** (0-0-4)

**Semesters Offered:** Fall

**Pre-Requisite(s):** (MA 1031(C) or MA 1032(C)) and (Spatial Visualization Score  $\geq$  18 or ENG 1002(C))

### ENG 1002 - Introduction to 3-D Spatial Visualization

Intended for first-year engineering students with a demonstrated need for the development of 3-D spatial visualization skills. Topics include isometric sketching, orthographic projection, object transformations, 3-D coordinate systems, patterns folding to 3-D objects, and cross sections of solids.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-0-2)

**Semesters Offered:** Fall

### ENG 1003 - Introduction to Computer Aided Drafting

Fundamentals of creating engineering drawings with modern CAD software. Topics include basic geometric construction, drawing modification, dimensioning, and working with layers. Designed for students with no CAD experience.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-0-2)

**Semesters Offered:** Spring

**Restrictions:** Must be enrolled in one of the following Class(es): Freshman, Sophomore

**Pre-Requisite(s):** ENG 1002 or ENG 1100 or ENG 1101

### ENG 1100 - Engineering Analysis

An introduction to the engineering profession. Focuses on engineering analysis, computational skills, and communication skills.

**Credits:** 2.0

**Lec-Rec-Lab:** (0-0-4)

**Semesters Offered:** Spring

**Pre-Requisite(s):** ENG 1001 and (MA 1160(C) or MA 1161(C))

### ENG 1101 - Engineering Analysis and Problem Solving

An introduction to the engineering profession and to its various disciplines. Focuses on developing problem-solving skills, computational skills, and communication skills. Through active, collaborative work, students work on teams to apply the engineering problem-solving method to "real-world" problems.

**Credits:** 3.0

**Lec-Rec-Lab:** (0-0-5)

**Semesters Offered:** Fall, Spring, Summer

**Pre-Requisite(s):** (MA 1160(C) or MA 1161(C)) and (Spatial Visualization Score  $\geq$  18 or ENG 1002(C))

### ENG 1102 - Engineering Modeling and Design

Continuation of ENG1101. Introduction to the engineering design process with an emphasis on graphics and documentation. Focuses on engineering problem solving in the context of the design process.

**Credits:** 3.0

**Lec-Rec-Lab:** (0-0-5)

**Semesters Offered:** Fall, Spring, Summer

**Pre-Requisite(s):** (ENG 1101 or ENG 1001 and ENG 1100) and (MA 1160 or MA 1161)

### ENG 1990 - Special Topics in Engineering

Engineering topics of interest to students and faculty that are not normally covered in the existing courses.

**Credits:** variable to 5.0; Repeatable to a Max of 6

**Semesters Offered:** On Demand

### ENG 2120 - Statics-Strength of Materials

The composition and resolution of forces and force systems, principles of equilibrium applied to various bodies, simple structures, friction, and 2nd moments of area. Intro to the mechanical behavior of materials, including calculation of stresses, strains, and deformations due to axial, torsional, and flexural loading.

**Credits:** 4.0

**Lec-Rec-Lab:** (0-4-0)

**Semesters Offered:** Spring

**Restrictions:** May not be enrolled in one of the following Major(s):

Mechanical Engineering, Civil Engineering

**Pre-Requisite(s):** MA 2160 and PH 2100 and ENG 1102

### ENG 2990 - Special Topics in Engineering

Engineering topics of interest to students and faculty that are not normally covered in the existing courses.

**Credits:** variable to 5.0; Repeatable to a Max of 6

**Semesters Offered:** On Demand

### ENG 3000 - Engineering for Non-Believers

Everything you wanted to know about engineering but were afraid to ask. This course will take students on a journey through time investigating engineering's greatest feats and greatest lies. Students will work in teams to uncover basic engineering principles and how basic math skills help engineers do the things they do.

**Credits:** 3.0

**Lec-Rec-Lab:** (0-2-2)

**Semesters Offered:** Spring

**Restrictions:** May not be enrolled in one of the following College(s): College of Engineering

**Pre-Requisite(s):** UN 2002(C)

### ENG 3200 - Thermodynamics/Fluid Mechanics

Provides engineering students with a unified understanding of the fundamental conservation laws and property accounting applied to thermodynamic and fluid dynamic systems. Topics will include but are not limited to: ideal gas behavior; heat, work, and energy; 1st and 2nd laws of thermodynamics; heat pumps; cycles; hydrostatics; Bernoulli; pipe flow and loss; and lift and drag.

**Credits:** 4.0

**Lec-Rec-Lab:** (0-4-0)

**Semesters Offered:** Fall, Spring

**Pre-Requisite(s):** MA 2160 and CH 1100 or CH 1110 or CH 1112 or (CH 1150 and CH 1151) and PH 2100 and ENG 1102

### ENG 3507 - Introduction to Fluid Mechanics

Provides engineering students with a unified understanding of fluid dynamic systems. Topics will include but are not limited to hydrostatics, Bernoulli, pipe flow and loss, and lift and drag. Course offered second half of spring semester.

**Credits:** 2.0

**Lec-Rec-Lab:** (0-2-0)

**Semesters Offered:** Spring

**Pre-Requisite(s):** PH 2100 and CH 1100 or CH 1110 or CH 1112 or (CH 1150 and CH 1151) and MA 2160 and ENG 1102

### ENG 3530 - Undergraduate Colloquium in Sustainability

Readings and speakers are used to teach concepts of sustainable development and global sustainability. Specific topics are derived from the industrialized and developing world.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-1-0)

**Semesters Offered:** Fall

**Restrictions:** May not be enrolled in one of the following Class(es): Graduate

### ENG 3990 - Special Topics in Engineering

Engineering topics of interest to students and faculty that are not normally covered in the existing courses.

**Credits:** variable to 5.0; Repeatable to a Max of 6

**Semesters Offered:** On Demand

### ENG 4160 - Teaching Methods in Technology and Design

Course intended for students pursuing technology and design secondary teacher certification. Students enroll in this course during the semester of their directed teaching.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-0-3)

**Semesters Offered:** On Demand

**Co-Requisite(s):** ED 4710

### ENG 4510 - Sustainable Futures I

Covers introductory and intermediate concepts of Sustainable Development. Explores methods/tools for assessing sustainability (economic, environmental, societal impacts) of current and emerging industrial technologies. Explores relationships between government policies and markets for introducing sustainable technologies into national economies and corporations.

**Credits:** 3.0

**Lec-Rec-Lab:** (3-0-0)

**Semesters Offered:** Fall

**Restrictions:** May not be enrolled in one of the following Class(es):

Freshman, Sophomore

**Pre-Requisite(s):** UN 2002

**ENG 4900 - Multidisciplinary Senior Design Project I**

Introduction to engineering design, including modeling, simulation, economic decision making, and reliability. Integration of design principles in the solution of open-ended engineering problems. Projects are defined and planned with faculty and industrial guidance. Emphasizes economics and environmental constraints. Students must be Senior Project ready as defined by major.

**Credits:** 3.0

**Lec-Rec-Lab:** (0-1-6)

**Semesters Offered:** Fall, Spring, Summer

**Restrictions:** May not be enrolled in one of the following Class(es):  
Freshman, Sophomore, Junior

**ENG 4905 - Engineering Design Project**

Students complete a multidisciplinary engineering design project. Students must be Senior Project ready as defined by major. Not open to students who have taken ENG4900 or ENG4910.

**Credits:** 3.0

**Lec-Rec-Lab:** (0-2-3)

**Semesters Offered:** On Demand

**Restrictions:** May not be enrolled in one of the following Class(es):  
Freshman, Sophomore, Junior

**ENG 4910 - Multidisciplinary Senior Design Project II**

Continuation of ENG4900. Introduction to engineering design including modeling, simulation, economic decision making and reliability. Integration of design principles in the solution of open-ended engineering problems. Projects are defined and planned with faculty and industrial guidance. Emphasizes economics and environmental constraints. (Senior project ready as defined by major substitutes for prerequisites)

**Credits:** 3.0

**Lec-Rec-Lab:** (0-1-6)

**Semesters Offered:** Fall, Spring, Summer

**Restrictions:** May not be enrolled in one of the following Class(es):  
Freshman, Sophomore, Junior

**Pre-Requisite(s):** ENG 4900

**ENG 4990 - Special Topics in Engineering**

Engineering topics of interest to students and faculty that are not normally covered in the existing courses.

**Credits:** variable to 3.0; Repeatable to a Max of 6

**Semesters Offered:** On Demand