ENGINEERING (ENGR/ENGR&)

Engineering and Computer Science Orientation
ENGR 101 1 Credit/Unit
2 hours of lab
Orientation for students interested in Engineering and Computer Science. Topics include effective planning, communication, teamwork, and exposure to Engineering and Computer Science educational/career opportunities and challenges. [GE, SE][PNP]

Wheeler Innovation Lab Qualifications
ENGR 105 2 Credits/Units
1 hours of lecture / 2 hours of lab
A series of online training and hands on learning activities to learn how to use equipment in the Wheeler Innovation Lab. You will earn proficiency qualifications for at least two pieces of equipment and complete a project of your own design. [GE, SE][PNP]

Intro to Aerospace Engineering
ENGR 107 2 Credits/Units
1 hours of lecture / 2 hours of lab
Prerequisite: College Trigonometry (MATH 102 or MATH 103) grade of "C" or higher and concurrent enrollment in, or completion of College Algebra (MATH 110 or MATH 111) grade of "C" or higher
For students interested in pursuing a degree in aerospace engineering. Topics include history of aviation and spaceflight, careers in aerospace, foundations of physical principles that underlies aerodynamics, dynamic pressure, the standard atmosphere, and lift and drag coefficients. The course includes a team design project. [GE, SE]

Introduction to Engineering
ENGR 109 5 Credits/Units
5 hours of lecture
Prerequisite: College Trigonometry (MATH 102 or MATH 103) grade of "C" or higher and concurrent enrollment in, or completion of College Algebra (MATH 110 or MATH 111) grade of "C" or higher
Introduction to the engineering profession: its branches, principles, and practices. Engineering problem-solving, methods of analysis and design, and an introduction to engineering fundamentals. [GE, SE]

Engineering Sketching and VIsualization
ENGR 113 2 Credits/Units
1 hours of lecture / 2 hours of lab
Prerequisite: MATH 96 (grade of "C" or higher) or placement into Math level 50.
Engineering communication and graphics through freehand sketching. Visualization and development of orthographic theory, scales, and lettering. [GE, SE]

Geometric Dimensioning and Tolerancing
ENGR 115 2 Credits/Units
1 hours of lecture / 2 hours of lab
Prerequisite: ENGR 113 and (CADD 150 or ENGR 150) (grades of "C" or higher)
Basics of geometric dimensioning and tolerancing: what it is and why use it, GDT symbols and their use, maximum and least material conditions, datums, and geometric characteristics. AutoCAD will be used to dimension drawings using GDT. [GE, SE]

Intro to Electrical/Computer Sci & Engineering
ENGR 120 5 Credits/Units
4 hours of lecture / 3 hours of lab
Prerequisite: College Trigonometry (MATH 102 or MATH 103) grade of "C" or higher and concurrent enrollment in, or completion of College Algebra (MATH 110 or MATH 111) grade of "C" or higher
Introduction to electrical engineering, computer science and engineering processes, principles, problem-solving techniques, and contemporary tools. Application of in-class learning to hands-on projects and exploration of current industry trends and implications. [GE, SE]

Field Survey I
ENGR 121 5 Credits/Units
3 hours of lecture / 4 hours of lab
Prerequisite: MATH& 151 (grade of "C" or higher) or placement into Math Level 90
Basic theory of surveying, measurement and calculation. Topics include: measurement and determination of boundaries, areas, and shapes; location through traversing techniques; error theory; compass adjustments; public land system; use of programmable calculators; and principles of measurements of distances, elevation and angles. [GE, SE]

Basic Autocad
ENGR 140 4 Credits/Units
2 hours of lecture / 5 hours of lab
Basic operations of the current version of AutoCAD. Screen features, drawing and editing objects, working with 2D, using both model space and layouts, dimensioning and dimension styles, using blocks, attributes, and xrefs, opening and saving files, and using templates. [GE]

Basic Solidworks
ENGR 150 4 Credits/Units
2 hours of lecture / 5 hours of lab
Parametric solids modeling with SolidWorks, covering the breadth of the software at a basic level. Create part, assembly, and drawing files, including design tables and multiple configurations. [GE, SE]

Cooperative Work Experience
ENGR 199 1-5 Credits/Units
15 hours of clinical
Supervised work experience in an approved job. Completion of specific learning objectives and employer evaluation. Completion of, or concurrent enrollment in, HDEV 195, 198, or 200. [GE]

Fundamentals of Flight
ENGR 208 3 Credits/Units
2 hours of lecture / 2 hours of lab
Prerequisite: ENGR 107 and MATH& 151 and (CADD 150 or ENGR 150) (grades of "C" or higher)
Introduction to the fundamentals of the flight of air and space craft. Topics include review of basic fluid flow and aerodynamics, circulation theory of lift, finite wings, aerodynamic performance, stability and control, propulsion, and space flight. The course includes a team design project. [GE, SE]

Introduction to Gas Dynamics
ENGR 209 3 Credits/Units
2 hours of lecture / 2 hours of lab
Prerequisite: Concurrent enrollment in, or completion of ENGR 207 and MATH& 152 (grades of "C" or higher)
Introduction to compressible flow as applied to aerodynamics of aerospace systems. Topics include review of foundational principles, control volume analysis, compressible flow, normal and oblique shocks, Prandtl-Meyer flow, and overview of Fanno and Reyleigh flow. The course includes a team design project. [GE, SE]

Integrated Computational Design
ENGR 216 3 Credits/Units
1 hours of lecture / 4 hours of lab
Prerequisite: Concurrent enrollment in, or completion of, ENGR 150 and ENGR& 214 (grades of "C" or higher)
Use computational SolidWorks Simulation CADD applications in the design and analysis of engineering problems. Also, integrated surface/solid modeling techniques, motion analysis, and use of CADD in documentation of designs and analyses. [GE]

Materials Science
ENGR 221 5 Credits/Units
5 hours of lecture
Prerequisite: CHEM& 142 (grace of "C" or higher)
Basic structure and properties of materials. Phase equilibrium and transformations. Mechanical properties, electronic structure, thermal, electrical, and magnetic properties. [GE, SE]

Manufacturing Processes
ENGR 239 5 Credits/Units
3 hours of lecture / 4 hours of lab
Introduction to manufacturing processes, emphasizing methods and practices used when machining, welding, and fabricating metals and related materials. [GE, SE]

Applied Numerical Methods for Engineers
ENGR 240 4 Credits/Units
3 hours of lecture / 3 hours of lab
Prerequisite: MATH& 153 and ENGR 109 or ENGR 120 (grades of "C" or higher)
Numerical solutions to problems in engineering and science using modern scientific computing tools. Application of mathematical judgment in selecting computational algorithms and communicating results. Use of MATLAB programming for numerical computation. Completion or concurrent enrollment in MATH 215. [GE]

Digital Logic Design
ENGR 250 5 Credits/Units
4 hours of lecture / 3 hours of lab
Prerequisite: ENGR 120 (grade of "C" or higher)
Digital logic design, testing and implementation, including Boolean Algebra, Karnaugh map and design of logic circuits to solve practical problems using sequential/combinational/synchronous/asynchronous circuits, application of standard SSI/MSI/LSI logic systems, design/test/implement development cycle and Hardware Description Language (HDL). [GE]

Electrical Circuits and Signals
ENGR 252 5 Credits/Units
4 hours of lecture / 3 hours of lab
Prerequisite: ENGR& 204 (grade of "C" or higher)
Continuation of Electrical Circuits. Analysis and design of RLC circuits in sinusoidal steady state, complex-frequency domain of linear and lumped parameter circuits, active/passive filter circuits, poly phase and two-port circuits. Application of Fourier series, Fourier transforms and computer tools in circuit analysis. [GE, SE]

Signals and Systems
ENGR 253 5 Credits/Units
4 hours of lecture / 3 hours of lab
Prerequisite: ENGR 252 (grade of "C" or higher)
Concepts and applications in signal processing and linear system theory. Utilization of Fourier Analysis in both continuous and discrete time signals and systems. Role of sampling and the process of reconstructing a continuous-time signal from its samples and basics of communication systems. Application of Laplace transform and Z-transform. [GE, SE]

Digital Systems and Microprocessors
ENGR 270 5 Credits/Units
4 hours of lecture / 3 hours of lab
Prerequisite: ENGR 250 and CSE 121 (grades of "C" or higher)
Continuation of the Digital Design sequence. Covering synchronous/asynchronous state machines, shift registers, arithmetic circuits and devices, microprocessor internal and system architecture, design and subsystem interfacing, assembly language, and programmable logic devices, design for test, documentation standards, and use of computer-based tools. [GE, SE]

Selected Topics
ENGR 280 1-5 Credits/Units
5 hours of lecture
The course focuses on selected topics in Engineering. Topics vary, and course theme and content change to reflect new topics. Because the course varies in content, it is repeatable for credit for different topics. [GE, SE]

Special Projects
ENGR 290 1-6 Credits/Units
6 hours of lecture
Opportunity to plan, organize and complete special projects approved by the department. [GE]

Introduction to Design
ENGR& 104 5 Credits/Units
4 hours of lecture / 3 hours of lab
Introduction to the engineering method of problem solving through guided Engineering design projects. Focus on developing group skills, understanding the effects of different learning styles, producing strategies for innovation, and fostering creativity in problem solving. [GE, NS, NS-LAB, SE]

Electrical Circuits
ENGR& 204 5 Credits/Units
4 hours of lecture / 3 hours of lab
Prerequisite: MATH& 152 (grade of "C" or higher) or placement into Math Level 100
Basic concepts of AC and DC electrical circuits. Analyze and design voltage and current relationships for series and parallel RLC circuit. Use of Kirchhoff's laws, Thevenin/Norton theorems, Operational Amplifier circuits, and Step/Natural/Steady-State circuit response. Use of test and measurement equipment in a laboratory setting. [GE, SE]

Statics
ENGR& 214 5 Credits/Units
5 hours of lecture
Prerequisite: MATH& 152 (grade of "C" or higher) or placement into Math Level 100
Solution of two and three dimensional vector systems using vector algebra notation and free-body diagrams. Friction, centroids, moment of inertia, radius of gyration, and loads involved in structures, machines, and trusses. [GE, SE]

Dynamics
ENGR& 215 5 Credits/Units
5 hours of lecture
Prerequisite: ENGR& 214 and MATH& 152 (grades of "C" or higher)
Kinematics and kinetics of particles, systems of particles and rigid bodies. Force/acceleration, work/energy and impulse/momentum problem solving techniques will be applied to two and three dimensional systems. [GE, SE]

Thermodynamics
ENGR& 224 5 Credits/Units
5 hours of lecture
Prerequisite: MATH&152 and PHYS&241 (grades of "C" or higher)
Explores the fundamentals of thermodynamics. Investigates the thermodynamic properties of matter with emphasis on ideal and real gases and introduces the concepts of heat and work. Defines the first and second laws of thermodynamics and explores their impact with examples. Uses thermodynamic cycles to apply the concepts of learned and relates the principles to applications. [GE, SE]

Mechanics of Materials
ENGR& 225 5 Credits/Units
5 hours of lecture
Prerequisite: ENGR& 214 and MATH& 152 (grades of "C" or higher)
Concepts of stress and strain for deformable objects. Axial, torsional and bending loading, combined loadings. Column loading and stability with other applied topics. [GE, SE]