

**ISC 5315**  
**Applied Computational Science 1**  
Fall 2021

**SYLLABUS**

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<b>Instructor</b>	Chen Huang 484, Dirac Science Library chuang3@fsu.edu (*)
<b>Class</b>	DSL 152 (Tuesday and Thursday: 11:35 am-12:50 pm)
<b>Office Hours</b>	Set up time by email (I should be available most of the time)
<b>Lab</b>	DSL 152 (Thursday: 3:05-5:35 pm) TA: Kyle Shaw, Email: kjs16c@my.fsu.edu
<b>Office Hours</b>	Contact TA to set up time.
<b>Text</b>	None required. Class Notes + Web resources will suffice
<b>Coding</b>	The class is language-agnostic. You may use whatever you like best.
<b>Pre-reqs</b>	ISC 5305, or instructor permission.
<b>Website</b>	FSU Canvas Course Management Site.

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**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 8/31 (T) and the last class is on 12/2 (Th). Here is a tentative list of topics and schedule.

1. *Linear Algebra*  
LU, QR, direct and iterative solvers, eigenvalues, SVD
2. *Interpolation*  
Lagrange, linear, cubic (1D), splines, hermite, Fourier
3. *Approximation*  
projection, least-squares, weighted orthogonal polynomials
4. *Integration*  
Newton-Cotes, Romberg, adaptive methods, Gauss, Monte Carlo
5. *Differentiation*  
error analysis, higher order methods
6. *Ordinary Differential Equations*  
linear multistep methods, Runge-Kutta methods, convergence, stiffness

<b>Grading</b>	Homework	35% (about 5)
	Labs	40% (about 6)
	Midterm	10%
	Final Project	15%

### **Course Policies**

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

### **Grading Policy**

(a) More than 90% overall: A; (b) 80% to 89%: B; (c) 70% to 79%: C; (d) 60% to 69%: D; (e) less than 60%: F. If you think you haven't received the credit you deserve for a homework or an exam, write up your argument, and submit for re-grading no later than 3 days after the graded assignments have been handed out.

### **Late Assignment Policy**

No assignments will be accepted more than 7 days past the due date. Exceptions to these rules are made only if extenuating circumstances (such as illness, etc.) arise which can be documented. For a late assignment, it will be penalized by applying a graded scale which terminates with a 25% reduction at the end of one week.

### **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)  
sdradmin.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](mailto: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.