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| --- | --- | --- | --- |
| **Sections** | CRN 33367 on campus, CRN 33368 online | **Credits** | 4 |
| **Classroom** | Building 19, room 132 | **Day & Time** | M, W 12:00–11:50 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Instructor** | Brian Bird | **Office** | Building 19, Room 152 |
| **Office Phone** | 541–463–3024 | **Office Hours** | M, W 2:00 – 3:00 |
| **E-mail** | birdb@lanecc.edu | **Lab Hours** | Tu, Th 2:30 – 4:30 |

**Course Description**

This course introduces students to applying object oriented programming to mobile application development using the Android SDK (System Devlopment Kit). Cross-platform mobile app developpment will be done using the Xamarin framework and Visual Studio.

**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 that interoperate with the core logic. Evaluate mobile app designs and architectures in terms of UX (User eXperience), performance, and maintainability.

**Time Commitment**

Since this is a 4-credit class, you will need to spend 4 hours a week in class or engaging with content online and 8 hours a week studying, taking quizzes, writing code and doing code reviews. This comes to a total of 12 hours a week for the typical student.

**Course Content**

***Technologies***

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

***Concepts***

|  |  |  |
| --- | --- | --- |
| 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 Visual 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, database and GPS 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](https://developer.xamarin.com/guides/android/getting_started/).

Optional textbooks:

Murach, Joel, [*Murach's Android Programming* (2nd Ed)](https://www.murach.com/shop-books/mobile-development-books/murach-s-android-programming-2nd-edition-detail). 2015. Murach. ISBN 978-1-890774-93-6

Reynolds, Mark. [*Xamarin Mobile Application Development for Android*](https://www.packtpub.com/application-development/xamarin-mobile-application-development-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 Visual Studio, and an Android Emulator are provided in the classroom. There are also Google Nexus 7 Android tablets 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 in building 19, room 135.

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 Visual Studio Android development environment available for Linux.

***Software and licenses***

[Visual Studio Community Edition](https://www.visualstudio.com/vs/community/) (free) or Visual Studio Professional (or higher) is the IDE we will use. It is available for both Mac OS and Windows. The professional edition is available to CIT students. It can be obtained by downloading it from [LCC’s Microsoft Imagine Premium web site](https://lcc-edu.onthehub.com/WebStore/ProductsByMajorVersionList.aspx). 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 posted on Moodle.

***Weekly Learning Activities***

* *Monday by midnight*
  + *Review your lab partner’s code*
  + *Start this week’s reading*
  + *Start this week’s lab project*
* *Wednesday by midnight*
  + *Take the reading quiz*
* *Saturday by midnight*
  + *Post a beta version of this week's lab app for your lab partner to review*
  + *Submit the release version of last week's lab app*

Example: Activities and deadlines for the first two weeks

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Week | Sun | Mon | Tu | Wed | Th | Fri | Sat. |
| 1 |  | Start week 1 reading  Start lab 1 |  | Reading quiz due |  |  | Lab 1 beta due |
| 2 |  | Lab 1 code review due  Start week 2 reading Start Lab 2 |  | Reading quiz due |  |  | Lab 1 release due  Lab 2 beta due |

**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** | **% each** | **Total %** |
| ***Labs*** | 8 | 5% | 40% |
| ***Code Reviews*** | 8 | 1% | 8% |
| ***Quizzes*** | 8 | 1% | 8% |
| ***Midterm and final exams*** | 2 | 12% | 24% |
| ***Term Project*** | 1 | 20% | 20% |

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

|  |  |  |  |
| --- | --- | --- | --- |
| **Letter** | ***-*** |  | ***+*** |
| *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 25% 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%
  + Late labs 1 – 3 will only be accepted before the midterm exam.
  + Late labs 4 – 8 will only be accepted before the final exam.
* 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 in person or via live or recorded video
* 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 Winter Term 2018***

|  |  |  |
| --- | --- | --- |
| Term begins | 1/8/18 |  |
| Last day to receive refund | 1/14/18 |  |
| Martin Luther King Jr. holiday – college closed | 1/15/18 |  |
| Presidents Day holiday – college closed | 2/19/18 |  |
| Last day for schedule changes | 3/2/18 |  |
| Finals week | 3/19/18 – 3/24/18 |  |

***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*

|  |  |  |  |
| --- | --- | --- | --- |
| **Week** | **Topics** | **Reading** | **Assignments Due** |
| **1**  1/7 – 1/13 | 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   * Group A: Reset button * Group B: Extra label and button |
| **2**  1/14 – 1/20  No class on Monday, MLK Day | Multi-screen applications  Intent objects and Activity Lifecycle  C# new and review topics | [Multiscreen Apps](http://developer.xamarin.com/guides/android/getting_started/hello,android_multiscreen/)  [Activity Lifecycle](http://developer.xamarin.com/guides/android/application_fundamentals/activity_lifecycle/) | Reading quiz 2  Lab 2: Multi-screen apps – beta version   * Group A: 99 bugs * Group B: Let’s Make a deal   Lab 1 Code review and release version |
| **3**  1/21 – 1/27 | More on the Activity life-cycle  Saving and restoring Activity state  UI Layouts and Orientation | [User Interface](https://developer.xamarin.com/Guides/android/User_Interface)  (Section on Layouts) | Reading quiz 3  Lab 3: layout and orientation app – beta version   * Group A: Pig with 8-sided die * Group B: Pig with 6-sided die   Lab 2 Code review and release version |
| **4**  1/28 – 2/3 | UI Fragments | [Fragments](http://developer.xamarin.com/guides/android/platform_features/fragments/)  [ActionBar UI Element](http://developer.xamarin.com/guides/android/user_interface/actionbar/) ? | Reading quiz 4  Lab 4: Fragments app – beta version   * Group A: Pig with 8-sided die * Group B: Pig with 6-sided die   Lab 3 Code review and release version |
| **5**  2/4 – 2/10 | Midterm |  | Start term project |

|  |  |  |  |
| --- | --- | --- | --- |
| **6**  2/11 – 2/17 | Displaying data in lists | [ListViews and Adapters](http://developer.xamarin.com/guides/android/user_interface/working_with_listviews_and_adapters/)  Intro to Web Services | Reading quiz 5  Lab 5: ListView app – beta version   * Tide prediction app using pre-written web service code   Lab 4 Code review and release version |
| **7**  2/18 – 2/24  No class on Monday, Pres Day | Data access with SQLite | [Managing SQLite Data](http://developer.xamarin.com/guides/cross-platform/application_fundamentals/data/) | Reading quiz 6  Lab 6: SQLite Database – beta version   * Tide prediction app   Lab 5 Code review and release version |
| **8** 2/25 – 3/3 | Consuming web services | [Maps and Location](http://developer.xamarin.com/guides/android/platform_features/maps_and_location/) | Reading quiz 7  Lab 7: Geolocation – beta version   * Tide prediction app   Lab 6 Code review and release version |
| **9**  3/4 – 3/10 | Using Android device resources  Geolocation |  | Reading quiz 8  Lab 8: Publishing to the Google Play Store   * Practice publishing   Lab 7 Code review and release version  Term project beta version |
| **10**  3/11 – 3/17 | Work on term projects  Present term projects |  | Term project code review and release version  Publish term project to the Google Play Store |
| **11**  3/18 – 3/21 | Final Exam |  |  |