October 27, 2025

FACULTY OF ENGINEERING
MECHANICAL, AUTOMOTIVE & MATERIALS ENGINEERING

NOTICE RE GRADUATE ASSISTANT (GA) POSITIONS AVAILABLE FOR WINTER 2026

In accordance with Article 12:01 of the CUPE 4580 Collective Agreement, the Department of Mechanical, Automotive & Materials Engineering invites applications for GA positions for the Winter 2026 term. The total number of Graduate Assistantships allocated to MAME for 2025-2026 (S25, F25, W26) is 180. It is anticipated that 60 GA positions for 140 hours each (may be split between courses) will be required for Winter 2026, subject to final budgetary approval and sufficient enrolment.

Expected GA duties

Assistants cannot commence their GA duties until email confirmation of the approval of their contract is received from Human Resources.

GA employees are expected to make themselves available to report for all assigned duties, **both in-person/on-campus and remote/online duties**. Most classes across the University are held face-to-face on campus or have a face-to-face component and even online classes may require on-campus face-to-face duties.

List of courses that may utilize Graduate Assistants for Winter 2026 which will run from January 1, 2026 – April 30, 2026:
Students CANNOT serve as the GA for a course they are also registered in.

Course # and Name	Course Description	R=Required / P=Preferred Skills	Projected # of GAs
AUTO-8010-01/ Mobility and Society	The course will provide insights into societal contexts and issues related to road vehicle transportation, economics and the changes to society and infrastructure caused by the mass adoption of electric vehicles and ubiquitous charging systems. EDI and ID-related topics such as Canada's interactions with its Indigenous peoples and broader societal and cultural issues such as urbanization, demographics will be examined in the context of the needs of all people for safe, reliable, and affordable transportation while reviewing the life-cycle analysis and impact of EVs on sustainability, the environment and public infrastructure such as charging and hydrogen fueling systems for fuel cells. This course will examine these topics in a manner that promotes student's ability to clearly and concisely communicate (verbally, in written and mathematical formats), from the viewpoint of an engineer.		0.5
AUTO-8015-01/ Automotive Body Structures and Components	This course will look at body and chassis types, construction methods and materials including steel, aluminum, magnesium, fiberglass and carbon fibre and the relative merits of each including basic calculations. It will include structural analysis using finite element analysis (FEA) software. The rationale for the use of various materials and their relative merits including cost, weight, manufacturability, and properties will be discussed. The influence on occupant safety, comfort, and vehicle acoustics (NVH), ride and handling, crashworthiness, and durability of different types of vehicle powertrain components, battery packs and vehicle payloads will also be described.		0.5
AUTO-8020-01/ Vehicle Systems	Introduction to primary automotive systems including engine types and configurations, vehicle dynamics, powertrain and vehicle propulsion. Advanced driver assist systems (ADAS), tractive effort, energy requirements, vehicle duty cycles and usage patterns, propulsion system efficiency, regenerative braking systems, emission, and fuel economy standards as they relate to internal combustion, electric, hybrid, hydrogen fuel cell electric propulsion systems and the relative merits of each will be incorporated. Identification and discussion of industry issues and trends including vehicle safety standards (FMVSS/CMVSS, NCAP and ECE, for example) and emerging technologies and standards (i.e. SAEJ1772, J3400 (NACS), SAE J2601and ISO-26262)		0.5

Course # and Name	Course Description	R=Required / P=Preferred Skills	Projected # of GAs
AUTO-8030-01/ Engineering Project Management, Automotive Lean and Quality Processes	This course will examine the basic principles and tools used in engineering project management through topics such as project scope definition, consideration of time, cost, risk, procurement, and stakeholder management. The course will also review topics associated with the principles of process management used in lean manufacturing (the 5 Lean Principles, House of Value and 6S attributes) and specialized automotive quality processes such as design failure modes and effects analysis (DFMEA), production part approval process (PPAP). and advanced product quality planning (APQP) that are used in the auto industry to ensure on-time delivery of the right product with the right attributes, overall product quality and sound financial management of product development processes. Principles, methods, and best practices (such as life cycle analysis), Poka-Yoke design, design for manufacturability and assembly (DFMA) that are used by industry to reduce waste and operate more efficiently will also be covered.		0.5
AUTO-8040-01/ Vehicle Propulsion	This course will provide an examination of propulsion systems such as clean burning IC engine propulsion, electric vehicle (EV) propulsion (battery, hybrid, plug-in hybrid) and fuel cell electric vehicle propulsion. Topics will include combustion processes and pollution prevention for IC engines, and chemical and material properties and processes for electric propulsion along with key performance metrics. Charging systems and their integration with, and influence on, the electric power grid and potential future developments will be reviewed.		0.5
AUTO-8050-01/ Vehicle Energy and Thermal anagement	This course will examine control of the passenger compartment environment, occupant comfort and powertrain thermal management for different types of propulsion (i.e. internal combustion engines, battery electric engines, hybrid, and hydrogen fuel cells) along with energy management topics as it relates to vehicle energy and thermal management. Software will be introduced to aid with system and component sizing and performance calculations.	P - knowledge of technical and mechanical software tools such as Python, as well as being precise and reliable when completing tasks	0.5
AUTO-8060-01/ Powertrain Systems	This course will provide an in-depth examination of vehicle electric drive systems including e-motors and motor controllers operating at different voltage levels, various types of batteries, (cell formats and chemistries and new concepts such as solid state batteries) and performance metrics including cruise and acceleration, range calculations and influences on each component using representative software to model E-motor materials, magnet design, gearboxes, EV powertrain component manufacturing processes, on-board safety and safety in energy storage for EV and hydrogen as well as component manufacturing, will also be discussed.		0.5
AUTO-8070-01/ Manufacturing and Robotics Fundamentals	This course introduces the basics of robotically assisted manufacturing by examining the modeling, design, planning, and control of robot and manufacturing systems. Global robotic specifications (GRS) will be introduced at a high level. In addition, students will learn to develop multi robots work-cell construction as an introduction to dexterous manipulation (DM) using an advanced DM work-cell design.		0.5
GENG-1102-01/ Engineering Graphics	Visualization techniques, graphical communication using sketching, descriptive geometry, and computer-aided design (CAD) for orthographic projection, pictorial drawings, dimensioning, section views, and auxiliary views. Reading engineering drawings. Engineering graphics e-portfolio and CAD project to develop visualization skills and task completion skills.	R - Must have Knowledge of DRAFTING: Sketching, orthographic views, auxiliary views, section views, familiar with mechanical drafting conventions/standard, Knowledge of AutoCAD software, only 2D - Drafting and Annotation Workspace and fluent in English. P - Previously taken/GA'd the course	1
GENG-2201-01/ Engineering Design II	This course covers: problem formulation, functional requirements and constraints, competitive evaluation and areas of improvement, conceptual design through ideation sketches, selection of design, communication of the design solution, prototype construction, testing, iteration, reporting. Includes team work to develop personal, partnership, leadership, and task completion skills.	R - Familiar with MATLAB essential P - Previously taken or GA'd the course	0.5

Course # and Name	Course Description	R=Required / P=Preferred Skills	Projected # of GAs
GENG-2220-01/ Probability and Statistics for Engineering	Treatment of engineering data using the concepts of frequency distribution; measures of central tendency and dispersion. Probability; random variables; discrete and continuous distributions. Tests of hypotheses; estimation; goodness-of-fit test; linear regression and correlation. Applications using computers in engineering design problems, quality control, and manufacturing processes.	R - Experience with Intermediate Statistics, Microsoft Excel required. P - Previously taken/GA'd the course preferred.	10.5
GENG-3400-60/ Mechatronics System Design	This course will introduce concepts to integrate mechatronic components such as mechanical, electronic, optical and computer programming. Basic concepts and fundamental principles in mechatronic system-based design for automation, packaging and other applications will be reviewed. Students will develop the knowledge and skills necessary to adopt an interdisciplinary approach to mechatronic system design. The hands-on laboratory activities will assist in developing the skills in designing and troubleshooting integrated mechatronic systems. Students will be organized into teams of three or four students, and each team will be proposing, conceptualizing, designing, building and demonstrating a significant hands-on mechatronic project. Through this course and team project the students will be prepared for the final Capstone Mechatronics.	P - Previously taken/GA'd the course	0.5
GENG-4300-60/ Intelligent and Digital Manufacturing	Manufacturing methods are shifting towards smart tools that are adaptive and self-aware. This course will introduce concepts and components for intelligent machining tools and interfacing them with digital manufacturing that will create the knowledge of Industry 4.0. Integration of smart sensors and controls, data processing, interconnected machines, digital link between design and production, analysis of manufacturing processes and supply chains will be discussed.	P - Previously taken or GA'd the course	0.5
GENG-4500-60/ ECE-Artificial Intelligence and Machine Learning	This course is an introduction to the area of Artificial Intelligence and designing intelligent machines. Artificial intelligence aims to understand thinking and intelligence in ways that enable the construction of computer systems that are able to reason in uncertain environments. Work in AI has supported the development of driverless cars and house-cleaning robots as well as systems that have defeated world chess champions and planned space explorations. The course has three core sections: search, representation, and uncertainty. Each section will provide a thorough understanding of major approaches, representational techniques and core algorithms. Students completing this course will have an in-depth understanding of three core areas of AI and the connections among them, and with such other key AI areas as machine learning, robotics, natural language processing and multi-agent systems.	P - Previously taken or GA'd the course	0.5
GENG-8040-40/ MEM - Engineering Management Capstone	This is a jointly instructed and administered course between the Faculty of Engineering and the Odette School of Business. The course is the last course students take in the Masters of Engineering Management program and has mandatory prerequisites. The goal is to allow students to practice all business and management theory they learned in previous courses by completing one of: 1) an engineering management report 2) an engineering feasibility study, or 3) a new venture business plan. This course is entirely project-based.	P - Previously GA'd the course is preferred	0.5
GENG-8060-40/INDE-8900-04 Strategic Entrepreneurial Management	This course introduces the basic principles and techniques of start-up creation. The focus of the course is on nurturing the skills required to develop a successful business model for a new venture. First, students learn to assess the commercial viability of a new product or service. Then, they learn techniques to identify and validate the key value propositions for a start-up. They also employ the lean startup methodologies to define and segment the market, identify adequate revenue streams, and assess distribution channels. Also, students learn how to design and develop a minimum viable product and identify risks associated with market entry. Finally, students explore the financial and legal aspects of a startup. Attention is also given to aspects of sustainability, diversity, and ethics. (Restricted to students in the Master of Engineering Management program.)		0.5

Course # and Name	Course Description	R=Required / P=Preferred Skills	Projected # of GAs
INDE-3150-01/ Product and Process Design	Engineering design and work measurement principals are studied and applied to quantify and reduce the base engineered assembly content of automotive product designs. Non traditional methods for designing and building products for profit are studied with a goal of minimizing total assembly costs, manual labour and associated ergonomic injuries. Recent advances in manufacturing driven product designs in the automotive industry are presented to educate students on the contributions of product designs to the minimization of assembly costs, assembly labour content and the risk of injuries.	R - Applicants need to be confident they can teach well MODAPTS, BasicMOST and Traditional Time Study. P - Previously taken the course	0.5
INDE-4000-01/ IE senior capstone design	Student teams, supervised by faculty, undertake a significant design project, which integrates mathematics, basic sciences, engineering sciences and complementary studies in making informed, thoughtful and creative decisions in devising a product, system, component, or process to meet specified needs. It is a creative open-ended and generative activity often iterative and multidisciplinary, subject to constraints which may be governed by corporate standards or applicable legislation to varying degrees depending upon the project. These constraints may relate to economic, health, safety, environmental, social or other pertinent factors. Course requirements include seminars, group meetings, oral presentations, and written reports. Faculty advisors and industrial preceptors will advise project groups and evaluate the progress and results of the design projects.	R - graduated from a Canadian Engineering program	0.5
INDE-4130-01/ Production Analysis	Analysis and control of production systems. Demand forecasting. Deterministic and stochastic inventory systems. Aggregate planning and master scheduling. Material requirement planning. Operations sequencing and balancing. Job shop scheduling and control systems. Introduction to group technology and flexible manufacturing systems.	R - Knowledge of Operation research, Excel solver, and operation analysis required. P - Previously taken or GA'd this the course is preferred	0.5
INDE-4220-01/ Simulation of Industrial Systems	Introduction to Simulation-Random number and variate generation. Applications to queues, inventories, and related models. Special purpose simulation languages-SIMAN/ARENA. Input data analysis and model validation. Simulation output analysis, design of experiments. Use of computer software.	P - Previously taken course, having hands-on knowledge of features and commands of the software Promodel preferred	0.5
INDE-4280-01/ Facilities Design and Logistics	Approaches to establishing location and layout of space, equipment and services for industrial facilities. Criteria and data for generating & comparing alternatives. Computerized layout planning models, storage systems, AS/RS, Material handling, scope, definitions, and principles, unit load design, types of equipment, flow of material and line balancing. Environmental, human, and cost considerations. Electrical and lighting systems and atmospheric systems.	R - hands-on knowledge of features and commands of software packages; Pro Balance, Flow Planner, Workplace Planner as well as PlanOpt P - Previously taken or GA'd the course.	0.5
INDE-8340-01/ Engineering Design, Methodology & Applications	Engineering Design is a creative, iterative and often open-ended process subject to constraints. Topics include: design creativity & problem solving, engineering conceptual design & embodiment design, practices for product realization design theories and methodologies, parametric design, probabilistic design, industrial design, design and manufacturing integration, concurrent Engineering, materials selection in design, design for x (e.g. manufacturing, assembly), engineering design communication. Significant time is devoted to the applications of design theories and methodologies and to a product/process design realization.	P - Previously taken the course preferred.	0.5
INDE-8360-01/MECH-8290-09 Computer-Aided Design (CAD)	This course in CAD/CAM/CAE is directed towards students preparing to work as technical professionals and mechanical designers in industry. This course is based on from theory to practice and discusses important integration issues and approaches. The lectures present basic and generic principles and tools; this is supplemented with significant hands-on practice and engineering applications. Much of the learning will result from "hands-on" experience operating CAD software and learning the machining tools and a bit of programming (CAM) as well.	R - Knowledgable in CATIA, being able to help the students using the software on the first day.	0.5
MATL-8811-01/ Casting: Modeling and Simulation	Review of casting fundamentals. Techniques for mathematical model formulation. Development of general numerical method based on control volume finite difference scheme to predict mold filling, heat transfer, and solidification phenomena. Treatment of gates, runners, risers, and overflow. Mesh generation for full casting. Applications using commerical casting-simulation software. Students will apply their knowledge of engineering mathematics and transport phenomena to the processes of manufacturing light weight automotive components.	P - Previously taken or GA'd the course.	0.5

Course # and Name	Course Description	R=Required / P=Preferred Skills	Projected # of GAs
MATL-8890-30/mech-8290-30 Topics in Metal Forming	This graduate course presents some engineering concepts in the mechanics of metal forming. Students will become familiar with industrial metal forming manufacturing processes and also learn the theoretical basis for analyzing and solving metal forming problems. The mathematical theory of plasticity is presented using a phenomenological approach. The course also provides a brief overview of crystal plasticity and the influence of crystallographic texture on the anisotropic behaviour of sheet metal. And some of the more common anisotropic yield criteria used to analyze the plastic behaviour of orthotropic sheets are introduced. Finally, the determination and industrial implementation of the forming limits of sheet metals are presented. Throughout the course, students are taught to solve simple and practical sheet metal forming problems, making use of mechanical properties, constitutive equations and process conditions	P - Previously taken or GA'd the course.	0.5
MECH-2210-01/ Dynamics	Review of kinetics and kinematics of particles; workenergy and impulse-momentum methods; moments of inertia of areas and masses; kinematics of rigid bodies; plane motion; forces and accelerations for rigid bodies, energy and momentum methods for rigid bodies in plane motion.	P - previously taken/GA'd the course, studying, at the graduate level, within the Solid Mechanics field	4.5
MECH-2230-01/ Advanced Engineering and Design	Computer aided design applications for engineering graphic communication. Solid modeling; orthographic projection and isometric drawing; sections and conventions; dimensioning and tolerancing. Design portfolio and project.	R - Fluent in English essential. Good knowledge of CATIA for specific workbenches: sketching, part design, assembly design, drafting workbench and knowledge of drafting techniques and mechanical drafting conventions required. P - Previously taken or GA'd the course is preferred	5
MECH-3221-01/ Control Theory I	Control system concepts, linear modelling and analysis of response and stability of physical systems, complex variables and Laplace transforms, frequency, and transient response analysis and performance specifications. (Prerequisites: 62-215 and 62-216.) (3 lecture hours, 1 tutorial hour a week.)	R - Familiarity with electrical, mechanical, fluid dynamics, and kinematics modeling; Familiarity with control theory concepts (state-space systems, Laplace transform, Bode plots, PID controllers, stability, accuracy, vibration), familiarity with MATLAB and Simulink P - Previously taken or GA's this course or similar course preferred	0.5
MECH-3221-60/ Control Theory I	Control system concepts, linear modelling and analysis of response and stability of physical systems, complex variables and Laplace transforms, frequency, and transient response analysis and performance specifications.	R - Familiarity with electrical, mechanical, fluid dynamics and kinematics modeling; Familiarity with control theory concepts (state-space systems, Laplace transform, bode plots, PID controllers, stability, accuracy, vibration), familiarity with MATLAB and SIMULIN required. P - Previously taken or GA's this course or similar course preferred	0.5
MECH-3224-01/ Engineering Measurements	Basic concepts and applications in engineering data acquisition (DAQ), error analysis, signal conditioning and measurement presentation. Microcomputer-based data acquisition and analysis involving DAQ hardware, including sensors, and software will occur.	R – Previous experience with DAQ hardware and software, preferrably NI LabVIEW and the NI CompactDAQ DAQ system. Previous experiencing using sensors, including but not limited to, load cells, displacement transducers, and accelerometers in mechanical systems. P - Previously taken or GA'd the course is preferred	2.5

Course # and Name	Course Description	R=Required / P=Preferred Skills	Projected # of GAs
MECH-3224-60/ Engineering Measurements	Basic concepts in instrumentation; error analysis; instrumentation and measurement systems including sensors, transducer, signal conditioning and display; microcomputer-based data acquisition and analysis.	P - Previously taken or GA'd the course is preferred	0.5
MECH-3671-01/ Aerospace Materials and Manufacturing	Properties and selection of metals, ceramics, polymers, and composite materials for aerospace applications. Structural and gas-turbine alloys. Machining, casting, forming, heat treating, and joining processes for original manufacture and repair. Manufacture and application of composites. In-service materials degradation.	R - GA must attend all lab/tutorials P - students with Materials Engineering background, or those who previously taken or GA'd the course are preferred.	0.5
MECH-4200-01/ Mechanical Capstone Design	Student design teams, operating within a "company" environment, utilize the broad range of their undergraduate experience in interdisciplinary projects selected to promote interaction between the mechanical, automotive, and materials programs. Design methodologies and team interaction simulate future professional practice. Project milestones include: a design proposal with cost analysis and scheduling, construction and commissioning of the designed appartus, and a final report and presentation having both global and detail completeness.	P - Previously taken or GA'd the course is preferred	3
MECH-4211-01/ Design for Failure Prevention	Philosophy of machine design. Design factor/reliability relationships. Contemporary fatigue analysis, including low- and high-cycle, triaxial state of non-reversed stress and fatigue damage, with applications of selected mechanical elements.	R - GA must attend lab/tutorials P - Previously taken or GA'd the course is preferred	2.5
MECH-4218-01/ Thermofluid Systems Design	Evaluation of major thermofluid systems: HVACandR, power generation. Factors affecting design and selection of thermofluid devices: boilers, pumps and compressors, valves, piping systems, heat exchangers, evaporators, and turbines. Effect of device characteristics on process efficiency. Application of optimization techniques to thermofluid systems. (Prerequisites: MECH-3212, MECH-3233, MECH-3228; and either MECH-3217 or MECH-3220.)	R - Basic knowledge on thermodynamics, heat transfer, fluid mechanics, design; familiar with software packages (Finite element analysis, computational fluid dynamics, MATLAB, etc). P - Previously taken or GA'd this course preferred	3
MECH-4221-01/ Machine Design II	Gearing and gear trains: spur, helical, worm, and bevel gears. Clutches, brakes, couplings, flywheels. Chain and belt drives. Design of shafting. Student-developed software to support mechanical design.	R - Mechanical Engineering student with background/research in the solid mechanics areas required with familiarity in machine design topics such as: brakes, clutches, ball bearings, roller bearings, flat belts, v-belts, timing belts, chains, compression springs, extension springs, spur gears, helical gears, bevel gears, worm gears, threaded fasteners P - Previously taken or GA'd this course preferred	0.5
MECH-4240-05/ Advanced Mechatronics	The course will cover advanced concepts in sensors, actuators, and the integration of mechanical, electrical, and control technologies for mechatronic system design. Topics covered will be fundamental theories and computational methodologies of complex mechatronic systems, selection and implementation of sensors and actuators, signal processing and advanced algorithms, microcontroller interfacing and programming, advanced motion control using PLC, and design of complex mechatronic systems and applications.	P - Previously taken or GA'd this course preferred	0.5
MECH-4240-60/ Biomedical Signal Processing	The goal of this course is to provide biomedical signal processing background on technical aspects. This course will cover biomedical signal generation, detection and measurement, and processing. The physiology of bio-electrical signal generation will cover ionic transport in cellular membranes and propagation of electrical signals in cells and tissues. Different kinds of biomedical signals such as the electromyography (EMG), the electrocardiography (ECG), the electroencephalography (EEG) will be covererd. Biopotential Electrode technology, instrumentation amplifiers, and safety standard will be covered. Processing includes filtering, frequency domain analysis, time domain analysis, removal of artifacts, feature extraction, classification, signal correlation, and event detection.	P - Previously taken or GA'd this course preferred	0.5

Course # and Name	Course Description	R=Required / P=Preferred Skills	Projected # of GAs
MECH-4250-01/ Gas Dynamics	Basic concepts and one-dimensional flow equations of gas dynamics. Emphasis on isentropic flows in variable area ducts as well as Fanno, Rayleigh and Isothermal flows in constant area ducts. Normal shock waves, their appearance in various flow types, their application in nozzles and diffusers. Oblique shock and Prandtl Meyer expansion waves. Considerations in compressible flow measurements.	R - Basic knowledge on thermodynamics, heat transfer, fluid mechanics. P - Previously taken a course on Gas Dynamics is preferred.	0.5
MECH-4253-01/ Heating, Ventilation and Air Conditioning	Principles of environmental air quality and occupant comfort control. Psychrometric analysis of buildings as applied to common air distribution system designs. Current solar radiation estimation techniques and other energy transfer mechanisms; their application to cooling and heating load calculations. Analytical and numerical calculations. Computational tools.	R - Basic knowledge on thermodynamics, heat transfer, fluid mechanics. P - Previously taken a course in HVAC is preferred.	1
MECH-4463-01/ Vehicle Dynamics	Classification and analysis of suspension types and geometry, powertrain layout, and ride quality. Tire modeling, stability, and numerical simulation of vehicle dynamics, including longitudinal and lateral vehicle response to driver inputs. Selected topics from industry experts.	P - Previously taken or GA'd this course preferred	1.5
MECH-4465-01/ Internal Combustion Engines	Mechanical design of vehicular internal combustion engines for different applications. Covers basic engine types and their operation from an energy conversion systems viewpoint, where the system needs to satisfy a number of requirements. These performance and operational requirements are derived from basic thermodynamics, operation of heat engine cycles, ignition and combustion processes, fuel system design, heat transfer, emissions formulation, available instrumentation and testing procedures. Environmental impact of vehicular designs on global pollution and government standards. Recent developments in energy-efficient and alternate fuel engines.	R - Must have experience with internal combustion engine operation, performance, and design. P - Prior successful completion of, or previously GA appointment for, MECH-4465 is significant asset	0.5
MECH-4471-01/MECH-4871 01 Automotive Materials and manufacturing methods	The objective of this course is to introduce both the metallic and non-metallic materials employed in automobiles. The metallic automotive materials are comprised of ferrous and nonferrous alloys. Although the traditional ferrous alloys – cast irons and steels are still present in automobiles, the advanced high strength ferrous alloys are emerging. The nonferrous alloys – aluminum and magnesium-based light alloys are increasingly used in the auto industry. Polymers as the non-metallic lightweight materials are widely employed in automobiles. The content to be covered ranges from the production of introduced automotive materials to their recent development. To understand the rationale for the usage of various automotive materials, the advantages of their manufacturability and properties are discussed. Various manufacturing processes corresponding to specific automotive materials are highlighted. The mechanical properties and microstructure of automotive materials are reviewed. The implementation of automotive materials in automobiles is presented. Upon the completion of this course, students are expected to understand basic principles of manufacturing, and advantages and disadvantages of introduced automotive materials over other materials in terms of performance and weight saving. The course also trains students in obtaining knowledge of advanced manufacturing processes, and structure characterization and property evaluation as well as component design of various automotive materials.	P - Previously taken or GA'd this course preferred	0.5
MECH-4670-01/ Aerospace propulsion	Application of gas dynamics and thermodynamics to aerospace engines. Analysis of engine cycles. Theory and design of propellers; turboprop engine analysis, Internal combustion and gas turbine engines. Component design for compressors, combustors, afterburners, exhaust nozzles.	R - Experience with air-breathing and/or rocket propulsion modelling, analysis, and design. P - Previous experience GAing this course is an asset	0.5
MECH-4673-01/ Aerospace Structures	Parts of an airplane, their function and loads transfer between major structural elements; airframe loads; trusses in aerospace applications and stress analysis of truss structures; airframe as a thin-walled stiffened beam: bending of thin-walled beams, shear of thin-walled beams, torsion of thin-walled beams, structural idealization of airframe; stress analysis of wing spars and box beams; stress analysis of fuselages; stress analysis of wings.	R - strong knowledge of solid mechanics required; P - previously taken/GA'd this course preferred	0.5

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MECH-4871-01/MECH-4471 01 Automotive Materials and manufacturing methods	The objective of this course is to introduce both the metallic and non-metallic materials employed in automobiles. The metallic automotive materials are comprised of ferrous and nonferrous alloys. Although the traditional ferrous alloys – cast irons and steels are still present in automobiles, the advanced high strength ferrous alloys are emerging. The nonferrous alloys – aluminum and magnesium-based light alloys are increasingly used in the auto industry. Polymers as the non-metallic lightweight materials are widely employed in automobiles. The content to be covered ranges from the production of introduced automotive materials to their recent development. To understand the rationale for the usage of various automotive materials, the advantages of their manufacturability and properties are discussed. Various manufacturing processes corresponding to specific automotive materials are highlighted. The mechanical properties and microstructure of automotive materials are reviewed. The implementation of automotive materials in automobiles is presented. Upon the completion of this course, students are expected to understand basic principles of manufacturing, and advantages and disadvantages of introduced automotive materials over other materials in terms of performance and weight saving. The course also trains students in obtaining knowledge of advanced manufacturing processes, and structure characterization and property evaluation as well as component design of various automotive materials.	P - Previously taken or GA'd this course preferred	0.5
MECH-8244-01/ FINITE Element Mechods for Crashworthiness & Impact Analysis	The topics include a brief history on the use of numerical tools in automotive/impact field, Explicit and Implicit time integration techniques, Shell and Solid finite element formulations for impact analyses - advantages and disadvantages, Zero Energy Modes (Hourglassing) and Hourglass control, Material modeling for large displacement problems, Finite element modeling for contact, Mesh Adaptivity, Arbitrary Lagrangian and Eulerian Meshes for large deformation problems, Use of implicit integration techniques for impact problems, Quasi-static simulations as well as the development of finite element models for impact analyses.	Previously taken the course is preferred	0.5
MECH-8290-23/ Advanced Fluid Mechanics	This course provides a solid grounding in the principles of incompressible fluid mechanics for graduate students. The course covers advanced fluid mechanics topics and begins with review of the fundamental fluid mechanics conservation laws of mass, momentum (Navier-Stokes equations) and energy using tensorial (indicial) notations. The processes of how a fluid flow is modeled, the development of the basic equations of fluid mechanics, the simplification of these basic equations using appropriate assumptions, the establishment of proper boundary/initial conditions, and methods of reducing the resulting equations through judicious parameter scaling will be covered. The physical interpretation of the mathematical terms used in solutions to fluid mechanics problems applied to canonical flows, such as boundary layers, jets and wakes will be discussed. A brief introduction to turbulence, statistical representation of turbulence, turbulence spectra and Kolmogorov hypothesis are also planned. Various examples of analytical and numerical solutions to fluid problems will be analyzed as described in the current research literature. The course will provide an opportunity to review fluid mechanics fundamentals, to read research papers and build the necessary engineering intuition needed to practically employ effective numerical solution techniques	P - Previously taken or GA'd the course	0.5
MECH-8290-79/ Practical CFD and Turbulence Modeling	CFD fundamentals, principles, modelling procedures, meshing considerations and requirements, grid sensitivity analysis, boundary condition types and the user input for each boundary type including multiphase flows. Setting up of the physical properties of fluid, turbulence modelling (RANS, DES & LES), solution control parameters and discretization schemes. Guidelines for verification and validation of CFS simulation. Open source CFD solver OpenFOAM will also be briefly reviewed.	R - Knowledge in the OpenFOAM required. Background in fluid mechanics and CFD P - Previously taken or GA'd the course	0.5

Course # and Name	Course Description	R=Required / P=Preferred Skills	Projected # of GAs
MECH-8293-01/ Introduction to Finite Element Analysis	**This course covers the fundamentals of the Finite Element Analysis (FEA) with emphasis on solid mechanics and stress analysis. The subject of finite elements is treated using variational principles such as the principle of virtual work and total potential energy. The course deals with a variety of structural components such as springs, axially loaded bars, beams under bending, two-dimensional/axially symmetric/three-dimensional continuum elements and their formulation is static and dynamic analysis. In addition to three hours of lecture, a two-hour computer lab is mandatory where the students use different commercial FEA software.**	**P - Previously taken or GA'd the course**	**0.5**
TRON-2201-01/ Kinematics and Dynamics	**This course covers the principles of motion and force analysis applied to machines, including moments of inertia, kinematics of rigid bodies; plane motion, forces and accelerations for rigid bodies, work-energy and impulse-momentum methods; the fundamentals of mechanisms and machines, the kinetics and kinematics of particles; kinematic and dynamic analysis of linkages, cam-based, gear-based, and intermittent motion mechanisms, static and dynamic analysis of mechanical flywheels, balancing of reciprocating and rotating masses.**		**0.5**

Refer to the timetable (www.uwindsor.ca/registrar/timetable-information) for class and exam hours and location.

Eligibility requirements:
GA appointments shall be offered in accordance with the criteria specified in Article 12:03 of the Collective Agreement. Note that the number of G.A. positions for each course is determined by the enrolment in the course, instructor requests and laboratory requirements. In addition, previous experience of applicants in courses posted will be taken into consideration. Students must maintain fulltime registration throughout the term and must be in good standing in the degree program in order to hold a Graduate Assistantship. Students who meet the Phase I tuition refund deadline are therefore not eligible to hold a GA. A full graduate assistantship requires an average of 10 hours per week for a maximum of 140 hours per semester. Refer to Articles 12, 13, and 14 of the Collective Agreement for eligibility details.

All Graduate Assistants must meet the specific requirements related to the duties listed with the course(s) above.

"With respect to those students who have applied for and been accepted for Assistantships, the Assistant will not be paid for any shortfall of hours at the end of their respective program, provided the University has satisfied its obligation to post available positions each term in writing and on the AAU website and to offer the minimum terms of support in accordance with Article 13:01 (a) & (b) and provided that the Assistant has applied in writing or via e-mail by the application deadline for each term until they have received the minimum terms of support in accordance with Article 13:01 (a) & (b)."

In pursuit of the University of Windsor's Employment Equity Plan, members from the designated groups (Women, Aboriginal Peoples, Visible Minorities, Persons with Disabilities, and Members of Sexual Minorities) are encouraged to apply.

Online applications, submitted through Qualtrics link https://uwindsor.ca1.qualtrics.com/jfe/form/SV_ahDT02Rxeekeid8

Ms. A. Haskell,
MAME Department, Room 2166 CEI

Deadline for completing the online application – 8:30am – Monday, November 10, 2025

Dr. Minaker
Head