Syllabus EGM 3344 Introduction to Numerical Methods of Engineering Analysis

James Fairbanks

2025-08-18

Basic information

Course:	EGM3344
Section:	
Class Dates:	Aug 21, 2025 – Dec 3, 2025
Class Time:	M,W,F Period 8 (3:00 PM - 3:50 PM)
Office Hours:	W After Class (3:50 PM - 4:45 PM)
Meeting Room:	FLG 0260
Final Exam Period:	12/12/2025 12:30 PM - 2:30 PM
Instructor:	Dr. James Fairbanks
Office:	MAE 226C
Phone:	-6687
Email:	fairbanksj
Teaching Assistant:	Tabitha
Email:	TBD
Grading:	A-F (3 Credits) Standard UF scale
	Class participation: 5%
	Homework: 25%
	Quizzes: 20%
	Exams: 25%
	Project: 25%

Course Description

The course description in the catalog is:

> Methods for numerical solution of mathematical problems with emphasis on engineering applications using MATLAB. Includes roots, optimization, linear algebraic equations, matrices, curve fitting, differentiation, integration and ordinary differential equations.

Course Pre-Requisites

Prerequisites: Prerequisite: MAC 2313 and COP 2271; Corequisite: MAP 2302.

Course Objectives

The goal of this course is to teach you the fundamentals of computational numerical methods. We will solve the primary types of equations necessary for scientific discovery and engineering invention. Linear Systems, Least-Squares Problems, Nonlinear Equations, and Differential Equations will all be covered. Diligent students will learn to implement these algorithms in software, and become proficient in deploying them to solve scientific and engineering problems. Projects will help you learn to identify the need for numerical methods in a applied setting.

Materials and Supplies Fees

None

ABET Outcomes

Outcome	Coverage
An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	High
An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	
An ability to communicate effectively with a range of audiences	Low
An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	
An ability to function effectively on a team whose members together provide leadership, create a collaborative environment, establish goals, plan tasks, and meet objectives	Low
An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	

Outcome	Coverage
An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	High

The course schedule can be found at the end of this document.

The course description in the catalog is:

> Methods for numerical solution of mathematical problems with emphasis on engineering applications using MATLAB. Includes roots, optimization, linear algebraic equations, matrices, curve fitting, differentiation, integration and ordinary differential equations.

Required Textbook and Software

Required Book: Driscoll & Braun Fundamentals of Numerical Computation. Society for Industrial and Applied Mathematics, Philadelphia, 2022.

The textbook is available from the publisher at The SIAM Store.UF is an institutional member of SIAM.

- Julia Edition
- Matlab Edition

The textbook adoption is listed in: Textbook adoptions.

We will be using the software resources by the author on GitHub.

Homework assigned out of the book will use the online edition of the textbook

Attendance Policy

You are expected to attend all classes. Class participation is a grading component so active participation which includes asking questions, answering questions, engaging in discussion with other students, active note taking, and canvas discussion posts. If you need to miss class, please let me know via canvas message in advance.

Excused absences must be consistent with university policies in the Catalog and require appropriate documentation. Additional information can be found in the university Attendance Policies. This policy may change in response to administration guidance.

What to do immediately

1. Access the course webpage
2. Read the preface, prologue, and Chapter 1 of the textbook.
3. Enroll in GitHub Education if you have not already done so for another class.
4. Introduce yourself to your classmates

Grading

Class participation part of your grade. How to participate? Ask questions! It's crucial that you ask questions when you don't understand.

Homework and Quizzes will be collected on Canvas. Late homework will generally not be accepted. Just turn in what you have finished at the time the homework is due. Homework must comply with both the global homework expectations and any per-assignment instructions.

Grade reviews must be requested within one week of a grade being posted. After two weeks, no grade will be revisited. In the event of a grade review, the entire assignment will be reviewed.

No early exam will be given to any student for any reason.

Homework Guidelines

Homework will be regularly assigned on Canvas e-learning course website. All assignments are to be turned in through Canvas e-learning course website.

1. Attach both a source material (markdown, latex, word) and a rendered format (pdf, html) of all assignments.
2. Homework assignments **must** be legible. Typesetting them with technologies such as Latex, quarto, or pandoc are recommended to make this easier.
3. Data or source code files are not substitutes for written reports of your work. You can attach them as proof of your work, but you will be graded on the writen description of your results, proofs, calculations, and analysis.
4. Before you submit your work to Canvas, check the quality of your submitted file. Illegible work will not be graded.
5. For each assigned problem, detailed solutions will be posted after you have turned in your HWs. Please review posted solutions carefully to enhance your understanding.
6. To receive full credit, you will be required to complete all assigned problems. Your homework must be neatly formatted and readable.
7. A proof is an argument for the correctness of a theorem/lemma/proposition. Arguments must be explained in words. A string of formulas is not a proof. Each step in the proof should be accompanied by the principle or lemma being invoked to perform the step in the proof.

Group Work

1. Students are encouraged to work in study groups.
2. However, each student should submit their own answers to the homework questions.
3. To help determine the boundary between working on the problem together and sharing answers, I will give you examples. Notice that doing work together is preferred over one way transfers of information.

4. Large language models (LLMs) such as ChatGPT, Bard, Claude, etc. are not allowed to be used to write your solutions. You can use them to explain concepts or principles that you do not understand. But they should not be used to write your solutions and are not a substitute for your group discussions or attending office hours.

    a. Discussing the general solution techniques
    b. Doing derivations together
    c. Sharing typed up final solutions or parts of final solutions
    d. Writing code together
    e. Sharing working code
    f. Sharing code snippets
    g. Providing feedback or debugging help on code
    h. Splitting up the problem set and parallelizing effort
    i. Asking a large language model to explain a principle or concept
    j. Asking a large language model to write your solutions

Exams

1. There will be a midterm exam and a final exam.
2. The exams are closed-book and closed notes. You are allowed to bring **one** sheet of 8.5x11" formula sheet (front and back) for exams.
3. You **must** turn in your formula sheet with your exam as the **last page**.
4. No cell phones (or anything that can store formulae) are allowed during the exams. - NO programmable calculator is allowed during exams. - Only SAT approved calculators (such as TI-36, Casio,...) are allowed during exams.

5. The exam problems will require written responses involving derivation and calculations. The emphasis of the exams will be to test your understanding, not on formulaic repetition.
6. Some problems may be taken directly from the homework problems or from lecture discussions with or without modifications.

Rules, Regulations, and Resources

Students Requiring Accommodations

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course Evaluation

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Click here for guidance

on how to give feedback in a professional and respectful manner. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students here.

University Honesty Policy

UF students are bound by The Honor Pledge which states,

> We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. 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 Honor Code specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor class.

Commitment to a Safe and Inclusive Learning Environment

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture. If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@eng.ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: https://registrar.ufl.edu/ferpa.html

Campus Resources:

Health and Wellness

- U Matter, We Care: Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.
- Counseling and Wellness Center: http://www.counseling.ufl.edu/cwc, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.
- Sexual Discrimination, Harassment, Assault, or Violence: If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the Office of Title IX Compliance, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu
- Sexual Assault Recovery Services (SARS) Student Health Care Center, 392-1161.
- University Police Department at 392-1111 (or 9-1-1 for emergencies), or http://www.police.ufl.edu/.

Academic Resources

- E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml.
- Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. https:// www.crc.ufl.edu/.
- Library Support, http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.
- Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. https:// teachingcenter.ufl.edu/.
- Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. https:// writing.ufl.edu/writing-studio/.
- Student Complaints Campus: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf.

- On-Line Students Complaints: http://www.distance.ufl.edu/student-complaint-process.

Recording

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A *class lecture* is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To *publish* means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

Changelog

Any changes to the syllabus will be posted to canvas and summarized in this section.