DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING

NOTICE RE: GRADUATE ASSISTANT (GA) POSITIONS AVAILABLE FOR Winter 2025

In accordance with Article 12:01 of the CUPE 4580 Collective Agreement the Department of Electrical & Computer Engineering invites applications for GA positions for the Winter 2025 term.

The total number of projected Graduate Assistantship positions for Winter 2025 is 98 GAs for a total of 13,720 hours. All positions are subject to sufficient enrolment and final budgetary approval.

List of courses that may utilize Graduate Assistants for the Winter 2025 term which will run from January 6th, 2025 – April 30th, 2025:

Course # and course name	Course Description	E = Essential Qualifications P = Preferred Qualifications	Projected # of GAs
GENG 1201 Cornerstone Design	The engineering design process: 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 group work to develop personal, teamwork, leadership, and task completion skills as part of the design process. (Prerequisite: GENG- 1102. Open only to Engineering students.) (4.5 hours weekly.)	P – Previously taken or GA'd the course	2
GENG 1202 Introductory Electrical and Computer Engineering Dr. Arezoo Emadi	This course introduces the fundamentals of electrical and computer engineering, including introductory selected topics on circuit elements and analysis, semiconductor devices, optical devices, sensors, electric motors, operational amplifiers, and logic gates. (Open only to students in Engineering)	P – Previously taken or GA'd the course	15
GENG 8010 Engineering Mathematics Dr. Mehrdad Saif	This course introduces the fundamentals of electrical and computer engineering, including introductory selected topics on circuit elements and analysis, semiconductor devices, optical devices, sensors, electric motors, operational amplifiers, and logic gates. (Open only to students in Engineering)	P – Previously taken or GA'd the course	6
GENG 8030 Computational Methods and Modeling for Engineering Applications TBA	This course covers the basics of computational analysis for real-world engineering applications. Students will learn the fundamentals of programming and modeling with MATLAB. Topics include: Computational Methods, Model Building, for Engineering Projects, Hardware for Real-time Testing, Data Acquisition from Sensors. Students will complete a real-world project in the areas of their interests.	P – Previously taken or GA'd the course	5
ELEC 2170 Digital Logic Design TBA	Boolean algebra and logic gates; simplification of Boolean functions; arithmetic operations; analysis and design of combinatorial logic circuits with SSI, MSI, and LSI; sequential logic components; registers; counters and memory units; analysis and synthesis of sequential synchronous and asynchronous networks. (Co-requisites: MATH-2780 and MATH-2790) (3	P – Previously taken or GA'd the course	6

	lecture, 2 Laboratory/tutorial hours or equivalent a week.)		
ELEC 2200 Circuit Analysis II Dr. Chunhong Chen	Sinusoidal steady-state analysis; complex power in single and three-phase systems; magnetically coupled circuits; circuit analysis in the s-domain; frequency response; two-port networks; and computer-aided analysis and design. (3 lecture, 3.0 laboratory/tutorial hours a week.) (Prerequisite: ELEC-2140.)	P – Previously taken or GA'd the course	5
ELEC 2260 Electronics I Dr. Mitra Mirhassani	Classification of signals; introduction to diodes; rectifier circuits, Zener diode, limiting and clamping circuits; Op amp amplifier configurations, Op amp distortion, non ideal op amp performance; active filters, Tow-Thomas Biquad; Introduction to data converters; oscillators; super-diodes; pulse generation. (Prerequisites: MATH-2780 and MATH-2790) (3 lecture, 1.5 laboratory hours and 1.5 tutorial hours a week.)	Circuit Assembly and Testing: Ability to build and test circuits using breadboards, diodes, opamps, resistors, capacitors, and other components. Proficiency with Lab Equipment: Competence in using multimeters, oscilloscopes, signal generators, and power supplies to measure voltage, current, and other parameters. Understanding of Circuit Theory: Solid grasp of basic electronics theory, including the behaviour of circuit elements in different configurations (e.g., rectifiers, clippers, clamping circuits) and operational amplifiers (e.g., inverting, non-inverting amplifiers). Troubleshooting Skills: Ability to diagnose and resolve issues in lab experiments, such as incorrect wiring, faulty components, or unexpected measurement results. Knowledge of Simulation Tools: Familiarity with circuit simulation software (e.g., LTSpice, Multisim) to assist students in verifying theoretical designs and predicting circuit behaviour. Safety Awareness: Knowledge of lab safety protocols, especially concerning the handling of electrical equipment and power supplies and preventing short circuits. Effective Communication: Explaining concepts clearly to students and providing guidance during lab sessions. Patience and Attention to Detail: Precision in setting up experiments and guiding students through detailed steps, ensuring that they understand theory and practical applications. P – Previously taken or GA'd the course	5
ELEC 2280 Electromagnetic Fields	Static electric fields; Coulomb's law, Gauss's law and its applications; electric potential; dielectrics; boundary	P – Previously taken or GA'd the course	5

Dr. Rashid Rashidzadeh	conditions; capacitance; resistance; steady electric currents, current density, boundary condition for current density, equation of continuity and Kirchhoff's law; power dissipation; static magnetic fields; Biot-Savart's law, Ampere's law; vector magnetic potential; magnetic dipole; magnetic circuits; boundary conditions for magnetic fields; magnetic forces and torque; induction current. (Prerequisites: MATH-2780 and MATH-2790) (3 lecture, 2 laboratory/tutorial hours or equivalent a week.)		
ELEC 2320 Engineering Software Fundamentals TBA	Fundamental engineering problems and the application of digital computers to analyze these problems. Introduction to additional programming languages and computing concepts and emphasizing the use of MATLAB in engineering computations (2 lecture, 2 tutorial hours a week.)	P – Previously taken or GA'd the course	6
ELEC 4000A Capstone Design Project Dr. Roberto Muscedere	Team based design project satisfying the "CAPSTONE DESIGN PROJECT REQUIREMENTS", available from the Department of Electrical and Computer Engineering. Gives the student significant design experience and builds on the knowledge and skills acquired in earlier course work. Provides an exposure to teamwork so as to emulate a typical professional design environment. Computers are to be used both in the execution of the design methodology and the management of the design project. (Prerequisites: completion of all Electrical Engineering courses from 1st year, 2nd year and 3rd year.) (6 laboratory hours per week; that must be completed over two consecutive winter and summer terms.) 2 semester course. Topics on ethics for engineers will be covered in the winter term, and topics on laws for engineers will be covered in the summer term during lectures. (This is an experiential learning course.)	P – Previously taken or GA'd the course	2
ELEC 4190/ELEC 8900-9 Digital Communications Dr. Ahmed Hamdi Sakr (Cross listed with ELEC 8900-9)	Digital communication systems; discrete Fourier transform; sampling theory; A/D converters; digital modulation; time-division multiplexing; packet transmission; random processes and spectral analysis for digital systems; error probabilities; noise; introduction to information theory. (Prerequisites: completion of all Electrical Engineering courses from 1st year, 2nd year and 3rd year.) (3 lecture, 2 laboratory/tutorial hours or equivalent a week.)	E - Knowledge of digital communications fundamentals E - Strong grasp of probability theory E - MATLAB/Simulink proficiency P – Previously taken or GA'd the course	4
ELEC 4310 Control systems II Dr. Xiang Chen	Stability and performance analysis in frequency domain; lead-lag control design in frequency domain; elementary observer and control design in state space; z- transformation and z-plane analysis; direct and indirect discrete-time control design; implementation of digital control. (Prerequisites: completion of all Electrical Engineering courses from 1st year, 2nd year and 3rd year.) (3 lecture, 1.5 laboratory hours and 1.5 tutorial hours a week.)	P – Previously taken or GA'd the course	0.5

ELEC 4350/ELEC 8900-43 Microelectromechanical Systems Dr. Sazzadur Chowdhury (Cross Listed with ELEC 8900-43)	MicroElectroMechanical System (MEMS) technology overview and design process; microfabrication and process integration; lumped element modeling; 3-D finite element modeling; energy conserving transducers (electrostatics); linear and nonlinear system dynamics; elasticity, stress, strain, material properties; structure analysis, beams, plates; MEMS sensing and actuation; material case studies; MEMS design methodology; device modeling. (Prerequisites: completion of all Electrical Engineering courses from 1st year, 2nd year and 3rd year.) (3 lecture, 2 laboratory/tutorial hours or equivalent a week.)	E - Requires skills on 3D finite element analysis P – Previously taken or GA'd the course	1
ELEC 4360 Computer Communications Dr. Huapeng Wu	Protocols and architecture; data transmission; data encoding; interfacing; data link control; multiplexing, ISO reference model; wide-area networks; circuit switching; packet switching; ATM and frame relay; LAN technology and systems; internet protocols; inter-network operation; transport protocols; network security. (Prerequisites: completion of all Electrical Engineering courses from 1st year, 2nd year and 3rd year.) (3 lecture, 2 laboratory/tutorial hours or equivalent a week.)	P – Previously taken or GA'd the course	2
ELEC 4370 Intelligent Computing Dr. Hon Kwan	Computing models of the human mind. Neural computing models and learning algorithms. Fuzzy set theory and fuzzy systems. Evolutionary computing. Applications of intelligent computing. (Prerequisites: completion of all Electrical Engineering courses from 1st year, 2nd year and 3rd year in an Engineering program or fourth year standing in a Computer Science program.) (3 lecture, 2 laboratory/tutorial hours or equivalent a week.)	P – Previously taken or GA'd the course	1
ELEC 4430 Embedded System Design TBA	Embedded hardware and software systems; introduction to embedded systems; custom single-purpose processors, hardware design; general-purpose processors, software, design flow environment and tools, testing and debugging; standard single-purpose processors, peripherals, memory system design; interfacing issues, serial and parallel communication, bus standards, protocols and arbitration; exercises on real world applications; Laboratory implementation on modern Field Programmable Gate Arrays (FPGAs) and microcontrollers using associated Electronic Design Automation (EDA) tools. (Prerequisites: completion of all Electrical Engineering courses from 1st year, 2nd year and 3rd year.) (3 lecture, 3 laboratory hours a week.)	P – Previously taken or GA'd the course	2
ELEC 4450 Power Electronics Dr. Caniggia Viana	Power diodes; thyristors; power Metal-Oxide-Semiconductor Field-Effect Transistors (MOSFET); Insulated-Gate Bipolar Transistors (IGBT); controlled rectifiers; DC-DC converters; inverters; AC-AC converters; gate drive circuits; motor drives; r computer simulation of power electronics and motor drives.	P – Previously taken or GA'd the course	0.5

	(Prerequisites: completion of all Electrical Engineering courses from 1st year, 2nd year and 3rd year.) (3 lecture, 2 laboratory/tutorial hours or equivalent a week.)		
ELEC 4490 Sensor and Vision Systems Dr. Jonathan Wu	Basics of sensors and transducers; sensor characteristics and applications; fundamentals of pressure, temperature, displacement and position sensors; accelerometer physics, strain gauges, and torque sensors; machine vision; image processing, image enhancement, edge and corner detectors; image segmentation techniques; image feature extraction and matching; colour models and processing; object recognition and classification; discussion on camera parameters and calibration; stereo vision, 3D range imaging techniques. (Prerequisites: completion of all Electrical Engineering courses from 1st year, 2nd year and 3rd year.) (3 lecture, 2 laboratory/tutorial hours a week.)	P – Previously taken or GA'd the course	3
ELEC 4500/ELEC 8900-52 Power Systems I TBA (Cross listed with ELEC 8900-52)	Principles of operation, modeling and analysis of electric power systems; complex power, phasors and per-unit system; three-phase circuits; power transformer and generator modeling; transmission line parameters; steady-state operation of transmission lines; network matrices and power flow analysis; introduction to alternative energy sources. (Prerequisites: completion of all Electrical Engineering courses from 1st year, 2nd year and 3rd year) (3 lecture, 2 laboratory/tutorial hours or equivalent a week.)	P – Previously taken or GA'd the course	7
ELEC 4570 Fundamentals of Digital Signal Processing Dr. Esam Abdel-Raheem	Discrete time signals and systems models and analysis; Z-transform; discrete Fourier transform (DFT); FFT algorithms; FIR filter design; IIR filter design; stability; realization; hardware and software implementations; digital signal processing applications. (Prerequisites: completion of all Electrical Engineering courses from 1st year, 2nd year and 3rd year.) (3 lecture, 2 laboratory/tutorial hours or equivalent a week.)	P – Previously taken or GA'd the course	4
ELEC 8240 Stochastic Processes Dr. Behnam Shahrrava	Development and applications of probability models in the analysis of stochastic systems; review of probability, random variables and stochastic processes; correlation functions applications to filtering, prediction, estimation and system identification. Prerequisite: Graduate Student Status. (3 lecture hours a week.)	P – Previously taken or GA'd the course	0.5
ELEC 8280 Image Processing Dr. Jonathan Wu	This course presents digital and hybrid representation of images, fundamentals of colour, 2-D systems, 2-D filter design and 2-D filtering of digital images, image enhancement techniques: homomorphic filtering, histogram equalization and modification techniques, median and statistical filtering, 2-D FFT algorithms, properties of digital images. Projects are given as a means of learning practical applications of the field. Prerequisite: Graduate Student Status. (3 lecture hours per week.)	P – Previously taken or GA'd the course	2

ELEC 8330 Computational Intelligence Dr. Hon Kwan	Models of the human brain and sensory systems. Neural networks and learning algorithms. Fuzzy sets, fuzzy logic, and fuzzy systems. Evolutionary computation. Advanced topics in computational intelligence. Prerequisite: Graduate Student Status. (3 lecture hours a week.)	P – Previously taken or GA'd the course	3
ELEC 8510 Advanced Digital Signal Processing Dr. Majid Ahmadi	Review of discrete-time systems and digital filters. Multirate systems including decimatots, interpolators, polyphase decomposition, Nyquist filters, two-channel, and M-channel filter banks. Adaptive equalization including equalization techniques for digital receivers, linear and non-linear equalizers, adaptive algorithms, and blind equalization. Analysis of finite wordlength effects including coefficient quantization, arithmetic round-off errors, dynamic range scaling, and low-sensitivity digital filter structures. (3 lecture hours per week.). Prerequisite: Graduate Student Status.	P – Previously taken or GA'd the course	0.5
ELEC 8660 Data Security and Cryptography Dr. Huapeng Wu	This is an introductory course on the techniques, algorithms, architectures and tools of data security and cryptography. Firstly, the theoretical aspects of data security and cryptographic algorithms and protocols are reviewed. Then we show how these techniques can be integrated to provide solutions to particular data and communication security problems. This course contents are of use to computer and communication engineers who are interested in embedding security services into an information system, and thus, providing integrity, confidentiality and authenticity of the data and the communicating parties. Main contents: classical cryptography techniques; mathematical foundations; secret key cryptography; public key cryptography; authentication and digital signature; network cryptographic protocols. Prerequisite: Graduate Student Status. (3 lecture hours a week.) (Credit cannot be obtained for both 88-565 and if taken as a Special Topics course.)	P – Previously taken or GA'd the course	4
ELEC 8900-2 Special Topics: Estimation, Filtering & Tracking Dr. Bala Balasingam	This is a graduate level course designed to provide students with in-depth knowledge in Estimation, Filtering and Target Tracking. Engineering applications of this course include autonomous vehicle navigation, localization and navigation in robotics, air traffic control, and biomedical signal processing. The focus will be equally on (i) enriching the mathematical background in estimation theory and (ii) developing appreciation for the above practical applications.	P – Previously taken or GA'd the course	1
ELEC 8900-30 Special Topics: Advanced Energy Storage Systems Dr. Bala Balasingam	This is a graduate level course designed to provide in-depth knowledge in energy storage systems, particularly, batteries. This course will introduce important battery management problems, such as, battery fuel gauging, optimal charging, and cell balancing, and introduce engineering approaches to solve them. This course offers hands on experience in battery management through	P – Previously taken or GA'd the course	4

	programming examples supported by realistic data. (3 lecture hours a week.)		
ELEC 8900-58 Special Topics: EV Power Conversion Dr. Caniggia Viana	This course will cover the main power processing converters in a modern EV, including traction inverter, onboard charger, auxiliary power module, and DC-DC converter. It will also touch on EV charging infrastructure and DC fast chargers	P – Previously taken or GA'd the course	1

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

Expected GA Duties

TA 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, and even online classes may require on-campus face-to-face duties.

Assistants cannot commence their GA/TA duties until email confirmation of the approval of their contract is received from Human Resources (email titled "Authorization to Commence GA/TA Duties").

Eligibility requirements:

Successful applicants must be available to attend at the specified time of the course/lab/exams and to report for all assigned duties, which may include both in-person/on-campus and remote/online duties.

GA appointments will be offered to qualified applicants in accordance with the criteria specified in Article 12:03 of the CUPE4580 Collective Agreement.

To be eligible for a Graduate Assistantship you must be a **registered fulltime graduate student**:

- must be registered for the term of work at the time of hiring
- must maintain **fulltime** registration throughout the term and must be in good standing in the degree program

GA appointments cannot exceed **140 hours total for the Winter term period (January 6th to April 30th, 2025).** Refer to Articles 12, 13, and 14 of the CUPE 4580 Collective Agreement for eligibility details.

Required Essential Qualifications:

Successful applicants must meet all essential qualifications identified in the course table above.

Application forms are available from the following webpage: Employment | Electrical and Computer Engineering (ECE) (uwindsor.ca)
Complete applications form along with a copy of your unofficial transcript must be submitted via email to Danielle Gauthier, Graduate Secretary at gradece@uwindsor.ca
For any questions please contact: Danielle Gauthier

Deadline for receiving applications: Wednesday, November 13th, 2024

Note that Graduate Assistants must apply each term by the application deadline, in accordance with Article 13:

"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.

Date posted: October 30th, 2024