Course Outline

School:	Eng. Tech. & Applied Science
Department:	Information and Communication Engineering Technology (ICET)
Course Title:	Mobile Apps Development
Course Code:	COMP 304
Course Hours/Credits:	56
Prerequisites:	COMP 228
Co-requisites:	N/A
Eligible for Prior Learning, Assessment and Recognition:	Yes
Originated by:	ILIA NIKA
Creation Date:	Fall 2005
Revised by:	ILIA NIKA
Revision Date:	Fall 2023
Current Semester:	Summer 2024
Approved by:	ppesikan c/o

Chairperson/Dean

Students are expected to review and understand all areas of the course outline.

Retain this course outline for future transfer credit applications. A fee may be charged for additional copies.

This course outline is available in alternative formats upon request.

Acknowledgement of Traditional Lands

Centennial is proud to be a part of a rich history of education in this province and in this city. We acknowledge that we are on the treaty lands and territory of the Mississaugas of the Credit First Nation and pay tribute to their legacy and the legacy of all First Peoples of Canada, as we strengthen ties with the communities we serve and build the future through learning and through our graduates. Today the traditional meeting place of Toronto is still home to many Indigenous People from across Turtle Island and we are grateful to have the opportunity to work in the communities that have grown in the treaty lands of the Mississaugas. We acknowledge that we are all treaty people and accept our responsibility to honor all our relations.

Course Description

In Mobile Application Development, students will gain hands-on experience in developing and deploying native mobile applications on the Android platform using the Kotlin programming language. The coursework emphasizes creating advanced User Interfaces (UIs), event handling, accessing remote services, storing and retrieving data on the device, displaying maps, and utilizing other Android APIs. Android Studio will serve as the primary tool for creating a variety of mobile applications

Program Outcomes

Successful completion of this and other courses in the program culminates in the achievement of the Vocational Learning Outcomes (program outcomes) set by the Ministry of Colleges and Universities in the Program Standard. The VLOs express the learning a student must reliably demonstrate before graduation. To ensure a meaningful learning experience and to better understand how this course and program prepare graduates for success, students are encouraged to review the Program Standard by visiting http://www.tcu.gov.on.ca/pepg/audiences/colleges/progstan/. For apprenticeship-based programs, visit http://www.collegeoftrades.ca/training-standards.

Course Learning Outcomes

The student will reliably demonstrate the ability to:

1. Distinguish various mobile application development technologies and examine the Android platform and development environment.
2. Build the UI of Android applications using both the Android View system and Jetpack Compose toolkit.
3. Develop Android applications that incorporate Graphics and Animations.
4. Apply structured Data Storage APIs to store data in a local database or a NoSQL cloud-hosted database.
5. Design, code, and test Android Applications that connect to internet resources, perform network operations on background threads and parse the information using various parsers.
6. Create Android Applications that apply Location, Maps, and Awareness APIs.
7. Develop Android Applications that send/receive broadcasts and SMS messages.
8. Discuss various Android APIs and best-practice patterns designed to support running background tasks and providing notifications to users.
9. Deploy Android Applications and discuss security issues.

Essential Employability Skills (EES)

The student will reliably demonstrate the ability to*:

1. Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience.
2. Respond to written, spoken, or visual messages in a manner that ensures effective communication.
3. Execute mathematical operations accurately.
4. Apply a systematic approach to solve problems.
5. Use a variety of thinking skills to anticipate and solve problems.

**There are 11 Essential Employability Skills outcomes as per the Ministry Program Standard. Of these 11 outcomes, the following will be assessed in this course.*

Global Citizenship and Equity (GC&E) Outcomes

N/A

Methods of Instruction

The instructional methods utilized in this course encompass a variety of approaches, including interactive lectures covering weekly topics, hands-on lab sessions conducted weekly, live demonstrations, practical exercises, and independent lab assignments. Additionally, for online programs, recordings of interactive sessions will also be made available. All course materials will be provided within the course shell in eCentennial.

Text and other Instructional/Learning Materials

Text Book(s):

Reference books (both available on O'Reilly online http://go.oreilly.com/centennial-college):

Griffiths D., Griffiths D, Head First Android Development: A Learner's Guide to Building Android Apps with Kotlin, Third edition, Publisher: O'Reilly Media, Inc., ISBN: 9781492076520, Released November 2021

Sills B, Gardner B, Marsicano K, and Stewart C, Android Programming: The Big Nerd Ranch Guide, 5th edition, Publisher Big Nerd Ranch, LLC., 2022

Online Resource(s):

eCentennial course shell

Evaluation Scheme

- Test 1: Hands-On test covering Week 1 - 6 materials
- Test 2: Hands-On test covering Week 7-13 materials and comprehensive topics from previous weeks
- Assignment 1: Developing an Android application that incorporates multiple activities and fragments.
- Assignment 2: Developing an interactive Android application with standard UI elements
- Assignment 3: Developing an Android application with Data Access and remote connection capabilities.
- Assignment 4: Developing native Android app UIs using Jetpack Compose with Location and Mapping capabilities.

Evaluation Name	CLO(s)	EES Outcome(s)	GCE Outcome(s)	Weight/100
Test 1	1, 2	1, 2, 3, 4, 5		25
Test 2	4, 5, 6, 7, 8, 9	1, 2, 3, 4, 5		25
Assignment 1	1, 2	1, 2, 4		8
Assignment 2	1, 2	1, 2, 4, 5		12
Assignment 3	1, 4, 5	1, 2, 3, 4, 5		15
Assignment 4	2, 3, 5, 6, 9	1, 2, 4, 5		15
Total				100%

If students are unable to write a test they should immediately contact their professor or program Chair for advice. In exceptional and well documented circumstances (e.g. unforeseen family problems, serious illness, or death of a close family member), students may be able to write a make-up test.

All submitted work may be reviewed for authenticity and originality utilizing Turnitin®. Students who do not wish to have their work submitted to Turnitin® must, by the end of the second week of class, communicate this in writing to the instructor and make mutually agreeable alternate arrangements.

When writing tests, students must be able to produce official Centennial College photo identification or they may be refused the right to take the test or test results will be void.

Tests or assignments conducted remotely may require the use of online proctoring technology where the student's identification is verified and their activity is monitored and/or recorded, both audibly and visually through remote access to the student's computer and web camera. Students must communicate in writing to the instructor as soon as possible and prior to the test or assignment due date if they require an alternate assessment format to explore mutually agreeable alternatives.

Student Accommodation

The Centre for Accessible Learning and Counselling Services (CALCS) (http://centennialcollege.ca/calcs) provides programs and services which empower students in meeting their wellness goals, accommodation and disability-related needs. Our team of professional psychotherapists, social workers, educators, and staff offer brief, solution-focused psychotherapy, accommodation planning, health and wellness education, group counselling, psycho-educational workshops, adaptive technology, and peer support. Walk in for your first intake session at one of our service locations (Ashtonbee Room L1-04, Morningside Room 190, Progress Room C1-03, The Story Arts Centre Room 285, Downsview Room 105) or contact us at calcs@centennialcollege.ca, 416-289-5000 ext. 3850 to learn more about accessing CALCS services.

Use of Dictionaries

- Any dictionary (hard copy or electronic) may be used in regular class work.

Program or School Policies

N/A

Course Policies

N/A

College Policies

Students should familiarize themselves with all College Policies that cover academic matters and student conduct.

All students and employees have the right to study and work in an environment that is free from discrimination and harassment and promotes respect and equity. Centennial policies ensure all incidents of harassment, discrimination, bullying and violence will be addressed and responded to accordingly.

Academic Honesty

Academic honesty is integral to the learning process and a necessary ingredient of academic integrity. Forms of academic dishonesty include cheating, plagiarism, and impersonation, among others. Breaches of academic honesty may result in a failing grade on the assignment or course, suspension, or expulsion from the college. Students are bound to the College's AC100-11 Academic Honesty and Plagiarism policy.

To learn more, please visit the Libraries information page about Academic Integrity https://libraryguides.centennialcollege.ca/academicintegrity and review Centennial College's Academic Honesty Module: https://myappform.centennialcollege.ca/ecentennial/articulate/Centennial_College_Academic_Integrity_Module_%202/story.html

Use of Lecture/Course Materials

Materials used in Centennial College courses are subject to Intellectual Property and Copyright protection, and as such cannot be used and posted for public dissemination without prior permission from the original creator or copyright holder (e.g., student/professor/the College/or third-party source). This includes class/lecture recordings, course materials, and third-party copyright-protected materials (such as images, book chapters and articles). Copyright protections are automatic once an original work is created, and applies whether or not a copyright statement appears on the material. Students and employees are bound by College policies, including AC100-22 Intellectual Property, and SL100-02 Student Code of Conduct, and any student or employee found to be using or posting course materials or recordings for public dissemination without permission and/or inappropriately is in breach of these policies and may be sanctioned.

For more information on these and other policies, please visit www.centennialcollege.ca/about-centennial/college-overview/college-policies.

Students enrolled in a joint or collaborative program are subject to the partner institution's academic policies.

PLAR Process

This course is eligible for Prior Learning Assessment and Recognition (PLAR). PLAR is a process by

which course credit may be granted for past learning acquired through work or other life experiences. The PLAR process involves completing an assessment (portfolio, test, assignment, etc.) that reliably demonstrates achievement of the course learning outcomes. Contact the academic school to obtain information on the PLAR process and the required assessment.

Semester:	Summer 2024	Professor Name:	See eCentennial course shell
Section Code:	ALL	Contact Information:	See eCentennial course shell
Meeting Time & Location:	See myCentennial timetable	Delivery Method:	See myCentennial timetable

Topical Outline (subject to change):

Week	Topics	Readings/Materials	Weekly Learning Outcome(s)	Instructional Strategies	Evaluation Name and Weight	Evaluation Date
1	Introduction to Android Platform and Android Application Development	Lecture ppt slides Recorded Lecture for online sections.	Examine Android Platform. Discuss the differences between leading mobile operating systems. Explain Android Development Environment and Android Application Architecture. Write a simple Android application using Android Studio.	Interactive Lecture (recording provided for online sections) Interactive Lab Session Demonstration Hands-On Exercises		
2	Introduction to Kotlin Programming Language	Lecture ppt slides Recorded Lecture for online sections.	Review the basics of Kotlin programming language: - Variables - Control structures - Functions - Classes - Collections - Set up Android Studio to use Kotlin and build apps Develop Android Apps Using Kotlin	Interactive Lecture (recording provided for online sections) Interactive Lab Session Demonstration Hands-On Exercises		
3	Anatomy and Life Cycle of Android Applications Activities, Fragments, Intents	Lecture ppt slides Recorded Lecture for online sections.	Explain Android Activities, Fragments, and Intents. Examine the life cycles of Android applications, activities, and fragments. Analyze the creation and utilization of Android activities. Apply Intents to initiate built-in Android applications and share data between activities.	Interactive Lecture (recording provided for online sections) Demonstration Interactive Lab Session Hands-On Exercises	Lab Assignment 1: Developing an Android application that incorporates multiple activities and fragments	Week 3

Week	Topics	Readings/Materials	Weekly Learning Outcome(s)	Instructional Strategies	Evaluation Name and Weight	Evaluation Date
			Create, implement, and manage Android fragments.			
4	Managing Application Resources Introduction to Building User Interfaces using Views	Lecture ppt slides Recorded Lecture for online sections.	Apply Externalizing of Resources - Declare simple resource values - Strings, Integers, Booleans, Colors, Drawables, String Arrays, XML files, etc. Classify Layout Managers. Apply layout classes and simple UI controls in Android apps: - TextView - EditText - Button Utilize Recycler View in Android apps. Apply data binding in Android apps.	Interactive Lecture (recording provided for online sections) Demonstration Interactive Lab Session Hands-On Exercises		
5	Designing UI with Standard Views The Android Widget Tool Optional: Custom Views	Lecture ppt slides Recorded Lecture for online sections.	Examine Android Views Implement Menus in Android Apps Implement Check boxes, RadioGroup & RadioButton, ToggleButton, ImageButton, Spinner, Progress indicators: - Defining UI elements - Event Handling - Handling threads	Interactive Lecture (recording provided for online sections) Demonstration Interactive Lab Session Hands-On Exercises		
6	Accessing Internet Resources from within Android Apps	Lecture ppt slides Recorded Lecture for online sections.	Apply Kotlin Coroutines to download and process Internet resources on background threads Apply Flow to emit and collect data Parse internet resources (XML, JSON)	Interactive Lecture (recording provided for online sections) Demonstration Interactive Lab Session Hands-On Exercises	Lab Assignment 2: Developing an Android application with standard UI elements.	Week 6
7	Creating and Using Databases in Android Apps	Lecture ppt slides Recorded Lecture for online sections.	uild Android apps using Room persistence library to add, modify, and delete saved data Query Room databases and observe query result changes using Flow.	Interactive Lecture (recording provided for online sections) Demonstration Interactive Lab Session Hands-On Exercises	Test 1 Hands-On, covering week 1-6 topics.	Week 7
8	Working With	Lecture ppt slides	Write Android Apps with full CRUD	Interactive Lecture		

Week	Topics	Readings/Materials	Weekly Learning Outcome(s)	Instructional Strategies	Evaluation Name and Weight	Evaluation Date
	Firebase/Firestore Databases	Recorded Lecture for online sections.	functionalities Write Android apps that manipulate a Firebase/Firestore database	(recording provided for online sections) Demonstration Interactive Lab Session Hands-On Exercises		
9	Introduction to Jetpack Compose	Lecture ppt slides Recorded Lecture for online sections.	Discuss Jetpack Compose architecture Create Composable Functions Develop Android apps with Jet Compose UI	Interactive Lecture (recording provided for online sections) Demonstration Interactive Lab Session Hands-On Exercises	Lab Assignment 3: Developing an Android application with Data Access and remote connection capabilities. Students should collaborate in pairs using the pair programming technique	Week 9
10	Location Services Maps Awareness API	Lecture ppt slides Recorded Lecture for online sections.	Install and use Google Play services. Determine and update the device's physical location using the emulator. Add interactive maps to your application. Display user location on a map. Find addresses and address locations with the Geocoder. Set and monitor Geofences.	Interactive Lecture (recording provided for online sections) Demonstration Interactive Lab Session Hands-On Exercises		
11	Intents and Broadcast Receivers Messaging	Lecture ppt slides Recorded Lecture for online sections.	Discuss Broadcasts and implement Intent Broadcast and Broadcast Receivers Examine SMS Messaging Send SMS messages using the built-in Messaging application Develop android apps that send/receive SMS messages.	Interactive Lecture (recording provided for online sections) Demonstration Interactive Lab Session Hands-On Exercises		

Week	Topics	Readings/Materials	Weekly Learning Outcome(s)	Instructional Strategies	Evaluation Name and Weight	Evaluation Date
12	Developing Android apps using Jetpack Compose Graphics and Animation Capabilities	Lecture ppt slides Recorded Lecture for online sections.	Discuss Graphics in Compose Incorporate basic drawing in Android Apps Implement basic transformations: scale, translate, rotate Discuss Animations in Compose Incorporate Animations in Android Apps to realize a smooth and understandable user experience	Interactive Lecture (recording provided for online sections) Demonstration Interactive Lab Session Hands-On Exercises	Lab Assignment 4: Developing native Android app UIs with Jetpack Compose and Location/Mapping capabilities	Week 12
13	Developing Android Services	Lecture ppt slides Recorded Lecture for online sections.	Review background services Explain and schedule tasks with WorkManager Develop Android Apps that run long-performing tasks on background	Interactive Lecture (recording provided for online sections) Demonstration Interactive Lab Session Hands-On Exercises		
14	Test 2	Week 7-13 materials	Develop Android Apps using various Android APIs.	Review test materials and complete the practice session	Test 2 Hands-On, covering week 7-13 topics.	Week 14