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| **Sections** | CRN 43837 & 43673 (online) | **Credits** | 4 |
| **Classroom** | Building 19, room 132 | **Day & Time** | M, W 8:00–9:50 |

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| --- | --- | --- | --- |
| **Instructor** | Brian Bird | **Office** | Building 19, Room 152 |
| **Office Phone** | 541–463–3024 | **Office Hours** | M–Th 2:00 – 3:00pm |
| **E-mail** | birdb@lanecc.edu |

**Course Description**

This course introduces students to applying object oriented programming to mobile application development and the Android System Devlopment Kit. Cross-platform mobile app developpment will be done using the Mono .NET framework and the Xamarin IDE.

**Learning Outcome**

Design the core logic for a mobile software application. Write, debug, and test the code for the core logic for an application. Design User Interfaces for two platforms. Integrate the UIs with the core logic on two platforms. Evaluate mobile app designs and architectures in terms of user experience, performance, and maintainability.

**Course Content**

***Technologies***

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| --- | --- | --- |
| C# | Xamarin Studio | Mono (.NET) framework |
| Android APIs | AXML (Android declarative UI) | SQLite |
| Android Emulators | Android SDK | UI Controls & Widgets |

***Concepts***

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| --- | --- | --- |
| Cross platform development | Android Activity lifecycle | Cross platform architecture |
| Mobile UI design | Separation of concerns | Android application architecture |
| Android Services | Using device resources | Native apps vs. Web apps |

***Skills***

|  |
| --- |
| Use Xamarin Studio to write, compile and run C# Android applications. |
| Test and debug Android applications using the Android emulator and on Android devices. |
| Design and create Android UIs using AXML and the Xamarin Studio UI designer. |
| Design and create apps that consume web services |
| Use Android device resources such as the file system, GPS, and camera in your apps |
| Read and write data using SQLite in your apps |

**Learning Resources**

***Texts***

There is no textbook required for this class. We will be using resources provided on the Xamarin Web site: <http://developer.xamarin.com/guides/cross-platform/getting_started/introduction_to_mobile_development/>

Optional textbooks:

Murach, Joel, Murach's Android Programming (2nd Ed). 2015. Murach. ISBN 978-1-890774-93-6

Reynolds, Mark. *Xamarin Mobile Application Development for Android.* 2014. Packt.

***Course Web Site***

<http://classes.lanecc.edu> is the address for the LCC Moodle site. Course learning materials and activities will be managed through the course Moodle page.

***Computers and Tablets***

Computers with Xamarin Studio, Visual Studio, and the an Android Emulator are provided in the classroom. There are also Google Nexus 7 tablets with Android available for student use in the classroom. Students may also bring their own computers and Android phones or tablets for use in class.

Computers with the software required for the course are also available to all students in the CIT Main Lab on campus.

You may install all the software needed for this course on your own computer. On a Windows PC, you must have Windows 7, 8.1 or 10. On a Mac you need at least OS-X 10.10 (Yosemite). Unfortunately, there is no Xamarin Android development environment available for Linux.

***Software and licenses***

Xamarin Studio is the IDE (Integrated Development Environment) to use on the Mac OS. Xamarin Studio is free and can be downloaded from <http://xamarin.com/download>.

[Visual Studio Community Edition](https://www.visualstudio.com/vs/community/) (free) or Visual Studio Professional (or higher) is the IDE for use on Windows. The professional edition is available to CIT students. It can be obtained by downloading it from Microsoft Imagine Premium or students may borrow installation DVDs from the CIT computer lab.

Microsoft also provides an [Android Emulator for Visual Studio](https://www.visualstudio.com/vs/msft-android-emulator/) which is faster and easier to use than the emulator in the Android SDK. It requires Windows 10.

The Xamarin.Android license is free for individuals and small teams.

**Learning Activities**

***Lab Assignments***

These are programing projects that you will do on your own- either using the computers and software in the CIT lab, or using your own computer and software. Students will submit both a *beta* version and a *release* version of the software solution for each lab assignment. The *beta* version should be essentially complete. “Complete” means having working code that fulfill all the core requirements for the assignment, but it does not need to be bug free. The *release* version should fulfill all requirements and be bug fee.

***Code Reviews***

Students will be paired with a code review partner. The partners will evaluate each-other’s coding practices as well as the functionality of each software solution. Students will use input from the code review to revise their code prior to submitting the *release* version of their software solution.

***Quizzes***

Weekly quizzes are given over the reading and exercises in the textbook as a way to focus students on the most important concepts in textbook chapters covered.

***Term Project***

The requirements for the term project will be presented during the first week of class.

***Weekly Learning Activities***

* *Tuesday by 11:55 pm*
  + *Finish this week's reading and take the Quiz*
  + *Complete a code review of last week's lab app for your partner*
* *Saturday by 11:55 pm*
  + *Send the beta version of this week's lab app to your code review partner*
  + *Submit the release version of last week's lab app*

**Assessment and Grading**

Specific grading criteria will be applied to each of the labs, quizzes, and exams you will be working on in this class.

The table below summarizes the percentage of your total grade given for each assessment task:

|  |  |  |
| --- | --- | --- |
| **Learning & Assessment Activities** | **Number** | **Total Percentage** |
| ***Labs (release version)*** | 9 | 40% |
| ***Code Reviews*** | 9 | 10% |
| ***Quizzes*** | 9 | 10% |
| ***Term Project*** | 1 | 40% |

Letter grades for the course will be determined by the following percentages:

|  |  |  |  |
| --- | --- | --- | --- |
|  | ***-*** |  | ***+*** |
| *A* | 90 - 91 | 92 – 97 | 98 - 100 |
| ***B*** | 80 - 81 | 82 – 87 | 88 - 89 |
| ***C*** | 70 – 71 | 72 – 77 | 78 - 79 |
| ***D*** | 60 - 61 | 62 – 67 | 68 - 69 |
| ***F*** | Below 60 | | |

***Late Work***

* Grades for code reviews will be reduced by 20% if either the beta version or code review are submitted late.
* Grades for lab release versions submitted after the due date will be reduced by 10%
* Quizzes and exams cannot be taken after the due date. Plan ahead! Exceptions will only be made for illness or emergency situations.

***Academic Honesty***

While students are encouraged to discuss labs and to use each other as resources, each student is responsible for his/her own work. In other words you can help each other, but you can’t copy any part of someone else’s work. The end product must be each student’s own individual work.

***Attendance***

Attendance is not graded, but to succeed, you must engage in the lectures and participate in class activities either online or in the classroom.

***No Show Drop***

The college’s “no show, drop” policy requires that: during the first week, on-campus students must physically attend at least one class session. Online students must complete at least one activity (a quiz or assignment) otherwise the student will be dropped from the class.

***Academic Calendar for Spring Term 2017***

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| --- | --- | --- |
| Term begins | 4/3/17 |  |
| Last day to receive refund | 4/19/17 |  |
| Spring Conference, College closed | 5/5/17 |  |
| Last day for schedule changes | 5/26/16 |  |
| Memorial Day holiday | 5/29/16 |  |
| Finals week | 6/6/16 - 6/11/16 |  |

***Accessibility and Accommodations***

To request accommodations contact the Center for Accessible Resources at (541) 463-5150 or AccessibleResources@lanecc.edu

Please be aware that any accessible tables and chairs in this room should remain available for authorized students who find that standard classroom seating is not usable.

*Table 1: Tentative Schedule*

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| --- | --- | --- | --- | --- |
| **Week** | **Topics** | **Reading** | **Assignments** | **Due** |
| **1**  4/2 – 4/8 | Intro to the Xamarin mobile platform.  Android application development.  Android project resources.  C# new and review topics | [Intro to Mobile Development](http://developer.xamarin.com/guides/cross-platform/getting_started/introduction_to_mobile_development/)  [Setting up the Developer Tools](http://developer.xamarin.com/guides/android/getting_started/installation/)  [Intro to Android Development](http://developer.xamarin.com/guides/android/getting_started/hello,android/)  [Android Resources](http://developer.xamarin.com/guides/android/application_fundamentals/resources_in_android/) | Reading quiz 1  Lab 1: Hello Android   * Beta * Code review * Release | 4/3  4/8  4/11  4/15 | |
| **2**  4/9 – 4/15 | Multi-screen applications  Intent objects and LaunchMode  C# new and review topics | [Multiscreen Apps](http://developer.xamarin.com/guides/android/getting_started/hello,android_multiscreen/) | Reading quiz 2  Lab 2: Multi-screen apps: Poke-a-screen, 99 Bugs   * Beta * Code Review * Release | 4/11  4/15  4/18  4/22 |
| **3**  4/16 – 4/22 | More on the Activity life-cycle  Saving and restoring Activity state | [Activity Lifecycle](http://developer.xamarin.com/guides/android/application_fundamentals/activity_lifecycle/) | Reading quiz 3  Lab 3: Activity lifecycle app: Random Quotes, Who said it quiz,   * Beta * Code Review * Release | 4/18  4/22  4/25  4/29 |
| **4**  4/23 – 4/29 | Displaying data in lists | [ListViews and Adapters](http://developer.xamarin.com/guides/android/user_interface/working_with_listviews_and_adapters/) | Reading quiz 4  Lab 4: ListView app – Tide table v1   * Beta * Code Review * Release | 4/25  4/29  5/2  5/6 |
| **5**  4/30 – 5/6 |  |  | * Term Project Proposal | 5/11 |

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| --- | --- | --- | --- | --- |
| **6**  5/7 – 5/13 | UI Layouts and Orientation | [User Interface](https://developer.xamarin.com/Guides/android/User_Interface)  (Section on Layouts) | Reading quiz 5  Lab 5: layout and orientation – Pig game v1   * Beta * Code Review * Release | 5/9  5/13  5/16  5/20 |
| **7**  5/14 – 5/20 | UI Fragments  *Brian will be at Google I/O this week* | [Fragments](http://developer.xamarin.com/guides/android/platform_features/fragments/)  [ActionBar UI Element](http://developer.xamarin.com/guides/android/user_interface/actionbar/) ? | Reading quiz 6  Lab 6: Fragments app – Pig game v2   * Beta * Code Review * Release | 5/14  5/20  5/23  5/27 |
| **8** 5/21 – 5/27 | Data access with SQLite  Read Ch. 3 | [Managing SQLite Data](http://developer.xamarin.com/guides/cross-platform/application_fundamentals/data/) | Reading quiz 7  Lab 7: SQLite Database – Tide table   * Beta * Code Review * Release | 5/23  5/27  5/30  6/3 |
| **9**  5/28 – 6/3  *Memorial Day* | Consuming web services  *No class on Monday 5/29* | [Intro to Web Services](http://developer.xamarin.com/guides/cross-platform/application_fundamentals/web_services/) | Reading quiz 8  Lab 8: Web Service – Tide table   * Beta * Code Review * Release | 5/30  6/3  6/6  6/10 |
| **10**  6/4 – 6/10 | Using Android device resources  Geolocation | [Maps and Location](http://developer.xamarin.com/guides/android/platform_features/maps_and_location/) | Term Project: beta  Reading quiz 9  Code Review  Extra credit: Lab 9: Geolocation | 6/5  6/6  6/7 |
| **11**  6/11 - 6/17 | Present term projects |  | Term project: Release version | 6/12 |