

Engineering Physics (ENGP)

ENGP 101 Introduction to Engineering Physics and Space Physics 1 Credit (1,0)

Seminar on contemporary space-related research and career topics; problem-solving, critical thinking, internships, industry standards, and skills development.

Prerequisites: Open to BSEP and BSSP majors only

Course Offered at: Daytona Beach

ENGP 199 Special Topics in Engineering Physics 1-6 Credit (1-6,0)

Individual, independent, or directed studies of selected topics in engineering physics.

Course Offered at: Daytona Beach, Prescott

ENGP 221 Microcomputers and Electronic Instrumentation 3 Credits (3,0)

Electronics applied to the design of circuits for measuring instruments and interfacing sensors and computers. Electrical signal progression through signal conditioning circuits into microcomputers for processing. Focus on signals from light, pressure, temperature, and other sensors.

Prerequisites: PHYS 228 and PHYS 228L

Corequisites: MATH 345

Course Offered at: Daytona Beach

ENGP 221L Microcomputer and Electronic Instrumentation Laboratory 1 Credit (0,3)

Two 90-minute lab sessions per week. Software modeling of circuits; analog devices: diodes, transistors, op-amps, motors; digital devices: microcontrollers, multiplexers, communication radios. Device-level C programming. Complements ENGP 221 lectures.

Course Offered at: Daytona Beach

ENGP 240L Machine Shop Laboratory 1 Credit (0,1)

Introduction to machine shop techniques including riveting, sheet metal forming, welding, and machining.

Prerequisites: Open to BSEP majors only

Course Offered at: Daytona Beach

ENGP 299 Special Topics in Engineering Physics 1-6 Credit (1-6,0)

Individual, independent, or directed studies of selected topics in engineering physics.

Course Offered at: Daytona Beach, Prescott

ENGP 301 Transport Phenomena 3 Credits (3,0)

Introduction to fluid dynamics and to heat transfer. Development and applications of differential forms of basic equations. Dynamics of inviscid and viscous fluids, flow measurement and dimensional analysis with engineering applications. Introduction to heat transfer and development of characteristic equations for heat exchange equipment. Basic thermodynamic theory for closed systems including first and second law analyses for ideal gases and for incompressible substances.

Prerequisites: PHYS 228 and MATH 345

Course Offered at: Daytona Beach, Prescott

ENGP 311 Spaceflight Dynamics 3 Credits (3,0)

Analytical dynamics, two-body orbits, initial value problems, orbital boundary value problems, Earth coverage, space mission geometry, non-Keplerian effects, orbital maneuvers, rendezvous, and interplanetary transfer.

Prerequisites: MATH 345 and CPSC 223 or ENGR 115

Course Offered at: Daytona Beach

ENGP 312 Space Systems Engineering 3 Credits (3,0)

Engineering and design of space systems. Major subsystems including propulsion, power, telemetry and command, communications, thermal control, guidance, navigation, and control, and attitude determination and control. Topics on mission selection and performance, space environments, environmental control, life support systems, system integration, testing, and operations.

Daytona Beach Prerequisites: AERO 313 or ENGP 311

Prescott Prerequisites: AE/ME students must have a C or better in AERO 313

Course Offered at: Daytona Beach, Prescott

ENGP 323 Engineering Electricity and Magnetism 3 Credits (3,0)

Solutions of electrostatic and magnetic problems using Poisson's and Laplace's equations, electromagnetic induction, Maxwell's equations, reflection, refraction, waveguides, antenna radiation.

Prerequisites: PHYS 303 and PHYS 303L and (ENGR 115 or CPSC 223) and PHYS 320

Corequisites: MATH 442

Course Offered at: Daytona Beach

ENGP 330 Electro-Optical Engineering 3 Credits (3,0)

Geometrical and physical optics, fiber optics, interference, diffraction, polarization, phaser methods; applications in remote sensing and image processing.

Prerequisites: MATH 345 and (CPSC 223 or ENGR 115)

Corequisites: PHYS 303

Course Offered at: Daytona Beach

ENGP 335 Nanomaterials and Nanoscience 3 Credits (3,0)

Introduction to the field of nanotechnology; synthesis, characterization, and applications of nanodots, nanowires, and nanotubes; atomic force microscopy, scanning electron microscopy, and nanotoxicology.

Prerequisites: (CHEM 110 or CHEM 140) and (PHYS 228 or PHYS 250) and MATH 242

Course Offered at: Daytona Beach

ENGP 340 Engineering Physics Experimental Design 2 Credits (2,1.5)

Application of engineering and scientific fundamentals in use of industrial thermal, fluid, electrical, mechanical, and chemical phenomena. Emphasis on design of experiments and deductive analysis. Incorporation of environmental, safety, health, ethical, and economic concerns on the design of such engineering systems.

Prerequisites: (CPSC 223 or ENGR 115) and PHYS 228 and ENGP 301

Course Offered at: Daytona Beach

ENGP 345 Engineering Physics Seminar 1 Credit (1,0)

Seminar-style course with lectures, readings, and writing on current topics in space science.

Prerequisites: Open only to BSEP majors with at least junior standing

Course Offered at: Daytona Beach

ENGP 399 Special Topics in Engineering Physics 1-6 Credit (1-6,0)

Individual, independent, or directed studies of selected topics in engineering physics.

Course Offered at: Daytona Beach, Prescott

ENGP 413 Spacecraft Instrumentation 3 Credits (3,0)

Space environment models for engineering analysis, plasma interactions, chemical reactions, radiation effects, thermal issues, instrument design, spacecraft telemetry, and command systems. Theory, engineering, and data reduction techniques.

Prerequisites: ENGP 221 and ENGP 312

Course Offered at: Daytona Beach

ENGP 431 Control System Theory and Engineering Applications 3 Credits (3,0)

Modeling, analysis, and design of linear and nonlinear control systems; stability, state space models, PID controllers, pole placement, Lyapunov stability, LQR, LQG control, numerical simulation, adaptive control, neural network control, sliding mode control.

Prerequisites: ENGP 323

Course Offered at: Daytona Beach

ENGP 432 Applied Quantum Mechanics 3 Credits (3,0)

Selected topics and applications from Schrodinger equation, harmonic oscillator, hydrogen atom, operators, angular momentum, spin, time-dependent and independent perturbation theory, scattering theory, quantum statistical distributions.

Corequisites: ENGP 323

Course Offered at: Daytona Beach

ENGP 490 Engineering Physics Capstone Design I 3 Credits (1,3)

Undergraduate research in engineering physics; technical design report on a science or engineering problem using industry standards. Supervised by faculty.

Prerequisites: ENGP 340 and ENGP 312

Course Offered at: Daytona Beach

ENGP 491 Engineering Physics Capstone Design II 3 Credits (2,4)

Completion of senior design project, solving complex engineering problems, and presenting results.

Prerequisites: ENGP 490

Course Offered at: Daytona Beach

ENGP 499 Special Topics in Engineering Physics 1-6 Credit (1-6,0)

Individual, independent, or directed studies of selected topics in engineering physics.

Course Offered at: Daytona Beach, Prescott