McMaster University | Engineering
Mechanical Engineering

MARKING / CONSULTING ASSIGNMENTS

2026 – 2027 Academic Session | Department of Mechanical Engineering

FALL TERM 2026 (Sept. – Dec.)

MECH ENG 4Y03 – Internal Combustion Engines

Fall Term 2026 (Sept. – Dec.)	
Course Code	**MECH ENG 4Y03**
Course Name	**Internal Combustion Engines**
Course Description	This course focuses on internal combustion engines (ICE), including operations, thermodynamics, combustion, and characteristics of gasoline and diesel engines, as well as hybrid powertrains.
Course Instructor	Dr. Fengjun Yan
TA Duties	*Duties: Marking and Consulting* Required Expertise: Combustion Engine Expertise
Number of TAs Required	2
Total Hours	130 hours total (2 TAs × 65 hrs each)
Hours Breakdown	Per TA – 65 hrs: Marking / Consulting

MECH ENG 4V03 – Thermo-Fluids Systems Design and Analysis

Fall Term 2026 (Sept. – Dec.)	
Course Code	**MECH ENG 4V03**
Course Name	**Thermo-Fluids Systems Design and Analysis**
Course Description	Design, operation and application characteristics of equipment commonly used in thermal systems. Modelling performance characteristics of piping systems, pumps, compressors, fans, heat exchangers, boilers and cooling towers. System simulation and optimization. Selection criteria of thermal equipment. Design optimization and system performance evaluation.
Course Instructor	**Dr. Chan Y. Ching**
TA Duties	*Duties: Marking and Consulting* Required Expertise: Thermo-Fluids Expertise
Number of TAs Required	**5**
Total Hours	325 hours total (5 TAs × 65 hrs each)
Hours Breakdown	Per TA – 65 hrs: Marking / Consulting

MECH ENG 4U03 – Compressible Flow and Turbomachinery

Fall Term 2026 (Sept. – Dec.)	
Course Code	**MECH ENG 4U03**
Course Name	**Compressible Flow and Turbomachinery**
Course Description	Compressible flows: Fanno and Rayleigh flows, normal and oblique shocks. Turbomachines: axial flow gas and wind turbines, axial flow compressors and fans.
Course Instructor	**Dr. Stephen Tullis**
TA Duties	*Duties: Marking and Consulting* Required Expertise: Fluid Mechanics Expertise
Number of TAs Required	**1**
Total Hours	65 hours
Hours Breakdown	Per TA – 65 hrs: Marking / Consulting

MECH ENG 4T03 – Finite Element Applications

Fall Term 2026 (Sept. – Dec.)	
Course Code	**MECH ENG 4T03**
Course Name	**Finite Element Applications**
Course Description	Theory of the finite element method, element derivation, solution procedures. Applications to static and dynamic mechanical systems using a finite element package.
Course Instructor	**Dr. Peidong Wu**
TA Duties	*Duties: Marking and Consulting* Required Expertise: Finite Elements Expertise
Number of TAs Required	**1**
Total Hours	65 hours
Hours Breakdown	Per TA – 65 hrs: Marking / Consulting

MECH ENG 4SS3 – Smart Systems

Fall Term 2026 (Sept. – Dec.)	
Course Code	**MECH ENG 4SS3**
Course Name	**Smart Systems**
Course Description	This course will teach the fundamentals of smart systems which incorporate elements of sensing, actuation, and control in order to interact with the environment and make decisions in a predictive and intelligent manner. Students will learn how to mathematically model systems, how to program and implement Kalman filters, how to tune and code PID controllers, how to collect and process sensor data, and how to apply machine learning strategies for system optimization.
Course Instructor	**Dr. S. Andrew Gadsden**
TA Duties	*Duties: Marking and Consulting* Required Expertise: Mechatronics Expertise
Number of TAs Required	1
Total Hours	65 hours
Hours Breakdown	Per TA – 65 hrs: Marking / Consulting

MECH ENG 4S03 – Incompressible Flow

Fall Term 2026 (Sept. – Dec.)	
Course Code	**MECH ENG 4S03**
Course Name	**Incompressible Flow**
Course Description	Introduction to internal and external laminar and turbulent incompressible flows. Topics include turbulent boundary layers, aerodynamics and convective heat transfer.
Course Instructor	**Dr. Shakirudeen A. Salaudeen**
TA Duties	*Duties: Marking and Consulting* Required Expertise: Fluid Mechanics Expertise
Number of TAs Required	2
Total Hours	130 hours (2 TAs @ 65 hrs each)
Hours Breakdown	Per TA – 65 hrs: Marking / Consulting

MECH ENG 4Q03 – Mechanical Vibrations

Fall Term 2026 (Sept. – Dec.)	
Course Code	**MECH ENG 4Q03**
Course Name	**Mechanical Vibrations**
Course Description	Transient and steady state vibration of single- and multi-degree of freedom systems. Free and forced vibrations of single and multiple degree-of-freedom mechanical systems, transient response, damping and vibration isolation.
Course Instructor	**Dr. Stephen C. Veldhuis**
TA Duties	*Duties: Marking and Consulting* Required Expertise: Vibrations Expertise
Number of TAs Required	**5**
Total Hours	325 hours total (5 TAs × 65 hrs each)
Hours Breakdown	Per TA – 65 hrs: Marking / Consulting

MECH ENG 4K03 – Robotics

Fall Term 2026 (Sept. – Dec.)	
Course Code	**MECH ENG 4K03**
Course Name	**Robotics**
Course Description	Fundamental theory and practical applications of robotic manipulators and mobile robots. Equations of motion, robot dynamics and statics, motion planning, introduction to machine vision, basics of robot programming.
Course Instructor	Dr. Fengjun Yan
TA Duties	*Duties: Marking and Consulting* Required Expertise: Robotics Expertise
Number of TAs Required	3
Total Hours	195 hours total (3 TAs × 65 hrs each)
Hours Breakdown	Per TA – 65 hrs: Marking / Consulting

MECH ENG 4I03 – Noise Analysis and Control

Fall Term 2026 (Sept. – Dec.)	
Course Code	**MECH ENG 4I03**
Course Name	**Noise Analysis and Control**
Course Description	Acoustic quantities; noise measurements and analysis; noise standards; sound generation, propagation, absorption, transmission; acoustic materials; noise control techniques; case studies.
Course Instructor	**Sessional Instructor**
TA Duties	*Duties: Marking and Consulting* Required Expertise: Acoustics Expertise
Number of TAs Required	**1**
Total Hours	65 hours
Hours Breakdown	Per TA – 65 hrs: Marking / Consulting

MECH ENG 4BB3 – Biomechanics

Fall Term 2026 (Sept. – Dec.)	
Course Code	**MECH ENG 4BB3**
Course Name	**Biomechanics**
Course Description	Application of mechanical engineering principles to biomechanics problems including cellular biomechanics, hemodynamics, circulatory system, respiratory system, muscles and movement and skeletal biomechanics.
Course Instructor	**Dr. Gregory Wohl**
TA Duties	*Duties: Marking and Consulting* Required Expertise: Biomechanics Expertise
Number of TAs Required	1
Total Hours	130 hours total
Hours Breakdown	Per TA – 130 hrs: Marking / Consulting

MECH ENG 4AI3 – Applied Artificial Intelligence

Fall Term 2026 (Sept. – Dec.)	
Course Code	**MECH ENG 4AI3**
Course Name	**Applied Artificial Intelligence**
Course Description	Exploring the principles of modern Artificial Intelligence (AI) in a practical, hands-on way. Covers concepts such as Generative AI (GenAI), Natural Language Processing (NLP), Deep Learning (DL), recommendation engines, and computer vision
Course Instructor	**Dr. Ryan Ahmed**
TA Duties	*Duties: Marking and Consulting* Required Expertise: Mechatronics
Number of TAs Required	1
Total Hours	65 hours total
Hours Breakdown	Per TA – 65 hrs: Marking / Consulting

MECH ENG 3C03 – Manufacturing Engineering

Fall Term 2026 (Sept. – Dec.)	
Course Code	**MECH ENG 3C03**
Course Name	**Manufacturing Engineering**
Course Description	A general introduction, encompassing the wide field of activities from iron and steel making through casting, rolling, forging, to cold forming, metal cutting, welding, bonding, electrical machining, surface treatment, mechanical handling, assembly, cleaning, packaging.
Course Instructor	**Dr. Maryam Aramesh**
TA Duties	*Duties: Marking and Consulting* Required Expertise: Material Processes Expertise
Number of TAs Required	6
Total Hours	390 hours total (6 TAs × 65 hrs each)
Hours Breakdown	Per TA – 65 hrs: Marking / Consulting

MECH ENG 2Q04 – Engineering Mechanics: Kinetics and Dynamics

Fall Term 2026 (Sept. – Dec.)	
Course Code	**MECH ENG 2Q04**
Course Name	**Engineering Mechanics: Kinetics and Dynamics**
Course Description	Kinematics and dynamics of particles and rigid bodies. Analysis of planar mechanisms. Displacement, velocity and acceleration analysis methods. Motion with respect to a rotating frame of reference. Work, energy and momentum principles.
Course Instructor	**Dr. Eu-Gene Ng**
TA Duties	*Duties: Marking and Consulting* Required Expertise: Mechanics Expertise
Number of TAs Required	**5**
Total Hours	325 hours total (5 TAs × 65 hrs each)
Hours Breakdown	Per TA – 65 hrs: Marking / Consulting

MECH ENG 2P04 – Statics and Mechanics of Materials

Fall Term 2026 (Sept. – Dec.)	
Course Code	**MECH ENG 2P04**
Course Name	**Statics and Mechanics of Materials**
Course Description	Principles of statics as applied to deformable solid bodies. Stress and strain, elastic behaviour of simple members under axial force, bending and torsion. Principle stresses; statical indeterminacy.
Course Instructor	**Dr. Philip Koshy**
TA Duties	*Duties: Marking and Consulting* Required Expertise: Mechanics Expertise
Number of TAs Required	**5**
Total Hours	325 hours total (5 TAs × 65 hrs each)
Hours Breakdown	Per TA – 65 hrs: Marking / Consulting

MECH ENG 2D03 – Mechanical Engineering Design Elements

Fall Term 2026 (Sept. – Dec.)	
Course Code	**MECH ENG 2D03**
Course Name	**Mechanical Engineering Design Elements**
Course Description	Design synthesis, fundamental principles of standard design elements, mechanical and fluid power elements, component specification and optimization.
Course Instructor	**Sessional Instructor**
TA Duties	*Duties: Marking and Consulting* Required Expertise: Mechanical Design Expertise
Number of TAs Required	**5**
Total Hours	325 hours total (5 TAs × 65 hrs each)
Hours Breakdown	Per TA – 65 hrs: Marking / Consulting

WINTER TERM 2027 (Jan. – April)

MECH ENG 4Z03 – CAD/CAM/CAE

	Winter Term 2027 (Jan. – April)
Course Code	**MECH ENG 4Z03**
Course Name	**CAD/CAM/CAE**
Course Description	Solid modelling theory, part creation, assemblies and rigid bodies, mechanism simulation, B-Splines, data exchange, CNC machining and inspection. Major project using computer laboratory facilities.
Course Instructor	**Sessional Instructor**
TA Duties	*Duties: Marking and Consulting* Required Expertise: Autodesk Inventor / Alias Expertise
Number of TAs Required	**5**
Total Hours	325 hours total (5 TAs × 65 hrs each)
Hours Breakdown	Per TA – 65 hrs: Marking / Consulting

MECH ENG 4W03 – Air Conditioning and Refrigeration Systems

	Winter Term 2027 (Jan. – April)
Course Code	**MECH ENG 4W03**
Course Name	**Air Conditioning and Refrigeration Systems**
Course Description	Re-examination of laws of thermodynamics, multicomponent vapour systems, psychrometry, air conditioning, mechanical vapour compression refrigeration, absorption refrigeration, heating and cooling load calculations, air quality and human thermal comfort.
Course Instructor	**Dr. Sumanth Shankar**
TA Duties	*Duties: Marking and Consulting* Required Expertise: Thermo-Fluids Expertise
Number of TAs Required	**1**
Total Hours	65 hours
Hours Breakdown	Per TA – 65 hrs: Marking / Consulting

MECH ENG 4T03 – Finite Element Applications

Winter Term 2027 (Jan. – April)	
Course Code	**MECH ENG 4T03**
Course Name	**Finite Element Applications**
Course Description	Theory of the finite element method, element derivation, solution procedures. Applications to static and dynamic mechanical systems using a finite element package.
Course Instructor	**Dr. Peidong Wu**
TA Duties	*Duties: Marking and Consulting* Required Expertise: Finite Elements Expertise
Number of TAs Required	1
Total Hours	65 hrs
Hours Breakdown	Per TA – 65 hrs: Marking / Consulting

MECH ENG 4R03 – Control Systems

Winter Term 2027 (Jan. – April)	
Course Code	**MECH ENG 4R03**
Course Name	**Control Systems**
Course Description	Fundamentals of linear, continuous control systems. Control system performance in both time and frequency domains. Design and analysis of controllers.
Course Instructor	**Dr. Saeid Habibi**
TA Duties	*Duties: Marking and Consulting* Required Expertise: Control Theory Expertise
Number of TAs Required	**5**
Total Hours	325 hours total (5 TAs × 65 hrs each)
Hours Breakdown	Per TA – 65 hrs: Marking / Consulting

MECH ENG 4J03 – Introduction to Computational Fluid Mechanics and Heat Transfer

Winter Term 2027 (Jan. – April)	
Course Code	**MECH ENG 4J03**
Course Name	**Introduction to Computational Fluid Mechanics and Heat Transfer**
Course Description	Computational Methods for Fluid Mechanics and Heat Transfer covering: concepts of modelling and numerical analysis, governing equations of 11hermos-fluid problems, finite-difference discretization methods. Use of commercial computational software for solving 11hermos-fluid problems.
Course Instructor	**Dr. Mohamed S. Hamed**
TA Duties	*Duties: Marking and Consulting* Required Expertise: Fluid Mechanics Expertise
Number of TAs Required	**1**
Total Hours	65 hours
Hours Breakdown	Per TA – 65 hrs: Marking / Consulting

MECH ENG 4H03 – Mechatronics

Winter Term 2027 (Jan. – April)	
Course Code	**MECH ENG 4H03**
Course Name	**Mechatronics**
Course Description	Integration of mechanical engineering with electronics and computer control. Sensors, actuators (including pneumatic and hydraulic), modelling using building block and state space methods, model-based control, programming of PLCs with practical demonstrations.
Course Instructor	**Dr. Gary M. Bone**
TA Duties	*Duties: Marking and Consulting* Required Expertise: Mechatronics Expertise
Number of TAs Required	**5**
Total Hours	325 hours total (5 TAs × 65 hrs each)
Hours Breakdown	Per TA – 65 hrs: Marking / Consulting

MECH ENG 4D03 – Manufacturing Processes (Metal Removal)

Winter Term 2027 (Jan. – April)	
Course Code	**MECH ENG 4D03**
Course Name	**Manufacturing Processes (Metal Removal)**
Course Description	Fundamentals of metal removing processes, including mechanics and tribological aspects of material removal. Application of theory to the practice of machining processes such as turning, milling, drilling and grinding.
Course Instructor	**Dr. Philip Koshy**
TA Duties	*Duties: Marking and Consulting* Required Expertise: Manufacturing Expertise
Number of TAs Required	**1**
Total Hours	65 hours
Hours Breakdown	Per TA – 65 hrs: Marking / Consulting

MECH ENG 4CC3 – Experimental and Computational Biomechanics

Winter Term 2027 (Jan. – April)	
Course Code	**MECH ENG 4CC3**
Course Name	**Experimental and Computational Biomechanics**
Course Description	Introduction to experimental and computational biomechanics including biomechanical testing concepts and application of finite element methods in simulations of biomechanical structures/systems.
Course Instructor	Dr. Cheryl Quenneville
TA Duties	*Duties: Marking and Consulting* Required Expertise: Biomedical Engineering Expertise
Number of TAs Required	**1**
Total Hours	130 hours
Hours Breakdown	Per TA – 130 hrs: Marking / Consulting

MECH ENG 4B03 – Topics in Product Development

Winter Term 2026 (Jan –Apr.)	
Course Code	**MECH ENG 4B03**
Course Name	**Topics in Product Development**
Course Description	Case studies using modern product development methods, value engineering, product specification, rapid product development, lean design and continuous improvement. Product liability and robust design.
Course Instructor	**Dr. Elizabeth Hassan**
TA Duties	*Duties: Marking and Consulting* Required Expertise: 1 TA – CAD Expertise; 1 TA – Mechanics Expertise
Number of TAs Required	**2**
Total Hours	130 hours total (2 TAs × 65 hrs each)
Hours Breakdown	Per TA – 65 hrs: Marking / Consulting

MECH ENG 4BF3 – Biofluid Mechanics

Winter Term 2027 (Jan. – April)	
Course Code	**MECH ENG 4BF3**
Course Name	**Biofluid Mechanics**
Course Description	The objective is to learn blood flow mechanics through the circulatory system and its subsystems. The course examines mechanics of circulation, mechanobiology and biomechanics of different components of circulatory system, in-vivo and in-vitro techniques and their medical applications.
Course Instructor	**Dr. Zahra Motamed**
TA Duties	*Duties: Marking and Consulting* Required Expertise: Biomechanics Expertise
Number of TAs Required	**1**
Total Hours	65 hours
Hours Breakdown	Per TA – 65 hrs: Marking / Consulting

MECH ENG 4AA3 – Aerodynamics

Winter Term 2027 (Jan. – April)	
Course Code	**MECH ENG 4AA3**
Course Name	**Aerodynamics**
Course Description	Forces and moments associated with flow around airfoils and bodies. Finite wings. Potential flow and introduction to panel methods. Thin airfoil theory and symmetric and cambered airfoils. Introduction to aircraft stability and aeroelasticity.
Course Instructor	**Dr. Stephen Tullis**
TA Duties	*Duties: Marking and Consulting* Required Expertise: Fluid Mechanics Expertise
Number of TAs Required	**1**
Total Hours	65 hours
Hours Breakdown	Per TA – 65 hrs: Marking / Consulting

MECH ENG 3R03 – Heat Transfer

Winter Term 2027 (Jan. – April)	
Course Code	**MECH ENG 3R03**
Course Name	**Heat Transfer**
Course Description	Application of the laws of conduction, convection and radiation to problems in heat transfer. Steady and transient conduction in solids. Laminar and turbulent convection. Radiation heat transfer processes. Boiling and condensation heat transfer.
Course Instructor	**Dr. Keena Trowell**
TA Duties	*Duties: Marking, Consulting, and Leading Tutorials* Required Expertise: Heat Transfer Expertise
Number of TAs Required	**5**
Total Hours	325 hours total (5 TAs × 65 hrs each)
Hours Breakdown	Per TA – 65 hrs: Marking / Consulting / Leading Tutorials

MECH ENG 3A03 – Engineering Mechanics

Winter Term 2027 (Jan. – April)	
Course Code	**MECH ENG 3A03**
Course Name	**Engineering Mechanics**
Course Description	Singularity functions, generalized Hooke's law; shear stress, shear flow in beams; shear centre. Biaxial and unsymmetrical bending, analysis of indeterminate beams and frames using energy methods, impact loads. Buckling of compression members. Introduction to yield criteria.
Course Instructor	**Dr. Duncan Cree**
TA Duties	*Duties: Marking and Consulting* Required Expertise: Mechanics Expertise
Number of TAs Required	5
Total Hours	325 hours total (5 TAs × 65 hrs each)
Hours Breakdown	Per TA – 65 hrs: Marking / Consulting