Syllabus

INTRODUCTION TO SCIENTIFIC COMPUTING (JAVA)

ISC 3313, FALL 2014

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
TA:	Alisha Rossi, bright2life@gmail.com
CLASS:	Dirac 152, M W F 10:10-11:00 (42 class days)
OFFICE HOURS:	Dr. Lemmon: W 11-12 and by Appt, in DSL 150D; Alisha Rossi: Thursday 11-12 and by Appt, in DSL 446B **Students must sign up for a 5-minute one-on-one the first week of September.**
COURSE WEBSITE:	Blackboard, to be used for turning in assignments.
CALENDAR:	A tentative course calendar will be provided on Blackboard. Note that the calendar may be adjusted based on student needs, but the midterm exam dates will remain fixed.
TEXTBOOK:	INTRODUCTION TO PROGRAMMING USING JAVA Free download at: http://math.hws.edu/eck/cs124/javanotes6/
EVALUATION:	12% (120 pts) Participation (42 total days, 3 pts. each, best 40 counted) 12% (120 pts) Quizzes (9 total, 15 pts. each, best 8 counted) 27% (270 pts) Homework (9 total, 30 pts each, all counted) 24% (220 pts) Midterm Exams (2 total, 120 pts. each) 25% (250 pts) Student Project

Attendance, Reading Assignments, Participation

Since each class will build on the material from previous classes, regular attendance is critical. Students will receive 3 points for attending each of the 42 classes, with a maximum of 120 points being counted towards their grade (two 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 class activities. Students will receive up to 15 points points for each of the 9 open-note quizzes (120 points total after dropping the lowest score), which will be designed to test if the students understand the main points of the reading assignments.

Homework

Homework assignments will consist of fully-functional source code. Ten such homework assignments will collected, each of which will be worth 30 points, with the best nine of seven counting towards the final grade (270 points total). Details regarding expectations for homework assignments will be given in class.

Midterm Exams

Two hand-written midterm exam covering the programming topics covered in the assigned reading and/or class. The first Midterm will be given in class on Monday **September 29th, 2014**. The second midterm will be given in class on Friday **October 24, 2014**. Each midterm will be worth 120 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 (100 pts), a written summary of results (75 pts), and a short oral presentation (75pts).

JAVA PROGRAMMING TOPICS:

Topic	Reading Assignment	Read By
Introduction to Programming and Java	1.1-1.5	27 Aug
Variables, Types, Objects and Subroutines	2.1-2.3	29 Aug
Expressions, Loops, Branches	2.5, 3.1-3.6	8 Sept
Scanner Input, Programming Environments	2.4, 2.6.1, 2.6.2	15 Sept
Arrays	7.1-7.5	26 Sept
Methods (Subroutines)	4.1-4.4	3 Oct
Input and Output	11.1	8 Oct
Objects (Fundamentals), Linked Lists	5.1, 9.2	13 Oct
Recursion	9.1	27 Oct

SCIENTIFIC COMPUTING APPLICATIONS

Calculation of Mathematical Constants and Series
Approximation Via Monte Carlo
Numerical Integration
Maximum Likelihood Estimation
DNA Sequence Alignment
Polynomial Fitting

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