The following proposals, received on DAP between the dates listed below, have been approved.

DAP Submission Period: June 16-30, 2021   **DAP Approval Date:** July 16, 2021

For more information on the DAP process, see the Secretariat's website.

Approval Route: DAP

Faculty of Arts and Humanities

STUDIO ART

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Studio Art 3690A/B/Y SPECIAL TOPICS IN STUDIO ART
Please consult Department for current offerings.
 Prerequisite(s): Registration in years 3 or 4 of a Department of Visual Arts Module, or Permission of the Department.
Extra Information: 4 contact hours, lecture, blended or online format.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Studio Art 3691 SPECIAL TOPICS IN STUDIO ART
Please consult Department for current offerings.
Prerequisite(s): Registration in years 3 or 4 of a Department of Visual Arts Module, or Permission of the Department.
Extra Information: 4 contact hours.
Course Weight: 1.0

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Studio Art 3692A/B/Y SPECIAL TOPICS IN STUDIO ART
Please consult Department for current offerings.
Prerequisite(s): Registration in years 3 or 4 of a Department of Visual Arts Module, or Permission of the Department.
Extra Information: 4 studio hours.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Studio Art 3693 SPECIAL TOPICS IN STUDIO ART
Please consult Department for current offerings.
 Prerequisite(s): Registration in years 3 or 4 of a Department of Visual Arts Module, or Permission of the Department.
Extra Information: 4 studio hours.

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Studio Art 3694A/B SPECIAL TOPICS IN STUDIO ART
Please consult Department for current offerings.
Prerequisite(s): Registration in years 3 or 4 of a Department of Visual Arts Module, or Permission of the Department.
Extra Information: 4 studio hours.

Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Studio Art 4691 SPECIAL PROJECTS IN STUDIO
An advanced thematic course integrating studio theory and practice.
 Prerequisite(s): Registration in years 3 or 4 of a Department of Visual Arts Module, or Permission of the Department.

Faculty of Engineering

BIOMEDICAL ENGINEERING

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Biomedical Engineering 3303A/B - Cellular Systems Engineering
 This course introduces key topics in interdisciplinary biomedical engineering involving the investigation or application of cell-based systems. Students will learn to integrate engineering design principles and mathematical models with knowledge of applied cellular and molecular biology to characterize, understand and optimize cellular responses within 3-D engineered microenvironments.
Prerequisite(s): BME 3201A/B, Biology 1002B or the former 1202B, Biochemistry 2280A.
Extra Information: 3 lecture hours per week, 3 additional hours, 4 times per term. 0.5 course.

CHEMICAL AND BIOCHEMICAL ENGINEERING

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Chemical and Biochemical Engineering 2214A/B ENGINEERING THERMODYNAMICS
Properties of a pure substance, first law of thermodynamics, processes in open and closed systems, second law of thermodynamics; ideal gases, mixture of ideal gases, and psychometry, compressors and energy conversion systems.
Antirequisite(s): MME 2204A/B.
Prerequisite(s): NMM 1411A/B or the former Applied Mathematics 1411A/B
Extra Information: 3 lecture hours, 2 tutorial hours.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Chemical and Biochemical Engineering 2220A/B CHEMICAL PROCESS CALCULATIONS
The objective of this course is to introduce the fundamental concepts of material and energy balances which form the basis of chemical and biochemical engineering processes. Calculations related to specific problems in these fields are carried out. New directions in chemical and biochemical engineering are introduced.
Prerequisite(s): NMM 1411A/B or the former Applied Mathematics 1411A/B, NMM 1414A/B or the former Applied Mathematics 1414A/B, Chemistry 1302A/B, Physics 1401A/B and Physics 1402A/B.
Extra Information: 3 lecture hours, 2 tutorial hours.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Chemical and Biochemical Engineering 2221A/B FLUID FLOW
To introduce chemical engineering students to the basics of momentum transfer and fluid flow; their application to the solution of engineering problems. Topics include: conservation of mass, momentum and energy, flow of fluids, measurement of fluid flow, laminar and turbulent flow, compressible and incompressible flow, pumps, nozzles, flow meters, turbines.
Prerequisite(s): NMM 1414A/B or the former Applied Mathematics 1414A/B
Extra Information: 3 lecture hours, 3 tutorial/lab hours.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Chemical and Biochemical Engineering 2224A/B CHEMICAL ENGINEERING THERMODYNAMICS
Provides the basics of the thermodynamics involved in chemical engineering with emphasis on material and energy balances, thermo physics, thermo chemistry, and thermodynamics of chemical processes. Emphasis is placed on the application of thermodynamics to practical problems in phase equilibria and on solutions and reaction equilibria in separations and reaction engineering.
Prerequisite(s): CBE 2214A/B or MME 2204A/B, NMM 1414A/B or the former Applied Mathematics 1414A/B
Extra Information: 3 lecture hours, 2 tutorial hours.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Chemical and Biochemical Engineering 3310A/B PROCESS DYNAMICS AND CONTROL
The course covers the dynamic behavior, modeling and control of chemical processes. The principles of feedback control of commonly-encountered systems such as level, flow, temperature, pressure, are described. Theory is introduced to illustrate current practice. Simulations of dynamic behavior of processes will make use of the MATLAB/Simulink programming environment.
Antirequisite(s): The former CBE 4410A/B.
Prerequisite(s): NMM 2277A/B or the former Applied Mathematics 2277A/B, CBE 2291A/B.
Extra Information: 3 lecture hours, 1 laboratory hours, 1 tutorial hour.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Chemical and Biochemical Engineering 3315A/B REACTION ENGINEERING
Chemical kinetics as applied to the large-scale manufacture of chemicals. An introduction to the factors which affect the design and size of chemical reactors, as well as the conditions under which they are to be operated for maximum efficiency.
Prerequisite(s): NMM 1414A/B or the former Applied Mathematics 1414A/B, CBE 2224A/B and Chemistry 1302A/B.
Extra Information: 3 lecture hours, 1.5 laboratory hours, 2 tutorial hours.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Chemical and Biochemical Engineering 4428A/B INTRODUCTION TO NANOENGINEERING
An introduction to fundamental concepts in nanoengineering, emphasizing limitations of macroscale models and presenting alternative molecular approaches to the engineering of nanoscale systems.
Prerequisite(s): NMM 2277A/B or the former Applied Mathematics 2277A/B or NMM 2276A/B or the

former Applied Mathematics 2276A/B; CBE 2214A/B or MME 2204A/B.
Extra Information: 3.0 lecture hours, 1.0 tutorial hours.
Course Weight: 0.50

CIVIL AND ENVIRONMENTAL ENGINEERING

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Civil and Environmental Engineering 2202A/B MECHANICS OF MATERIALS
Concept of stress and strain; axially loaded members; second moment of area; elastic torsion of circular shafts; bending and shearing stresses in beams; transformation of stress and strain; stresses in thin-walled pressure vessels; design of beams and introduction to beam deflection.
Antirequisite(s): MME 2202A/B.
Prerequisite(s): Engineering Science 1022A/B/Y, NMM 1412A/B or the former Applied Mathematics 1412A/B.
Extra Information: 3 lecture hours, 3 tutorial hours.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Civil and Environmental Engineering 2219A/B COMPUTATIONAL TOOLS FOR CIVIL ENGINEERS
A first course in numerical methods for civil and environmental engineers, emphasizing problem formulation, solution algorithm design and programming application. Methods for solving nonlinear algebraic equations, ordinary differential equations, and differential-algebraic systems. Introduction to the systems approach, and system analysis terminology, for application to engineering planning, design and operations.
Antirequisite(s): CBE 2291A/B, the former CEE 2218A/B.
Prerequisite(s): Engineering Science 1036A/B, NMM 1411A/B or the former Applied Mathematics 1411A/B, NMM 1412A/B or the former Applied Mathematics 1412A/B, NMM 2270A/B or the former Applied Mathematics 2270A/B. Corequisite: NMM 2277A/B Applied Mathematics 2277A/B
Extra Information: 3 lecture hours, 3 design lab/tutorial hours.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Civil and Environmental Engineering 2220A/B INTRODUCTION TO STRUCTURAL ENGINEERING
A first course in Structural Theory and Design, including a consolidation of material concerning static equilibrium. Free body diagrams; behaviour, analysis and design of steel and wooden trusses and statically determinate steel and wooden beams; Euler buckling; force effect envelopes; snow and static wind loads.
Prerequisite(s): Engineering Science 1022A/B/Y, NMM 1412A/B or the former Applied Mathematics 1412A/B. **Corequisite:** NMM 2270A/B Applied Mathematics 2270A/B; CEE 2202A/B or registration in Integrated Engineering.
Extra Information: 3 lecture hours per week, 2 tutorial hours per week, 2 - 30-minute lab sessions per term.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Civil and Environmental Engineering 2221A/B STRUCTURAL THEORY & DESIGN
A consolidation of the analysis and design of statically determinate structures, and an introduction to the analysis of indeterminate structures. Analysis and design of statically determinate beams and

frames; bending of unsymmetric sections; virtual work and energy methods, introduction to indeterminate structural analysis.
Prerequisite(s): CEE 2202A/B, CEE 2220A/B, NMM 2270A/B or the former Applied Mathematics 2270A/B.
Extra Information: 3 lecture hours per week, 2 tutorial hours per week.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Civil and Environmental Engineering 2224 ENGINEERING FLUID MECHANICS
Basic concepts of fluid mechanics: fluid statics; continuity, momentum and energy equations; vortex flow; flow of real fluids and boundary layers; dimensional analysis. These principles are applied to pipe and open channel flows: steady pipe flows, uniform and gradually-varied flow in open channels; sluice gates, weirs and hydraulic jumps, unsteady flows.
Prerequisite(s): ES 1022A/B/Y, Physics 1401A/B or the former Physics 1026. Corequisite(s): NMM 2270A/B Applied Mathematics 2270A/B
Extra Information: 3 lecture hours per week, 2 tutorial hours per week, 3 lab hours 4 times per year.
Course Weight: 1.00

ELECTRICAL AND COMPUTER ENGINEERING

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Electrical and Computer Engineering 2205A/B ELECTRIC CIRCUITS
Basic resistive circuits, Ohm's, Kirchhoff's Laws. DC analyis: nodal and mesh analysis. Network theorems: linearity, superposition, Thévenin's and Norton's theorems. Time-domain analysis: first and second order circuits, source-free and forced response. Sinusoidal steady-state analysis: phasors, complex power. Basic OpAmp circuitry.
Prerequisite(s): Physics 1302A/B or Physics 1402A/B, NMM 1411A/B or the former Applied Mathematics 1411A/B, NMM 1412A/B or the former Applied Mathematics 1412A/B, Engineering Science 1036A/B or Computer Science 1026A/B. **Corequisite(s):** NMM 2270A/B Applied Mathematics 2270A/B
Extra Information: 3 lecture hours, 1 tutorial hour.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Electrical and Computer Engineering 2208A/B ELECTRICAL MEASUREMENT & INSTRUMENTATION
Measurements: System of units, errors. Basic resistive circuits: Ohm's, Kirchhoff's Laws; DC analyis: nodal and mesh analysis, superposition, Thévenin's/Norton's theorems; Sinusoidal steady-state analysis: phasors, complex power; Basic OpAmp circuitry; Boolean circuits; Transducers.
Antirequisite(s): ECE 2205A/B.
Prerequisite(s): Engineering Science 1036A/B or Computer Science 1026A/B, Physics 1302A/B or Physics 1402A/B. Pre-or **Corequisite(s):** NMM 2270A/B or the former Applied Mathematics 2270A/B
Extra Information: 3 lecture hours, 1 laboratory hour.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Electrical and Computer Engineering 2233A/B CIRCUITS AND SYSTEMS
Introduction to a system level analysis of electrical circuits. The S-Plane and frequency response of circuits, frequency selective circuits, state variables, introduction to Fourier analysis, Fourier transform

and Laplace transform techniques. Transfer functions and system functions.
Antirequisite(s): MSE 2233A/B.
Prerequisite(s): NMM 2270A/B or the former Applied Mathematics 2270A/B, ECE 2205A/B.
Corequisite(s): NMM 2276A/B Applied Mathematics 2276A/B
Extra Information: 3 lecture hours, 1 tutorial hour, 1 laboratory hour.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Electrical and Computer Engineering 2236A/B MAGNETIC CIRCUITS & TRANSMISSION LINES
Three phase circuits, magnetic coupling and circuits, transformers. Transmission lines and the telegrapher equation.
Prerequisite(s): NMM 2270A/B or the former Applied Mathematics 2270A/B, ECE 2205A/B, Physics 1302A/B or Physics 1402A/B. Corequisite(s): NMM 2276A/B Applied Mathematics 2276A/B
Extra Information: 3 lecture hours, 3 hour lab sessions (4 labs per term).
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Electrical and Computer Engineering 2238A/B INTRODUCTION TO ELECTRICAL ENGINEERING
DC circuit analysis, fundamentals of DC circuit analysis, Ohm's Law, KCL, KVL, Thévenin and Norton Equivalent circuits, maximum power transfer; linear analog circuits, diodes, transistors, operational amplifiers, biasing, gain, frequency response.
Antirequisite(s): ECE 2205A/B, ECE 2231A/B.
Prerequisite(s): Engineering Science 1036A/B or Computer Science 1026A/B, Physics 1302A/B or Physics 1402A/B. Pre-or **Corequisite(s):** NMM 2270A/B or the former Applied Mathematics 2270A/B.
Extra Information: 3 lecture hours, 1 tutorial hour, 1 laboratory hour.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Electrical and Computer Engineering 2238A/B INTRODUCTION TO ELECTRICAL ENGINEERING
DC circuit analysis, fundamentals of DC circuit analysis, Ohm's Law, KCL, KVL, Thévenin and Norton Equivalent circuits, maximum power transfer; linear analog circuits, diodes, transistors, operational amplifiers, biasing, gain, frequency response.
Antirequisite(s): ECE 2205A/B, ECE 2231A/B.
Prerequisite(s): Engineering Science 1036A/B or Computer Science 1026A/B, Physics 1302A/B or Physics 1402A/B. Pre-or **Corequisite(s):** NMM 2270A/B or the former Applied Mathematics 2270A/B.
Extra Information: 3 lecture hours, 1 tutorial hour, 1 laboratory hour.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Electrical and Computer Engineering 2274A/B ELECTRIC CIRCUITS AND ELECTROMECHANICS
This course introduces the principles of electrical circuits and components, including common electric motors employed in mechanical systems. Laboratories to introduce the students to common measurement tools used to assess and troubleshoot circuits. These foundations are expanded upon in a subsequent course focusing on electronic components and their applications.
Antirequisite(s): ECE 2205A/B, ECE 2231A/B.
Prerequisite(s): Engineering Science 1036A/B or Computer Science 1026A/B, Physics 1402A/B. Pre-or Corequisite(s): NMM 2270A/B Applied Mathematics 2270A/B.
Extra Information: 3 lecture hours, 1.5 laboratory hours.

Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Electrical and Computer Engineering 3330A/B CONTROL SYSTEMS
The concept of feedbacks; modelling of dynamic systems; characteristics of feedback control systems, performance of control systems in time and frequency domains; stability of feedback systems; control system analysis and design. Using root locus and frequency response techniques.
Antirequisite(s): CBE 3310A/B
Prerequisite(s): NMM 2270A/B or the former Applied Mathematics 2270A/B and (ECE 2233A/B or MSE 2233A/B)
Extra Information: 3 lecture hours, 1 laboratory hour.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Electrical and Computer Engineering 3336A/B ELECTROMAGNETIC THEORY
Radio-frequency transmission lines, telegrapher's equations, Smith chart. A vector treatment of the theory of electric and magnetic fields. Integral and differential forms of Maxwell's equations. Boundary conditions. Scalar and vector potentials, reflection and transmission of electromagnetic waves in dielectric and conducting media.
Antirequisite(s): Physics 3300A/B.
Prerequisite(s): NMM 2276A/B or the former Applied Mathematics 2276A/B, NMM 3415A/B or the former Applied Mathematics 3415A/B, ECE 2233A/B, ECE 2236A/B.
Extra Information: 3 lecture hours, 1 tutorial hour.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Electrical and Computer Engineering 4432A/B RADIATION AND PROPAGATION
EM radiation principles; EM wave propagation, wave polarization, reciprocity theorem, antenna properties, dipole antennas; reflection from the ground; waveguides and transmission lines, impedance matching, antenna arrays, selected topics.
Prerequisite(s): NMM 3415A/B or the former Applied Mathematics 3415A/B, ECE 3336A/B, ECE 3370A/B
Extra Information: 3 lecture hours, 1 laboratory hour.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Electrical and Computer Engineering 4433A/B DIGITAL COMMUNICATIONS SYSTEMS
Transceiver design for digital communication systems, design goals and tradeoffs. Deterministic and random signals. Digital modulation techniques, optimal receiver design, performance analysis under noisy conditions. Digital communication through bandlimited channels. Characteristics of wireless channel, intersymbol interference, channel estimation, adaptive equalization. Synchronization techniques. Multiple access techniques, CDMA, TDMA, FDMA. Principles of OFDM, cyclic prefix, in-band pilots, PAPR, applications of OFDM.
Prerequisite(s): ECE 3331A/B, ECE 3370A/B, Statistical Sciences 2141A/B, NMM 3415A/B or the former Applied Mathematics 3415A/B
Extra Information: 3 lecture hours, 1.5 laboratory hours.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Electrical and Computer Engineering 4437A/B COMMUNICATIONS THEORY
Introduction to communication systems and information theory. Classification of signals and systems. Communication channel modeling. Fourier series and transform applications. Modulation techniques. Sampling theory and digital transmission. Digital modulation, optimum receiver design, performance analysis. Error control. Selected topics.
Prerequisite(s): ECE 3330A/B, ECE 3331A/B, ECE 3375A/B, Statistical Sciences 2141A/B or Statistical Sciences 2143A/B, NMM 2276A/B or the former Applied Mathematics 2276A/B or the former Applied Mathematics 2415.
Extra Information: 3 lecture hours, 1 tutorial hour.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Electrical and Computer Engineering 4451A/B ADVANCED TOPICS IN WIRELESS COMMUNICATIONS
The objective is to examine in-depth the practice of analog and digital communications. Fundamentals of wireless communication electronics are considered. A number of existing systems, including 2G/3G wireless systems, satellite communication systems, radio and TV broadcasting, and others are reviewed. Design aspects of wireless communications systems.
Prerequisite(s): ECE 3370A/B, ECE 4432A/B, ECE 4437A/B, Statistical Sciences 2141A/B, NMM 3415A/B or the former Applied Mathematics 3415A/B and completion of the third year of the Electrical Engineering program. Corequisite(s): ECE 4433A/B.
Extra Information: 2 lecture hours, 1.5 laboratory hours.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Electrical and Computer Engineering 4468A/B SYSTEMS OPTIMIZATION
Engineering problems as optimization problems. Single-variable optimization. Multi-variable unconstrained optimization. Advanced techniques for unconstrained optimization. Equality and inequality constraints and optimality criteria. Techniques for constrained optimization. Linear programming.
Prerequisite(s): NMM 3415A/B or the former Applied Mathematics 3415A/B.
Extra Information: 3 lecture hours.
Course Weight: 0.50

ENGINEERING LEADERSHIP AND INNOVATION

Effective September 1, 2021, the following change(s) be made: Course Antirequisite Revision.

ELI 3200A/B - New Venture Creation

This course highlights new venture creation and technology innovation. The entrepreneurial process is introduced as a path to market that includes searching for and screening new ideas, planning development, and starting up new ventures. The course delivery, through the Ivey Business School case method, fosters learning within an active class environment.
Prerequisite(s): Completion of year 2 Engineering or enrollment in year 2 Software Engineering.
Antirequisite(s): Business Administration 4558A/B or the former ES 3331A/B ES 3330A/B
Extra Information: 3 lecture hours

MECHANICAL AND MATERIALS ENGINEERING

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Mechanical and Materials Engineering 2202A/B MECHANICS OF MATERIALS
Stress and strain, Mohr's stress circle, behaviour of structures, axial loading of columns and struts, torsion of shafts, bending of beams, buckling of columns and combined loading of components.
Antirequisite(s): CEE 2202A/B, MSE 2212A/B.
Prerequisite(s): Engineering Science 1022A/B/Y, NMM 1414A/B or the former Applied Mathematics 1414A/B.
Extra Information: 3 lecture hours, 2 tutorial hours, 0.5 laboratory hour
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Mechanical and Materials Engineering 2204A/B THERMODYNAMICS I
Properties of a pure substance, first law of thermodynamics, processes in open and closed systems, second law of thermodynamics; ideal gases, compressors and energy conversion systems.
Antirequisite(s): CBE 2214A/B, MSE 2214A/B.
Prerequisite(s): NMM 1414A/B or the former Applied Mathematics 1414A/B.
Extra Information: 3 lecture hours, 2 tutorial hours, 0.5 laboratory hour
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Mechanical and Materials Engineering 2213A/B ENGINEERING DYNAMICS
Topics include: rectilinear, angular and curvilinear motion; kinetics of a particle, a translating rigid body and a rigid body in pure rotation; definitions of different energies and energy balance: power and efficiency; and linear impulse and momentum.
Antirequisite(s): MSE 2213A/B.
Prerequisite(s): Engineering Science 1022A/B/Y. Pre-or **Corequisite(s):** NMM 2270A/B or the former Applied Mathematics 2270A/B.
Extra Information: 3 lecture hours, 2 tutorial hours
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Mechanical and Materials Engineering 2221A/B COMPUTATIONAL METHODS FOR MECHANICAL ENGINEERS
The objective of this course is to introduce data organization and processing techniques using spreadsheet tools; and numerical methods, model formulation and programming using advanced mathematical software tools. Applications in applied mathematics and mechanical engineering will be considered throughout the course.
Antirequisite(s): CEE 2219A/B, CBE 2291A/B.
Prerequisite(s): ES 1036A/B, NMM 1411A/B or the former Applied Mathematics 1411A/B, NMM 1414A/B or the former Applied Mathematics 1414A/B.
Corequisite(s): NMM 2270A/B Applied Mathematics 2270A/B or NMM 2276A/B Applied Mathematics 2276A/B.
Extra Information: 3 lecture hours, 2 tutorial hours.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Mechanical and Materials Engineering 2234A/B HEAT TRANSFER AND DYNAMICS
To provide the student with an understanding of the basic concepts of heat transfer and the dynamics of particles and rigid bodies.
Antirequisite(s): MME 2204A/B, CBE 2214A/B, MME 2213A/B.
Prerequisite(s): Engineering Science 1022A/B/Y.
Corequisite(s): NMM 2270A/B Applied Mathematics 2270A/B.
Extra Information: 3 lecture hours, 3 tutorial hours. Note: Restricted to students enrolled in the Department of Electrical and Computer Engineering.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Mechanical and Materials Engineering 2273A/B INTRODUCTION TO FLUID MECHANICS AND HEAT TRANSFER
An introduction to fluid mechanics and heat transfer. The fluid mechanics covers fluid properties, fluid statics including buoyancy and stability, one-dimensional fluid dynamics including conservation of mass and energy and losses in pipe networks. Heat transfer covers development of the general energy equation for three dimensions and steady-state conduction in one and two dimensions.
Pre- Corequisite(s): NMM 2270A/B or the former Applied Mathematics 2270A/B.
Extra Information: 3 lecture hours, 2 tutorial hours, 0.5 laboratory hour
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Mechanical and Materials Engineering 3303A/B FLUID MECHANICS II
 Rigid-body motion and rotation, control volume method of analysis, conservation of mass, linear and angular momentum, centrifugal pumps, potential flow, dimensional analysis, viscous flow in channels and ducts, open channel flow, laminar and turbulent boundary layers, statistical description of turbulence
 Prerequisite(s): MME 2273A/B, **Corequisite(s):** Applied Mathematics 3413A/B
Extra Information: 3 lecture hours, 2 tutorial hours, 0.5 laboratory hour

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Mechanical and Materials Engineering 3307A/B HEAT TRANSFER II
Transient heat conduction. Forced and natural convection heat transfer. Advanced radiation heat transfer, including surface properties and shape factor. Condensation and boiling heat transfer. Heat exchanger design, applications of heat transfer in Engineering Systems.
Prerequisite(s): MME 2204A/B, MME 2273A/B, Applied Mathematics 3413A/B.
Extra Information: 3 lecture hours, 2 tutorial hours, 0.5 laboratory hour

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Mechanical and Materials Engineering 3325A/B MECHANICAL VIBRATIONS
Free and forced vibration of single-degree-of-freedom systems; viscous and coulomb damping; vibration isolation and vibration measuring instruments; modelling of multi-degree-of-freedom systems via Newton's second law; modal analysis and modal summation method for response predictions of multi-degree-of-freedom systems; tuned mass vibration absorber; introduction to vibration of continuous systems; introduction to spectrum analysis for machinery diagnostics.
Antirequisite(s): MME 4425A/B.

Prerequisite(s): NMM 2270A/B or the former Applied Mathematics 2270A/B
Extra Information: 3 lecture hours, 2 tutorial hours, 2 laboratory hours/week (3 per term).
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Mechanical and Materials Engineering 3350A/B SYSTEM MODELING & CONTROL
Basic analytical techniques for modeling and control of dynamic systems. Solve for response as well as design controllers to shape response of systems. Applications to vibratory, thermo-fluidic, hydraulic, pneumatic and electro-mechanical systems.
Antirequisite(s): CBE 3310A/B.
Prerequisite(s): NMM 2270A/B or the former Applied Mathematics 2270A/B, MME 2273A/B, MME 3381A/B.
Extra Information: 3 lecture hours, 2 tutorial hours, 0.5 laboratory hours.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Mechanical and Materials Engineering 3360A/B FINITE ELEMENT METHODS IN MECHANICAL ENGINEERING
Linear finite element analysis using the direct equilibrium method and the principle of minimum potential energy. Focus on structural mechanics using spring and bar elements (including two-dimensional trusses), beam elements, two-dimensional plane stress/strain elements, axisymmetric elements, and isoparametric formulation. Concepts of heat transfer, fluid flow, and thermal stress also introduced.
Antirequisite(s): MSE 3360A/B.
Prerequisite(s): Engineering Science 1036A/B or Computer Science 1026A/B, NMM 2270A/B or the former Applied Mathematics 2270A/B, MME 2202A/B or CEE 2202A/B, MME 2204A/B, MME 2259A/B or MSE 2202A/B.
Extra Information: 3 lecture hours, 2 laboratory, 2 tutorial hours.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Mechanical and Materials Engineering 3381A/B KINEMATICS & DYNAMICS OF MACHINES
Displacement, velocity and acceleration analysis of linkage mechanisms; inertia force analysis of mechanisms; balancing of reciprocating and rotating masses; introduction to vibration analysis of single-degree-of-freedom systems.
Antirequisite(s): MSE 3381A/B.
Prerequisite(s): MME 2213A/B, NMM 2270A/B or the former Applied Mathematics 2270A/B.
Extra Information: 3 lecture hours, 2 tutorial hours, 0.5 laboratory hour
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Mechanical and Materials Engineering 4425A/B MECHANICAL VIBRATIONS
Free and forced vibration of Single-degree-of-freedom systems; modelling of multi-degree-of-freedom systems via Lagrange's equations; modal summation method for response predictions; vibration isolation and vibration measuring instruments; tuned mass vibration absorber; viscous, coulomb and hysteresis damping; vibration of continuous systems; introduction to experimental modal analysis.
Prerequisite(s): NMM 3415A/B or the former Applied Mathematics 3413A/B or Applied Mathematics

3415A/B, and MME 3381A/B or MSE 3381A/B.
Extra Information: 3 lecture hours, 2 laboratory hours per week (3 times per term).
Course Weight: 0.50

MECHATRONIC SYSTEMS ENGINEERING

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Mechatronic Systems Engineering 2212A/B MECHANICS OF MATERIALS
Stress and strain, Mohr's stress circle, behaviour of structures, axial loading of columns and struts, torsion of shafts, bending of beams, buckling of columns and combined loading of components.
Antirequisite(s): CEE 2202A/B, MME 2202A/B.
Prerequisite(s): Engineering Science 1022A/B/Y, NMM 1412A/B or the former Applied Mathematics 1412A/B.
Extra Information: 3 lecture hours, 2 tutorial hours, 0.5 laboratory hour.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Mechatronic Systems Engineering 2213A/B ENGINEERING DYNAMICS
Topics include: rectilinear, angular and curvilinear motion; kinetics of a particle, a translating rigid body and a rigid body in pure rotation; definitions of different energies and energy balance: power and efficiency; and linear impulse and momentum.
Antirequisite(s): MME 2213A/B.
Prerequisite(s): Engineering Science 1022A/B/Y. Pre-or **Corequisite(s)**: NMM 2270A/B or the former Applied Mathematics 2270A/B.
Extra Information: 3 lecture hours, 2 tutorial hours.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Mechatronic Systems Engineering 2214A/B THERMODYNAMICS
Properties of a pure substance, first law of thermodynamics, processes in open and closed systems, second law of thermodynamics; ideal gases, compressors and energy conversion systems.
Antirequisite(s): CBE 2214A/B, MME 2204A/B.
Prerequisite(s): NMM 1412A/B or the former Applied Mathematics 1412A/B.
Extra Information: 3 lecture hours, 2 tutorial hours, 0.5 laboratory hour.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Mechatronic Systems Engineering 2233A/B CIRCUITS AND SYSTEMS
Introduction to a system level analysis of electrical circuits. The S-Plane and frequency response of circuits, frequency selective circuits, state variables, introduction to Fourier analysis, Fourier transform and Laplace transform techniques. Transfer functions and system functions.
Antirequisite(s): ECE 2233A/B.
Prerequisite(s): NMM 2270A/B or the former Applied Mathematics 2270A/B, ECE 2205A/B. Pre-or Corequisite(s): NMM 2276A/B Applied Mathematics 2276A/B or the former Applied Mathematics 2415.
Extra Information: 3 lecture hours, 2 tutorial hours, 1 laboratory hour. Restricted to students enrolled in the Mechatronic Systems Engineering program or in Computer Engineering Option B.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Mechatronic Systems Engineering 2273A/B INTRODUCTION TO FLUID MECHANICS AND HEAT TRANSFER
An introduction to fluid mechanics and heat transfer. The fluid mechanics covers fluid properties, fluid statics including buoyancy and stability, one-dimensional fluid dynamics including conservation of mass and energy and losses in pipe networks. Heat transfer covers development of the general energy equation for three dimensions and steady-state conduction in one and two dimensions.
Antirequisite(s): MME 2273A/B.
Pre-or Corequisite(s): NMM 2270A/B or the former Applied Mathematics 2270A/B.
Extra Information: 3 lecture hours, 2 tutorial hours, 0.5 laboratory hour.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Mechatronic Systems Engineering 3360A/B FINITE ELEMENT METHODS FOR MECHATRONIC SYSTEMS ENGINEERING
Overview of the finite element method (FEM) and its use to solve general problems in 2-D and 3-D. Applications include structural mechanics, heat transfer, thermal stress, electromagnetism and radiation. Methods and applications of optimization in support of engineering design are also introduced.
Antirequisite(s): MME 3360A/B.
Prerequisite(s): Engineering Science 1036A/B or Computer Science 1026A/B, NMM 2270A/B or the former Applied Mathematics 2270A/B, or the former Applied Mathematics 2415, MME 2202A/B or MSE 2212A/B or CEE 2202A/B, MME 2204A/B or MSE 2214A/B, MSE 2202A/B or MME 2259A/B.
Extra Information: 3 lecture hours, 2 tutorial hours, 2 laboratory hours.
Course Weight: 0.50

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Mechatronic Systems Engineering 3381A/B KINETICS & DYNAMICS OF MACHINES
Displacement, velocity and acceleration analysis of linkage, mechanisms; inertia force analysis of mechanisms; balancing of reciprocating and rotating masses; introduction to vibration analysis of single-degree-of-freedom systems.
Antirequisite(s): MME 3381A/B.
Prerequisite(s): MME 2213A/B or MSE 2213A/B, NMM 2270A/B or the former Applied Mathematics 2270A/B or the former Applied Mathematics 2415.
Extra Information: 3 lecture hours, 2 tutorial hours, 0.5 laboratory hour.
Course Weight: 0.50

Faculty of Information and Media Studies

DIGITAL COMMUNICATION

Effective September 1, 2021, the following change(s) be made: Course Title or Description Revision, Other Course Revision (i.e. hours, suffix... etc.).

Digital Communication 3204F/G A/B RESEARCH ENGINES & WEB DATA MINING
The course will examine how search engines are built, how they work, and how to evaluate them. The

course will introduce basic concepts and techniques of Web data mining including Web hyperlink analysis, Web traffic analysis and Web server log analysis. Emphasis will be fall on the professional and applied applications of this topic.
Antirequisite(s):
Extra Information: 2 3 lecture hours, 1 laboratory hour.
Course Weight: 0.50

Faculty of Science

MATHEMATICS

Effective September 1, 2021, the following change(s) be made: Course Antirequisite Revision, Course Pre or Corequisite Revision.

Mathematics 2151A/B: Discrete Structures for Engineering
Logic, sets and functions, algorithms, mathematical reasoning, counting, relations, graphs, trees, Boolean Algebra, computation, modeling.
Antirequisite(s): Computer Science 2214A/B, Mathematics 2155F/G, the former Mathematics 2155A/B, the former Software Engineering 2251A/B.
Prerequisite(s): Computer Science 1026A/B or Engineering Science 1036A/B, in each case with at least 60%, and 1.0 courses with at least 60% in each from: Numerical and Mathematical Methods 1411A/B or the former Applied Mathematics 1411A/B, Numerical and Mathematical Methods 1412A/B or the former Applied Mathematics 1412A/B, Numerical and Mathematical Methods 1414A/B or the former Applied Mathematics 1414A/B, or the former Applied Mathematics 1413A/B.
Corequisite(s): Computer Science 1027A/B or Computer Science 1037A/B.
Extra Information: 3 lecture hours. Note: this course is offered only to software engineering students enrolled in the Faculty of Engineering.
Course Weight: 0.50

NEUROSCIENCE

Effective September 1, 2021, the following change(s) be made: Course Pre or Corequisite Revision.

Neuroscience 4000E HONOURS THESIS
An independent laboratory project in Neuroscience emphasizing experimental design, instrumentation, data collection and analysis, and communication of experimental results by oral, poster and written presentations. Topics covered in seminar time include animal and human research ethics and institutional approval of animal and human experimentation, laboratory safety, and scientific communication skills.
Prerequisite(s): Neuroscience 3000F/G with a minimum mark of 75%; one of Biology 2244A/B, Statistical Sciences 2244A/B or Psychology 2810; Pharmacology 3620; Physiology 3140A; one of **Medical Sciences 3991F**, Communication Sciences and Disorders 3317A/B, Psychology 3996F or Psychology 3997G, **or the former** Medical Sciences 3900F/G/Z; and registration in Year 4 of an Honours Specialization in Neuroscience.
Extra Information: Minimum 15 hours per week.
Course Weight: 1.50

Brescia University College

ENGLISH

Effective September 1, 2021, the following change(s) be made: Course Introduction.

English 4070E: DIRECTED READINGS IN LITERATURE
A program of intensive reading in an author, group of authors, period, movement, genre or theme under the direction of a full-time faculty member who is willing to supervise the student. The proposed subject of study will be presented to the faculty member in the term prior to that in which the course will begin.
Prerequisite(s): Only fourth year honours students with an average of at least 80% in their third year English courses are eligible. Permission of the department is also required.
Course Weight: 1.00
Breadth: CATEGORY B
Subject Code: ENGLISH

King's University College

HISTORY

Effective September 1, 2021, the following change(s) be made: Course Introduction.

History 1821F/G – Selected Introductory Themes in History
See History Department for current offerings.
Extra Information: 3 hours.
Course Weight: 0.50
(King's)

Effective September 1, 2021, the following change(s) be made: Course Introduction.

History 1822F/G – Selected Introductory Themes in History
See History Department for current offerings.
Extra Information: 3 hours.
Course Weight: 0.50
(King's)

HUMAN RIGHTS STUDIES

Effective September 1, 2021, the following change(s) be made: Course Introduction.

Human Rights Studies 1000F/G – Discovering Human Rights
This course is a preliminary exploration of the interdisciplinary field of Human Rights Studies that examines historical and contemporary human rights and their impact on people's lives around the world. Topics include legal and religious conceptions of rights, debates over rights, and their practical applications in law, policy and workplaces.

Prerequisite(s): none
Extra Information: 2 lecture hours, 1 tutorial hour, 0.5 Course
(King's)

PSYCHOLOGY

Effective September 1, 2021, the following change(s) be made: Course Introduction.

Psychology 4995E – Special Topics in Psychology
Selected topics of current interest in Psychology. Topic available in Department.
Prerequisite(s): Fourth year Honours Specialization Psychology status.
Extra Information: 3 hours.
Course Weight: 1.0
(King's)

Schulich School of Medicine & Dentistry

EPIDEMIOLOGY

Effective September 1, 2021, the following change(s) be made: Revision to course suffix.

Epidemiology 4320A/B – Clinical Epidemiology
An introduction to methods for the design, analysis and interpretation of studies that evaluate the sensitivity and specificity of diagnostic tests and the outcomes of new treatments and health technologies. The course will also explore health policy and will follow examples of translation of knowledge generated by clinical epidemiology studies.
Prerequisite(s): Biostatistics 3100A and Epidemiology 3200A.
Extra Information: 3 lecture hours.
Course Weight: 0.50