

ENGINEERING-GENERAL (ENGR)

ENGR 1050 Engineering Graphics (2 credits)

Freehand and computer aided drawing in pictorial and orthographic projection; section and auxiliary views; descriptive geometry; graphical presentation of data; scales, dimensioning, and measurements. Two lectures and one 2-hour lab per week.

ENGR 1060 Introduction to Drones (1 credit)

Introduction to STEM education and hands-on exposure to the design and construction of drones. Students will build drones from scratch using individual parts, learn coding skills for machine automation, learn federal regulations and safety guidelines, and fly drones. Graded Pass/Fail. Typically Offered: Spring.

ENGR 1230 First Year Engineering (2 credits)

Introduction to critical thinking and engineering problem solving, writing in the professional context, oral communication skills, teamwork and leadership, professionalism, and work ethic. Focuses on career exploration, best practices in completing STEM homework assignments, development of a professional identity, immersion in a team-based design project with a campus client, and cultivation of life-long learning to ensure workforce success. Typically Offered: Fall.

Coreqs: MATH 1080 or higher

ENGR 2040 (s) Special Topics (1-16 credits, max 99)

Credit arranged

ENGR 2050 Near Space Engineering (1 credit, max 6)

Idaho RISE (Research Involving Student Engineers and Educators) is the NASA Idaho Space Grant Consortium student high-altitude scientific balloon program at the University of Idaho. RISE is a multidisciplinary program involving students from all departments in the College of Engineering, as well as Physics, Chemistry, Life Sciences, Education, and many other departments. Students in ENGR 2050 will participate in the design, development, testing, flight and flight operations, recovery, and data analysis of balloon-borne science and engineering instrumentation flown to altitudes of 100,000 feet and higher. Recommended Preparation: Interest in space, aerospace science, and engineering.

ENGR 2060 Near Space Engineering II (1 credit, max 6)

Idaho RISE (Research Involving Student Engineers and Educators) is the NASA Idaho Space Grant Consortium student high-altitude scientific balloon program at the University of Idaho. RISE is a multidisciplinary program involving students from all departments in the College of Engineering, as well as Physics, Chemistry, Life Sciences, Education, and many other departments. Students in ENGR 2060 will participate in the design, development, testing, flight and flight operations, recovery, and data analysis of balloon-borne science and engineering instrumentation flown to altitudes of 100,000 feet and higher. Recommended Preparation: Interest in engineering, space, and aerospace sciences. Typically Offered: Spring.

ENGR 2100 Engineering Statics (3 credits)

Principles of statics with engineering applications; addition and resolution of forces, vector algebra, moments and couples, resultants and static equilibrium, equivalent force systems, centroids, center of gravity, free body method of analysis, two and three dimensional equilibrium, trusses, frames, and friction.

Prereqs: MATH 1170 Cooperative: open to WSU degree-seeking students.

ENGR 2120 Python Programming Essentials (3 credits)

This course is an introduction to Python programming fundamentals. It will cover the basics of Python, good algorithm design, and code development. Topics include Python types, data structures, and objects. The course will include hands-on programming in a variety of applications from multiple application areas. Major general-purpose Python modules including numeric and graphing modules will be explored. Prior programming experience is not required. Typically Offered: Fall and Spring.

Prereqs: MATH 1143 or equivalent

ENGR 2150 Elements of Materials Science (3 credits)

Principles relating properties of metals, ceramics, polymers, and composites to their structures. Typically Offered: Fall and Spring.

Prereqs: CHEM 1111, CHEM 1111L

ENGR 2200 Engineering Dynamics (3 credits)

Particle and rigid body kinematics and kinetics; rectilinear, curvilinear, and relative motion, equations of motion, work and energy, impulse and momentum, systems of particles, rotation, rotating axes, rigid body analysis, angular momentum, vibration, and time response.

Prereqs: ENGR 2100 and MATH 1750 Cooperative: open to WSU degree-seeking students.

ENGR 2400 Introduction to Electrical Circuits (3 credits)

Not open for credit to electrical engineering majors. Circuit analysis, transient and steady state behavior, resonant systems, system analysis, and power and energy concepts; elementary differential equations will be introduced to solve basic transient problems.

Prereqs: MATH 1750 and PHYS 2110/PHYS 2110L

ENGR 3200 Engineering Thermodynamics and Heat Transfer (3 credits)

First and second laws of thermodynamics; thermodynamic processes; thermodynamic properties; flow processes; conversion of heat into work; conduction, convection, radiation, and heat exchangers. Recommended Preparation: ENGR 2100 and MATH 3100. Cooperative: open to WSU degree-seeking students.

ENGR 3350 Engineering Fluid Mechanics (3 credits)

Physical properties of fluids; fluid statics; continuity, energy, momentum relationships; laminar and turbulent flow; boundary layer effects; flow in pipes, open channels, and around objects.

Prereqs: ENGR 2100, MATH 2750 Cooperative: open to WSU degree-seeking students.

ENGR 3500 Engineering Mechanics of Materials (3 credits)

Elasticity, strength, and modes of failure of engineering materials; theory of stresses and strains for ties, shafts, beams, and columns. Typically Offered: Fall and Spring.

Prereqs: ENGR 2100, MATH 1750

ENGR 3600 Engineering Economy (2 credits)

Economic analysis and comparison of engineering alternatives. This class meets for three lectures per week for the first ten weeks of the semester.

Prereqs: Junior standing

ENGR 3980 (s) Internship (1-16 credits, max 99)

Credit arranged

ENGR 4040 (s) Special Topics (1-16 credits, max 99)

Credit arranged

ENGR 4280 Numerical Methods (3 credits)

Cross-listed with MATH 4280, PHYS 4280

Joint-listed with MATH 5290, PHYS 5280

Systems of equations, eigenvalues and eigenvectors, root finding, error analysis, numerical solution to differential equations, interpolation and data fitting, numerical integration, related topics and applications, such as fast Fourier transforms, as time and interest permits. Typically Offered: Spring.

Prereqs: MATH 3100; and CS 1120 or MATH 1830 or ENGR 2120 or Permission

ENGR 4660 PLC Programming for Automation (3 credits)

Cross-listed with CS 4556

Joint-listed with CS 5556, ENGR 5660

This course covers the theory and practice of utilizing Programmable Logic Controllers used in industrial automation. It will provide background in Boolean logic and its application in combinational and sequential logic. The course will then go over analog and digital input/output such as light sensors, switches, motors, relays, pulse-width modulation, encoders and how they relate to PLCs. Computer networking and the Modbus communications protocol and security issues will be examined. Additional projects/assignments required for graduate credit. Typically Offered: Fall.

ENGR 4670 Advanced PLC Programming (3 credits)

Cross-listed with CS 4670

Joint-listed with CS 5670, ENGR 5670

This course covers advanced theory and practice of utilizing Programmable Logic Controllers (PLC) used in industrial automation. This course aims at introducing students to more advanced PLC programming topics such as motor control, basic circuitry design, industrial safety, fault handling, Supervisory Control and Data Acquisition (SCADA) systems, analog device programming, proportional control, and other topics encountered in today's automation world. Additional projects/assignments are required for graduate credit. Typically Offered: Spring.

Prereqs: CS 4556/CS 5556 or ENGR 4660/ENGR 5660

ENGR 4990 (s) Directed Study (1-16 credits, max 99)

Credit arranged

ENGR 5010 Seminar (0-16 credits, max 99)

Seminar. Graded Pass/Fail. Typically Offered: Varies.

ENGR 5040 (s) Special Topics (1-16 credits, max 99)

Credit arranged

ENGR 5660 PLC Programming for Automation (3 credits)

Cross-listed with CS 5556

Joint-listed with CS 4556, ENGR 4660

This course covers the theory and practice of utilizing Programmable Logic Controllers used in industrial automation. It will provide background in Boolean logic and its application in combinational and sequential logic. The course will then go over analog and digital input/output such as light sensors, switches, motors, relays, pulse-width modulation, encoders and how they relate to PLCs. Computer networking and the Modbus communications protocol and security issues will be examined. Additional projects/assignments required for graduate credit. Typically Offered: Fall.

ENGR 5670 Advanced PLC Programming (3 credits)

Cross-listed with CS 5670

Joint-listed with CS 4670, ENGR 4670

This course covers advanced theory and practice of utilizing Programmable Logic Controllers (PLC) used in industrial automation. This course aims at introducing students to more advanced PLC programming topics such as motor control, basic circuitry design, industrial safety, fault handling, Supervisory Control and Data Acquisition (SCADA) systems, analog device programming, proportional control, and other topics encountered in today's automation world. Additional projects/assignments are required for graduate credit. Typically Offered: Spring.