

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

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| 1. Course title/number, number of credit hours | |
| Concurrency Modeling, COT 5930 | 3 credit hours |
| 2. Course prerequisites, corequisites, and where the course fits in the program of study | |
| Prerequisites: COP 3530, Data Structures and Algorithms Analysis, or consent of instructor. By Topic : Programming and introduction to Object Oriented design. Knowledge of Java or C++ is not a prerequisite (but most students now-a-days come with Java background). Weekend MSCS course. | |
| 3. Course logistics | |
| <p><i>Term:</i> spring 2012</p> <p>Concurrent programming is needed today, not only for programmers involved with operating systems and embedded real-time applications, but also in other domains such as Internet, Games, Animation, etc. Concurrency is useful in a wide range of applications where responsiveness and throughput are issues. This course will provide a systematic treatment of the concepts and issues in concurrency; a rigorous technique to specify and model concurrent behavior, with analysis tools for animation and verification; and a wide range of design examples.</p> <p><i>Class location and time:</i> First and second Saturday, 9 AM to 5 PM, February 2012</p> | |
| 4. Instructor contact information | |
| <i>Instructor's name</i> <i>Office address</i> <i>Office Hours</i> <i>Contact telephone number</i> <i>Email address</i> | Dr. R. Shankar, Professor and Director, CSI, CEECS, Engineering & Computer Science Engineering East (EG-96) Bldg., Room 513 Saturdays and Sundays, 10 AM to 12 PM, for four weeks after the classes were over, February 18, 2012 on. 561-297-3470/ (561) 306-5625 shankar@fau.edu |
| 5. TA contact information | |
| TA | Sifat Islam, PhD Student |
| 6. Course description | |
| This course makes it practical and accessible to learn about concurrency and concurrent programming, and to combine theory and practice in one common environment. The course will allow students to verify and resolve concurrency issues at a high level of abstraction in a productive and efficient way. | |
| 7. Course objectives/student learning outcomes/program outcomes | |
| <i>Course objectives</i> | This course is designed to help students understand concurrency concepts and develop software that can effectively take advantage of concurrency concepts without incurring concurrency pertinent failures. The tools used help model the software at a high levels of abstraction and reason about safety and progress violations, and improve the model, and hence the code. |
| <i>Student learning outcomes & relationship to ABET a-k objectives:</i> <i>We believe that our course</i> | (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 |

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| <p><i>addresses all of the ABET sub-criteria a-k, but for h and j. These are typically working engineers who are back at our university for an advanced degree – and they are already aware of the criterion (i). The students used state-of-the-art tools (FSP, LTSA, Eclipse, and Android) and applied them to develop effective solutions for today’s multi-core concurrent processing environment.</i></p> | <p>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.</p> |
| 8. Course evaluation method | |
| <p>Four assignments, 25% each. Two to be completed in the class and two were group assignments to be completed within two weeks after the classes ended. An extra group assignment was offered if they wished to improve grades. The class assignments ensured they understood the class material, while the group assignments were challenging and required substantial extra work.</p> | <p><i>Note:</i> The minimum grade required to pass the course is C.</p> |
| 9. Course grading scale | |
| <p>Grading Scale: It will be based on a curve. Expected distribution is given below: 90 and above: "A", 85-89 "A-", 80-84: "B+", 75-79: "B", 70-74 : "B-", 65-69: "C+", 60-64: "C", 55-59: "C-", 50-54: "D+", 45-49: "D", 40-44: "D-", 39 and below: "F."</p> | |
| 10. Policy on makeup tests, late work, and incompletes | |
| <p><i>There are no exams in this course.</i></p> <p><i>A grace period of 1 week is allowed for submission of assignments. One makeup take=-home may be attempted if the other assignment scores are not satisfactory. However, expect this assignment to be challenging and open-ended.</i></p> <p><i>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.</i></p> | |
| 11. Special course requirements | |
| <p>Students have to work together. That requires certain amount of communication and effort.</p> | |
| 12. Classroom etiquette policy | |
| <p>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 class room, on a basis to solve problems and gain deeper insight. So, have your laptop ready and be prepared to use it during the lectures.</p> | |

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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

Concurrency, State Models and Java Programs, by Jeff Magee and Jeff Kramer, 2nd Edition, Wiley, 2006. ISBN: 0-470-09356-0; Also download the LTSA software and run the Applets of several book examples at: <http://www.doc.ic.ac.uk/~jnm/book/>

Assignments 2 and 4 will use material from the Java book listed here: Java – Learning to Program with Robots, by B. W. Becker, U of Waterloo, Canada, Thomson Course Technology, 2007. The book is available in PDF format, along with the robotics library (as a .jar file) at: <http://www.learningwithrobots.com/>. The author has made all of it available free. You will be developing parallel and concurrent versions of the book examples, given certain constraints.

16. Supplementary/recommended readings

Additional Textbook (to be loaned by Dr. Shankar): Hello, Android, by Ed Burnette, The Pragmatic Bookshelf, Raleigh, NC.

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

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1. (Lectures, Labs, and Hands-On Java Applet-based Demos)
2. Object Oriented Design;
3. Concurrency programming with Java (introduction);
4. Processes and Threads; FSP (Finite State Processes) for concurrency notation
5. Concurrent Execution;
6. Shared Objects and Mutual Exclusion;
7. Monitors and Condition Synchronization;
8. Deadlock;
9. Safety and Liveness Properties;

Dates: Two individual assignments on each of the class days, and two take-home group assignments (25% each). Each group will identify the roles (design & test, documentation, and programming; if a fourth student, the student will focus on aesthetics types of enhancements) that each of the members will undertake. Each group must have one of each kind. Bonus: 20% for the better and complete reports, at 5% each. No exams. Assignments 1 and 3 will be completed during the class hours on 2/4 and 2/11 respectively. They will be within the hour on these days. Assignments 2 and 4 will be take-home assignments that need to be completed by 2/26/12 12 AM (mid-night) and 3/4/12 12 AM (mid-night), respectively. I need to review your documentation for Assignment #2 and comment about it during the class on 2/11/12 – submit a draft one day before the second day of classes. Design will make use of UML; test will make use of JUnit; and documentation will make use of javadoc. Eclipse IDE will be used extensively.

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/demos at the authors' sites, android.fau.edu and many other on-line sites. First try these things and if you still have difficulties, feel free to contact Dr. Shankar.