Engineering (ENGINR)

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

ENGINR 1050: Foundations of Engineering
Foundational principles of engineering including problem solving, design, technical communication, and professionalism. This course includes activities focused on collaboration, teamwork, and interdisciplinary labs. Graded on A-F basis only.

Credit Hours: 2
Prerequisites: Must be an Engineering student
Recommended: Recommended to have taken any introductory engineering course, including ENGINR 1000, CH_ENG 1000, CMP_SC 1000, CV_ENG 1000, or INFOTC 1000

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: PHYSCS 2750 C- or higher. Restricted to Engineering Students only or with departmental consent
Prerequisites: MATH 1500 C- or higher

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: PHYSCS 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

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

ENGINR 2010: Women in Engineering Leadership
This is a course focused on women in leadership, leadership development and leadership in engineering. Through experiential learning, empowering examples, group discussion, written reflections, attendance at three conferences, one retreat and completion of two short papers and one major project, you will develop the self-knowledge and skills to practice leadership for a changing world, explore your own potential for leadership, explore the context for the practice of leadership and learn to make a difference through leadership. Beginning in August and working through May, you will work individually and in teams to produce a final project that shows how your own skills and knowledge about leadership can you help you use your passion and engineering degree to impact the world around you.

Credit Hours: 3
Recommended: First Year Students (transfers, first time college, etc)

ENGINR 2011: Engineering Leadership and Strategic Communication
This course is inspired by the experience and writings of CEO and world-renowned leader David Novak. It is designed to introduce engineering students to the concepts, theory, and practice of engineering leadership. Topics include; effective written and oral communications, presentations, engineering leadership characteristics, individual differences and self-awareness, and developing and building teams. Graded on A-F basis only.

Credit Hours: 3

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

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

ENGINR 2200: Mechanics of Materials
This course introduces the fundamental principles that govern the behavior of solid materials subjected to various types of loading. Emphasis is placed on the relationships among stress, strain, and deformation, and on the analysis of structural members under axial, torsional, and bending loads. Students learn to apply these principles to evaluate the strength and deformation of engineering materials and simple structural components.

Credit Hours: 3
Prerequisites: C- or higher in ENGINR 1200. Restricted to Engineering Students only or departmental consent required

ENGINR 2260: Dynamics
(same as MAE 2600, CV_ENG 2080). Introductory study of the motion of particles and rigid bodies under the influence of forces and moments. Topics include kinematics and kinetics of particles, systems of particles, and rigid bodies; Newton's laws of motion; work-energy principles; impulse and momentum; and the application of these principles to engineering problems. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: C- or better in ENGINR 1200. Restricted to Engineering Students only or departmental consent required

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 ENGINR 1050 and a grade of C or better in PHYSCS 2750. Restricted to Engineering Students Only or departmental consent

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

ENGINR 2550: Artificial Intelligence Essentials
This interdisciplinary introductory course builds AI literacy for undergraduate students across all majors, with a focus on generative AI. Students will explore foundational concepts in artificial intelligence, including AI history, ethics, prompt engineering, and hands-on engagement with cutting-edge tools. Emphasis is placed on the practical application of AI across diverse fields - from the arts and humanities to science and business. No programming experience is required, making the course accessible to students from any academic background. Graded on A-F basis only.

Credit Hours: 3

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

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

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 will 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

ENGINR 4050: Cooperative Education Program
For Engineering Cooperative Education Program Students. No billing hours, No term finalization.

Credit Hours: 0
Prerequisites: Instructor consent

ENGINR 4887: Internship in Engineering
Internship experience for students in the College of Engineering. Supervised internship work with approval of the internship course instructor and academic adviser. Course appears on transcript for zero credit and does not count toward full-time enrollment. No tuition or fees are charged. Graded on S/U basis only.

Credit Hours: 0
Prerequisites: Instructor consent required

ENGINR 4888: Research in Engineering
Mentored research experience for students in the College of Engineering. Project must be arranged with faculty member prior to registration. Course appears on transcript for zero credit and does not count toward full-time enrollment. No tuition or fees are charged. Graded on S/U basis only.

Credit Hours: 0
Prerequisites: Instructor consent required

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

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

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