

ENGINEERING PHYSICS (EPHY)

EPHY 155 ENGINEERING DESIGN FOR SOCIETY (3)

Introduces engineering design as a creative process to solve local and global problems, including one in the university or local community. Emphasizes engineering for all. Focuses on defining problems, solving problems using an engineering design process that includes sketching and making, and teamwork. Core: Creativity & Creative Development. Lab/Class fee will be assessed.

EPHY 335 ANALOG ELECTRONICS (4)

Covers the design, analysis, simulation, construction, and evaluation of electronic circuits with circuit elements including resistors, capacitors, inductors, diodes, transistors, and operational amplifiers. Kirchhoff's laws, Thevenin and Norton equivalent circuits, DC and AC (frequency dependent) circuit analysis is covered. Three lecture hours and one three-hour laboratory period. Students who successfully completed PHYS 335 will not receive additional credit for EPHY 335. Prerequisites: PHYS 212 or PHYS 242; sophomore standing; or consent of the instructor. Lab/Class fee will be assessed.

EPHY 337 DIGITAL ELECTRONICS (4)

Subjects covered will be basic concepts of digital electronics such as gates, logic modules, truth tables, digital codes, sequential systems, semi-conductor memories, decade counters, etc. The laboratory program is designed to give students first-hand experience on the material covered in lecture using integrated circuits and LED display systems. Three lecture hours and one three-hour laboratory period. Students who successfully completed PHYS 337 will not receive additional credit for EPHY 337. Prerequisites: PHYS 242 or PHYS 212; sophomore standing; or consent of instructor. Lab/Class fee will be assessed.

EPHY 373 ENGINEERING DESIGN IN PHYSICS (3)

Applies an engineering design process to solve problems related to physics and create technologies that employ physics principles. Emphasizes brainstorming, planning, modeling, testing, troubleshooting, optimization, and iteration; teamwork and communication; project management; computer-aided design; and fabrication using laser cutting and 3D printing. Additional lab time is required. Prerequisites: EPHY 155 and PHYS 242; sophomore/junior/senior standing; or consent of instructor.

EPHY 381 OPTICAL SYSTEMS DESIGN (4)

Addresses key principles/ideas within optical systems design, including advanced geometrical optics, Lens maker equation, real lens approximation, ZemaxTM training, aberration theory, imaging systems design, sequential and non-sequential optical systems. Three lecture hours and one three-hour laboratory each week. Prerequisites: PHYS 243; PHYS 341 (may be taken concurrently); sophomore/junior/senior standing; and consent of the instructor.

EPHY 385 ENGINEERING PHYSICS SEMINAR (1)

Students participate in seminars on topics of current interest in engineering physics under guidance of instructor. One lecture hour. Prerequisite: at least junior standing in the physics major.

EPHY 423 FLUID DYNAMICS (3)

An in-depth introduction to the physics of fluid flows, which governs physical phenomena as diverse as the drainage of water from a kitchen sink and the development of tropical cyclones. Prerequisites: MATH 374, PHYS 243, PHYS 307, junior/senior standing, or consent of instructor.

EPHY 442 MATERIALS CHARACTERIZATION & INSTRUMENTATION LABORATORY (3)

Several advanced experiments exploring methods currently used in research and industry. Familiarization with machine shop procedures, vacuum, low temperature and other experimental techniques. Six laboratory hours. Students who successfully completed PHYS 342 will not receive additional credit for EPHY 442. Prerequisites: PHYS 341; junior/senior standing. Lab/Class fee will be assessed.

EPHY 495 RESEARCH PROBLEMS IN ENGINEERING PHYSICS (1-4)

Individual project in any engineering physics. May be repeated for a maximum of 9 units. Prerequisites: senior standing and permission of the faculty member who will mentor the research project.