GENERAL ENGINEERING (ENGR)

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 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 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 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
ENGR 595
Product Development for Entrepreneurs
Elements of product development (mechanical and electrical), manufacturing and production planning, supply chain, marketing, product research, and entrepreneurship concepts are taught in this class. In this course, student teams will be required to create a compelling product that has potential to be sold in today’s marketplace. They will be required to create functional prototypes of their product for people to use and critique. If successful, students will be allowed to put their product on Kickstarter.com and take orders for delivery after the class is complete while potentially fostering their own business as a result of this course.
**Lecture:** 3  **Lab:** 0  **Credits:** 3

ENGR 596
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 graduate standing.
**Lecture:** 0  **Lab:** 9  **Credits:** 3

ENGR 598
Technological Entrepreneurship in Drug Development: Pharmaceutical Entrepreneurship
This course will give students an understanding of what is involved in technology commercialization, development of a business plan, and understand/experience what it is like working for a startup company by working on a real life project. Students from various educational fields (engineering, business, biology, chemistry, industrial technology/management) are welcome to be a part of a cross functional team that will participate in the National Institute of Health (NIH) Startup Challenge Business Plan Competition. Students will understand how to translate an idea to a business and also experience what it is like to work in a startup company in the field of engineering, science, and technology. Students will also gain an understanding of what it takes to bring a drug to the market. Furthermore, students will get the opportunity to obtain guidance on the business from expert advisors from the pharmaceutical industry, entrepreneurs, and venture capitalists. Permission of the instructor is required.
**Lecture:** 3  **Lab:** 0  **Credits:** 3

ENGR 599
Graduate Research Immersion: Individual
This course provides a faculty-mentored immersive 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.
**Lecture:** 3  **Lab:** 0  **Credits:** 3