

Western University  
Faculty of Engineering  
*Department of Electrical and Computer Engineering*

**ECE 9013A – Programming for Engineers**

COURSE OUTLINE 2023-2024

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**DESCRIPTION**

Programming for Engineering ECE 9013A is intended for MEng students with little programming experience. It aims to provide students with an understanding of the role computation can play in solving problems and to help students, regardless of their major, feel justifiably confident of their ability to write small programs that allow them to accomplish useful goals. The class uses the Python programming language along with code version control.

**ENROLLMENT RESTRICTIONS**

Enrollment in this course is restricted to graduate students in the Department of Electrical and Computer Engineering, as well as any student that has obtained special permission to enroll in this course from the course instructor as well as the Graduate Chair (or equivalent) from the student's home program.

**COURSE FORMAT**

In-Person

**TOPICS**

<b>Topic #</b>	<b>Description</b>	<b>Learning Activities</b>	<b>Tentative timeline</b>
1	Course Introduction	<ul style="list-style-type: none"><li>• Lectures</li><li>• Additional reading Material</li></ul>	Week 1
2	Python Fundamentals: Variables and Mathematical Operations	<ul style="list-style-type: none"><li>• Lectures</li><li>• Assignment</li><li>• Example Code</li></ul>	Week 2
3	Python Fundamentals: Strings, Lists, Control Flow, Loops	<ul style="list-style-type: none"><li>• Lectures</li><li>• Assignment</li><li>• Example Code</li><li>• Quiz</li></ul>	Week 3
4	Python Fundamentals: Functions	<ul style="list-style-type: none"><li>• Lectures</li></ul>	Week 4

		<ul style="list-style-type: none"> <li>• Assignment</li> <li>• Example Code</li> </ul>	
5	Python Fundamentals: Advanced Functions	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Assignment</li> <li>• Example Code</li> <li>• Quiz</li> </ul>	Week 5
6	Python Fundamentals: Object-Oriented Programming	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Assignment</li> <li>• Example Code</li> </ul>	Week 6
7	Python Fundamentals: Advanced Topics of Object-Oriented Programming	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Assignment</li> <li>• Example Code</li> <li>• Quiz</li> </ul>	Week 7
8	Python Use Cases: Data Visualization	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Assignment</li> <li>• Example Code</li> </ul>	Week 8
9	Python Use Cases: Time Series and Statistics	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Assignment</li> <li>• Example Code</li> <li>• Quiz</li> </ul>	Week 9
10	Advanced Topics in Python	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Assignment</li> <li>• Example Code</li> </ul>	Week 10
11-12	Course Wrap-Up	<ul style="list-style-type: none"> <li>• Project</li> <li>• Exam Review</li> </ul>	Week 11-12

### SPECIFIC LEARNING OUTCOMES

Degree Level Expectation	Weight	Assessment Tools	Outcomes
<b>Depth and breadth of knowledge</b>	35%	<ul style="list-style-type: none"> <li>• Assignments</li> <li>• Project</li> <li>• Quizzes</li> <li>• Examinations</li> </ul>	<ul style="list-style-type: none"> <li>• Understanding of fundamental programming theory</li> <li>• Development of computer programming skillset</li> <li>• Understanding of structural and stylistic components of coding</li> <li>• Understanding of the best practices of Pythonic coding</li> </ul>
<b>Research &amp; scholarship</b>	10%	<ul style="list-style-type: none"> <li>• Project</li> </ul>	<ul style="list-style-type: none"> <li>• Ability to conduct critical evaluation of current advancements in the field of specialization</li> <li>• Ability to conduct coherent and thorough analyses of complex problems using established techniques/principles and judgment</li> </ul>
<b>Application of knowledge</b>	35%	<ul style="list-style-type: none"> <li>• Assignments</li> <li>• Project</li> <li>• Quizzes</li> </ul>	<ul style="list-style-type: none"> <li>• Ability to apply knowledge in a rational way to analyze and solve a particular problem</li> <li>• Ability to use proper code architecture to build a solution to a problem</li> </ul>

		<ul style="list-style-type: none"> <li>Examinations</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate appropriate logic and control sequence in programming solutions</li> </ul>
<b>Professional capacity / autonomy</b>	5%	<ul style="list-style-type: none"> <li>Project</li> </ul>	<ul style="list-style-type: none"> <li>Awareness of academic integrity</li> <li>Ability to implement established procedures and practices in the coursework</li> <li>Defends own ideas and conclusions</li> <li>Integrate reflection into their learning process</li> </ul>
<b>Communication skills</b>	10%	<ul style="list-style-type: none"> <li>Project</li> </ul>	<ul style="list-style-type: none"> <li>Ability to communicate (oral and/or written) ideas, issues, results and conclusions clearly and effectively</li> </ul>
<b>Awareness of limits of knowledge</b>	5%	<ul style="list-style-type: none"> <li>Project</li> </ul>	<ul style="list-style-type: none"> <li>Ability to acknowledge analytical limitation due to complexity of practical problems</li> <li>Ability to acknowledge limitations caused by the programming language in use</li> <li>Ability to compare and contrast programs based on their time and computational efficiency</li> </ul>

## ASSESSMENTS

Assessment Type	Material Covered	Tentative Due Date	Weight
Homework Assignments (8-10)	Topics 1-10	Weekly	30%
Quizzes (5)	Topics 1-10	Bi-Weekly	10%
Participation in class activities			10%
Project report (1)	Project topic to be decided later		10%
Project presentation (1)			10%
Final Examination (1)	Topics 1-10		30%

### Activities in which collaboration is permitted:

- In-class participation activities
- Project (3-4 Students per group)

### Activities in which students must work alone (collaboration is not permitted):

- Assignments
- Quizzes
- Examinations

## REQUIRED TEXTBOOK

None

## OPTIONAL COURSE READINGS

Course notes and additional resources/materials provided.

## **CHEATING, PLAGIARISM/ACADEMIC OFFENCES**

Academic integrity is an essential component of learning activities. Students must have a clear understanding of the course activities in which they are expected to work alone (and what working alone implies) and the activities in which they can collaborate or seek help; see information above and ask instructor for clarification if needed. Any unauthorized forms of help-seeking or collaboration will be considered an academic offense. University policy states that cheating is an academic offence. If you are caught cheating, there will be no second warning. Students must write their essays and assignments in their own words. Whenever students take an idea or a passage of text from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence. Academic offences are taken seriously and attended by academic penalties which may include expulsion from the program. Students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence at the following website: [https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/scholastic\\_discipline\\_grad.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_grad.pdf)

All required papers may be subject to submission for textual similarity review to the commercial plagiarism-detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).

## **CONDUCT**

Students are expected to follow proper etiquette to maintain an appropriate and respectful academic environment. Any student who, in the opinion of the instructor, is not appropriately participating in course activities and/or is not following the rules and responsibilities associated with the course activities, will be reported to the Associate Dean (Graduate) (after due warning has been given). On the recommendation of the Department concerned, and with the permission of the Associate Dean (Graduate), the student could be debarred from completing the assessment activities in the course as appropriate.

## **HEALTH/WELLNESS SERVICES**

As part of a successful graduate student experience at Western, we encourage students to make their health and wellness a priority. Western provides several health and wellness related services to help you achieve optimum health and engage in healthy living while pursuing your graduate degree. Information regarding health- and wellness-related services available to students may be found at <http://www.health.uwo.ca/>.

Students seeking help regarding mental health concerns are advised to speak to someone they feel comfortable confiding in, such as their faculty supervisor, their program director (graduate chair), or other relevant administrators in their unit. Faculty of Engineering has a Student Wellness Counsellor. To schedule an appointment with the counsellor, contact Kristen Edwards ([khunt29@uwo.ca](mailto:khunt29@uwo.ca)) via confidential email and you will be contacted by our intake office within 48 hours to schedule an appointment.

Students who are in emotional/mental distress should refer to Mental Health@Western: <http://www.uwo.ca/uwocom/mentalhealth/> for a complete list of options about how to obtain help.

## **SICKNESS**

Students should immediately consult with the Instructor (for a particular course) or Associate Chair (Graduate) (for a range of courses) if they have problems that could affect their performance. The student should seek advice from the Instructor or Associate Chair (Graduate) regarding how best to deal with the problem. Failure to notify the Instructor or the Associate Chair (Graduate) immediately (or as soon as possible thereafter) will have a negative effect on any appeal. Obtaining appropriate documentation (e.g., a note from the doctor) is valuable when asking for accommodation due to illness.

Students who are not able to meet certain academic responsibilities due to medical, compassionate or other legitimate reason(s), could request for academic consideration. The Graduate Academic Accommodation Policy and Procedure details are available at:

<https://www.eng.uwo.ca/graduate/current-students/academic-support-and-accommodations/index.html>

## **ACCESSIBLE EDUCATION WESTERN (AEW)**

Western is committed to achieving barrier-free accessibility for all its members, including graduate students. As part of this commitment, Western provides a variety of services devoted to promoting, advocating, and accommodating persons with disabilities in their respective graduate program.

Graduate students with disabilities (for example, chronic illnesses, mental health conditions, mobility impairments) are strongly encouraged to register with Accessible Education Western (AEW): [http://academicsupport.uwo.ca/accessible\\_education/index.html](http://academicsupport.uwo.ca/accessible_education/index.html)

AEW is a confidential service designed to support graduate and undergraduate students through their academic program. With the appropriate documentation, the student will work with both AEW and their graduate programs (normally their Graduate Chair and/or Course instructor) to ensure that appropriate academic accommodations to program requirements are arranged. These accommodations include individual counselling, alternative formatted literature, accessible campus transportation, learning strategy instruction, writing exams and assistive technology instruction.