

MAD-2502 INTRODUCTION TO COMPUTATIONAL MATHEMATICS

General information.

- Semester: Spring, 2018.
- When: 09:30AM – 10:50AM, Wednesday and Friday.
- Where: SE 271 (Math Lab., Science and Engineering Building).
- Instructor: Shi Bai. Email: sbai@fau.edu. Office: SE230.
- Office hours: see course website.

Description. This is an introductory course to mathematical computation by means of algorithmically solving a number of mathematical problems. As computational tools, the basics of the **Python Programming Language** (see <http://www.python.org>) will be introduced, and it is demonstrated how a programming language can enable and support the solution of mathematical problems. This course covers some basic methods of computational mathematics, focusing on the mathematical design, analysis and implementation of computational algorithms. The topics involve with problems from numerical analysis, number theory, combinatorics, algebra, linear algebra and modeling. The course does not assume prior programming experience and does not aim at an in-depth understanding of the details of Python. Rather the focus is on understanding concepts and computational techniques of how programming can help to expand the spectrum of tractable mathematical problems. Thus emphasis is on what we can do with a programming language, not on the language itself. After completion of the course, you should be acquainted with the use of different data types and programming concepts. You should be able to write simple programs in Python to solve computational problems from different areas in mathematics. Finally, this course should enable you to read more advanced material on Python, and prepare you to learn other programming languages or packages that are commonly encountered in computational mathematics.

Textbook. We will mainly follow the textbook,

- John V. Guttag, *Introduction to Computation and Programming Using Python*.
The library has e-book access available for FAU students.

EVALUATION

The grade for the course will be determined by:

Assignments (32%), Quizzes (20%), Midterm Exam (18%), Final Exam (30%).

Assignments. There will be 4 computer-based assignments for the course. All these assignments contribute 32% to your overall score. All codes in the assignment should be written by you. Your solutions must be submitted electronically by email to sbai@fau.edu by 5:00 PM on the due date. Explanations and output should also be included in the electronic submission. LATE WORK WILL NOT BE ACCEPTED.

Quizzes. On Friday we will have a quiz of about 20 minutes on the material covered in the previous class. There will be ≥ 5 quizzes. But only your best 5 quizzes will be taken into account towards your final grade; the others will be dropped. Your best 5 quizzes in total that counts for 20% of the overall grades. A missed quiz will result in a score of 0, with no possible make-up. The only exception is any quiz missed due to a university-excused absence; such quizzes may be made up with appropriate documentation.

Mid-exam. There will be a midterm exam, which counts for 18% of your overall grade. The tentative date of the midterm exam is late Feb. The midterm exam will cover the lectures and topics taught during the first half semester.

Final exam. There will be a final exam, which counts for 30% of your overall grade. It is comprehensive and cover the topics taught during the whole semester.

Grading. Your overall grade will be calculated by the following algorithm,

- There will be ≥ 5 quizzes. But only your best 5 quizzes will be taken into account towards your final grade; the others will be dropped.
- Your highest scored assignment will replace the lowest one.
- Mid-exam weights 18% and final exam weights 30%.
- If your overall score calculated as above is $\geq C$:
 - If the lowest exam grade is the midterm (in terms of percentage), the final exam score will replace your midterm score. In this case, the final exam will worth 48% of the overall score.

Else:

- The same protocol as above. However, your maximum possible grade is C.

Grading scale. At the end of the semester, the following scale for FAU grade will be used.

%	92-100	89-91	86-88	83-85	80-82	75-79	70-74	60-69	0-59
Grade	A	A-	B+	B	B-	C+	C	D	F

You should try to meet the above scale to be assured of the grade you want. EXTRA CREDIT WORK IS NOT POSSIBLE. A grade of I (incomplete) will only be given for circumstances specified in the FAU Catalog.

COURSE POLICIES

Attendance. Attendance is required. Students are expected to be regular in class attendance and to fully participate in the course. Grade penalties will be imposed for unexcused absences.

Exam and quiz policies. No calculator, books, notes will be allowed at any time during quizzes and/or exams. All exams will be taken as scheduled. Make-up examinations will not be given for missed tests, unless prior arrangements have been made under exceptional circumstances with advance notice. In the case of a valid excuse, it is the students responsibility to establish with documentation that the exam was missed for a solid reason. The student cannot make up a missed midterm or final exam without such documentation.

Disclaimer. This syllabus is subject to reasonable changes/updates at the discretion of the instructor.