The School of Science and Engineering

Engineering Science

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MINOR IN ENGINEERING SCIENCE

Students not majoring in biomedical or chemical engineering may earn a minor in Engineering Science by completing the following courses.

I. Prerequisite Math and Science Courses:

MATH 121 Calculus I	(4)
MATH 122 Calculus II	(4)
MATH 221 Calculus III	(4)
MATH 224 Introduction to Applied Mathematics	(4)
or MATH 424 Ordinary Differential Equations	(4)
and either CHEM 107/117; CHEM 108/118 General Chemistry	(4, 4)
or	
PHYS 131; PHYS 132 (4, 4) General Physics I and II	(4, 4)
	Total 24

II. Engineering Courses:

Required of all Engineering Science minors:

* Two 300-400 level electives in either biomedical or chemical engineering (3,3)

Total 6

*CENG 221 Chemical Engineering Design I	(3)
	Total 3

And three courses chosen from the following list: (appropriate for students who have taken Physics)

*ENGP 201 Electric Circuits I	(3)
*ENGP/BMEN 241 Statics	(3)
*ENGP/BMEN 243 Mechanics of Materials	(3)
*ENGP/BMEN 344 Fluid Mechanics	(3)
(Appropriate for students who have taken Chemistry)	
*CENG 212 Thermodynamics	(3)
*ENGP/BMEN/CEBG 312 Materials Science and Engineering	(3)
	Total 9

COURSE DESCRIPTIONS

ENGP 201 Electric Circuits 1 (3) Lecture
Prerequisites: MATH 122, PHYS 132 A fundamental course dealing with electric charge, current, voltage, power, energy, and passive and active circuit elements. Response of linear circuits to steady state and time dependent signals, differential equations, circuit laws, network analysis, frequency response, phasors, and transfer functions.

ENGP 241 Statics (3) Lecture
Prerequisites: PHYS 131. Statics of particles and rigid bodies. Concepts of force, moments, free body diagrams, equilibrium and friction with engineering applications.

ENGP 243 Mechanics of Materials (3) Lecture
Prerequisites: ENGP 241, MATH 122. Concepts of stress and strain. Generalized Hooke's Law. Mohr's circle. Formulations for axial, shear, bending, torsion, and combined stresses applied to tension members, pinned points, symmetric and unsymmetric beams, and shafts. Euler buckling criteria for columns.

ENGP 312 Materials Science and Engineering (3) Lecture
Prerequisites: CHEM 107, CHEM 108, PHYS 131, PHYS 132, MATH 221. The structure and properties of engineering materials are considered. Coverage includes basic atomic and microscopic structure, testing methods, phase relationships, and strengthening techniques. Emphasis is placed on common industrial materials. Thermodynamics and kinetics aspects of material science are discussed.

ENGP 344 Fluid Mechanics (3)
Prerequisites: ENGP 241, MATH 224. Fundamental concepts and properties of fluids. Basic equations of fluid statics and dynamics in differential and integral form using both system and control volume viewpoints. Topics and applications include dimensional analysis and similitude; ideal, viscous and compressible flows; pipe and boundary layer flow.