ENGINEERING (EGR)

EGR 120 Introduction to Engineering (2 CR.)
Introduces the engineering profession, professional concepts, ethics, and responsibility. Reviews hand calculators, number systems, and unit conversions. Introduces the personal computer, operating systems and processing; engineering problem solving; and graphic techniques. Lecture 2 hours per week.
Prerequisite(s) MTH 162, MTH 167
Corequisite(s) ENG 111
Credit for Prior Learning available for this course. More information at https://www.nvcc.edu/admissions/cpl.html.

EGR 121 Foundations of Engineering (2 CR.)
Eligible for ENG 111. Introduces the engineering profession and its impact on society and the environment, including engineering problem solving, the engineering design process, and professional practices. Covers fundamental engineering calculations, descriptive statistics, basic spreadsheet and mathematical scripting language applications, professional ethics, teamwork, and communication Lecture 2 hours. Total 2 hour per week.
Prerequisite(s) MTH 167 or MTH 162
Credit for Prior Learning available for this course. More information at https://www.nvcc.edu/admissions/cpl.html.

EGR 122 Engineering Design (3 CR.)
Applies engineering methods to a semester-long team design project with an emphasis on engineering software involving 2D and 3D computer aided design; data modeling and analysis; and iterative programming solutions. Covers design drawings and dimensioning; spreadsheet software usage; mathematical scripting language; and professional practices. 3 credits. Lecture 2 hours per week; lab 2 hours per week; total 4 hours per week.
Prerequisite(s) EGR 121 or department permission

EGR 125 Introduction to Computer Programming for Engineers (4 CR.)
Introduces problem solving and implementation of computer software solutions using a high-level programming language in a structured environment. Includes concepts and practice of algorithm design, language syntax, control structures, arrays, and introduction to object-oriented programming. Covers engineering applications, such as mathematical modeling, file input and output, and basic numerical methods. The assignments in this course require mathematical problem-solving skills, algebraic modeling, and functions, and use of variables. Lecture 4 hours per week.
Prerequisite(s) MTH 162 or MTH 167 or equivalent
Corequisite(s) EGR 121

EGR 126 Computer Programming For Engineers (3 CR.)
Introduces computers, their architecture and software. Teaches program development using flowcharts. Solves engineering problems involving programming in languages such as FORTRAN, Pascal, or C++. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.
Prerequisite(s) EGR 120, EGR 121, or EGR 122, and MTH 263

EGR 130 Statics/Material Strength For Eng te (5 CR.)
Presents principles and applications of free-body diagrams of force systems in equilibrium. Analyzes frames and trusses. Presents principles and applications to problems in friction, centroids, and moments of inertia. Includes properties of materials, stress, strain, elasticity, design of connections, shear and bending in statically determinate beams, and axially loaded columns. Lecture 4 hours. Laboratory 2 hours. Total 6 hours per week.
Prerequisite(s) MTH 161 and MTH 162, or MTH 167 or equivalent

EGR 206 Engineering Economics (3 CR.)
Presents economic analysis of engineering alternatives. Studies economic and cost concepts, calculation of economic equivalence, comparison of alternatives, replacement economy, economic optimization in design and operation, depreciation, and after tax analysis. Lecture 3 hours per week.
Prerequisite(s) MTH 162 or MTH 167

EGR 240 Statics (3 CR.)
MTH 263 and PHY 241(or old PHY 231). Introduces basic concepts of engineering mechanics, systems of forces and couples, equilibrium of particles and rigid bodies, and internal forces and analysis of structures, including SI and U.S. customary units. Includes trusses, frames, machines, beams, distributed forces, friction, and centroids. Lecture 3 hours per week.
Prerequisite(s) EGR 120, EGR 121, or EGR 122

EGR 245 Dynamics (3 CR.)
Presents approach to kinematics and kinetics of particles (and systems of particles) in linear and curvilinear motion. Includes kinematics and kinetics of rigid bodies in plane motion. Teaches Newton's second law, work-energy, and impulse-momentum methods. Lecture 3 hours per week.
Prerequisite(s) MTH 265 and EGR 240

EGR 246 Mechanics of Materials (3 CR.)
TIntroduces concepts of stress, strain, deformation, internal equilibrium, and basic properties of engineering materials. Analyzes axial loads, torsion, bending, shear and combined loading. Studies stress transformation, principal stresses, and buckling. Lecture 3 hours per week.
Prerequisite(s) EGR 240

EGR 248 Thermodynamics For Engineering (3 CR.)
Studies formulation of the first and second law of thermodynamics. Presents energy conversion, concepts of energy, temperature, entropy, and enthalpy, equations of state of fluids. Covers reversibility and irreversibility in processes, closed and open systems, cyclical javascript:submitAction_win1(document.win1,'$ICField2$hdown $0');processes and problem solving using computers. Lecture 3 hours per week.
Prerequisite(s) MTH 264 and PHY 241 (or PHY 231)

EGR 255 Electric Circuits Laboratory (1 CR.)
Teaches principles and operation of laboratory instruments such as VOM, electronic voltmeters, digital multimeters, oscilloscopes, counters, wave generators, and power supplies. Presents application to circuit measurements, including transient and steady-state response of simple networks with laboratory applications of laws and theories of circuits plus measurement of AC quantities. Laboratory 3 hours per week.
Corequisite(s) EGR 251

EGR 265 Digital Electronics And Logic Design (4 CR.)
Teaches number representation in digital systems; Boolean algebra; design of digital circuits, including gates, flip-flops, counters, registers, architecture, microprocessors, and input-output devices. Lecture 3 hours. Laboratory 2 hours. Total 5 hours per week.
Credit for Prior Learning available for this course. More information at https://www.nvcc.edu/admissions/cpl.html.

EGR 270 Fundamentals of Computer Engineering (4 CR.)
Covers digital system analysis, design, and implementation. Includes digital logic, Boolean algebra, combinational and sequential circuits, hierarchical design, and introduction to computer organization and assembly language. Features in laboratory work the use of discrete logic, programmable logic devices, and hardware description language to design, simulate, implement, validate, and document digital circuits. Lecture 3 hours, Laboratory 3 hours, Total 6 hours per week.
Prerequisite(s) EGR120, or EGR, 121 and either EGR 125 or CSC 221 (or CSC 200)

EGR 271 Electric Circuits I (4 CR.)
Covers fundamentals of electric circuits. Teaches resistive circuit analysis methods, including network theorems. Teaches operational amplifiers, capacitors, inductors, resistor-capacitor (RC), resistor-inductor (RL) and resistance-inductance-capacitance (RLC) circuit transient response. Introduces phasor representation of alternating current (AC) circuits. Utilizes circuit design processes, technical writing and computer software for problem solving. Includes laboratory analysis to explore course concepts. Lecture 3 hours, Laboratory 3 hours, Total 6 hours per week. Please note: Credit will not be awarded for both EGR 271: Electric Circuits I and EGR 251: Basic Electric Circuits I/EGR 255: Electric Circuits Laboratory
Prerequisite(s) MTH 264 and EGR 121

EGR 272 Electric Circuits II (4 CR.)
Covers sinusoidal steady state circuit response using phasors; frequency analysis of linear circuits including frequency response, Bode plots, Fourier series analysis, and design of basic filters. Examines Laplace circuit analysis and transfer functions, AC power analysis; nonlinear diode models; and technical writing. Includes laboratory analysis and open-ended design project. Lecture 3 hours, Laboratory 3 hours, Total 6 hours per week. Please note: Credit will not be awarded for both EGR 272: Electric Circuits II and EGR 252: Basic Electric Circuits II
Prerequisite(s) MTH 267 and EGR 271

EGR 280 Foundations of Environmental Engineering (3 CR.)
Provides an introduction to the concepts of environmental engineering including air pollution, water pollution, water treatment, waste management, and health risk assessment. Examines sustainability and global climate change in the context of contemporary environmental engineering. Lecture 3 hours. Total 3 hours per week.
Prerequisite(s) CHM 111

EGR 282 Hydraulics for Civil and Environmental Engineering (3 CR.)
Introduces the basic principles governing the statics and dynamics of fluids, especially incompressible fluids. Examines hydrostatic pressure; continuity, Bernoulli, and momentum equations; viscosity flow problems; measuring instruments; and applications to closed conduits and open channels. Lecture 3 hours. Total 3 hours per week.
Prerequisite(s) EGR 240 or departmental approval