CS 646 Syllabus

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Office Hours: 3:15-5:15 pm Tuesday, Thursday, 10 am - noon Friday

Course Objectives: Learn the basics of developing iOS apps.

Course WWW Site: The course website is in the SDSU Blackboard system. SDSU students can access it through their SDSU portal. It can also be accessed at: https://blackboard.sdsu.edu/

Texts:

- The Swift Programming Language (Swift 3), Apple Inc. Free on iBooks
- Beginning iPhone Development with Swift 2: Exploring the iOS SDK 2nd ed. David Mark, Jack Nutting, Kim Topley, Fredrik Olsson, Jeff Lamarche, Apress, 2015, 978-1484204108

The mobile development is changing rapidly. Each year Apple releases a new version of iOS and updated versions of their development tools. As a result books tend to be slightly out of date when they are published. For the most part this does not matter as the basics remain the same. You do need to pay attention to the version of Xcode you are using and the version of Xcode discussed in the textbooks. If the versions are different beware that some of menu items may be different between the versions of Xcode. Sometime during the semester Apple is making major changes to iOS and Xcode. This will impact the course. The new version of Xcode has some important improvements. Two years ago Apple released a new language called Swift. This year they released Swift 3 and Xcode 8. Swift 3 is not that different from Swift 2. However the naming convention for Apple’s Swift libraries have changed in Swift 3.

Prerequisites: The course assumes that you have some programming experience in a C based programming language (Java, C, C++ or C# ) and that you have some experience working with APIs in a C based programming language. You will be developing applications for iPhone/iPod touch/iPads. This involves designing and building GUIs and using SQL databases. While prior experience with GUIs and SQL databases are not required prior experience will be very useful in the course.

No prior knowledge of Swift, iOS development or mobile development is needed.

Required Hardware: The recommended hardware/software for the course is a Macintosh computer running El Capitan (Mac OS 10.11). These are required to run the current version of
Apple’s tools for developing iPhone applications. During the semester Apple will release Xcode 8 which requires Mac OS 10.11. An iOS device (iPhone, iPad, iPod Touch) for testing your apps is not required but is strongly recommended.

**Apple Developer Program:** Apple has a developer program for iOS developers which costs $100 per year. You do not need to sign up as a developer with Apple for this course. Everything that you will do in this course is now free without using the paid developer account.

**Grading:** Your grade will be based on one exam (20% of your grade) assignments (60% of your grade), a project (20%). The course will be graded on 1,000 points. The exam will be on Sept 27. There will be 6 assignments. Tentative due dates for the assignments are Sept 9, Sept 18, Oct 2, Oct 16, Nov 6, and Nov 20. The project is due Dec 20.

**Exams & On-line Students:** There will be one exam in the course. The on-line students need to find someone to proctor the exam for them. Local libraries and local colleges often have a service that proctors exam for on-line students. Also religious organizations often will also proctor exams. Once you have identified who will proctor your exam please send their contact information to the instructor (Roger Whitney).

**Learning Objectives:**
- Be able how to design, structure and develop an app for iPhone and iPad
- Be able to a GUI interface that runs on multiple size screens
- Utilize IDE to debug apps and find performance bottlenecks
- Utilize database and network as data sources for apps
- Utilize common mobile app design patterns in iOS app
- Be able to read API documentation to use new APIs in an app

**Dropping the course.** The following is from the CES website from [http://www.ces.sdsu.edu/Pages/Engine.aspx?id=64#refund](http://www.ces.sdsu.edu/Pages/Engine.aspx?id=64#refund). If you drop this course CES will refund part of your fees depending on when you drop the course. If you drop the course at least one day before the first time the class meets you will receive a full refund minus $17 administration fee. If you drop the course after the first meeting of the class but before 25% of the course time as elapsed you will receive 65% of your fees back minus $17 administration fee. After this date you will not receive refund if you drop the course. If you wish to drop this course to take another of the Certificate course this semester you can do so without any penalty. If you have questions about this and other issues related to CES please contact the CES registration office at 619-594-5152.

**Late Policy:** Late homework will be accepted, but with a penalty. An assignment turned in 1-7 days late, will lose 3% of the total value of the assignment per day late. The eight day late the penalty will be 40% of the assignment, the ninth day late the penalty will be 60%, after the ninth day late the penalty will be 90%. Once a solution to an assignment has been posted or discussed in class, the assignment will no longer be accepted. Late penalties are always rounded up to the next integer value.

**Crash Policy:** The last day to add this course is Sept 4.

**Cheating:** Any one caught cheating will receive an F in the course and they will be reported to the SDSU Judicial Procedures Office.
**Course Project:** Due December 20. There is a course project required for this course. You can work on the the course project by your self or in teams of two people. Teams larger than 2 are not allowed. You are to come up with an idea for an iPhone or iPad application and implement the application. Your project will be evaluated using the following criteria:

1. **Originality (5 points)**
   How original is the idea and/or implementation of the project.

2. **Size of project (20 points)**
   Is the project an appropriate size for a semester project. A project that is too large is as bad as a project that is too small. The project should be larger in scope than an assignments in the course? The project should take longer than 2-3 week to design and implement?

3. **Quality of UI (80 points)**
   The app should follow the Apple UI guidelines for iOS apps. How well does the app follow users mental model of how the app should work. Are the UI elements used effectively or not? Is the app UI structured in a way to make it easy to use and understand. Is the text used in menus, labels, buttons, etc. concise and have clear meaning?

4. **Working code (75 points)**
   Do the features implemented work. All UI elements should actually do what they are supposed to do? Are features fully or only partially implemented. Does the app have enough features to actually do something. Does the app run? Are there bugs and memory leaks? Does the app crash?

5. **Quality of code (20 points)**
   The code should be formatted in a reasonable and consistent manner. Names of classes, methods and variables should understandable and follow standard naming conventions. The code should be clear and well organized. The code should be appropriately documented.

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**Disabled Students:** If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to contact Student Disability Services at (619) 594-6473. To avoid any delay in the receipt of your accommodations, you should contact Student Disability Services as soon as possible. Please note that accommodations are not retroactive, and that accommodations based upon disability cannot be provided until you have presented your instructor with an accommodation letter from Student Disability Services.

**Topics covered in the course:**

Swift
Swift is a very new language. We will cover Swift from the beginning. Basic data structures, control structures, let, var, optionals, enumerations, classes, structures, functions, generics, guards, closures, reduce, map, properties, extensions, protocols

Xcode 7 & 8
Xcode 7 & 8 will be used in the course. The course will spend a little time looking at Xcode IDE and the parts needed to develop apps - the editor, debugger, UI builder and Instruments. You are encouraged to start with Xcode 8.

UI design
Development teams for mobile applications tend to be small. So developers are often involved in UI design. Some background in UI design will be covered - affordance, conceptual models, feedback, information structure. Parts of the iOS Human Interface Guidelines will be examined.

iOS API
The vast majority of the course will be spent covering the basics of the iOS API needed to develop apps. Topics listed below correspond to chapters 1-17 in Beginning iPhone 7 Development. Topics will be covered in the order listed.

  - Model-View-Controller
  - Connecting views and controllers - xib files, outlets, actions
  - Application delegate
  - Basic views and controllers
    - Text fields, sliders, switches, buttons, segmented controls, action sheets, alerts
    - Autorotation, autosizing, Adaptive Layouts
  - Testing
  - Multiview applications
  - Tab bars and pickers
  - Table Views
  - Navigation controllers
  - iPad views - split views and popovers
  - Application settings
  - Data Persistence
    - Files, Property lists, SQLite3, Core Data
  - Background Processing (Grand Central Dispatch)
  - Drawing
  - Taps, Touches, Gestures
  - Location
  - Motion
  - Localization