ISC 5315
Applied Computational Science 1
Spring 2012

SYLLABUS

Instructor   Sachin Shanbhag
488, Dirac Science Library
`sshanbhag@fsu.edu` (*)

Class   DSL 152 (TR: 9:30-10:45 am)
Office Hours   (i) set up time by email (deterministic), or
(ii) stop by anytime to see if I am available (stochastic)

Lab   DSL 152 (T: 3:30-6:00 pm)
TA: Nick Forinash, `njf10@fsu.edu`

Text   None required. Class Notes + Web resources will suffice
Coding   The class is language-agnostic. You may use whatever you like best.
Pre-reqs   ISC 5305, or instructor permission.
Website   FSUs Blackboard Course Management Site.

Grading   Assignments   50%   (will disregard the lowest score)
Lab Work   50%   (will disregard the lowest score)

Objectives

"This course provides students with high performance computational tools necessary to investigate problems arising in science and engineering with an emphasis on combining them to accomplish more complex tasks. A combination of course work and lab work will provide the proper blend of theory and practice. Problems to be investigated will be culled from the applied sciences."

Course Outline

1.	*Data Structures*	3 lectures
	queues, stacks, linked lists, binary trees	
2.	*Linear Algebra*	5 lectures
	LU, QR, direct and iterative solvers, eigenvalues, SVD	
3.	*Interpolation*	3 lectures
	Lagrange, linear, cubic (1D), splines, hermite, Fourier	
4.	*Integration*	4 lectures
	trapezoid, Simpson, adaptive methods, Gauss quadrature	
5.	*Approximation*	3 lectures
	weighted orthogonal polynomials (Chebyshev, Legendre, Fourier)	
6.	*Differentiation*	2 lectures

Compact/Hermite methods, linear and higher order, Fourier

7. *Ordinary Differential Equations*   4 lectures
    linear multistep methods, Runge-Kutta methods, convergence, stiffness
8. *Monte Carlo and Statistics*   4 lectures
    random numbers and processes, Markov chains

Course Policies

- Class lectures will be a mix of whiteboard lectures and powerpoint presentations. I will post all the lecture presentations after class.

- Assignments are due before midnight on the due date. You will work individually. Most homeworks will involve using a computer. If you cannot submit an assignment on time, due to a legitimate reason, please inform me as soon as you can. Otherwise late submissions will be penalized *per day* by 10%. For example, assume that the maximum score on an assignment is 50, and you are late by 2 days. Suppose, you score 40/50. Your final score will be rescaled to reflect late-submission according to 40 - 0.1 × 40 × 2 = 32.

- If you think you haven't received the credit you deserve for a homework or a lab, write up your argument, and submit for re-grading no later than 3 days after the graded assignments have been handed out.

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:

- register with and provide documentation to the Student Disability Resource Center; and

- 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)
sdrcadmin.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.