

## 142 Education

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### 4826 – 4849 Special Topics in Education

3 credit hours

Prerequisite: permission of instructor

### 4876 – 4899 Directed Study in Education

3 credit hours

Prerequisite: at least thirty (30) credit hours of University courses.

An independent study organized by a faculty member in consultation with a student. It enables a student to pursue independent research in a specific theme in education. Papers and/or examinations will be required.

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## Engineering (EGNE)

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External Director, Professor M. Butler (acting)

Professors D. Swingler,  
V. Tarnawski,

Associate Professor D. Van Dyer

Assistant Professor A. Merabet

Details of the program requirements for Engineering are delineated in Section 3 of this *Calendar*.

### Course Descriptions

#### 1203 Engineering Mechanics (Statics)

3 credit hours

Prerequisite: MATH 1210/1211 (concurrently).

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, moments of inertia.

Classes 3 hrs. and lab 3 hrs. a week.

#### 1204 Computer Methods for Engineers

3 credit hours

Prerequisite: Nova Scotia Pre-calculus Mathematics 12 Academic or MATH 0010/0011 and Nova Scotia Grade 12 Physics Academic, or equivalents. 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.

#### 1206 Engineering Design Graphics (Design I)

3 credit hours

Graphics as a language of communication; 3D visualization; projection theory, orthographic, oblique and isometric sketching and drawing as a means of representing

3D objects on 2D paper; reading of engineering drawings; standards and conventional practices. An integral part of the course is a design project to provide students with conceptual design, team work and computer drafting experiences including reporting and presentation.

Classes 3 hrs. a week and lab 3 hrs. a week.

#### 1209 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. After introducing fundamental concepts and cash flow diagrams, interest factors are dealt with in some detail. A variety of discounted cash flow techniques are covered including rate of return calculations. Inflation, tax, replacement and risk are also amongst the topics considered.

Classes 3 hrs. a week and labs 1 hr. a week.

#### 2301 Dynamics

3 credit hours

Prerequisite: MATH 1211/1212, EGNE 1203, and EGNE 1204.

Rectilinear and curvilinear kinematics using cartesian, normal-tangential, and polar cylindrical labels: projectile motion with zero and non-zero drag. Continuous and discrete forms of the second law: work-energy, conservation of energy, impulse-momentum. Newtonian analysis of bodies in translation, rotation about a fixed axis, and plane general motion. Planar mechanisms with pin joints, sliding connections, and gears.

Classes 3 hrs. and lab 3 hrs. a week.

**2303 Fluid Mechanics**

3 credit hours

Prerequisite: MATH 1211/1212, EGNE 1203, and EGNE 1204.

Fluid properties, fluid statics and stability. Lagrangian and Eulerian methods of analysis. Bernoulli's equation and applications. Linear momentum equation and applications. Dimensional analysis and dynamic similitude. Viscous effects in pipe flow.

Classes 3 hrs. and lab 3 hrs. a week..

**2304 Mechanics of Deformable Bodies**

3 credit hours

Prerequisite: MATH 1211/1212, and EGNE 1203.

An introduction to the techniques and theories involved in the analysis of the strength, deformation and stability of structural members and assemblies under the action of forces. Specifically, the object is to develop 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 finally an introduction to the Theory of Elasticity.

Classes 3 hrs. and lab 3 hrs. a week.

**2305 Introduction to Digital Logic Circuits**

3 credit hours

This course introduces students to 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; finite state machines.

Classes 3 hrs. and lab 3 hrs. a week.

**2306 Engineering Thermodynamics**

3 credit hours

Prerequisite: PHYS 1101 and MATH 1211/1212.

Energy and the first law, ideal gas, gas state equation, macroscopic properties of pure substances, properties and state, energy analysis of thermodynamic systems, entropy and the Second Law, thermodynamic relations, consequences and applications of the Second Law to thermodynamic systems.

Classes 3 hrs. and lab 3 hrs. a week.

**2307 Engineering Design II**

3 credit hours

Prerequisite: EGNE 1206 and 1204.

The work of EGNE 1206 is extended to include technical drawings and computer graphics, a design project with working drawings and a technical report, as well as the construction and testing of a physical model.

Classes 3 hrs. a week and lab 3 hrs. a week.

**2308 Electric Circuits**

3 credit hours

Prerequisite: PHYS 1100 and 1101 (concurrently).

The objective of this course is to introduce the student 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.

**2309 Probability and Statistics for Engineers**

3 credit hours

Prerequisite: MATH 1211/1212.

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.

**2310 Technical Communications**

3 credit hours

Prerequisite: Students must be registered in either the Diploma of Engineering or the B.Sc./Diploma in Engineering program.

This course is designed to prepare students for the range of communicative functions important to professional engineers. Students will complete assignments requiring proficiency with word processing, PowerPoint (or similar software), spreadsheets and databases, and will be taught how to produce business letters, proposals, reports and oral presentations in a professional manner.

Classes 3 hrs. a week.

**2311 Circuit Analysis (Circuits II)**

Prerequisite: EGNE 2308.

This course builds on the introduction to electric circuits in EGNE 308. Topics include sinusoidal steady-state response via phasor diagrams and impedance concepts; power and energy; mutual inductance and transformers; balanced and unbalanced three-phase circuits.

It is intended that labs be "virtual labs" using Electronics Workbench/Spice packages on P.C. network.

Classes 3 hours and lab 3 hours a week.