ENGINEERING-GENERAL (ENGR)

ENGR 105 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 123 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.
Prereqs: None
Coreqs: MATH 108 (or higher)

ENGR 204 (s) Special Topics (1-16 credits)
Credit arranged

ENGR 205 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 205 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 206 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 206 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. (Spring only)

ENGR 210 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. Cooperative: open to WSU degree-seeking students.
Prereqs: MATH 170.

ENGR 212 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 143 or equivalent

ENGR 215 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 111, CHEM 111L

ENGR 220 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. Cooperative: open to WSU degree-seeking students.
Prereqs: ENGR 210 and MATH 175

ENGR 240 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 175 and PHYS 211/PHYS 211L

ENGR 320 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 210 and MATH 310. Cooperative: open to WSU degree-seeking students.

ENGR 335 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. Cooperative: open to WSU degree-seeking students.
Prereqs: ENGR 210, MATH 275

ENGR 350 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 210, MATH 175

ENGR 360 Engineering Economy (2 credits)
Economic analysis and comparison of engineering alternatives. This class meets for 3 lectures per week for the first 10 weeks of the semester.
Prereqs: Junior standing

ENGR 398 (s) Internship (1-16 credits)
Credit arranged

ENGR 404 (s) Special Topics (1-16 credits)
Credit arranged

ENGR 428 Numerical Methods (3 credits)
Cross-listed with MATH 428, PHYS 428
Joint-listed with MATH 529, PHYS 528
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 310; and CS 120 or Math 183 or ENGR 212 or Permission

ENGR 466 PLC Programming for Automation (3 credits)
Cross-listed with CS 466
Joint-listed with CS 566, ENGR 566
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 499 (s) Directed Study (1-16 credits)
Credit arranged

ENGR 504 (s) Special Topics (1-16 credits)
Credit arranged

ENGR 566 PLC Programming for Automation (3 credits)
Cross-listed with CS 566
Joint-listed with CS 466, ENGR 466
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.