

Programming in Java

Elec&Comp EngTech - CompSc-Acad Del

Course Number: COMP 10062	Equivalencies: N/A	Pre-Requisites: COMP 10001
Applicable Program(s): 548 - C.S.Techn.-Software Support 558 - C.S.Techn.-Software Supp - CoOp 559 - CS Technology-Software Devlpt	Core/Elective: Core Core Core	
Prepared by:		
Approved by:		
Approval Date:		
Approved for Academic Year:	2022-2023	
Normative Hours:	70.00	
Course Level:	Foundational	

Course Description

Design object-oriented apps in Java that make effective use of encapsulation, inheritance, polymorphism, interfaces, association, and arrays of objects. Create desktop apps that display graphics and use Graphical User Interface components to communicate with the user. Implement apps that allow the user to open, view, and modify the contents of text files. Extend programming and problem solving skills developed in Programming Fundamentals to the Java programming language.

Relationship to Vocational Learning Outcomes

This course contributes to your program by helping you achieve the following Vocational Learning Outcomes:

548 - C.S.Techn.-Software Support

- VLO 1 Identify, analyze, develop, implement, verify and document the requirements for a computing environment. (T, A, R,)
- VLO 2 Contribute to the diagnostics, troubleshooting, documenting and monitoring of technical problems using appropriate methodologies and tools. (T, A, R,)
- VLO 4 Implement robust computing system solutions through validation testing that aligns with industry best practices. (T, A, R,)
- VLO 11 Automate routine tasks using scripting tools and programming languages. (T, A, R,)

558 - C.S.Techn.-Software Supp -CoOp

- VLO 1 Identify, analyze, develop, implement, verify and document the requirements for a computing environment. (T, A, R,)
- VLO 2 Contribute to the diagnostics, troubleshooting, documenting and monitoring of technical problems using appropriate methodologies and tools. (T, A, R,)
- VLO 4 Implement robust computing system solutions through validation testing that aligns with industry best practices. (T, A, R,)
- VLO 11 Automate routine tasks using scripting tools and programming languages. (T, A, R,)

559 - CS Technology-Software Devlpt

- VLO 1 Identify, analyze, design, develop, implement, verify and document the requirements for a computing environment. (T, A, R,)
- VLO 2 Diagnose, troubleshoot, document and monitor technical problems using appropriate methodologies and tools. (T, A, R,)
- VLO 4 Analyze, develop and maintain robust computing system solutions through validation testing and industry best practices. (T, A, R,)
- VLO 12 Select and apply scripting tools and programming languages to automate routine tasks. (T, A, R,)
- VLO 13 Install, monitor, optimize and administer a database management system in response to specified requirements. (T, A, R,)
- VLO 14 Design, implement, and administer technical support processes for computing system infrastructures that aligns with industry best practice. (T, A, R,)

Relationship to Essential Employability Skills

This course contributes to your program by helping you achieve the following Essential Employability Skills:

- EES 1 Communicate clearly, concisely and correctly in the written, spoken and visual form that fulfills the purpose and meets the needs of the audience. (T, A, R,)
- EES 4 Apply a systematic approach to solve problems. (T, A, R,)
- EES 5 Use a variety of thinking skills to anticipate and solve problems. (T, A, R,)
- EES 7 Analyze, evaluate and apply relevant information from a variety of sources. (T, A, R,)
- EES 10 Manage the use of time and other resources to complete projects. (T, A, R,)

Course Learning Outcomes/Elements of Performance

When you have earned credit for this course, you will have demonstrated the ability to:

CLO 1. Solve processing problems in Java using the Input-Processing-Output model.

EOP 1.1. Describe Java's primitive data types.

EOP 1.2. Compare primitive data types to reference data types.

EOP 1.3. Explain the importance of type casting and promotion.

EOP 1.4. Use correct Java Syntax to get input from standard input, process it using basic arithmetic and String operations, and output the result to standard output.

EOP 1.5. Use Java arithmetic expressions, Boolean expressions, selection statements and repetition statements to solve basic computing problems.

EOP 1.6. Use arrays to solve basic computing problems.

EOP 1.7. Use exception handling techniques to recover from run-time errors gracefully.

CLO 2. Solve processing problems in Java using custom objects.

EOP 2.1. Define a Java class that can be used to create objects with attributes and methods.

EOP 2.2. Explain the difference between static and instance variables and methods.

EOP 2.3. Distinguish between the interface and the implementation of an object.

EOP 2.4. Apply industry standard best practices in entity naming, commenting and indenting to produce detailed internal documentation for a Java class.

EOP 2.5. Write an appropriate set of constructors, getters and setters for a Java class.

EOP 2.6. Use method and constructor overloading to provide a clean interface for an object.

EOP 2.7. Translate the description of a real world object into a UML class diagram.

EOP 2.8. Translate a UML class diagram for a single class into Java code.

EOP 2.9. Implement graceful error handling by throwing and catching exceptions.

CLO 3. Design object-oriented solutions in Java that make effective use of encapsulation, inheritance, polymorphism, interfaces, and association.

EOP 3.1. Explain the role and the importance of encapsulation, inheritance, polymorphism, interfaces and association in an object-oriented program.

EOP 3.2. Use visibility modifiers, accessor methods, and mutator methods to control access to the variables of a class.

EOP 3.3. Model the relationships between classes and interfaces using association and inheritance.

EOP 3.4. Use inheritance to minimize code duplication in a Java program consisting of multiple classes.

EOP 3.5. Use abstract classes, interfaces and inheritance in Java to create objects that exhibit subtype polymorphism.

EOP 3.6. Use arrays of objects and ArrayLists to solve problems involving multiple association relationships between classes.

EOP 3.7. Implement (in Java code) UML class diagrams representing multiple classes and interfaces and the association and inheritance relationships between them.

EOP 3.8. Evaluate an object oriented application for appropriate use of encapsulation, inheritance, polymorphism, interfaces, and association.

CLO 4. Create Graphical User Interfaces for input and output in Java.

EOP 4.1. Describe the basic operation of an event-driven program.

EOP 4.2. Use a canvas element to draw shapes and text.

EOP 4.3. Lay out a basic Graphical User Interface consisting of buttons, labels, canvases, and text fields.

EOP 4.4. Respond to user input using mouse and button listeners.

EOP 4.5. Separate the view from the model in the design of a GUI app.

Evaluation/Earning Credit

The following list provides evidence of this course's learning achievements and the outcomes they validate:

Assignment(s) (30%)

Validates Outcomes: CLO 1, CLO 2, CLO 3, CLO 4, EES 1, EES 4, EES 5, EES 7, EES 10

548 : VLO 1, VLO 4, VLO 11

558 : VLO 1, VLO 4, VLO 11

559 : VLO 1, VLO 4, VLO 12, VLO 13, VLO 14

Test(s) (30%)

Validates Outcomes: CLO 1, CLO 2, CLO 3, CLO 4, EES 1, EES 4, EES 5

548 : VLO 1, VLO 2, VLO 4, VLO 11

558 : VLO 1, VLO 2, VLO 4, VLO 11

559 : VLO 1, VLO 2, VLO 4, VLO 12, VLO 13

Final Exam (40%)

Validates Outcomes: CLO 1, CLO 2, CLO 3, CLO 4, EES 1, EES 4, EES 5

548 : VLO 1, VLO 2, VLO 4, VLO 11

558 : VLO 1, VLO 2, VLO 4, VLO 11

559 : VLO 1, VLO 2, VLO 4, VLO 12, VLO 13

Learning Resources

All required course materials will be available on line through MyCanvas. The following text is also recommended (but not required): Savitch, Walter (2018) *Java: An Introduction to Problem Solving & Programming*. Pearson. ISBN: 978-0-13-446203-5 (recommended)

Delivery Format

5 hours in lab

This course has 5 contact hours per week, which are all in a lab environment, allowing the instructor to be flexible with their teaching style and change between lecture and lab work as needs arise. Typically this will be broken down on a weekly basis as one 2-hour period and one 3-hour period.

Prior Learning Assessment and Recognition

Students who wish to apply for prior learning assessment and recognition (PLAR) need to demonstrate competency at a post-secondary level in all of the course learning requirements outlined above. Evidence of learning achievement for PLAR candidates includes:

- Challenge Exam

Grade Scheme

Course Related Information

Final Exam Weighting:

If your mark on the comprehensive Final Exam is better than your combined grade on the two tests, your grade will be determined using only the Assignments (30%) and the Final Exam (70%).

Late Assignments:

You can hand in late assignments and online exercises with no penalty, but you have a limit of 10 late days for all assignments combined. If you go over that limit, late assignments will no longer be accepted. Please note that the final day to hand in any work for this course, regardless of how many late days you have remaining, will be the Friday of Week 13.

Assignments are due in the drop box on the day shown (i.e. up to 11:59:59 pm that day). After that, they are late. Late days are tracked by calendar date. For example if the due date is November 1st and you hand in the assignment some time on November 2nd, it is one day late.

Your 10 late days do not include special or unforeseen circumstances (illnesses, family emergencies, etc.). If you are delayed in completing an assignment due to special or unforeseen circumstances, let your instructor know as you can in order to negotiate a new due date. Keep in mind that your instructor may require documentation of your special or unforeseen circumstances.

Department Related Information

Please note:

- The final grades for this course will not be posted on myCANVAS. Final exams may be posted but only after all grades are posted in myMohawk.
- Under special circumstances, tests and exams may need to be written using remote proctoring applications. Students may be required to submit to some form of visual identification and be available for verification duration of the test or exam. Please refer to your myCANVAS course pages for directions from your professor.

College Related Information

Mohawk College is committed to creating a learning community where all students and staff experience a safe and respectful work and study environment. College policies and procedures respect individual rights and responsibilities, promote accountability, fairness and due process. Students are expected to familiarize themselves with Mohawk College's Policies and Procedures accessible through the College website <http://www.mohawkcollege.ca/corporate-policies-procedures/student.html>

Students with permanent or temporary disabilities who require academic accommodations are encouraged to register with Accessible Learning Services. Documentation outlining the functional limitations of disability is required; however, interim accommodations pending receipt of appropriate documentation is possible. All documentation is kept confidential in the office of Accessible Learning Services. For more information, contact (905) 575-2211 or email als@mohawkcollege.ca

Mohawk College is committed to the implementation of universal design for learning in order to support learners with disabilities, broadly promote inclusion and provide compliance elements for the Accessibility for Ontarians with Disabilities Act within the college community. Mohawk College courses will employ universal design for learning principles and/or initiatives and these elements will be indicated. For more information on the specific universal design for learning elements included in this course, contact the professor. For more information on universal design for learning, review the universal design for learning webpages <http://www.mohawkcollege.ca/employees/centre-for-teaching-learning/universal-design-for-learning>

In addition, students enrolled in Mohawk/McMaster collaborative programs are protected under McMaster University's policies and procedures outlined in General Academic Regulations, McMaster Undergraduate Calendar, and in McMaster's Academic Integrity Policy <http://www.mcmaster.ca/academicintegrity/> . Please be advised that all policies and procedures are subject to change.

To maintain academic integrity student submissions may be assessed using <http://www.turnitin.com/>

This course may use online proctoring software for one or more assessment(s) to uphold academic quality and maintain academic integrity where deemed required by the academic area. Additional information will be provided by your professor/instructor at the beginning of the term in your MyCanvas course if a remote proctoring tool is being used. Please refer to Mohawk College's Student Online Proctoring Guide to learn more at https://mycanvas.mohawkcollege.ca/courses/62461/pages/online-proctoring-guide?module_item_id=3151225

EFFECTIVE FALL 2009 - Policy: SS-3103-2009 in order to find this policy must go to: <https://www.mohawkcollege.ca/registration-and-records/grading-evaluation/grading-system> - Program Promotion and Graduation Requirements: A minimum grade of 50% is required as a course pass at Mohawk College. Please be aware, however, that a higher passing grade (minimum 60% or 70%) may be required if this course is taken as part of certain diploma or certificate programs. Please consult your Academic Department for details. Additionally, if you are taking this course as part of a diploma or certificate program, be aware that you need an overall weighted grade point average (WGPA) of at least 60% to graduate. Graduation requirements are higher for some programs. Please check requirements with your department.

PLEASE NOTE: Faculty are required to review Emergency Lockdown procedures and Emergency Evacuation Procedures, including Evacuation and Lockdown procedures for students with disabilities, at the first class of every course they are teaching each semester. This information is available in the College Emergency Safety and Security Procedures Booklet distributed to all staff in hard copy, or online in MyMohawk within the Human Resources Tab in the Occupational Health and Safety Channel (Occupational Health and Safety web site).

To understand your Course Outline please read the following document.

https://comms.blob.core.windows.net/public/mohawk/COMMS-Understanding_your_Course_Outline.pdf

Legend

Terms

- ILO = Indigenous Learning Outcome
- Apprenticeship LO = Apprenticeship Learning Outcome
- CLO = Course Learning Outcome
- DPLO = Degree Program Learning Outcome
- EES = Essential Employability Skill
- EOP = Element of Performance
- GELO = General Education Learning Outcome
- LO = Learning Outcome
- ES = External Standard
- PLA = Prior Learning Assessment
- PLAR = Prior Learning Assessment and Recognition
- VLO = Vocational Learning Outcome

Assessment Levels

- T = Taught
- A = Assessed
- R = Reinforced