

Syllabus

INTRODUCTION TO SCIENTIFIC COMPUTING (JAVA)

ISC 3313, FALL 2011

- COURSE DESCRIPTION:** This course introduces the student to the science of computations. Algorithms for standard problems in computational science are presented. In this course the programming language Java is used. The basics of this object-oriented programming language are taught to facilitate the student's implementation of algorithms. Aspects of the programming language are taught through a set of standard problems in scientific computing.
- OBJECTIVES:**
1. identify the components of scientific computing;
 2. identify standard problems in scientific computing;
 3. implement basic algorithms for standard problems in computational science using the programming language Java;
 4. write, debug, and verify computer codes;
 5. output results of computer simulations in a meaningful manner.
- INSTRUCTOR:** Dr. Alan R. Lemmon
alemmon@fsu.edu
www.evotutor.org/LemmonLab
- CLASS:** Dirac 152, M,W,F 2:30-3:20 (41 class days)
- OFFICE HOURS:** Dirac 150-D, Monday, 3:30-5:30, and by appointment. Students must sign up for one 30 minute office hour during weeks 2-4.
- COURSE WEBSITE:** Blackboard, to be used for turning in assignments.
- CALENDAR:** Students will have access to a Google calendar containing the expected timeline for the course (including due dates, reading assignments, etc). Note that the calendar may be adjusted based on student needs, but the midterm exam date will remain fixed.
- TEXTBOOK:** REQUIRED: ABSOLUTE JAVA. SAVITCH. ISBN-013608382X
- EVALUATION:** 25% (100 pts) Attendance, Reading Assignments, Participation
25% (100 pts) Homework
25% (100 pts) Midterm Exam
25% (100 pts) Student Projects

Attendance, Reading Assignments, Participation

Since each class will build on the material from previous classes, regular attendance is critical. Students will receive 1 point for attending each of the 41 classes, with a maximum of 40 points being counted towards their grade (one unexcused absence will be forgiven).

Students who prepare for each class will have a much better chance of keeping up with the material covered in the lectures. Students will receive 2 points for each of the 15 reading assignments (30 points total). Typed notes submitted to blackboard by class time will serve as evidence that the reading assignment was completed. Notes will be accepted by the next class day after an excused absence, but must be submitted in advance for planned (unexcused) absences. The collection of notes may be used during the midterm exam, but only notes turned in prior to each class can be used on the exam.

Students will also receive points for code & comments written during class. At the end of each class session, students will upload the source code file from that day to Blackboard. The collection of source code files will be worth 30 points total.

Homework

Homework assignments will consist of fully-functional source code. Six such homework assignments will be collected, each of which will be worth 20 points, with the best 5 of six counting towards the final grade (100 points total). Details regarding expectations for homework assignments will be given in class.

Midterm Exam

A hand-written midterm exam covering the programming topics covered in the assigned reading and/or class will be given in class on Wednesday October 12, 2011. The midterm will be worth 100 points.

Student Project

Near the end of the semester, the students will complete an independent programming project focusing on a scientific computing topic of their choosing and approved by the instructor. Students will be graded based on the completed program (50 pts), a written summary of results (25 pts), and a short oral presentation (25pts).

**File naming convention: In order to ease the handling of files, students will submit files to blackboard using the following naming convention:

Type_LastName_Date.Extension

Type can equal: "notes" or "code" or "homework", or "project"

LastName equals your last name

Date equals August29, for example

Extension equals ".txt." or ".java" or ".doc" or ".docx" or ".xls" or ".xlsx"

JAVA PROGRAMMING TOPICS:

<u>Topic</u>	<u>Reading Assignment</u>
Java Intro	p3-p12
Variables and Assignments I	p13-p23
Variables and Assignments II	p23-p32
Strings	p33-p46
Console Output	p58-p76
Console Input	p76-p88
Branching Mechanisms	p96-p108
Boolean Expressions	p109-p121
Loops	p128-p145
Debugging	p146-p153
Writing Text Files	p567-p580
Reading Text Files	p580-p597
Arrays	p340-p371
Classes I	p168-p200
Classes II	p254-p306
Hashtables	none

SCIENTIFIC COMPUTING APPLICATIONS:

Approximation Via Monte Carlo
Polynomial Fitting
Solving Ordinary Differential Equations
Solving Non-Linear Equations
Parameter Estimation via Maximum Likelihood
Parameter Estimation via Bayesian MCMC
Parameter Estimation via Genetic Algorithms

*Note that course content may be adjusted based on student needs.

FACULTY SENATE REQUIRED SYLLABUS STATEMENTS

All syllabi must include the following statements:

University Attendance Policy: Excused absences include documented illness, deaths in the family and other documented crises, call to active military duty or jury duty, religious holy days, and official University activities. These absences will be accommodated in a way that does not arbitrarily penalize students who have a valid excuse. Consideration will also be given to students whose dependent children experience serious illness.

Academic Honor Policy: The Florida State University Academic Honor Policy outlines the University's expectations for the integrity of students' academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process. Students are responsible for reading the Academic Honor Policy and for living up to their pledge to ". . . be honest and truthful and . . . [to] strive for personal and institutional integrity at Florida State University." (Florida State University Academic Honor Policy, found at <http://dof.fsu.edu/honorpolicy.htm>.)

Americans With Disabilities Act: Students with disabilities needing academic accommodation should: (1) register with and provide documentation to the Student Disability Resource Center; and (2) bring a letter to the instructor indicating the need for accommodation and what type. This should be done during the first week of class.

This syllabus and other class materials are available in alternative format upon request.

For more information about services available to FSU students with disabilities, contact the:

Student Disability Resource Center
874 Traditions Way 108
Student Services Building
Florida State University
Tallahassee, FL 32306-4167
(850) 644-9566 (voice) (850) 644-8504 (TDD)
sdrc@admin.fsu.edu
<http://www.disabilitycenter.fsu.edu/>

Free Tutoring from FSU

For tutoring and writing help in any course at Florida State University, visit the Academic Center for Excellence (ACE) Tutoring Services' comprehensive list of tutoring options - see <http://ace.fsu.edu/tutoring> or contact tutor@fsu.edu for more information. High-quality tutoring is available by appointment and on a walk-in basis. These services are offered by tutors trained to encourage the highest level of individual academic success while upholding personal academic integrity.

Syllabus Change Policy

Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice.