Spring 2023
Introduction to Computational Finance MAP 5611

Details

- Time and Place : MWF 10:40–11:20, LOV 106
- Instructor: K. A. Gallivan (421 Love Building, kgallivan@fsu.edu)
  - Homepage: www.math.fsu.edu/~gallivan
  - Office Hours: 8:00 – 10:00, 12:00 - 13:00 MWF and by appointment
  - For remote contact during office hours or other arranged meetings, use the Zoom meeting room link on my homepage.
- Prerequisites: MAP 5601 and programming proficiency in C++.
- Text: no required textbook
- Recommended Reference Texts:
  - The Mathematics of Financial Derivatives: A Student Introduction. Wilmott, Howison, and Dewynne. Cambridge University Press, 1995 (last printing 2002).
  - An Introduction to Financial Option Valuation, Desmond Higham. Cambridge University Press, 2004 (last printing 2013).
  - Any good numerical methods textbook, for example, Numerical Analysis: Mathematics of Scientific Computing. Kincaid and Cheney. Brooks/Cole 2002.
- Grades: Homework 40 %, Midterm Exam 25 %, and a comprehensive Final Exam 35 %.
- The Midterm Exam will be given in the evening at mutually agreed upon times in the regular class room.
- The Final Exam will be held at the appointed time on the FSU Final Exam schedule.
- The Final Exam is comprehensive.
- Makeup exams require prior approval or, if not possible, standard university approved documentation of an excused absence.
- Class Information: Class notes, homework, programming assignments and announcements will be posted on the class website (follow the teaching link from www.math.fsu.edu/~gallivan). You are expected to consult the website in a timely and regular manner. The user and password information for portions of the class website will be given during the first class meeting.
- The class Canvas page will be used for class email announcements, submit homework, and post grades. Some mailers view these announcement emails as spam so make sure you check the appropriate directories in your mailer.

- Class Participation Policy: Participation in class by asking questions and responding to questions posed by the instructor is expected and strongly encouraged. Students are expected to be prepared for class lectures and for any office visits.

- Meetings with the instructor are expected and encouraged especially for discussions that are too lengthy for class. It is particularly important to have such meetings early and often for material about which you are uncertain. Group meetings are encouraged.

- Electronic devices may be used to access class notes and related material during lectures. **Other uses of cell phones and similar devices are often disruptive to the lecture and are not permitted.**

- Homework: Homework will consist of written exercises and programming assignments. They are due at the time specified in the assignment. Homework solutions will be accepted after the due date only with prior approval or with documentation of an excused absence.

- All programming assignments must be completed in C++. MATLAB and scripting languages are not acceptable for the code implementing the algorithms used to solve the assignment but they may be used to control or support the testing and evaluation of your code.

- All solutions for programming assignments must be submitted in the form described in "A Note on Reporting Programming Assignment Results" available on the class website. Homework will be assigned regularly consist and will comprise written exercises and programming assignments.

- Homework solutions will be submitted using the class Canvas page.

- Plagiarism is a violation of the university honor code. With respect to the solutions of programming problems in the homework, it is not acceptable to engage in plagiarism. You may discuss the programming problems with each other **but any significant discussion must cited, i.e., it should be treated like the citation of any outside material used in your solutions. Such a citation must include names and a brief description of the substance of the discussion.** All students must design and implement their own code. All students must write individually the description of the code, its complexity, the experimental design, the empirical results and the interpretation of the results. **No student should provide any portion of their code to any other student in class.** If you find a library code (not written by a student in class) that performs a portion of the task **it must be cited – including the specific source of the code and its function.** You are still responsible for describing correctly its implementation and time/space complexity in your solutions. Credit for the program will be prorated based on the amount of functionality performed by a cited library code relative to the functionality required to solve the assigned problem. **Citations when writing solutions to the analytical problems included in a graded homework or programming assignment and applicable penalties for plagiarism are covered by these same policies.** The first offense of submitting a solution without the appropriate citation will result in 0 credit for the programming/experimental portion of the assignment or the particular solution to the analytical problem. Multiple offenses may result in referral to the university for discipline according to university regulations.

- 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.
- Class Attendance Policy: With the exception of the first class meeting, attendance is not required but **it is strongly advised**. A student absent from class bears the full responsibility for all subject matter and procedural information discussed in class.

Content

Objectives

Sophisticated mathematical models, whose solution often requires computer programming, have become important in finance. This course will give students from a variety of disciplines, who are interested in financial mathematics, the basic numerical tools and practice to solve financial problems using computation.

Content

Below are the expected topics to be covered. Acutal coverage will depend on time constraints.

1. Problem conditioning and finite precision algorithm stability
2. Solving nonlinear equations
3. Interpolation and least squares approximation
4. Numerical Quadrature
5. Numerical Differentiation
6. Numerical Integration of ordinary differential equations
7. Basic Partial Differential Equations and finite difference methods
8. Monte Carlo methods

Syllabus Changes

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.

Honor Code

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 https://dof.fsu.edu/honorpolicy.htm.)

Americans with Disabilities Act

Students with disabilities needing academic accommodation should during the first week of class:

1. register with and provide documentation to the Student Disability Resource Center;
2. contact the instructor indicating the need for accommodation and what type.

This syllabus and other class materials are available in an 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
Tallahassee FL, 32306-4167
644-9566 (voice), 644-8504 (TDD), sdrc@admin.fsu.edu, http://www.disabilitycenter.fsu.edu.