EN.500 (GENERAL ENGINEERING)

EN.500.101.  What Is Engineering?.  3 Credits.
This is a course of lectures, laboratories, and special projects. Its objective is to introduce students not only to different fields of engineering but also to the analytic tools and techniques that the profession uses. Assignments include hands-on and virtual experiments, oral presentations of product design, and design/construction/testing of structures. Freshmen only or Permission Required.
Area: Engineering

EN.500.103.  Hopkins Engineering Sampler Seminar.  1 Credit.
This course provides students with an overview of the undergraduate programs in the Whiting School of Engineering. Faculty from various departments will introduce students to their discipline including aspects of their personal research. Freshmen only.
Area: Engineering

EN.500.109.  What is Engineering?-Summer.  3 Credits.
To introduce engineering ideas, thoughts, and problem-solving to potential engineering students. The course is intended to establish the framework within which engineers typically operate. Registration Requirement: Algebra II with Trig. Open only to high school students admitted to the Engineering Innovation Summer Program. Undergraduates should refer to EN.500.101.
Area: Engineering

EN.500.110.  Engineering Innovation.  3 Credits.
To introduce engineering ideas, thoughts, and problem-solving to potential engineering students. The course is intended to establish the framework within which engineers typically operate. Registration Requirement: Algebra II with Trig. Open only to high school students admitted to the Engineering Innovation Summer Program. Undergraduates should refer to EN.500.101.

EN.500.111.  Hopkins Engineering Applications & Research Tutorials.  1 Credit.
Area: Engineering

EN.500.112.  Gateway Computing: JAVA.  3 Credits.
This course introduces fundamental programming concepts and techniques, and is intended for all who plan to develop computational artifacts or intelligently deploy computational tools in their studies and careers. Topics covered include the design and implementation of algorithms using variables, control structures, arrays, functions, files, testing, debugging, and structured program design. Elements of object-oriented programming, algorithmic efficiency and data visualization are also introduced. Students deploy programming to develop working solutions that address problems in engineering, science and other areas of contemporary interest that vary from section to section. Course homework involves significant programming. Attendance and participation in class sessions are expected.
Prerequisite(s): Students may not have earned credit in courses:
EN.500.113 OR EN.500.114 OR EN.510.202 OR EN.530.112 OR EN.580.200 OR EN.601.107 OR EN.500.132 OR EN.500.133 OR EN.500.134.
Area: Engineering

EN.500.113.  Gateway Computing: Python.  3 Credits.
This course introduces fundamental programming concepts and techniques, and is intended for all who plan to develop computational artifacts or intelligently deploy computational tools in their studies and careers. Topics covered include the design and implementation of algorithms using variables, control structures, arrays, functions, files, testing, debugging, and structured program design. Elements of object-oriented programming, algorithmic efficiency and data visualization are also introduced. Students deploy programming to develop working solutions that address problems in engineering, science and other areas of contemporary interest that vary from section to section. Course homework involves significant programming. Attendance and participation in class sessions are expected.
Prerequisite(s): Students may not have earned credit in: EN.500.112 OR EN.500.114 OR EN.510.202 OR EN.530.112 OR EN.580.200 OR EN.601.107 OR EN.500.132 OR EN.500.133 OR EN.500.134.
Area: Engineering

EN.500.114.  Gateway Computing: Matlab.  3 Credits.
This course introduces fundamental programming concepts and techniques, and is intended for all who plan to develop computational artifacts or intelligently deploy computational tools in their studies and careers. Topics covered include the design and implementation of algorithms using variables, control structures, arrays, functions, files, testing, debugging, and structured program design. Elements of object-oriented programming, algorithmic efficiency and data visualization are also introduced. Students deploy programming to develop working solutions that address problems in engineering, science and other areas of contemporary interest that vary from section to section. Course homework involves significant programming. Attendance and participation in class sessions are expected.
Prerequisite(s): Students may not have earned credit in: EN.500.112 OR EN.500.113 OR EN.510.202 OR EN.530.112 OR EN.580.200 OR EN.601.107 OR EN.500.132 OR EN.500.133 OR EN.500.134.
Area: Engineering

EN.500.130.  Biomedical Engineering Innovation.  3 Credits.
To introduce biomedical engineering ideas, thoughts, and problem-solving to potential engineering students. The course is intended to establish the framework within which engineers typically operate. Registration Requirement: Either Chemistry with Lab or Physics with Lab.
Area: Engineering, Natural Sciences

EN.500.132.  Bootcamp: Java.  1 Credit.
This on-line course provides students who have already achieved a basic understanding of programming and computational thinking in one programming language with an opportunity to apply these skills in another programming language. Students will be expected to complete projects to demonstrate proficiency in the new language. Satisfactory/unsatisfactory only.
Prerequisite(s): Not open to students who have completed EN.601.107, EN.600.107, or EN.500.112; Students must have completed: EN.500.113 OR EN.500.114 OR EN.510.202 OR EN.580.200 OR EN.530.112 OR EN.520.123 OR EN.601.220.
Area: Engineering
EN.500.133. **Bootcamp: Python. 1 Credit.**
This on-line course provides students who have already achieved a basic understanding of programming and computational thinking in one programming language with an opportunity to apply these skills in another programming language. Students will be expected to complete projects to demonstrate proficiency in the new language. Satisfactory/unsatisfactory only
Prerequisite(s): Not open to students who have completed EN.500.113 or EN.580.200; Students must have completed: EN.500.112 OR EN.500.114 OR EN.601.107 OR EN.510.202 OR EN.530.112 OR EN.520.123 OR EN.601.220
Area: Engineering

EN.500.134. **Bootcamp: MATLAB. 1 Credit.**
This on-line course provides students who have already achieved a basic understanding of programming and computational thinking in one programming language with an opportunity to apply these skills in another programming language. Students will be expected to complete projects to demonstrate proficiency in the new language. Satisfactory/unsatisfactory only
Prerequisite(s): Not open to students who have completed EN.500.114 OR EN.580.200; Students must have completed: EN.500.112 OR EN.500.113 OR EN.601.107 OR EN.510.202 OR EN.530.112 OR EN.520.123 OR EN.601.220
Area: Engineering

EN.500.307. **Foundations of Multidisciplinary Design. 3 Credits.**
Students will be introduced to a human-centered design process and creative ways of thinking, which they will use to tackle a design challenge. While working on teams with classmates from different engineering disciplines, teams will understand the essential need behind the problem, prototype solutions, test their prototypes, and present a final solution. In addition to project work, students will learn to collaborate among different working styles. They will build on their own skills from their discipline while gaining familiarity with skills practiced in other engineering disciplines.
Prerequisite(s): Students may earn credit for EN.500.307 or EN.500.308, but not both
Area: Engineering

EN.500.308. **Multidisciplinary Engineering Design I. 3 Credits.**
Students will work on teams with colleagues from different engineering disciplines to tackle a challenge for a clinical, community, or industry project partner. Through practicing a creative, human-centered design process, teams will understand the essential need behind the problem, prototype solutions, and test and refine their prototypes. In addition to project work, students will learn healthy team dynamics and how to collaborate among different working styles.
Area: Engineering

EN.500.309. **Advanced Multidisciplinary Design. 3 Credits.**
As teams from EN.500.308 move into spring semester, students will be introduced to product development tools such as risk analysis, requirement testing, and timeline management. They will continue to iterate quickly on their prototypes in order to refine their solution for hand-off to their project partner at the end of the semester. As projects progress in technical depth, students have more opportunities to contribute expertise from their discipline while learning new skills from their peers.
Prerequisite(s): EN.500.307 OR EN.500.308 OR EN.500.503
Area: Engineering

EN.500.501. **SAB/JHU General Engineering Research (Abroad). 3 Credits.**
General Engineering Research Project Abroad for undergraduate participating on summer projects with NUS, EPFL, SJTU, and DTU. Permission required.
Prerequisite(s): You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration & Online Forms.

EN.500.551. **Engineering Research Practicum.**

EN.500.601. **Research Laboratory Safety. 1 Credit.**
This course covers physical, chemical, radiation, and biological hazards typically found in Johns Hopkins University research laboratories. It will use the “RAMP” (Recognize, Assess, Minimize, Prepare) framework originating in (Hill, R.H. Finster, D.C. Laboratory Safety For Chemistry Students, Wiley, 2nd Edition, 2016, 576pp.) and adopted by the American Chemical Society as a core concept for teaching laboratory safety. This framework does not depend on chemistry-specific practices (although it encompasses them as well as other disciplines), so it transfers well to general university-level research. The course also discusses the concepts of Inherently Safer Design of experiments. The course begins with a RAMP analysis of an assigned paper from the literature and concludes with a project analyzing a paper of the student’s choice.

EN.500.602. **Seminar: Environmental and Applied Fluid Mechanics. 1 Credit.**

EN.500.603. **Graduate Orientation and Academic Ethics.**

EN.500.781. **Preparation for University Teaching. 1.5 Credits.**
This course will prepare graduate students to teach at the university level. Topics covered include large and small class teaching, characteristics of student learning, syllabus construction, grading students, and developing a teaching portfolio. Full-time EN Graduate Students only. Co-listed with AS.360.781.

EN.500.851. **Engineering Research Practicum. 1 - 9 Credits.**