MAD 4401 Introduction to Numerical Analysis   **Spring 2024**
M W F Time 6th Period, FAC 127 Section 184G

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Course Description: MAD 4401 is a 3-credit course covering numerical approximation techniques. Topics will include Numerical integration, nonlinear equations, linear and nonlinear systems of equations, differential equations and interpolation.

Course Objective: To develop proficiency in numerical methods by mastering the following key topics:

1. Numerical integration techniques.
2. Solving nonlinear equations using numerical methods.
3. Handling linear and nonlinear systems of equations through numerical approaches.
4. Solving differential equations numerically.
5. Mastering interpolation methods for data analysis and function approximation.

Prerequisites: MAS 3114 or MAS 4105 with a minimum grade of C and experience with a scientific programming language.

Recommended Textbook: Numerical Methods: An Inquiry-Based Approach with Python by Eric Sullivan
Available open source here: https://numericalmethodssullivan.github.io/

Office Hours: M 4th period, W 7th period, and F 7th period. Other office hours are available by appointment.

Grades: Your course grade is based on 3 exams worth 45% total, a final exam worth 20%, homework will count 18% total, Discussion Board Participation will count 2% total and Computer Labs will count 15% total.

Assignment	Weight
Homework	18%
Computer Labs	15%
Discussion Board Participation	2%
Exams (Three exams, 15% each)	45%
Final Exam	20%

We will use the following scale:
A [90,100];   A-[87,90);   B+[83,87);   B [80,83);   B-[77,80);   C+[73,77);   C [68,73);
                    C-[64,68);   D+[62,64);   D [57,62);   D-[55,57);   E [0,55)

Your grade is your responsibility. You have exactly one week once your assignment has been returned to you to discuss that grade. After that week, the grade is final. No additional points will be awarded to "boost" your grade.

Here is the UF grading policies for assigning points: [Grades and Grading Policies < University of Florida (ufl.edu)](#)

Homework: Homework will be assigned regularly, and selected problems will be collected and graded. Credit will be taken off on any late assignment unless there is an acceptable excuse as judged by the instructor. Some of the assignments will include programming problems to be solved using a computer; any language will be acceptable if comments are included.

Computer Projects: A computer programming project will be assigned with each unit and will done in groups of at most three. Groups will be randomly assigned via Canvas and will change with each project. If a student does not participate in a group, please indicate that within the assignment submission and no credit will be given to that student. Otherwise, all students within a group will receive the same grade. Free software access is available to all UF students for free use at https://info.apps.ufl.edu/.

Discussion Board Participation: Canvas is organized by modules, which pertain to each exam. Module 1 corresponds to all the material related to exam 1. Within each module, there is a discussion board where students may ask questions or post answers. This includes homework, quizzes, exam reviews and lectures. You may earn up to 2 points for each module by:

- Asking a coherent mathematical question. (+1 each)

- Answering a fellow student's questions. (+1 each)

Exams: There will be three exams in class. The three exams' dates provided on the schedule are TENTATIVE. Exam 1: February 9th\, Exam 2: March 22nd, and Exam 3: April 9th.

Final Exam Date: April 30th (Tuesday) 2023 @ 3 PM - 5:00 PM
The final exam date and times are set by the registrar's office.

Honor Code: On all work submitted for credit by students, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment."

Attendance Policy: Registration in this course obligates the student to be regular and punctual in class attendance. All late work will be penalized. Students will **NOT** be given the opportunity to complete old assignments at the end of the semester to improve their grades. Excused absences are consistent with university policies in the undergraduate catalog (https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/) and require appropriate documentation.

Calculator Policy: You may need a scientific calculator, or graphing calculators to help with homework questions. A scientific calculator (non-graphing calculator) will be permitted on exams. You will also need to be familiar with computer software packages like Mathematica, Matlab, or Python.

Online course evaluation: Students are expected to provide feedback on the quality of instruction in this course based on 10 criteria. These evaluations are conducted online at https://evaluations.ufl.edu

Academic Honesty: On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied:
"On my honor, I have neither given nor received unauthorized aid in doing this assignment."
The UF honor code is available here: https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/

Students with Disability: Students with disabilities requesting accommodations should first register with the UF Disability Resource Center (352-392-8565) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodations. Students with disabilities should follow this procedure as early as possible in the semester.

Resources: Free tutoring is available at the Teaching Center that is located on the ground level of SW Broward Hall. The regular hours are Monday-Friday, 8am-5pm. Please check the website http://www.teachingcenter.ufl.edu/ for any changes.

Tentative Weekly Schedule

Introduction and Review	1 week
Error Analysis and Computer Arithmetic (Chapter 1)	2 weeks
Root finding methods (Chapter 2)	3 weeks
Interpolation and Polynomial Approximation (Chapter 3)	3 weeks
Linear Regression (section 8.1)	1 weeks
Numerical Differentiation and Integration (Chapter 4)	2 weeks
Initial Value Problems for ODE (Chapter 5)	3 weeks

* I reserve the right to change anything in this syllabus if needed. Please check Canvas for changes.