

# ENGINEERING (ENGR)

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## **ENGR 10 – Freshman Engineering Seminar 0 credit hours**

Overview of the engineering field as well as major specific information. Information will be provided to help with transitional needs to UNL and the college of engineering (time management, study skills, and resources), involvement opportunities (student organizations, research, and study abroad), tours of engineering facilities for experiential learning, and interactive learning to increase business knowledge and skills.

## **ENGR 101 – Introduction to Engineering 3 credit hours**

Students will examine relevant and practical industrial and commercial engineering applications to gain necessary engineering skills that will help them succeed as a student as well as a professional engineer. A variety of engineering disciplines will be highlighted and discussed, as well as topics in the underlying physical, chemical, and biological scientific principles and processes related to each topic. The class will use a specified focus area that involves real world applications to aid in the conceptualization and learning of the course material.

Corequisite: MATH 103 or MATH 115 or MATH 202.

## **ENGR 130 – Computer Aided Drafting for Mechanical Engineering 3 credit hours**

Principles and accepted practices of geometric design in mechanical engineering. Computer generation of 2D and 3D models for mechanical systems. Introduction to engineering design practices such as specifications, dimensioning, and tolerance.

Prerequisite: ENGR 101

## **ENGR 155 – Engineering Problem Solving: MATLAB 3 credit hours**

This course is divided into three modules. During the first module of this course, we will focus on the basics of computing and at the same time learn the basic programming constructs. The second module of this course explores engineering design process and computing with a focus on representing engineering systems using matrices and solving them in MATLAB. The third module will focus on using MATLAB for advanced computation optimization and data fitting.

Prerequisite: MATH 103 or higher

## **ENGR 200 – Engineering Thermodynamics 3 credit hours**

Introduce students to the Thermodynamics properties, open and closed systems, equations of state, heat and work, first law of thermodynamics, second law of thermodynamics, Carnot Cycle, Otto Cycle, Diesel Cycle and heat engine, Exergy balance, Rankine Cycle, refrigeration cycles, Brayton cycle, Heat pump, psychrometrics, Steady-flow, Entropy.

Prerequisite: PHYS 275 and PHYS 275L.

Corequisite: ENGR 223 and MATH 202.

## **ENGR 215 – Engineering Circuits I 4 credit hours**

Introduction to electrical engineering circuit theory. Kirchhoff's laws and circuit analysis theorems applied to steady state DC resistive circuits.

Analysis of transient RLC and sinusoidal steady-state circuits.

Corequisite: PHYS 276 and MATH 202.

## **ENGR 216 – Engineering Circuits II 4 credit hours**

Steady state power calculations for sinusoidal single-phase and balanced three-phase circuits. Analysis of circuits containing mutual inductance.

Advanced analysis of active and passive circuits in both the time and frequency domain. Introduction to fundamentals of semiconductor theory and their application to p-n junction devices. Kirchhoff's laws and circuit analysis theorems applied to steady state diode and transistor circuits.

Applications of operational amplifiers. Lecture 3 hours, lab 1 hour.

Prerequisite: ENGR 215

## **ENGR 223 – Engineering Statics 3 credit hours**

Analysis of forces, using vector algebra, acting on particles and rigid bodies in static equilibrium; equivalent systems of forces; friction; centroids and moments of inertia; introduction to energy methods.

Prerequisite: PHYS 275 and ENGR 101.

Corequisite: MATH 202.

## **ENGR 325 – Mechanics of Materials 3 credit hours**

Stresses and strain in solids, uniaxial loading, linear elasticity, material behavior, stresses in beams, pressure vessels, Torsion of circular shafts, bending of beams of symmetrical section, column buckling and elastic instability.

Prerequisite: ENGR 223.

Corequisite: MATH 260.

Additional Course Fee Required

## **ENGR 373 – Engineering Dynamics 3 credit hours**

Basic theory of engineering mechanics, using calculus, involving the displacement, velocity, and acceleration of particles, rigid bodies, and systems of particles. Newton's Laws, work and energy relationships, principles of impulse and momentum are applied to the solution of kinematic engineering problems.

Prerequisite: ENGR 223.

Corequisite: MATH 260.