JOHN ABBOTT CEGEP/COLLEGE COURSE OUTLINE

A. GENERAL INFORMATION

1. Program name:	Computer Science Technology 420.B0
2. **Course title:**	**Application Development III**
3. Course and section number(s):	420-6A6-AB, section(s) 1, 2
4. Ponderation (weekly class –lab/fieldwork – homework hours):	2 - 4 - 4
5. Credits:	3.33
6. Competency statements(s) and code(s):	00SS - Develop native applications with a database. Covered: Partially
7. Prerequisites:	420-5A6-AB
8. Semester:	Winter 2025
9. Teacher name:	Youmna Badawy
10. Office number, phone extension:	P-311
11. Teacher's availability:	Posted on office door and Moodle. Appointments can be made outside of the posted hours when the need arises.

B. INTRODUCTION

Course summary

This course covers the process of software development, consisting of the requirement gathering proposal, design, implementation, documentation, testing and deployment of a multiplatform software application. Students will learn the skills necessary to create applications that can run on multiple platforms: Windows, Android, MacOS, iOS, Chrome OS and/or Linux. Students will be exposed to one of the cross-platform app development (CPAD) such as: .NET MAUI, Flutter, React Native or Codename One.

Role of the course

This course completes the *Application Development* stream and allows students to integrate all concepts learnt in the program.

C. COURSE OBJECTIVES

Upon successful completion of this course, students will be able to:

General Learning Objective	Specific Learning Objective
1. Cross Platform App Development (CPAD)	1. Understand difference between native and cross platform development. 2. Examine challenges in CPAD. 3. Explore advantages of CPAD. 4. Research and compare different CPAD frameworks.
2. Setup and use of development environment.	1. Setup development IDE of chosen CPAD framework. 2. Setup & configure emulators for different target platforms to run and test apps.
3. Architect solutions for CPAD	1. Creation of shared code projects. 2. Create and use class libraries. 3. Plan for design-pattern (for example MVC / MVVM).
4. Create a shared UI.	1. Identify basic UI components. 2. Identify different layouts, views, and controls. . 3. Customize components using properties. 4. Construct a responsive UI using layout managers. 5. Interact programmatically with components. 6. Design for accessibility issues.
5. Add functionality and interactivity	1. Understand navigation process. 2. Configure app settings and start up behavior. 3. Request appropriate app permissions from the user. 4. Access different device resources: files, camera, sensors, etc.
6. Access data in app	1. Examine different data access classes. 2. Consume web server services with CRUD capabilities (Create-Read-Update-Delete). 3. Use databases: 1. Cloud databases: such as Firebase. 2. SQLite/CoreData. 4. Access local files.

General Learning Objective	Specific Learning Objective
7. Apply authentication and authorization mechanisms	1. Differentiate between authentication and authorization. 2. Understand user authentication process. 3. Identify providers, relying parties, tokens, and claims. 4. Examine common authentication and authorization protocols: e.g., OAuth and/or OpenID.
8. Integrate with IOT devices (Optional)	1. Communicate with IOT devices to read or write data. 2. Control IOT devices from app.
9. Use native platform integrations (Optional)	1. Apply custom UI modifications on specific platforms (OSs). 2. Apply custom UI modifications on specific idioms: desktop, tablet, or phone. 3. Use of native controls and renders.
10. App Testing	1. Write and execute UI tests using automated UI acceptance testing framework. 2. Write and execute unit tests to validate functionality of app on different platforms.
11. App Documentation and Deployment	1. Produce code documentation. 2. Learn how to generate .apk files for Android, .ipa files for iOS and other target platforms. 3. Explain how to deploy apps on different application stores: Google Play, App Store, Microsoft Store, etc.

Government Competencies

Competency 00SS. Develop native applications with a database.

Achievement Context

- Fully participate in the design and development of native applications with a database
- For different target platforms: tablets, smartphones, desktop computers, etc.
- For new applications and applications to be modified
- Based on design documents
- Using a compiler designed for the target platform, a cross compiler or an interpreter
- Using an emulator on the development platform
- Using images
- Using issue tracking and version control procedures.

Elements of competency	Performance criteria
00SS.5 Program the application logic.	• Proper programming or integration of authentication and authorization mechanisms • Proper programming of interactions between the graphical user interface and the user • Appropriate choice of clauses, operators, commands or parameters in database queries • Correct handling of database data • Proper programming of data synchronization • Appropriate use of data exchange services • Proper application of internationalization techniques • Precise application of secure programming techniques
00SS.6 Control the quality of the application.	• Precise application of test plans in the emulator and on the target platform • Thorough reviews of code and security • Relevance of the corrective actions • Compliance with issue tracking and version control procedures • Compliance with the design documents

Elements of competency	Performance criteria
00SS.7 Participate in the deployment of the application.	• Appropriate preparation of the application in view of its deployment or installation • Proper deployment or installation of the application
00SS.8 Produce the documentation	• Proper identification of the information to be written up • Clear record of the work carried out

D. EVALUATION PLAN

Evaluation type:	%	Tentative date:	Competencies/Objectives	Part of final evaluation?
Assignments (4-6)*	30%	TBD	00SS	✓
Tests (1-2) or Quizzes (4-6)	20%	Week6 and/or Week13	00SS	
Project Milestones (3-5)	50%	TBD	00SS	✓
Total value:	*100%*			
Value of final eval (min 40%)	*80%*			

(Note: Weeks indicated for Tests and Project are tentative)

E. COURSE CONTENT

Tentative Schedule

Week	Topic
1	Cross Platform App Development (CPAD) Frameworks
2	Development Environment / Shared Code / Library Classes / UI Components
3	UI Components (Buttons, controls, sliders, collections, etc.)

Week	Topic
4	Data Binding: INotifyPropertyChanged
5	Advanced Programming Concepts: Multithreading and Asynchronous Programming
6	**Test 1**
Study Break	
7	Design Patterns: MVVM/ Singletons – Transients - Dependency Injection
8	App settings / Navigation / Permissions / Resources / Native platform integrations and controls. / Android Apps and iOS Apps
9	App Data: Local files (JSON)/ Databases
10	Access data in app: Web Services
11	Authentication and authorization mechanisms
12	App Testing / Test plans / Documentation
13	Data Representation using Graphs
14	Project
15	Project and presentations

F. REQUIRED TEXTBOOKS/MATERIALS

TBD

G. BIBLIOGRAPHY

Not applicable.

H. INSTRUCTIONAL METHODS

This course consists of 90 hours of scheduled lectures and lab work. In addition, each student will be required to do 60 hours of personal study that includes research, personally booked computer time and work at home. Léa, the course management system within Omnivox, will be used in this course.

I. PROGRAM, DEPARTMENTAL/DISCIPLINE, AND COURSE/SECTION POLICIES

Topic	Resource

Topic	Resource
Approved department attendance policy	Active learning of competencies requires hands on learning with interactive classroom work, which cannot be achieved with absences of more than 20%. Attendance is mandatory for the following program activities: • **Stage courses:** Absences that amount to more than 20% of the hours associated with the stage activity may mean that a student cannot achieve more than 50% on the stage course, resulting in the failure of the stage course. • **Stage evaluation meetings:** Absences that amount to more than 20% of the hours dedicated to these meetings will result in a grade of zero on this portion of the stage course, unless the absences have been deemed excused absences as per the IPESA. • **In class group work or project integration activities:** Absences that amount to more than 20% of the hours associated with any of these activities will result in a grade of zero on the assessment related to the missed activity, unless the absences have been deemed excused absences as per the IPESA.
Policy to ensure that issues relating to late submission, or resubmission, or work to be dealt with in an equitable manner	All assignments and projects are expected to be submitted by the required due date. A late penalty of between 5 to 10% per day might apply to assignments submitted late up to a maximum number of allowed late days. The exact percentage and the maximum will be indicated on the instructions specific to that assignment. Any work submitted after the maximum number of allowed late days has been reached will not be graded.
Policy dealing with the expectations of classroom behaviour, including use of cell phones, laptops and other technology	Not applicable.

J. COLLEGE POLICIES

Topic	Resource
Student rights and responsibilities (articles 3.2 and 3.3) Changes to evaluation plan in the course outline (article 5.3) Religious holidays (articles 3.2.13 and 4.1) Cheating and plagiarism (articles 9.1 and 9.2)	Policy 7:IPESA - Institutional Policy on the Evaluation of Student Achievement (version: June 12, 2019)
Cheating and plagiarism academic procedure and other resources	Academic Integrity: Cheating and Plagiarism Procedure (version: October 22, 2021) • **You need to log into Omnivox to access the above document** • **For PowerPoint on cheating and plagiarism** refer to the JAC Portal: My JAC Communities / Academic Council / Curriculum Validation Committee (CVC) / Course Outlines -- Reference Documents / Academic Integrity • For link to interactive tutorial on how to cite sources correctly: http://citeit.ccdmd.qc.ca
Code of conduct	Policy 13: Policy on Student Conduct and Discipline Procedures (version: September 21, 2021)