ISC 5315
Applied Computational Science 1
Spring 2016

SYLLABUS

Instructor	Sachin Shanbhag
	488, Dirac Science Library
	sshanbhag@fsu.edu (*)
Class	DSL 152 (TR: 12:30-1:45 pm)
Office Hours	(i) set up time by email (deterministic), or
	(ii) stop by anytime to see if I am available (stochastic)
Lab	DSL 152 (M: 1:30-4:00 pm)
	TA: Eitan Lees, ejl15b@my.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.

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

The first class is on 8/30 and the last class is on 12/8 - giving us 29 lectures. Here is a tentative list of topics and schedule.

1.	*Linear Algebra*	7 lectures
	LU, QR, direct and iterative solvers, eigenvalues, SVD	
2.	*Interpolation*	3.5 lectures
	Lagrange, linear, cubic (1D), splines, hermite, Fourier	
3.	*Approximation*	5 lectures
	projection, least-squares, weighted orthogonal polynomials	
4.	*Integration*	5 lectures
	Newton-Cotes, Romberg, adaptive methods, Gauss, Monte Carlo	
5.	*Differentiation*	1.5 lectures
	error analysis, higher order methods	

6. *Ordinary Differential Equations*   7 lectures
    linear multistep methods, Runge-Kutta methods, convergence, stiffness

Grading   Homework   35% (about 6)
                  Labs   40% (about 6)
                  Tests   25% (about 3-4)

Course Policies

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

- I have a love-hate relationship with this classroom. I don't like the "screening" effect of the big monitors in front of you. During class, I expect you to resist the temptation to check email, Facebook, do other homework etc. It is hard, I know. *Warning*: Over the years, I have developed this annoying habit of preferentially directing questions to regions of low eye-contact.

- Assignments = Labs + Homeworks. Homeworks will typically consist of multiple "short" questions; the goal is to reinforce material learned in class by working out problems. Labs will address "bigger" practical problems. We will start getting our hands dirty during the lab hours; but you will be expected to finish up the lab at home.

- Assignments are due before 11:59 pm on the due date. You are free to discuss the labs/homeworks with others, but the final submission should be unambiguously yours. Most assignments 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.

- Grades are a necessary evil. Generally, my grading style skews towards leniency. So it is advisable to turn in all required work, even if it is imperfect. Crudely, if you score more than 90% overall you will make an A, if you score less than 60% you will fail. I don't pre-calibrate boundaries between other grades.

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.