FLORIDA ATLANTIC UNIVERSITY™

Graduate Programs—NEW COURSE PROPOSAL[1]

UGPC APPROVAL _____
UFS APPROVAL _____
SCNS SUBMITTAL _____
CONFIRMED _____
BANNER POSTED _____
CATALOG _____

DEPARTMENT: CEECS | **COLLEGE: ENGINEERING AND COMPUTER SCIENCE**

RECOMMENDED COURSE IDENTIFICATION:
PREFIX COT **COURSE NUMBER** 6716 **LAB CODE** (L or C) _____
(TO OBTAIN A COURSE NUMBER, CONTACT MJENNING@FAU.EDU)
COMPLETE COURSE TITLE: CONCURRENCY MODELING

EFFECTIVE DATE: (first term course will be offered) OFFERED THRICE AS A SPECIAL TOPICS AS SPRING 2013

CREDITS[2]:3

TEXTBOOK INFORMATION: (1) 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/. (2) Java – Learning to Program with Robots, by B. W. Becker, available free in PDF format, along with the robotics library (as a .jar file) at: http://www.learningwithrobots.com/ .

GRADING *(SELECT ONLY ONE GRADING OPTION)*: **REGULAR** __X__ **SATISFACTORY/UNSATISFACTORY** _____

COURSE DESCRIPTION, NO MORE THAN THREE LINES:
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.

PREREQUISITES *: Graduate student; Programming; and COP 3530, Data Structures and Algorithms Analysis or consent of instructor. Background in Java/C++ is preferred.	**COREQUISITES*: NONE**	**REGISTRATION CONTROLS (MAJOR, COLLEGE, LEVEL)*: GRADUATE STUDENTS IN COMPUTER ENGINEERING AND COMPUTER SCIENCE (ENGINEERING).**

* *PREREQUISITES, COREQUISITES AND REGISTRATION CONTROLS WILL BE ENFORCED FOR ALL COURSE SECTIONS.*

MINIMUM QUALIFICATIONS NEEDED TO TEACH THIS COURSE: PHD

Faculty contact, email and complete phone number: Ravi Shankar, shankar@fau.edu, 7-3470	Please consult and list departments that might be affected by the new course and attach comments.[3] NA

Approved by:	*Date:*
Department Chair:	11/27/13
College Curriculum Chair:	11/27/13
College Dean:	12/2/2013
UGPC Chair:	1/22/14
Graduate College Dean:	1-29-14
UFS President:	
Provost:	

1. **Syllabus** must be attached; see guidelines for requirements: *www.fau.edu/provost/files/course syllabus.2011.pdf*
2. Review **Provost Memorandum: Definition of a Credit Hour** *www.fau.edu/provost/files/Definition_Credit_Hour_Memo_2012.pdf*
3. **Consent** from affected departments (attach if necessary)

Email this form and syllabus to *UGPC@fau.edu* **one week before** the University Graduate Programs Committee meeting so that materials may be viewed on the UGPC website prior to the meeting.

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

1. Course title/number, number of credit hours	
Concurrency Modeling, COT ~~6xxx~~ 6716	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 : Data Structures and Programming. Introduction to Object Oriented design and Knowledge of Java or C++ are helpful	
3. Course logistics	
Term: 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, cloud computing, 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. 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.	
4. Instructor contact information	
Instructor's name *Office address* *Office Hours* *Contact telephone number* *Email address*	Dr. R. Shankar, Professor and Director, CSI, CEECS, Engineering & Computer Science Engineering East (EG-96) Bldg., Room 513 561-297-3470/ (561) 306-5625 shankar@fau.edu
5. TA contact information	
TA	None
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. There is much more visible and transparent concurrency in all the web related activities (synchronized web, cloud computing, online collaboration, etc.,) that we all can actually experience (both good and bad aspects - healthcare.gov and some state health exchanges are good examples to study and contrast).	
7. Course objectives/student learning outcomes/program outcomes	
Course objectives	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.
8. Course evaluation method	

Four assignments, 20% each. An extra group assignment was offered if they wish to improve grades. Two class assignments ensure that students understand the class material, while the two take-home group assignments will be challenging and require substantial extra work. A mid-term exam worth 20% will ensure that they understand the material before working on the last group assignment.	

9. Course grading scale

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."

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

There is a midterm exam in this course.

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.

A grade of *incomplete* will be assigned only in the case of solid evidence of medical or otherwise serious emergency situation.

11. Special course requirements

Students have to work together. That requires certain amount of communication and effort.

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 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.

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. URL to be added

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

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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.

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
None

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

Lectures, Labs, and Hands-On Java Applet-based Demos (in parentheses, number of 80 minute lectures)

1. Object Oriented Design- (3 lectures)
2. Concurrency programming with Java (introduction)- (4 lectures)
3. Processes and Threads; FSP (Finite State Processes) for concurrency notation -(3 lectures)
4. Concurrent Execution – (4 lectures)
5. Shared Objects and Mutual Exclusion – (3 lectures)
6. Monitors and Condition Synchronization – (3 lectures)
7. Deadlock – (4 lectures)
8. Safety and Liveness Properties – (4 lectures)

(1) Two individual assignments in the class, and two take-home group assignments (20% 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. (2) A midterm exam worth 20% that will test you on the concepts covered in the class. It will not ask you to write Java code, but may ask you to interpret code for concurrency aspects.
Assignments 1 and 3 will be completed during the class hours during the class periods. They will be completed within the class hours on these days. Assignments 2 and 4 will be take-home assignments that need to be completed within two weeks after being assigned. I need to review your documentation for Assignment #2 and comment about it during a subsequent class. Submit a draft at BB (blackboard) so we can discuss in a subsequent class. Eclipse IDE will be used.

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.