



CST2335

Mobile Graphical Interface Programming

Course Outline

2022-2023

Pre-requisite(s)	CST8215 and CST8284
Co-requisite(s)	N/A
Prepared by	Eric Torunski
Approved by	Sandra Brancatelli, M.Eng., P.Eng., Chair, ICT - Applications & Programming
Normative hours	56.00
Grading system	A+ Through F
Experiential Learning	No

Applicable Program(s)	Level	Core/Elective
0336X01FWO - Computer Programming	3	Core
0336X03FWO - Computer Programming	3	Core
0336X07PAO - Computer Programming	3	Core
0336X09FAO - Computer Programming	3	Core
1561X01FWO - Computer Programming and Analysis	3	Core
1561X03FWO - Computer Programming and Analysis	3	Core

Course Description

Mobile devices play an instrumental part of everyday life, thus requiring knowledge of mobile graphical user interface development. Students explore graphical user interface programming in a mobile Android environment. Students learn how to program applications using the latest Android development tools. Topics include application architecture, interface design, network communication, and database integration.

Vocational Learning Outcomes

This course provides the opportunity for you to achieve the following outcomes:

0336X01FWO - Computer Programming

- VLO 1** Identify, analyze, develop, implement, verify and document the requirements for a computing environment. (T, A)
- VLO 2** Contribute to the diagnostics, troubleshooting, documenting and monitoring of technical problems using appropriate methodologies and tools. (T, A)
- VLO 4** Implement robust computing system solutions through validation testing that aligns with industry best practices. (T, A)
- VLO 5** Communicate and collaborate with team members and stakeholders to ensure effective working relationships. (T, A)
- VLO 7** Apply project management principles and tools when working on projects within a computing environment (T)
- VLO 8** Adhere to ethical, legal, and regulatory requirements and/or principles in the development and management of computing solutions and systems. (T, A)
- VLO 9** Identify and apply discipline-specific practices that contribute to the local and global community through social responsibility, economic commitment and environmental stewardship. (T)

0336X03FWO - Computer Programming

- VLO 1** Identify, analyze, develop, implement, verify and document the requirements for a computing environment. (T, A)
- VLO 2** Contribute to the diagnostics, troubleshooting, documenting and monitoring of technical problems using appropriate methodologies and tools. (T, A)
- VLO 4** Implement robust computing system solutions through validation testing that aligns with industry best practices. (T, A)
- VLO 5** Communicate and collaborate with team members and stakeholders to ensure effective working relationships. (T, A)
- VLO 7** Apply project management principles and tools when working on projects within a computing environment (T)
- VLO 8** Adhere to ethical, legal, and regulatory requirements and/or principles in the development and management of computing solutions and systems. (T, A)
- VLO 9** Identify and apply discipline-specific practices that contribute to the local and global community through social responsibility, economic commitment and environmental stewardship. (T)

0336X07PAO - Computer Programming

- VLO 1** Identify, analyze, develop, implement, verify and document the requirements for a computing environment. (T, A)
- VLO 2** Contribute to the diagnostics, troubleshooting, documenting and monitoring of technical problems using appropriate methodologies and tools. (T, A)
- VLO 4** Implement robust computing system solutions through validation testing that aligns with industry best practices. (T, A)
- VLO 5** Communicate and collaborate with team members and stakeholders to ensure effective working relationships. (T, A)

- VLO 7** Apply project management principles and tools when working on projects within a computing environment (T)
- VLO 8** Adhere to ethical, legal, and regulatory requirements and/or principles in the development and management of computing solutions and systems. (T, A)
- VLO 9** Identify and apply discipline-specific practices that contribute to the local and global community through social responsibility, economic commitment and environmental stewardship. (T)

0336X09FAO - Computer Programming

- VLO 1** Identify, analyze, develop, implement, verify and document the requirements for a computing environment. (T, A)
- VLO 2** Contribute to the diagnostics, troubleshooting, documenting and monitoring of technical problems using appropriate methodologies and tools. (T, A)
- VLO 4** Implement robust computing system solutions through validation testing that aligns with industry best practices. (T, A)
- VLO 5** Communicate and collaborate with team members and stakeholders to ensure effective working relationships. (T, A)
- VLO 7** Apply project management principles and tools when working on projects within a computing environment (T)
- VLO 8** Adhere to ethical, legal, and regulatory requirements and/or principles in the development and management of computing solutions and systems. (T, A)
- VLO 9** Identify and apply discipline-specific practices that contribute to the local and global community through social responsibility, economic commitment and environmental stewardship. (T)

1561X01FWO - Computer Programming and Analysis

1561X03FWO - Computer Programming and Analysis

Assessment Levels —T: Taught A: Assessed CP: Culminating Performance

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)
- EES 2** Respond to written, spoken or visual messages in a manner that ensures effective communication. (A)
- EES 3** Execute mathematical operations accurately. (A)
- EES 4** Apply a systematic approach to solve problems. (T, A)
- EES 5** Use a variety of thinking skills to anticipate and solve problems. (T, A)
- EES 6** Locate, select, organize and document information using appropriate technology and information systems. (A)
- EES 7** Analyze, evaluate and apply relevant information from a variety of sources. (T, A)
- EES 9** Interact with others in groups or teams in ways that contribute to effective working relationships and the achievement of goals. (T, A)
- EES 10** Manage the use of time and other resources to complete projects. (T, A)

Assessment Levels —T: Taught A: Assessed CP: Culminating Performance

Course Learning Requirements / Embedded Knowledge and Skills

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

- 1. Write a graphical user interface-based program, given design documents using object-oriented programming, structured programming, top-down coding, and event-driven coding.**
 - Use good graphical interface design principles to build a user interface for an Android application.
 - Use various graphical programming components to build user interfaces using the Android SDK.
 - Declare layout of UI elements using Android Studio's editing and preview tools.
 - Code event procedures in a GUI based program.
 - Employ user storyboards, and wireframe diagrams, in the creation of an Android application.
 - Use a cross platform framework in the creation of an Android application.
 - Identify Android guidelines related to accessible mobile graphical user interface design.
- 2. Produce tested code that executes correctly and consistently.**
 - Analyze requirements
 - Decompose complex problems
 - Apply principles to build consistent and usable graphical user interfaces using Android Studio's prototyping tools.
 - Design and code loosely coupled, highly cohesive software modules
- 3. Test code using iterative testing of GUI program components, valid data only, invalid data only, a combination of valid and invalid data and set wise refinement involving users.**
 - Design and implement practical quality assurance.
 - Use automated testing tools to create and run JUnit tests.
- 4. Prepare program documentation using prescribed program specifications**
 - Implement technical documentation, including module and member level documentation using Javadoc documentation comments
- 5. Debug program problems using manual and programmatic methods**
 - Use debugging features of an IDE
- 6. Access and modify a database table from within the graphical user interface.**
 - Implement data controls, layered architecture, and database management in a graphical programming environment.
 - Implement an SQLite database in the Android enviroinment to store the data associated with an application.

7. Create GUI programs that support internationalization as well as sustainability.

- Create a GUI program that supports internationalization (multilingual support).
- Create a program that demonstrates programming as means to create tools to support sustainability.

8. Collaborate in a team to complete complex assignments

- Recognize common problems
- Establish module interfaces that allow work to be distributed amongst team members
- Accept responsibility for designing and implementing code modules within a design framework such that group success is ensured
- Communicate with others in a timely and supportive fashion
- Set and observe realistic time schedules that include allowances for final integration and testing

9. Use local and remote Git repositories to perform version control of a program, including use of branches when working with other developers.

- Review and demonstrate the use of Git commands on a local repository, including git init, git add, git commit, git status, and git log. Review and demonstrate the use of Git commands on a remote repository, including git push, git pull, git remote. Use Git commands to use branches when working with other developers, including git branch, git checkout, git merge, git pull request, git merge conflicts. Use Git commands at a command prompt, and within an Integrated Development Environment (IDE). Explain the benefits of using a private versus a public, remote Git repository for version control.

Learning Resources

Required Hardware:
This course is part of the mobile (laptop) program initiative at Algonquin College.
Students are required to have a functioning laptop at all lecture and lab classes.
The specifications for the required laptop and additional information about the mobile program initiative can be found at <http://www.algonquincollege.com/byod>.

Required Software:
1) Android Studio (free download)
2) Android SDK tools (free download)

Required Textbook:
1) None - Links will be posted to learning materials on Brightspace.

Learning Activities

During this course, you are likely to experience the following learning activities:
Lectures - 2 hrs / week
Lab - 2 hrs / week
Lab Prep and homework - at least 5 hours / week
Samples of learning activities include:
- Development of Android programs
- Integration of code classes with GUI components
- Individual coding assignments.
- Team work to solve coding assignments

Pre-defined Evaluation / Earning Credit

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

Final Project (30%)

Validates Outcomes: CLR 1, CLR 2, CLR 3, CLR 4, CLR 5, CLR 6, CLR 7, CLR 8, CLR 9, EES 1, EES 2, EES 3, EES 4, EES 5, EES 6, EES 7, EES 9, EES 10

Quiz(zes)/Test(s) (20%)

Validates Outcomes: EES 2, EES 3, EES 4, EES 5, EES 6, EES 7

Final Exam (30%)

Validates Outcomes: CLR 1, CLR 5, CLR 6, CLR 7, EES 1, EES 2, EES 3, EES 4, EES 5

Lab Activity(ies) (20%)

Validates Outcomes: CLR 1, CLR 5, CLR 6, CLR 7, CLR 8, CLR 9, EES 3, EES 4, EES 5, EES 7, EES 9, EES 10

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 outlined course learning requirements. Evidence of learning achievement for PLAR candidates includes:

- Portfolio
- Challenge Exam
- Project/Assignment

Other Information

Grade Scheme

Final Grade	Mark Equivalent	Numeric Value	Final Grade	Mark Equivalent	Numeric Value
A+	90% - 100%	4.0	A	85% - 89%	3.8
A-	80% - 84%	3.6	B+	77% - 79%	3.3
B	73% - 76%	3.0	B-	70% - 72%	2.7
C+	67% - 69%	2.3	C	63% - 66%	2.0
C-	60% - 62%	1.7	D+	57% - 59%	1.4
D	53% - 56%	1.2	D-	50% - 52%	1.0
F	0% - 49%	0	FSP	0	0

Course Related Information

The following information is course-specific:

Please refer to the Course Section Information (CSI) / weekly schedule for specific course-related information as provided by your professor.

The final exam will consist of theoretical in-class components discussed during in-class lectures and applied during practical in-lab sessions. Note: The tests will be either paper-based or online, and you will be expected to be able to write code by hand to solve problems. This includes, but is not restricted to, determining errors and/or add missing elements in provided code, writing classes and class members. In order to pass the course, the student must have a grade of at least 50% (or “D-”) on both the theory component as well as in the applied (i.e. lab) component. i.e. Even if your combined grade exceeds 50% for the entire course, if you fail either the theory component or the applied component you will not achieve a passing grade in the course.

Department Information

STUDENT ACADEMIC RESPONSIBILITIES

- Each student is responsible for:
- Knowing the due dates for marked out-of-class assignments.
 - Attending all classes and knowing the dates of in-class marked assignments and exercises.
 - Maintaining a folder of all work done in the course during the semester for validation claims in cases of disagreement with faculty.
 - Keeping both paper and electronic copies of all assignments, marked and unmarked, in case papers are lost or go missing.
 - Regularly checking both Brightspace announcements as well as one's Algonquin e-mail account for important messages from both professors and college administration.
 - Participating in on-line and classroom exercises and activities as required.
 - Retaining course outlines for possible future use to support applications for transfer of credit to other educational institutions.

Department Grading Policy - For all courses that have both a theory and practical (lab) component, students must have a grade of at least 50% (or “D-”) on both the theory component as well as in the practical (i.e. lab) component in order to achieve a passing grade in the course. i.e. Even if your combined grade exceeds 50% for the entire course, if you fail either the theory component or the practical component, you will not achieve a passing grade in the course.

Lab/Practical Assessment Demonstration "Demo" Requirements - Certain courses require students to demo their work after it has been submitted. These will be scheduled by the professor and involve 1-2 rudimentary questions to assure the professor that the work submitted by the student is their own. Demos are not graded items - the work submitted is graded. However, where demos are required, if a student does not demo their work, the work will not be graded (i.e. grade of 0 on the lab or practical assessment).

Department Academic Dishonesty Policy - Academic Integrity is very important to all of our faculty and administrative staff and as such, measures have been put into place to detect all forms of academic dishonesty, including plagiarism of code. If plagiarism is detected by a professor, the incident will be reported and investigated. If the findings of the investigation are that a student has submitted plagiarized work as their own, they will be subject to the following policy:

1. The first offence will result in the plagiarized assessment being assigned a grade of 0.
2. The second offence will result in the assignment of a grade of F for the course.
3. The third offence will result in removal of a student from the program of study.

Harassment/Discrimination/Violence will not be tolerated. Any form of harassment (sexual, racial, gender or disability-related), discrimination (direct or indirect), or violence, whether involving a professor and a student or amongst students, will not be tolerated on the college premises. Action taken will start with a formal warning and proceed to the full disciplinary actions as outlined in Algonquin College Policies - HR22 and SA07. Harassment means one or a series of vexatious comment(s) (whether done verbally or through electronic means), or conduct related to one or more of the prohibited grounds that is known or ought reasonably to be known to be unwelcome/unwanted, offensive, intimidating, derogatory or hostile. This may include, but is not limited to: gestures, remarks, jokes, taunting, innuendo, display of offensive materials, offensive graffiti, threats, verbal or physical assault, stalking, slurs, shunning or exclusion related to the prohibited grounds.

For further information, a copy of the official policy statement can be obtained from the Student Association.

Violation of the Copyright Act
General – The Copyright Act makes it an offence to reproduce or distribute, in whatever format, any part of a publication without the prior written permission of the publisher. For complete details, see the Government of Canada website at <http://laws.justice.gc.ca/en/C-42> . Make sure you give it due consideration, before deciding not to purchase a textbook or material required for your course.

Software Piracy - The Copyright Act has been updated to include software products. Be sure to carefully read the licensing agreement of any product you purchase or download, and understand the terms and conditions covering its use, installation and distribution (where applicable). Any infringement of licensing agreement makes you liable under the law.

Disruptive Behaviour is any conduct, or threatened conduct, that is disruptive to the learning process or that interferes with the well being of other members of the College community. It will not be tolerated. Members of the College community, both students and staff, have the right to learn and work in a secure and productive environment. The College will make every effort to protect that right. Incidents of disruptive behaviour must be reported in writing to the departmental Chair as quickly as possible. The Chair will hold a hearing to review available information and determine any sanctions that will be imposed. Disciplinary hearings can result in penalties ranging from a written warning to expulsion.

For further details, consult the Algonquin College Policies AA32, SA07 and IT01 in your Instaguide.

College Related Information

Algonquin College’s policies have been developed to ensure the health, safety and security of all students, faculty and staff, and the proper and fair operation of the College as an academic institution and employer. Please refer to the Algonquin College Policies website for the most current policy information available at <http://www.algonquincollege.com/policies/>.

Students are especially encouraged to be aware of the following College expectations

Academic Integrity

Algonquin College is committed to the highest standards of academic integrity, and students are expected to uphold these standards as part of the learning process. Any academic work submitted by a student is expected to be their own work, unless designated otherwise and all sources must be attributed. All students should be familiar with the Algonquin College policy [AA48: Academic Integrity](#), which outlines student's roles and responsibilities and what represents academic dishonesty. In some courses, online proctoring may be used to prevent academic dishonesty. Additional information can be found at [Academic Integrity - Student Survival Guide - Subject Guides at Algonquin College \(libguides.com\)](#) and via [Academic Integrity Student Resources](#). Students with any questions about the course expectations regarding academic integrity are encouraged to speak to their professor and the College's academic integrity team at acaio@algonquincollege.com

Centre for Accessible Learning

Students with visible and/or non-visible disabilities are encouraged to register with the [Centre for Accessible Learning \(CAL\)](#) in order to be eligible for appropriate learning supports and/or accommodations. Students are strongly encouraged to make an appointment with the Centre for Accessible Learning as early as possible when starting a program. Once your needs are identified, a Letter of Accommodation (LOA) will be issued which you can share with your professors. If you are a returning student, please ensure that professors are given a copy of your LOA each semester.

College Email

Students at Algonquin College are provided with a college email account. This is the address that will be used when the College, your professors, or your fellow students communicate important information about your program or course activities. Your network credentials can be found in the [ACSIS portal](#) and you are expected to check your Algonquin email regularly and to use it to send and receive college-related email. Support is available through the college Information Technology Service (ITS) at: <https://www.algonquincollege.com/its/>

Retroactive Accommodations

Students are expected to meet evaluation and completion deadlines as stated in course outline and course section information documents. In circumstances where evaluation and/or completion deadlines are missed or student performance has been affected by a temporary or permanent disability (including mental health), interim or retroactive accommodations may be considered. In such instances, please consult your course faculty member. For other situations where deferral of evaluations may be warranted, please consult Algonquin College Policy [AA21: Deferred Evaluation](#).

Student Course Feedback

Algonquin College invites students to share their course experience by completing a student course feedback survey for each course they take. For further details consult Algonquin College Policy [AA25: Student Course Feedback](#).

Use of Mobile Devices in Class

With the proliferation of small, personal mobile devices used for communications and data storage, Algonquin College believes there is a need to address their use during classes and examinations. During classes, the use of such devices unless authorized by your professor can be disruptive and disrespectful to others. During examinations, the use of such devices is generally prohibited unless authorized by your professor. Otherwise use is considered academic dishonesty in the form of cheating. For further details consult Algonquin College Policy [AA32: Use of Mobile Devices in Class](#)

Technology Requirements

Students are required to have access to a computer and to the internet. There may also be additional technology-related resources required to participate in a course that are not included in the course materials fee, such as headphones, webcams, specialized software, etc. Details on these requirements can be found in the Course Section Information of the course outline for each course available on Brightspace.

Transfer of Credit

It is the student's responsibility to retain course outlines for possible future use to support applications for transfer of credit to other educational institutions.

Safe Harbour

In the event of an unexpected major event (pandemic, etc.), your course may have changes that are not reflected in the Course Outline. Should this happen, the Course Section Information document will have updated information about your course.