Department of Computer and Electrical Engineering and Computer Science
Florida Atlantic University
Course Syllabus

1. Course title/number, number of credit hours	
Software-Hardware CoDesign, CEN 4214	3 credit hours

2. Course prerequisites, co requisites, and where the course fits in the program of study
Prerequisites: Programming or Permission of the Instructor

3. Course logistics
Term: summer 2012 This is an eLearning course with a significant component of team-based application development. Prof. McAfee, Arts & Letters, is teaching a related eLearning course this semester to his students. The intent is to team up to two of our students with up to two of his students. Both of us will train our students during the first half of the semester, with the projects slated to be undertaken during the second half of the semester. All the essential lectures will be held during the first half of the semester, with the second half focused on advanced topics, project and help sessions. Thus, it will be more intensive than a typical class during the first half of the semester, so you are fully prepared to start your App development during the second half. Many students like this since their work load from other courses increases during the second half of the semester. A mid-term exam will be held to ensure that you understand the material. Students, typically from CE and CS, take this course. There will be 4 on-campus visits on Saturdays/Tuesdays, every 3 weeks, to present project progress and give feedback to peer groups on their progress. The course will end with demos in front of a group of well-respected graphics and engineering professionals. *Class location and time*:   On Line Sessions, T (7 to 8.30PM); R (10 AM to 11.30 AM); Sa (10 AM to 11.30 AM) This course is designed to be a design course where students specify, design top-down, use existing/ built components via their APIs, experiment with, and implement systems that function and provide aesthetics.

4. Instructor contact information	
Instructor's name *Office address* *Office Hours* *Contact telephone number* *Email address*	Dr. R. Shankar, Professor, in collaboration with Prof. McAfee, Arts & Letters Engineering East (EG-96) Bldg., Room 513 MW 1 to 2.30 PM (available on-line during these hours and additional hours as time permits, mostly during evening and weekend hours). 561-297-3470 shankar@fau.edu

5. TA contact information **None**	
None	

6. Course description
Top-down design methodology for mobile based application development using Android Mobile Platform, Java, and XML

7. Course objectives/student learning outcomes/program outcomes	
Course objectives	This course is designed to help students develop and prototype Android-based mobile applications. XML, Java (mostly APIs), C, and the Google Phone are used in designing and prototyping. We will focus on game App, rich with graphics.

Student learning outcomes & relationship to ABET a-k objectives: *We believe that our course addresses all of the ABET sub-criteria a-k.*	(a) an ability to apply knowledge of mathematics, science, and engineering (b) an ability to design and conduct experiments, as well as to analyze and interpret data (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability (d) an ability to function on multidisciplinary teams (e) an ability to identify, formulate, and solve engineering problems (f) an understanding of professional and ethical responsibility (g) an ability to communicate effectively (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context (i) a recognition of the need for, and an ability to engage in life-long learning (j) a knowledge of contemporary issues (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

8. Course evaluation method

10 Team Quizzes (drop lowest 2) 24% 1 Mid Term Exam 16% 5 Project Assignments 20% Design Report and Documentation 15 % Demo, Presentation, and Marketing Video 25% Android Community Service (bonus) 10%	*Note*: The minimum grade required to pass the course is C.

9. Course grading scale

Grading Scale: It will not be based on a curve. Expected distribution is given below:
96 and above: "A", 92-95: "A-", 88-91: "B+", 84-87: "B", 80-83 : "B-", 76-79: "C+", 72-75: "C", 68-71: "C-",
63-67: "D+", 60-62: "D", 51-59: "D-", 50 and below: "F."

10. Policy on makeup tests, late work, and incompletes

There is a mid-term test in this course. The students will demonstrate their functioning systems at the end of the semester in front of a group of professionals. During the semester, a group of professors/professionals from different disciplines (such as engineering, arts, humanities, and business) will review progress and advise. These other professors are expected to have one or more concurrent courses; students in those courses will address related issues from their perspective, and help our engineering students, as appropriate. The ultimate goal is to develop marketable applications that have high impact.

A grace period of 1 week is allowed for submission of assignments. Two lowest score quizzes will be dropped.

Incomplete grades are against the policy of the department. Unless there is solid evidence of medical or otherwise serious emergency situation incomplete grades will not be given.

11. Special course requirements

Students have to work together, across disciplines. That requires certain amount of communication and effort. For technology requirements, see item 21 below. The eLearning aspect adds to the challenge this summer 2012.(Update: We are addressing this with the help of twice as many on-line sessions and a help session which are all taped and made available. The feedback we have received so far has been positive).

12. Classroom etiquette policy

Students have to use laptops in the class to conduct tool installation, training, programming, etc . Also, classes will be more problem solving oriented – you will be asked to read and try out tutorials ahead of time. There will be significant interaction among the students and the professor during the on-line class, on a basis to solve problems and gain deeper insight. This will be tested in a weekly quiz in the following week. So, have your laptop ready and be prepared to use it during the lectures. Here is a site with Net Etiquette rules: http://www.albion.com/netiquette/corerules.html - please familiarize yourself with it.

13. Disability policy statement

In compliance with the Americans with Disabilities Act (ADA), students who require special accommodations due to a disability to properly execute coursework must register with the Office for Students with Disabilities (OSD) located in Boca Raton campus, SU 133 (561) 297-3880 and follow all OSD procedures.

14. Honor code policy

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high quality education in which no student enjoys unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and place high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. See University Regulation 4.001 at www.fau.edu/regulations/chapter4/4.001_Code_of_Academic_Integrity.pdf

We will use mostly open source tools. Much code, reference designs, etc., are freely available at many sites on line, including our own, android.fau.edu, and that of Google, d.android.com. However, some code and graphics assets may be copyrighted and/or licensed. If so, appropriate permission must be taken before using these. They also should be acknowledged in the list of references in the report submitted and in the credits section of the App developed.

15. Required texts/reading

 Murphy, M. L., The Busy Coder's Guide to Android Development, CommonsWare, 2011. This was made available free of cost by the publisher and author for our course.

16. Supplementary/recommended readings

Burnette, E., Hello Android: Introducing Google's Mobile Development Platform, The Pragmatic Bookshelf, Raleigh, NC 2010, ISBN: 1934356565

d.android.com and   http://android.fau.edu/ - this course is based on open source tools

17. Course topical outline, including dates for exams/quizzes, papers, completion of reading

1. Android Introduction: High level Android Overview; Installing the MotoDev/Android SDK and Eclipse Plug-in; and general design considerations
2. Intro to Java: Basic Java concepts; Java API, Java Doc, Jars, and JUnit.
3. Intro to XML: Basic XML concepts on tree, syntax, elements, and attributes
4. Application components and Lifecycle
5. User Interface Design: Views, Layouts, Widgets (List, Button, etc.), Menus
6. Discussion on games, storyboarding, and Balsamiq mockups
7. Bluetooth protocol and 2D Graphics
8. Open GL: The Java and native ways
9. NDK and C code integration with Java

Note: Android uses the MVC (model-view-control) paradigm for design. Java program is used to model the functionality, with XML typically used for layout (or user interface) creation (that is, for the view part of it), and Android's Intent class used to convey the user intention or control (such as a button press) from the layout to the program

Dates: Team Quizzes- During Weeks 3 to 12, once per week

Mid-Term exam – Week 7 (1 hour)

Project Assignments – Weeks 8 to 11, one per week

Design Report and Documentation – Due on last Friday of the Final Exam week

Demo, Presentation, & Marketing Video – on Exam day at scheduled time (20 minutes)

18. Technical Resolution Policy - You will be using Blackboard tools for communication. On the Welcome page, once you log in, you have the option to Submit a Ticket (see on the left hand side) to the Online Support Center. They may also be reached at 561-297-3999. However, they will not be able to help you with the installation and use of the tool suite used in the class. We have excellent tutorials at android.fau.edu and many on-line sites. First try these things and if you still have difficulties, feel free to contact Dr. Shankar.

19. Test Policy – (1) The Quizzes will be available on-line. The team can collaborate and respond to these. These will typically require the use of tools, references, and resources to answer questions on programming, debugging, testing, application components, software engineering, system design, etc., as pertinent to that week's material covered and/or that week's project focus. These are expected to take about 1 hour to discus and respond. **(2)** The Mid Term exam will be one hour long and will be individual. It is meant to ensure that you understand the basic principles before you undertake App development. It will be open notes, open book, and available on-line over a 24 hour period. Questions will be drawn from a large pool of multiple choice and fill-in-the-blank types of questions. They will be randomly assigned to you when you sign in. You will be able to pause and continue the exam – but plan on being available continuously for about 1.5 hours, assuming you will take breaks in-between. It will not be timed. **(3)** The project assignments will help you develop your project in stages, viz., storyboarding, technical mockups, system design, coding, and report generation. Sufficient examples from previous semesters will be made available. These are group oriented assignments – the graphics students will help you, as you may have to help them a bit with their graphics oriented assignments. Each will either be an on-campus / on-line presentation in front of other student groups and/or faculty members involved. If a presentation, they will last about 20 minutes per team. If a report, it probably will be about 10 to 15 slides/pages for the submission. **(4)** Design Report will be a 6 to 7 page report written in the style of a conference paper, which may get submitted to a conference. Documentation is expected to document all the work accomplished (slides, assets, code, test suites, marketing video, demo, etc.,) so we have all the material to market the App and improve upon it. These are due at the end of the semester, three days before the grades are to be posted. **(5)** Demo, Presentation, and Marketing Video – These are due on the final exam day at the exam time – your group will make a 20 minute presentation on campus. **Final Note: All on-campus meetings are geared to get all the students from both the courses together in one place – so, you can hear and be heard, in terms of progress being made. Your feedback will help other teams to improve their work. We expect to assign some extra points to you if you provide constructive ideas /**

useful resources for other teams. This help is welcome during the semester too – for example, you might find a new good tutorial on a particular aspect. Post it at the Blackboard discussion site and get extra points. We call this "Android Community Service" in our grading scheme. This is worth 10% of the grade, as bonus.

20. Other Important Information - This is an eLearning course with strong emphasis on projects. You will be developing a marketable smart phone App. We have much experience in this area, having taught 360+ students during the past 2+ years. We expect that mainly computer engineering and computer science students will register for this course.

We have focused on three areas of hot job growth in designing this course (Software engineering, System design, and App development). Visit http://www.bls.gov/oco/ocos303.htm - this is a US Federal Government website for labor statistics. Scroll down - note that during 2008 to 2018, there will be a net loss of 3% in programming jobs; on the other hand, jobs for software engineers, App developers, and systems software will rise by 30+%. This is not a programming course, but an App Development course.

As with any field, to be successful, you will have to work with professionals in other fields. We will facilitate that in this course as well. Prof. McAfee, Arts & Letters, is teaching an eLearning course on graphics design to his students. Our intent is to team up to 2 of our engineering students with Work with up to 2 of his students. The intent is to develop Apps with both functionality and aesthetics.

I have prepared a list of FAQs under the title "Prerequisites and Expectations." It is posted on the 'Start Here' page of the Blackboard site. Please post your questions/concerns there. I will respond soon after.

We plan to market these Apps, as per FAU's IP policy: see http://www.fau.edu/research/techtransfer/techoverview.php .

By the end of Week 1, you should have posted your biosketch (so as to ease the process of team formation) and signed two forms (photo and video release form and IP release form). Details will be provided in the Week 1 folder. You should also take the Orientation test and pass the test with 100% score. This will ensure that we have divulged all the aspects of this course ahead of time and you have read and agree with those aspects.

21. Technology Requirements:
General System Requirements for Android SDK
Supported Operating Systems
- **Windows XP (32-bit) or Vista (32- or 64-bit) or Windows 7**
- **Mac OS X 10.4.8 or later (x86 only)**
- **Linux (tested on Linux Ubuntu Hardy Heron)**
    - **64-bit distributions must be capable of running 32-bit applications. For information about how to add support for 32-bit applications, see the Ubuntu Linux installation notes.**

Supported Development Environments
- **Eclipse IDE**
    - **Eclipse 3.4 (Ganymede) or 3.5 (Galileo)**
        - **Note: Eclipse 3.3 has not been tested with the latest version of ADT and support can no longer be guaranteed. We suggest you upgrade to Eclipse 3.4 or 3.5.**
        - **Recommended Eclipse IDE packages: Eclipse IDE for Java EE Developers, Eclipse IDE for Java Developers, Eclipse for RCP/Plug-in Developers, or Eclipse Classic (3.5.1+)**
        - **Eclipse JDT plugin (included in most Eclipse IDE packages)**
    - **JDK 5 or JDK 6 (JRE alone is not sufficient)**
    - **Android Development Tools plugin (optional)**
    - **Not compatible with Gnu Compiler for Java (gcj)**
- **Other development environments or IDEs**

- o <u>JDK 5 or JDK 6</u> (JRE alone is not sufficient)
- o <u>Apache Ant</u> 1.6.5 or later for Linux and Mac, 1.7 or later for Windows
- o Not compatible with Gnu Compiler for Java (gcj)

Note: If JDK is already installed on your development computer, please take a moment to make sure that it meets the version requirements listed above. In particular, note that some Linux distributions may include JDK 1.4 or Gnu Compiler for Java, both of which are not supported for Android development.

Hardware requirements

- For the base SDK package, at least 600MB of available disk space. For each platform downloaded into the SDK, an additional 100MB is needed.

General System Requirements for MOTODEV Studio

MOTODEV Studio for Android is tested for compatibility with the following systems. Although MOTODEV Studio may be compatible with other systems, Motorola offers support only for the systems described below, in terms of backward compatibility. Most current operating systems released during 2011 or earlier should be supported. Use the following info as a guide. The installation tutorial will help you make the final decision.

Microsoft Windows

- Microsoft Windows XP Professional Version 2002 with Service Pack 3
- Java™ Runtime Environment (JRE) 6.0 Update 13
- Intel® Core™ 2 Duo CPU, 2.33 GHz
- 2 GB RAM
- Over 1.5 GB of free disk space (needed to install both MOTODEV Studio for Android and the Android™ SDK and plug-ins from Google; MOTODEV Studio itself only needs 150 MB)

Mac OS X

- Mac OS X version 10.5.7
- Java 2 Runtime Environment, Standard Edition 5.0 32-bit
- Intel Core 2 Duo CPU, 2.4 GHz
- 4 GB RAM
- Over 1.5 GB of free disk space (needed to install both MOTODEV Studio for Android and the Android SDK and plug-ins from Google; MOTODEV Studio itself only needs 150 MB)

Ubuntu Linux

- Ubuntu Linux version 9.0.4
- GNOME version 2.26.1
- Java™ Runtime Environment (JRE) 6.0 Update 14 32-bit
- Intel Core 2 Duo CPU, 2.4 GHz
- 2 GB RAM
- Over 1.5 GB of free disk space (needed to install both MOTODEV Studio for Android and the Android SDK and plug-ins from Google; MOTODEV Studio itself only needs 150 MB)

Fedora Linux

- Fedora Linux version 11
- KDE version 4.2.2
- Java™ Runtime Environment (JRE) 6.0 Update 14 32-bit
- Intel Core 2 Duo CPU, 2.4 GHz
- 2 GB RAM
- Over 1.5 GB of free disk space (needed to install both MOTODEV Studio for Android and the Android SDK and plug-ins from Google; MOTODEV Studio itself only needs 150 MB)

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