ENGINEERING (EGNE)

EGNE 1203 Engineering Mechanics I: Statics
3 credit hours
Prerequisite: MATH 1210/1211 (concurrently)

Students will cover the fundamental concepts and principles of mechanics, statics of particles, equivalent force systems, equilibrium of rigid bodies, analysis of structures, friction, distributed forces, centroids, centre of gravity, and moments of inertia. Classes 3 hrs. and lab 3 hrs. a week.

EGNE 1204 Computer Methods for Engineers
3 credit hours
Prerequisite: Students must be registered in either the Diploma of Engineering or the B.Sc./Diploma in Engineering program

This course introduces students to computer tools and techniques for the solution of common engineering problems. Software methods include C language programming, MathCad, spreadsheets, PC operating systems and networks will be studied. Problems involving the solution of simultaneous equations, matrix algebra, numerical integration/differentiation, and display and analyses of experimental data will be addressed. Classes 3 hrs. and lab 3 hrs. a week.

EGNE 1206 Technical Communications
3 credit hours
Prerequisite: Students must be registered in either the Diploma of Engineering or the B.Sc./Diploma in Engineering Program

Students are exposed to the history of engineering and its disciplines, academic regulations, ethics, equity and professional responsibility. Students are provided with the practical communication skills associated with the Engineering profession including: writing fundamentals, technical writing, presentations, public speaking, and communication theory. Classes 3 hrs. a week and recitation 1.5 hrs. a week

EGNE 1210 Engineering Design I: Graphics
3 credit hours
Prerequisite: Students must be registered in either the Diploma of Engineering or the B.Sc./Diploma in Engineering Program

Students examine graphics as a language of communication. Topics include: 3D visualization; projection theory; orthographic, oblique and isometric sketching; drawing as a means of representing 3D objects on 2D paper; reading of engineering drawings; standards and conventional practices. Students complete a design project which includes elements of conceptual design, team work, project management, computer drafting, reporting and presentations. Classes 3 hrs. and lab 3 hrs. a week

EGNE 2301 Engineering Mechanics II: Dynamics
3 credit hours
Prerequisite: MATH 1211, EGNE 1203 (min grade C), and CSCI 1227

Topics include rectilinear and curvilinear kinematics using Cartesian, normal-tangential, and polar cylindrical labels: projectile motion with zero and non-zero drag. Topics also include continuous and discrete forms of the second law: work-energy, conservation of energy, impulse-momentum. Students are introduced to the Newtonian analysis of bodies in translation, rotation about a fixed axis, and plane general motion. Planar mechanisms with pin joints, sliding connections, and gears are addressed. Classes 3 hrs. and lab 3 hrs. a week.

EGNE 2302 Engineering Economics
3 credit hours
Prerequisite: Students must be registered in either the Diploma of Engineering or the B.Sc./Diploma in Engineering program

This course deals with the economics of engineering design. Students are introduced to the fundamental concepts and cash flow diagrams; and interest factors are dealt with in some detail. A variety of discounted cash flow techniques are covered including rate of return calculations. Topics also include inflation, tax, replacement and risk. Classes 3 hrs. a week and recitation 1.5 hrs. per week.

EGNE 2303 Thermodynamics
3 credit hours
Prerequisite: MATH 1211 and PHYS 1211

Students are introduced to the fields of Thermodynamics and Fluid Mechanics in an integrated manner. It covers the basic properties of fluids and gasses, ideal gas equation of state, fluid statics, work and heat interactions, control volume using energy, the first and second laws of thermodynamics, enthalpy, entropy, as well as Carnot, Rankine and power/refrigeration cycles. Classes 3 hrs. and lab 3 hrs. a week.

EGNE 2304 Mechanics of Materials
3 credit hours
Prerequisite: MATH 1211, and EGNE 1203 (min grade C)

This course is an introduction to the techniques and theories involved in the analysis of strength, deformation and stability of structural members and assemblies under the action of forces. Students are provided with the opportunity to develop their understanding of the relationships between loads applied to non-rigid bodies and the resulting stresses and strains. Topics include: stress and strain; axially loaded members; torsionally loaded members; flexural loading; combined loadings; column loading; and an introduction to the Theory of Elasticity. A design project is a component of this course. Classes 3 hrs. and lab 3 hrs. a week.

EGNE 2305 Digital Logic
3 credit hours
This course introduces students to the fundamental principles of digital system design. Topics covered include: Boolean algebra; basic logic gates; combinational logic circuits including programmable logic arrays (PLA's) and arithmetic circuits; sequential logic design involving flip-flops; counters; and finite state machines. Classes 3 hrs. and lab 3 hrs. a week.

EGNE 2306 Fluid Dynamics
3 credit hours
Prerequisite: MATH 1211

Topics include: buoyancy and stability; the use of continuity, control volume, Euler, Bernoulli, energy and momentum equations in engineering applications; dimensional analysis; similitude; theory of physical models; and laminar vs turbulent flows in piping/conduit systems. Classes 3 hrs. and lab 3 hrs. a week.

EGNE 2307 Engineering Design II
3 credit hours
Prerequisite: 54 credit hours that satisfy the EGNE program requirements including, CSCI 1227, EGNE 1210; and one of: EGNE 2301, 2304, 2305, 2401

This course is an extension of EGNE 1210 course material to include, technical drawings and computer graphics, a design project with working drawings and a technical report, and the construction and testing of a physical model.

EGNE 2308 Electric Circuits I
3 credit hours
Prerequisite: PHYS 1210 and 1211 (concurrently)

Students are introduced to the fundamental laws of electric circuits and circuit parameters, the concept of time-constants, impedances and admittances and general network theorems. Topics include: Kirchhoff's Laws, Ohm's law and circuit parameters, resistive networks, loop and node equations, network theorems, super position, Thevenin-Norton, A.C. circuits, sinusoidal response, power, power factor, three-phase circuits, transients in simple circuits. Classes 3 hrs. and lab 3 hrs. a week.

EGNE 2309 Probability and Statistics for Engineers
3 credit hours
Prerequisite: MATH 1211

The topics covered include probability laws and the interpretation of numerical data, probability distributions and probability densities, functions of random variables, joint distributions, characteristic functions, inferences concerning mean and variance, tests of hypotheses, an introduction to linear regression. The course emphasizes engineering applications and makes extensive use of statistical computer packages. Classes 3 hrs. and labs 2 hrs. a week.

EGNE 2311 Electric Circuits II
3 credit hours
Prerequisite: EGNE 2308

This course builds on the introduction to electric circuits in EGNE 2308. Topics include sinusoidal steady-state response via phasor diagrams and impedance concepts, power and energy, mutual inductance and transformers, balanced and unbalanced three-phrase circuits. Labs are "virtual labs" using Electronics Workbench/Spice packages on P.C. network. Classes 3 hours and lab 3 hours a week.

EGNE 2325 Modelling and Optimization for Engineers
3 credit hours
Prerequisite: CSCI 1227 (min C grade)

Students are introduced to the fundamentals of optimization theory for the design and operation of engineered systems. Students are exposed to problem formulation and analysis applied to linear programming, network models, project management, decision analysis, and non-linear optimization. Classes 3 hrs. and lab 3 hrs. a week.

EGNE 2330 Data Structures and Algorithms for Engineers
3 credit hours
Prerequisite: CSCI 1227 (min C grade)

Students are introduced to object oriented programming (OOP), algorithmic analysis and design, and common data structures. The concept of procedural programming is extended to modern software development for use in engineering and applied science. Classes 3 hrs. and lab 3 hrs. a week

EGNE 2401 Fundamentals of Process Engineering
3 credit hours
Prerequisite: CHEM 1213, EGNE 2303 (concurrently)

Students analyze both non-reactive and reactive process systems using the principles of mass and energy balances, phase equilibrium, vapour pressure, and the application of Raoult's and Henry's Laws. Industrial case studies and computer simulations will be used to emphasize important topics. Classes 3 hrs. a week and lab 3 hrs. a week.