

APPLIED PHYSICS/ ENGINEERING DUAL DEGREE PROGRAM

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Carroll University, the University of Wisconsin Platteville and the University of Wisconsin Milwaukee offer an inter-university program that allows students to earn two degrees: a B.S. in Applied Physics from Carroll University, and a B.S. in Engineering from the UW-Platteville or UW-Milwaukee. There is also an option to earn a B.S. in Applied Physics from Carroll University and an M.S. in Engineering from UW-Milwaukee. Usually taking 5 years to complete, the Carroll University portion of these 3+2 programs consists of an intensive integrated experience in general engineering, physical science, applied mathematics, computation, and liberal studies. Upon completing the 3 year program at Carroll University, students transfer to the UW-Platteville or UW-Milwaukee for 2 years to complete an engineering degree in any one of the following disciplines: Civil Engineering, Electrical Engineering, Engineering Physics, Industrial Engineering, Mechanical Engineering, and Materials Science. Students receive an Applied Physics degree after the successful completion of their first year at UWP or UWM.

Learning Outcomes for Applied Physics/Engineering

1. Prepare students to successfully complete an intensive 2-year engineering curriculum at UW-Platteville or UW-Milwaukee.
2. Introduce students to the engineering profession, including engineering problem solving, judgment and practice.
3. Begin development of student awareness of the impact of their work on society, locally, nationally and globally.

Courses taken at Carroll

Core

Chemistry 109, 110, Principles of Inorganic and Analytic Chemistry

Computer Science 111, Introduction to Java

Engineering (GEN) 100, 101, Engineering Seminar I and II

Engineering (GEN) 105, Engineering Graphics

Engineering (GEN) 210, Statics and Dynamics

Mathematics 160, 161, 207, Calculus I, II and III

Mathematics 309, Differential Equations

Physics 203, 204, General Physics
Physics 301, Electricity and Magnetism
Physics 303, Modern Physics
Physics 304, Mechanics
Physics 320, Thermodynamics
Engineering (GEN) 320, Advanced Circuits and Electronics

Two of the following: (*)
Engineering (GEN) 310, Strengths of Materials
Mathematics 208, Linear Algebra
Mathematics 312, Probability and Statistics

(*) Chosen according to the desired engineering field.

100. Engineering Seminar I

1 credit

New engineering students will be given opportunities to develop and improve problem solving, computer literacy and study skills to maximize their chances for success in their university careers and prepare them for subsequent engineering courses. Topics include: making the transition from high school to university; time management; exploration of the engineering disciplines, learning styles, introduction to computer skills including spreadsheets, word processing and presentation software; engineering ethics; introduction to engineering methods. (*Fa*)

101. Engineering Seminar II

1 credit

New engineering students are given opportunities to explore the engineering programs through interdisciplinary projects. Emphasis will be placed on written and oral communication skills, data collection and analysis, computer application skills and group work. (Required course fee) (*Sp*) Prerequisite: GEN 100.

105. Engineering Graphics

4 credits

Problems relative to points, lines and planes in space; Cartesian coordinates; projection plane theory; orthographic pictorials; dimensioning; auxiliary views; sections; extensive use of computer aided design (AutoCAD and solid modeling) including 2D and 3D drawing, editing and enhancing; emphasis on development of the ability to communicate graphically; special emphasis on engineering and computer graphics applications. (*Fa*)

210. Statics and Dynamics

4 credits

Principles of statics and dynamics with applications in engineering. Topics include force/movement vectors, resultants, distributed loads, internal forces in beams, properties of areas, moments of inertia and the laws of friction, kinematics and kinetics of particles, rigid bodies in translation, rotation and general plane motion, Newton's laws, work-energy methods, linear and angular momentum. (*Fa, even years*) Prerequisite: PHY 203, and MAT 207 or concurrent registration in MAT 207.

APPLIED PHYSICS/ENGINEERING

310. Strengths of Materials

4 credits

Simple stress and strain; design and investigation of joints, beams, torsion members and columns; evaluation of shear, moment, slope and deflection of beams and combined stresses. (*Sp, odd years*) Prerequisite: GEN 210.

320. Advanced Circuits and Electronics

2 credits

Expanding on topics covered in PHY 204 and 301, analog circuits are treated in greater detail, including steady-state AC circuits, transfer functions, transient current dynamics, circuit analysis, phasors, follower circuits, and operational and transistor amplifiers. Additional analog topics include diodes, transistors (bipolar junction and field-effect), elementary amplifier circuits, transistor limitations, comparators, and oscillators. Lectures and laboratories are expanded to include digital electronics, electronic devices and applications. Digital topics include digital circuits, digital logic, flip flops, counter, memory, A/D and D/A conversion. Additional topics may include arithmetic units and microprocessors. (Required course fee) (*Sp, even years*) Concurrent with PHY 301.

380. Engineering Internship

4 credits

The internship provides an opportunity for the student to synthesize knowledge and skills from coursework in a professional setting, under the supervision of faculty and professional engineers. (*Fa, Sp, Su*) Prerequisite: Junior or Senior standing and approval of instructor.