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# Engineering (ENGINR)

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**ENGINR 1000: Introduction to Engineering**

This course will help students identify a field of engineering that they will pursue during their studies at MU. This objective will be achieved by exposing students to design in the different engineering disciplines, overviews of the individual departments, and guest lecturers from industry. Other lectures will be given to help acclimate students to university life. Graded on A-F basis only.

**Credit Hour:** 1

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**ENGINR 1100: Engineering Graphics Fundamentals**

Introduction to computer-aided design and drafting. Topics include visualization methods and standards techniques for communication and presenting engineering design graphics information.

**Credit Hours:** 2

**Prerequisites or Corequisites:** MATH 1500

**Prerequisites:** Restricted to Engineering Students only, or by departmental consent

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**ENGINR 1100H: Engineering Graphics Fundamentals - Honors**

Introduction to computer-aided design and drafting. Topics include visualization methods and standards techniques for communication and presenting engineering design graphics information.

**Credit Hours:** 2

**Prerequisites or Corequisites:** MATH 1500

**Prerequisites:** Restricted to Engineering Students only, or by departmental consent. Honors Eligibility required

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**ENGINR 1110: Solid Modeling for Engineering Design**

Introduction to 3D (three dimensional) modeling techniques using computer aided design software. Topics include model creation techniques and advanced graphical presentation practices. Graded on A-F basis only.

**Credit Hour:** 1

**Prerequisites:** ENGINR 1100 or instructor's consent. Restricted to Engineering Students Only or by departmental consent

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**ENGINR 1200: Statics and Elementary Strength of Materials**

Fundamentals of statics; static equilibrium and introduction to elements of mechanics of elastic materials.

**Credit Hours:** 3

**Prerequisites or Corequisites:** PHYSICS 2750 C- or higher. Restricted to Engineering Students only or with departmental consent

**Prerequisites:** MATH 1500 C- or higher

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**ENGINR 1200H: Statics and Elementary Strength of Materials - Honors**

Fundamentals of statics; static equilibrium and introduction to elements of mechanics of elastic materials.

**Credit Hours:** 3

**Prerequisites or Corequisites:** PHYSICS 2750 C- or higher. Restricted to Engineering Students only or with departmental consent

**Prerequisites:** MATH 1500 C- or higher. Honors eligibility required

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**ENGINR 2001: Experimental Course**

For sophomore-level students. Content and number of credit hours to be listed in Schedule of Courses.

**Credit Hour:** 1-99

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**ENGINR 2001W: Experimental Course - Writing Intensive**

For sophomore-level students. Content and number of credit hours to be listed in Schedule of Courses.

**Credit Hour:** 1-99

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**ENGINR 2100: Circuit Theory for Engineers**

DC circuit analysis, inductors and capacitors, first-order response, AC circuit analysis, single-phase AC power and three-phase, transformers.

**Credit Hours:** 3

**Prerequisites:** MATH 1700. For Non-Electrical and Computer Engineering Majors. Restricted to Engineering Students only or with departmental consent

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**ENGINR 2100H: Circuit Theory for Engineers - Honors**

DC circuit analysis, inductors and capacitors, first order response, AC circuit analysis, single-phase AC power.

**Credit Hours:** 3

**Prerequisites:** MATH 1700. Honors eligibility required

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**ENGINR 2200: Intermediate Strength of Materials**

Elements of mechanics of elastic materials.

**Credit Hours:** 3

**Prerequisites:** ENGINR 1200 C- or higher. Restricted to Engineering Students only or with departmental consent

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**ENGINR 2300: Engineering Thermodynamics**

(same as MAE 2300). Fluid properties, work and heat, first law, second law, entropy, applications to vapor and ideal gas processes. Graded on A-F basis only.

**Credit Hours:** 3

**Prerequisites:** Grade of C- or better in PHYSICS 2750. Restricted to Engineering Students Only or departmental consent

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**ENGINR 2500: A History of Modern Engineering**

This course will introduce the student to significant engineering events that have shaped the late modern-area from the French Revolution to the end of World War II (1789-1945). Radical inventions and their dates will be used as historical landmarks throughout the course. Graded on A-F basis only.

**Credit Hours:** 3

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**ENGINR 2600H: History of Human Spaceflight - Honors**

This course will provide an overview of the history of human spaceflight, including early efforts up through the present for the three countries that have flown humans in space (U.S., Russian, and China). Special topics will include a discussion of the major space accidents. Finally, the future of human space exploration will be discussed. May be repeated for credit. Graded on A-F basis only.

**Credit Hours:** 3

**Prerequisites:** Honors eligibility required

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**ENGINR 2600HW: History of Human Spaceflight - Honors/ Writing Intensive**

This course will provide an overview of the history of human spaceflight, including early efforts up through the present for the three countries that have flown humans in space (U.S., Russian, and China). Special topics will include a discussion of the major space accidents. Finally, the future of human space exploration will be discussed. May be repeated for credit. Graded on A-F basis only.

**Credit Hours:** 3

**Prerequisites:** Honors eligibility required

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**ENGINR 3000: Short Term Education Abroad**

Introduction to history and culture of country and/or cities in specified country. Students will make engineering profession and corporate site visits. Lecture activities will focus on industry and society, with country and/or cities compared and contrasted to U.S. engineering. Graded A-F only.

**Credit Hours:** 3

**Prerequisites:** Instructor's consent required. Students must be in Academic Good Standing

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**ENGINR 3000H: Short Term Education Abroad - Honors**

Introduction to history and culture of country and/or cities in specified country. Students will make engineering profession and corporate site visits. Lecture activities will focus on industry and society, with country and/or cities compared and contrasted to U.S. engineering. Graded A-F only.

**Credit Hours:** 3

**Prerequisites:** Instructor's consent required. Students must be in Academic Good Standing

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**ENGINR 4000: Study Abroad Technical Elective**

This course is designed to provide students with an international experience while also potentially fulfilling a required engineering technical elective course. Engineering technical electives are courses that are relevant or related to engineering from a broad range of fields including math and science as well as the various engineering departments. This course will be used as the umbrella course for all Engineering Technical Elective Study Abroad Opportunities and each course will provide a separate section number.

**Credit Hour:** 3-6

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**ENGINR 4050: Cooperative Education Program**

For Engineering Cooperative Education Program Students. No billing hours, No term finalization.

**Credit Hours:** 0

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**ENGINR 4890: Multi-disciplinary Senior Engineering Capstone Design**

Engineering design and prototyping including reliability, testing, evaluation, preparation of documentation, safety, ethics, manufacturing, intellectual property, economic and environmental constraints. Oral and written reports. Graded A-F only.

**Credit Hours:** 3

**Prerequisites:** Instructor's consent. Student's department consent also required

**Recommended:** Senior standing

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**ENGINR 4890W: Multi-disciplinary Senior Engineering Capstone Design - Writing Intensive**

Engineering design and prototyping including reliability, testing, evaluation, preparation of documentation, safety, ethics, manufacturing, intellectual property, economic and environmental constraints. Oral and written reports. Graded A-F only.

**Credit Hours:** 3

**Prerequisites:** Instructor's consent. Student's department consent also required

**Recommended:** Senior standing

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**ENGINR 8100: Design and Development of Biomedical Innovations**

(same as BIOL\_EN 8100, MPP 8100). The overarching goal of this course is to help participants understand the design and development (drug or device) process in biomedical innovation. This course will help participants to understand the process of choosing unmet clinical needs, articulate a need statement without integrating solution, design and develop a solution. Participants will learn to assess the commercial potential of clinical needs by performing market analysis and valuing customer needs. A conceptual understanding about development of a prototype for a device and also drug development by different brainstorming process will be provided. Details of regulatory, reimbursement, patenting process required for product development will be explained with examples. An overview about how to evaluate preliminary designs, define product specifications, comply with manufacturing principles and methods, costs, cGMP requirements will be explained. Quality control and Quality assurance necessities for drug/device will be elucidated with case studies. Participants will gain knowledge about different business models for drug and devices, estimate market penetration and how to make profitable, patient-driven products. Graded on A-F basis only.

**Credit Hours:** 3

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