

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING***ES1036A/B - Programming Fundamentals for Engineers*****Course Outline Fall 2026/Winter 2027**

COURSE DESCRIPTION: This course is intended to establish a foundation for Computer Programming with specific emphasis on Engineering problems and applications. The course will cover the introductory aspects of Object-Oriented Analysis, Design, and Implementation (using Java) techniques, along with Testing according to the specified requirements of the program. Computer Programming will be treated as part of the Engineering Process, and as such will be contextualized through the course according to the Engineering Profession.

ACADEMIC CALENDAR:

https://www.westerncalendar.uwo.ca/Courses.cfm?CourseAcadCalendarID=MAIN_019426_1&SelectedCalendar=Live&ArchiveID=

Designing, implementing and testing computer programs using Java to fulfill given specifications for small problems using sound engineering principles and processes. Awareness of the engineering aspects of the process of constructing a computer program.

PRE OR COREQUISITES: Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you will be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

ANTIREQUISITES: Computer Science 1025A/B, Computer Science 1026A/B.

CEAB ACADEMIC UNITS: Engineering Science 100%.

CONTACT HOURS:

Timetable information is available at <https://draftmyschedule.uwo.ca/>.

LECTURE:	
LAB:	

RECOMMENDED/REQUIRED TEXT: NONE

RECOMMENDED/ REQUIRED SOFTWARE: IntelliJ IDEA Ultimate (Free for Western Students)

RECOMMENDED RESOURCES/REFERENCES:

- **Course notes and supplemental materials are available on course website (OWL)**
- **(Not required)** Tony Gaddis, Starting Out with Java: Early Objects, any Edition, Pearson.
- **(Not required)** Y. Daniel Liang, Introduction to Java Programming, any Edition, Pearson.
- **(Not required)** Walter Savitch, Absolute Java, 6th Edition, Pearson.

GENERAL LEARNING OBJECTIVES (CEAB GRADUATE ATTRIBUTES)

Knowledge Base	I	Use of Engineering Tools	I	Impact on Society and the Environment	I
Problem Analysis		Individual and Team Work		Ethics and Equity	
Investigation		Communication Skills		Economics and Project Management	
Design		Professionalism	I	Life-Long Learning	

Notation: x represents the content level code as defined by the CEAB. blank = not applicable; **I = introduced** (introductory); D = developed (intermediate) and A = applied (advanced).

Rating: **I – The instructor will introduce the topic at the level required. It is not necessary for the student to have seen the material before.** D – There may be a reminder or review, but the student is expected to have seen and been tested on the material before taking the course. A – It is expected that the student can apply the knowledge without prompting (e. g. no review).

COURSE MATERIALS: Weekly content and guides for the laboratories will be available on the course OWL site. The material for this course will be taught in both lectures and labs; therefore, it is imperative that you attend each lecture and lab.

COURSE TOPICS AND SPECIFIC LEARNING OUTCOMES:

The following table summarizes the course learning outcomes along with CEAB GAIs where the GAIs in bold indicate ones to be measured and reported annually.

COURSE TOPICS AND SPECIFIC LEARNING OUTCOMES	(CAEB) Graduate Attribute
1. Introduction to Computers and Java: Introduces the field of software engineering, and covers the fundamentals of hardware, software, programming languages, and the software development process. Discussed through the examination of a simple program the elements of a program, such as key words, variables, operators, and punctuation. Present an overview of entering source code, compiling it, and executing it. Give a brief history of Java as well. At the end of this section, students will be able to: - identify different components of a computer system, - identify different steps in software development process, - compile and run a Java program with or without using IDE, - understand the evolution of Java language and its important aspects of modern life.	IESE1

2. Java Fundamentals: Introduces data types, identifiers, variable declarations, constants, comments, program output, and arithmetic operations. This introduction also includes the conventions of programming style. At the end of this section, students will be able to: a. understand different types of variable/constant declarations, different JAVA operators and standard input/output statements b. solve simple problems by writing the program (code) in JAVA language. c. understand the major coding guidelines that lead to sustainable and readable code development, such as naming convention, curly braces, indentation, and comments.	KB 4 KB 4 IESE2
3. Classes and Objects: Introduces the student to classes. Once the student learns about fields and methods, UML diagrams are introduced as a design tool. Arguments and parameters are also discussed. Finally, the concept of the default constructor is discussed. At the end of this section, students will be able to: a. write simple methods, constructors and understand the concept of the default constructors, b. understand the concept of the Object-Oriented design, c. write classes and create objects, d. understand the static methods and fields, interaction between objects, passing objects as arguments, and returning objects from methods. e. understand the concept of Java standard libraries and the needs for developing custom libraries.	ET 2 KB 4 ET 2 KB 4 P1
4. Decision and Repetition Structures: Explores relational operators and relational expressions and shows how to control the flow of a program with the conditional and switch statements. Covers Java's repetition control structures. Counters, accumulators, running totals, sentinels, and other application-related topics are discussed. In addition, discusses the objects comparison. At the end of this section, students will be able to: a. write if, if/else, if/else if and switch statements, b. understand the concept of objects comparison with the equals, compareTo, equalsIgnoreCase, and compareToIgnoreCase methods. c. write while loop, do-while loop, and for loop. d. find the common uses for the repetition control techniques,	ET 1 KB 4 ET1 ET1
5. Arrays: Shows students how to create and work with single and multidimensional arrays. Demonstrate the most common array-processing techniques. At the end of this section, students will be able to: a. create single and multidimensional arrays, and pass an array to a method, b. calculate the sum of the elements in an array, finding the highest and lowest values, and sequentially search an array.	KB 4 KB 4

6. Inheritance and polymorphism: Covers superclass and subclass constructors, method overriding, polymorphism and dynamic binding, protected and package access, class hierarchies, abstract classes and methods, and interfaces. At the end of this section, students will be able to: - understand the concept of generalization and specialization relationships, - create a new class to be based on an existing class, call the superclass constructor, and override superclass methods, - define abstract classes, abstract methods, and interfaces, - understand the concepts of polymorphism.	KB 4 KB 4 KB 4 KB 4
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EVALUATION:

Name	% Worth	Assigned	Due Date	Weeks	CEAB GAs ASSESSED
Quizzes (Total = 4)	15%	During lab time	End of lab time		IESE1, IESE2
Labs (Total = 5)	20%	During lab time	End of lab time		ET1, ET2, P1
Mid-Term Examination	25%	Saturday October 24 th (Tentative)			KB4
Final Examination	40%	During the regular examination period			KB4
BONUS	5%	Selected Five weeks starting after week 2		TBD.	KB4

Note that the dates listed above are **tentative** and may be adjusted if needed. Marks will be assigned on the basis of method of analysis and presentation, correctness of solution, clarity and neatness.

COURSE POLICIES:

All work submitted must be of professional quality in the requested format. Material that is handed in dirty, illegible, disorganized, or in an unapproved format will be returned to the student for resubmission and the late submission penalty will take effect. An additional penalty of 10% may be deducted for poor grammar, incoherence, or lack of flow in the written reports.

To obtain a passing grade in the course, a mark of 50% or more must be achieved on any component worth more than 10%. Note that the examination component is the weighted combined midterm and final grade. **A mark < 50% in any of these components (labs, quiz, examination) will result in a final course grade of 48% or less.**

IN-PERSON PROGRAMMING QUIZZES (Closed Book): To help the students follow with the material there will be **4 quizzes** to be completed in-person during laboratory times and supervised by the TAs. Students will be given a question written on a piece of paper asking them to write small-size Java program(s) **within 20-30 minutes**. Students are required to write their programs (Java code) on the same paper without access to the computer or the Internet and then hand in their solutions to the TA immediately. The quiz schedule will be posted on the course website (OWL).

LABORATORY ACTIVITIES: There will be in person lab activities on weeks alternating quizzes in accordance with the posted schedule. Students will implement the covered course material to solve and submit five programming assignments online. Each lab preparation assignment will be posted on OWL the week prior to the lab, students should read it and use the practice exercises to prepare. During the week where labs take place, students will go to their assigned lab session where they will be given the lab tasks. The tasks should be completed individually during the lab sessions. The TAs will be available in person in the computer labs during the lab hours to assist students with technical issues related to the lab requirements. The labs are to be completed individually, with no help from your peers. The lab sessions, during assessments, are not to be used to explain concepts, make sure to seek clarifications if needed prior to the lab session. The lab assignments should be submitted by the end of the lab session. **Use of Generative AI is prohibited during the lab session.**

MIDTERM EXAM: A closed book on-campus written exam (mostly written programming questions). The time and the place will be announced in OWL.

FINAL EXAMINATION: The final exam will take place during the regular examination period. The final exam will be three hours long, closed book.

CLASS ATTENDANCE/PARTICIPATION: Attendance is mandatory for all lectures and bonus marks may be granted based on attendance and completion of other quizzes. **Any student who, in the opinion of the instructor, is absent too frequently from class or laboratory periods in any course will be reported to the Dean** of the Faculty offering the course (after due warning has been given). On the recommendation of the Department concerned, and with the permission of the Dean of that Faculty, **the student will be debarred from taking the regular examination in the course.** The Dean of the Faculty offering the course will communicate that decision to the Dean of the Faculty of registration.

LATE SUBMISSION POLICY:

Lab assignments: This course has 5 lab assignments, the best 3 out of the first 4 labs plus the last lab will be counted towards your final grade, **because flexible weighting is used in this course, unapproved or self-reported absences will not be granted consideration for missed assignments.** For each lab, students are expected to submit the lab by the end of the relevant week's lab period. If a lab is not received by the end of the session, a grade of zero will be awarded. If students miss more than 1 lab, they will receive a grade of zero unless formal accommodation is granted, in which case students will be offered to write a make-up lab during the week past the deadline without academic penalty. **The final lab is mandatory,** should illness or extenuating circumstances arise a makeup will be offered. **It is the student's responsibility to reach out to the instructor within the next day to arrange for a makeup for any missed lab assignment.**

In-person programming quizzes. For each quiz, students are expected to submit the quiz by the deadline listed, i.e., at the end of the relevant week's lab period. Should illness or extenuating circumstances arise and a quiz is missed, a request for accommodations must be submitted in accordance with the faculty policy. If accommodation is granted students will be offered to write a make-up quiz during the week following the deadline without academic penalty. If you have a long-term academic consideration or an accommodation for disability, up to 30 additional minutes may be granted in the lab (based on your accommodations), however if you require greater flexibility than provided here, **please reach out to your instructor** at least two weeks prior to the posted deadline. **It is the student's responsibility to reach out to the instructor within the next day to arrange for a makeup for any missed quiz.**

Midterm exam: Missing the midterm exam of this course requires formal accommodation, an academic consideration request form supported by formal documentation(s) through [STUDENT ABSENCE PORTAL](#). If granted, the midterm weight will contribute to the final exam mark.

FACULTY OF ENGINEERING POLICIES:

Students must familiarize themselves with the policies of the Faculty of Engineering

<https://www.eng.uwo.ca/electrical//pdf/2025-UG-Policy-and-Procedures.pdf>

Faculty of Engineering Policies and Procedures-Undergraduate

Absence/Late Accommodation Policy

Students must familiarize themselves with the University Policy on Academic

Consideration – Undergraduate Students in First Entry Programs posted on the Academic Calendar:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration_Sep24.pdf

This policy does not apply to requests for Academic Consideration submitted for attempted or completed work, whether online or in person. The policy also does not apply to students experiencing longer-term impacts on their academic responsibilities. These students should consult [Accessible Education](#).

Students missing a test/assignment/lab or examination will report the absence by submitting Academic Consideration Request form through [STUDENT ABSENCE PORTAL](#).

- All requests for Academic Consideration must be made within 48 hours after the assessment date or submission deadline. Academic consideration may include extension of deadlines, waiver of attendance requirements for classes/labs/tutorials, or re-weighting of course requirements.
- An instructor may deny academic consideration for any assessment that is not required in the calculation of the final grade (e.g., "8 of 10 quizzes"). Assessment flexibility must be indicated on the course outline.
- An instructor may deny academic consideration relating to the timeframe submission of work where there is already flexibility in the submission timeframe (e.g., 72-hour submission window). This assessment flexibility must be indicated on the course outline.
- All Academic Consideration requests must include supporting documentation; however, recognizing that formal documentation may not be available in some extenuating circumstances, the policy allows students to make one Academic Consideration request without supporting documentation per course. Some assessments are excluded from this policy. Please refer to the course outline to determine if documentation is required.
- Requests without supporting documentation are limited to one per term per course.
- Please note that examinations scheduled during official examination periods always require official supporting documentation.
- If a student mistakenly submits their one allowed Academic Consideration request without supporting documentation for the assessments listed above that do not require academic consideration, the request cannot be recalled and reapplied. This privilege is forfeited.

An undocumented absence is only valid for a 24-hour period, from midnight on the day specified to

midnight of the following day. An appropriate use of an undocumented absence would be for an in-class assessment that takes place that day. Where the time given to complete the assessment is longer than 24 hours, an undocumented absence will not cover a student for the full time given to complete the assessment, and flexibility considerations in submitting the assessment will override the undocumented absence.

NOTE: Forged notes and certificates will be dealt with severely. To submit a forged document is a scholastic offence (see below).

It is the student's responsibility to check the date, time and location of the [Special Examination](#).

Religious Accommodation

When scheduling unavoidably conflicts with religious holidays, which (a) require an absence from the University or

(b) prohibit or require certain activities (i.e., activities that would make it impossible for the student to satisfy the academic requirements scheduled on the day(s) involved), no student will be penalized for absence because of religious reasons, and alternative means will be sought for satisfying the academic requirements involved. If a suitable arrangement cannot be worked out between the student and instructor involved, they should consult the appropriate Department Chair and, if necessary, the student's Dean.

It is the responsibility of such students to inform themselves concerning the work done in classes from which they are absent and to take appropriate action.

Academic Integrity

In the Faculty of Engineering, we encourage students to create a culture of honesty, trust, fairness, respect, responsibility, and courage, befitting the professional degree you are pursuing.

Please visit [Academic Integrity Western Engineering](#) for more information

Academic Offences

Plagiarism means using another's work without giving credit. The university has rules against plagiarism and other scholastic offences. Western Engineering has a zero-tolerance policy on plagiarism. The minimum penalty is zero on the course work and a repeat offence will earn you zero on the course. A third offence may lead to expulsion from the university.

[Scholastic Discipline for Undergraduate Students & Cheating, Plagiarism and Unauthorized Collaboration: What Students Need to Know](#)

Students must write their reports, essays and assignments in their own words. Whenever students take an idea or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. University policy states that cheating, including plagiarism, is a scholastic offence. The commission of a scholastic offence is attended by academic penalties, which might include expulsion from the program. If you are caught cheating, there will be no second warning.

All required papers may be subject to submission for textual similarity review to commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted will be included as source documents on 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>). Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, in the relevant section of the Academic Handbook:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf

Faculty of Engineering AI Policy

The use of generative Artificial intelligence (GenAI) tools won't be discouraged in the Faculty of Engineering. As we pride ourselves on building the future we can't hide from the use of GenAI tools to contribute to the understanding of the course materials. Please refer to the course outline for the GenAI policy related to each course.

GenAI tools use won't be permitted in any type of examination or other assessments where the faculty have prohibited their use. If use of GenAI tools is detected by the instructor in these instances, academic offences penalties might be imposed against the student.

Accessibility

Western is committed to achieving barrier free accessibility for persons with disabilities studying, visiting and working at Western. As part of this commitment, there are a variety of services, groups and committees on campus devoted to promoting accessibility and to ensuring that individuals have equitable access to services and facilities. To help provide the best experience to all members of the campus community, please visit the [Accessibility Western University](#) for information on accessibility-related resources available at Western.

Students with disabilities may arrange for academic accommodation at Western. For a more detailed explanation, please visit [Academic Support & Engagement -Academic Accommodation](#).

Inclusivity, Diversity, and Respect

The Faculty of Engineering at Western University is committed to creating equitable and inclusive learning environments that value diverse perspectives and experiences. We recognize that university courses often marginalize students based on social identity characteristics such as, but not limited to, Indigeneity, race, ethnicity, nationality, ability, gender identity, gender expression, sexuality, age, language, religion, and socioeconomic status. Understanding this, we strive to facilitate equitable experiences and inclusion within the classroom by respecting and integrating multiple ways of knowing, being, and doing. Please visit the [Office of Equity, Diversity and Inclusion](#).

Health and Well-Being

[Health & Wellness Services – Students](#) - Offers appointment-based medical clinic for all registered part-time and full-time students.

[Mental Health Support](#) - Provides professional and confidential services, free of charge, to students needing assistance to meet their personal, social and academic goals. Services include consultation, referral, groups and workshops, as well as brief, change-oriented psychotherapy.

[Crisis Support](#) - For immediate assistance, please visit Thames Hall Room 2170 or call 519-661-3030. The crisis clinic operates between 11:00 am - 4:30 pm. For after-hours crisis support, click [here](#).

[Gender-Based Violence and Survivor Support](#) - "Western is committed to reducing incidents of gender-based and sexual violence (GBSV) and providing compassionate support to anyone who is going through or has gone through these traumatic events. If you are experiencing or have experienced GBSV (either recently or in the past), you will find information about support services for survivors, including

emergency contacts at the following website:

https://www.uwo.ca/health/student_support/survivor_support/gethelp.html To connect with a case manager or set up an appointment, please contact support@uwo.ca.

Important Contacts

[Engineering Undergraduate Services](#)

[Department of Electrical and Computer Engineering](#)

[Office of the Registrar/Student Central](#)

Important Links

- [WESTERN ACADEMIC CALENDAR](#)
- [ACADEMIC RIGHTS AND RESPONSIBILITIES](#)
- [ENGINEERING PROGRESSION REQUIREMENTS AND ACADEMIC REGULATIONS](#)
- [UNIVERSITY STUDENTS' COUNCIL \(USC\) - SERVICES](#)
- [IMPORTANT DATES AND DEADLINES](#)
- [ACADEMIC CONSIDERATION FOR MEDICAL ILLNESS - UNDERGRADUATE STUDENTS](#)
- [ACCOMMODATIONS FOR RELIGIOUS HOLIDAYS](#)
- [SCHEDULING OF ASSIGNMENTS, TESTS, AND EXAMINATIONS](#)
- [STUDENT FORMS](#)
- [OFFICE OF THE REGISTRAR](#)
- [RETENTION OF ELECTRONIC VERSION OF COURSE OUTLINES \(SYLLABI\)](#)
- [ACADEMIC APPEALS](#)
- [STUDENT ABSENCE PORTAL](#)