

# GENERAL ENGINEERING (ENGR)

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## ENGR 100

### Engineering Physics

The overall objective of the course is to prepare secondary school students to be successful in a typical university freshmen-level introduction to engineering curriculum. Students will use hands-on project work, presentations, and discussion to gain a broad perspective of a number of individual engineering disciplines. Students will understand and apply the various aspects of the engineering design process, understand and apply creative and analytical problem solving methods to various situations and improve their ability to use technical-based communication. The format of projects will be written, oral, or graphical.

**Lecture: 3 Lab: 0 Credits: 3**

## ENGR 101

### Transition to Engineering: Explore Armour

This course introduces students to the various engineering disciplines offered at Illinois Tech. Speakers (faculty and expert guest speaker) will address the student cohort to discuss the various engineering disciplines and opportunities working as an engineer, to build a successful career in a rewarding profession. Students will have the opportunity to visit the educational and research facilities at the Illinois Tech Chicago campus, get familiar with Illinois Tech campus and community, and to participate in various activities, projects, and events within the Armour College of Engineering (ACE). Admitted to guaranteed admission program for engineering.

**Lecture: .5 Lab: 0 Credits: 0.5**

## ENGR 102

### ACE Mentor Design/Build Workshop

ACE Mentor Design/Build Summer Workshop gives students the opportunity to work together using professional processes and tools from Design Thinking to create a solution for a community organization with a real world need. The students then work with mentors in engineering, construction and architecture to see their work realized. The collaborative team works for seven weeks during the summer, from late June through early August. It is an exciting and challenging opportunity for students who have completed one year of the ACE after-school program. Selected students experience: A unique summer apprenticeship program that immerses them in a 7-week hands-on community design project. The opportunity to collaborate with up to 25 high-school students and 5 or more college students under the guidance of working and licensed professionals in Architecture, Engineering and Construction Management. Engaging with a real client, a real design problem and real budget, and they will be asked to think critically and to express creative design solutions. The summer begins with a community design event in late June, and culminates in August with a final student presentation and ribbon cutting, unveiling the built project.

**Lecture: 0 Lab: 1 Credits: 1**

## ENGR 111

### Introduction to Engineering and Design

This course introduces the student to the basic concepts and practices common to engineering. The engineering design process is presented through examples and hands-on projects. Along with fundamental engineering principles, communication skills, computer applications, and professional ethics will be included. Upon successful completion, the student will have been provided a foundation for further study in engineering.

**Lecture: 2 Lab: 0 Credits: 2**

## ENGR 112

### Introduction to Robotics

Introductory experience to the field of robotics. Included in this experience will be the engineering design process, a university-level programming language, and open-ended problem solving strategies. Students, working in small hands-on teams, will be presented with several authentic design challenges. To meet these challenges, students will design, build, and program an appropriate LEGO® EV3 robot with National Instruments LabVIEW software. Teams will document and present their design solutions. Additional topics may include motor control, gear ratios, torque, friction, sensors, timing, program loops, logic gates, decision-making, and timing sequences. The course incorporates Next Generation Science Standards (NGSS).

**Lecture: 2 Lab: 0 Credits: 2**

## ENGR 198

### Research Immersion: Group

This course provides a faculty-mentored immersive group research experience. Research topics are determined by the faculty mentor's area of research. In addition to the mentored research, students participate in seminars, prepare a written report of their research findings, and present their research findings at a poster expo. Students will receive assignments consistent with their academic level.

**Lecture: 0 Lab: 9 Credits: 3**

## ENGR 199

### Engineering Research Immersion: Individual

This course provides a faculty-mentored immersive individual research experience. Research topics are determined by the faculty mentor's area of research. In addition to the mentored research, students participate in seminars, prepare a written report of their research findings, and present their research findings at a poster expo. Students will receive assignments consistent with their academic level. Open to advanced high school and incoming engineering students with appropriate background for the research topic. Students must apply to the course. Only students who apply to the course and are selected by the instructor will be allowed to register for the course.

**Lecture: 0 Lab: 9 Credits: 3**

**ENGR 200**

**Entrepreneurship NOW! -- Introduction to the Entrepreneurial Mind Set**

This course introduces students to the basic skill set that changes a student's perspective from one of passive reception and learning to active participation and purposeful exploration to create value. This is a hands-on course where students learn to climb Mount Everest as a team, learn and practice the five disciplines for creating value, spark creativity and invention, learn the IIT-way to design, prototype, prototype and prototype, elevator pitching, and practice what they have learned by competing in a mini-innovation chase. The winners receive free courses at IIT to continue their journey to perfect the entrepreneurial mind set.

**Lecture: 0 Lab: 4 Credits: 2**

**ENGR 411**

**Fabrication Practices for Engineers**

The course will provide an overview of standard shop practices, machining theory, measurement, mechanical drawing, dimensioning requirements, tolerances, material selection, fastener selection, and shop safety. This course will provide basic instruction on the proper use and complimentary capabilities of standard machine tools. Hand tools, drill press, lathe, mill, band saw, CNC machines, laser cutters and 3D printers will be used by students. Students will fabricate a variety of parts that will demonstrate the capabilities of individual machine tools.

**Lecture: 0 Lab: 5 Credits: 2**

**ENGR 494**

**Undergraduate Research Immersion: Team**

This course provides a faculty-mentored immersive research experience as a part of a student team. Research topics are determined by faculty mentor's area of research. Open only to engineering students with appropriate background for the research topic. Students must apply to the course. Only students who apply to the course and are selected by the instructor will be allowed to register for the course.

**Lecture: 0 Lab: 10 Credits: 3**

**ENGR 495**

**Undergraduate Research Immersion: Individual**

This course provides individually-based faculty-mentored immersive research experience. Research topics are determined by faculty mentor's area of research. Open only to engineering students with appropriate background for the research topic. Students must apply to the course. Only students who apply to the course and are selected by the instructor will be allowed to register for the course.

**Lecture: 0 Lab: 10 Credits: 3**

**ENGR 496**

**Practical Engineering Training**

This course is a mentored, immersive practical engineering training. Students learn under the direction of professional engineers and practicing engineers by working on real engineering projects. The student will perform hands-on engineering, including learning and developing/applying engineering principles and concepts to complete the project assigned to the student. The student will apply engineering ethics and safety during their practical engineering training. Students will communicate the results of their work in written and oral communications. Students will receive assignments of varying complexity consistent with their undergraduate standing.

**Lecture: 0 Lab: 9 Credits: 3**

**ENGR 497**

**Special Topics: Introduction to Research**

This course introduces students to research methods, techniques for measurement and data analysis, lab safety, and contemporary issues related to research in a university setting. Students will be introduced to research proposal development, scientific literature reviews, measurement techniques, statistical data analysis, design of experiments, good laboratory practice, and proper presentation techniques. Ethics and intellectual property topics related to research will also be covered. During this course, students will be involved in hands-on experimentation in order to practice their measurement and data analysis skills as well as test their hypotheses. Experiments will focus on the engineering themes of energy, water, health, and security.

**Lecture: 0 Lab: 3 Credits: 3**

**ENGR 498**

**Undergraduate Research Immersion: Team**

This course provides a faculty-mentored immersive research experience as a part of a student team. Research topics are determined by faculty mentor's area of research.

**Lecture: 0 Lab: 6 Credits: 3**

**ENGR 499**

**Undergraduate Research Immersion: Individual**

This course provides a faculty-mentored immersive research experience. Research topics are determined by faculty mentor's area of research.

**Lecture: 0 Lab: 6 Credits: 3**