



Florida State University

MAD 5403 0001

Foundations of Computational Mathematics I
2026 Fall

Course Information

Credit Hours: 3

Course Delivery Method: In Person/Traditional

Meeting Location: LOV0102

Meeting Days and Times: 10:40 AM 11:30 AM M|W|F

Instructor Information

Kyle Gallivan

Email: kgallivan@fsu.edu

Department/Office Location

421 LOV

Office Hours

MWF 11:30 to 13:30 and by appointment

Course Teaching Assistant(s)

Name: Brayton Link

Email: bl24@fsu.edu

Office Hours

303 LOV, TR 10 to 11 and by appointment

Prerequisites or Co-requisites

Prerequisites: MAS 3105 and competence in a programming language suitable for numeric computation.

Course Description

This course covers the design, analysis and evaluation of numerical algorithms for fundamental problems in computational mathematics. Factorization/transformation methods for solving linear systems and linear least squares problems; iterative methods based on contraction and projections for solving linear systems; and methods for solving scalar and systems of nonlinear equations are covered. The evaluation and analysis of these algorithms include an introduction to floating point systems, problem conditioning and numerical stability analysis.

Course Objectives

By completing this course material, it is expected that students will be able to demonstrate the following skills, which are fundamental to the design, analysis and use of algorithms to solve numerically important mathematical problems:

1. Apply the multiple approaches to the derivation of all of the solutions and methods covered;
2. Implement the methods and solve the related problems;
3. Empirically investigate the numerical robustness and effectiveness of the methods;
4. Analyze the complexity and accuracy of the methods.

Required Textbooks and Readings

No required textbook

Topical Outline /Course Schedule

1. Weeks 1 to 2: Computational primitives and elementary transformations;
2. Weeks 3 to 5: Factorization, transformations, projections for solving linear systems and linear least squares and related problems;
3. Weeks 6 to 7: Conditioning, Floating point systems, numerical stability;
4. Weeks 8 to 9: Structured and sparse computational primitives including FFT and convolutions;
5. Weeks 10-11: Iterative methods for linear systems using contraction and projections;
6. Week 11 to 13: Design and analysis of algorithms for solving scalar nonlinear equations;
7. Week 14 to 15: Design and analysis of algorithms for solving systems of nonlinear equations and a brief introduction to numerical optimization.

Assignments and Evaluations

1. Homework including written problems, implementation and empirical assessment of the methods 35%
2. Three exams during the semester 35%
3. Comprehensive Final Exam 30%

Grading Scale and Grading Policies

Grading scale breakdown

Letter Grade	Percentage
A	93% to 100%
A-	90% to <93%
B+	87% to <90%
B	83% to <87%
B-	80% to <83%
C+	77% to <80%
C	73% to <77%
C-	70% to <73%
D+	67% to <70%
D	63% to <67%
D-	60% to <63%
F	0% to <60%

This scale will be adjusted based on class performance. No grade will require a higher percentage than listed above.

University Policies

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 written 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 student's 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://fda.fsu.edu/academic-resources/academic-integrity-and-grievances/academic-honor-policy>.)

Americans With Disabilities Act

FSU is committed to providing reasonable accommodation for all persons with disabilities in a manner that is consistent with the academic standards of the course while empowering the student to meet the integral requirements of the course. Students with disabilities needing academic accommodation should: (1) register with and provide documentation to the Office of Accessibility Services; and (2) request a letter from the Office of Accessibility Services to be sent to the instructor indicating the need for accommodation and what type; and (3) meet (in person, via phone, email, zoom, etc...) with each instructor to whom a letter of accommodation was sent to review approved accommodations. Please note that instructors are not allowed to provide classroom accommodations to a student until appropriate verification from the Office of Accessibility Services has been provided. This syllabus and other class materials are available in an alternative format upon request. For the latest version of this statement and more information about services available to FSU students with disabilities,

contact the:

Office of Accessibility Services
874 Traditions Way
108 Student Services Building
Florida State University
Tallahassee, FL 32306-4167
(850) 644-9566 (voice)
(850) 644-8504 (TDD)
oas@fsu.edu
<https://dsst.fsu.edu/oas>

Academic Success

Your academic success is a top priority for Florida State University. University resources to help you succeed include tutoring centers, computer labs, counseling and health services, and services for designated groups, such as veterans and students with disabilities. The following information is not exhaustive, so please check with your advisor or the Department of Student Support and Transitions to learn more.

CONFIDENTIAL CAMPUS RESOURCES:

Various centers and programs are available to assist students with navigating stressors that might impact academic success. These include the following:

Victim Advocate Program

University Center A, Rm. 4100
(850) 644-7161
Available 24/7/365
Office Hours: M-F 8-5
<https://dsst.fsu.edu/vap>

Counseling and Psychological Services (CAPS)

Florida State University's Counseling and Psychological Services (CAPS)

primary mission is to address psychological needs and personal concerns, which may interfere with students' academic progress, social development, and emotional well-being. The following in-person and virtual (tele-mental health) services are available to all enrolled students residing in the state of Florida:

1. Individual therapy
2. Group therapy
3. Crisis Intervention
4. Psychoeducational and outreach programming
5. After hours crisis-hotline
6. Access to community providers for specialized treatment

Call 850-644-TALK (8255) for more information on how to initiate services.

Counseling and Psychological Services

250 Askew Student Life Center

942 Learning Way

(850) 644-TALK (8255)

Walk-in and Appointment Hours:

M-F 8 am – 4 pm

<https://counseling.fsu.edu/>

University Health Services

The mission of University Health Services (UHS) is to promote and improve the overall health and well-being of FSU students. UHS provides a coordinated continuum of care through prevention, intervention, and treatment. Services include general medical care, priority care, gynecological services, physicals, allergy injection clinic, immunizations, diagnostic imaging, physical therapy, and a medical response unit. The Center for Health Advocacy and Wellness (CHAW) assists students in their academic success through individual, group, and population-based health and wellness initiatives. Topics include wellness, alcohol and other drugs, hazing prevention, nutrition and body image, sexual health, and power based personal violence prevention. For more information, go to

uhs.fsu.edu.

University Health Services

Health and Wellness Center

960 Learning Way

Tallahassee, FL 32306

Hours: M-F, 8 am – 4 pm

(850) 644-6230

<https://uhs.fsu.edu/>

Syllabus Change Policy

Except for changes that substantially affect implementation of the evaluation statement, this syllabus is a guide for the course and is subject to change with advance notice.

Free Tutoring from FSU

On-campus tutoring and writing assistance is available for many courses at Florida State University. A comprehensive list of on-campus tutoring options is available at **tutoring.fsu.edu** (<https://tutoring.fsu.edu>). 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.

Proctored Examinations

This course requires you to take an exam in an approved, proctored environment. Expect to pay the provider a fee for their proctoring services. You are responsible for scheduling your exam appointment(s) with the testing provider, paying applicable fees, and familiarizing yourself with their policies, including when to arrive, what to bring and not bring, allowed and prohibited activities, and instructions for missed appointments. **Below are the testing providers I allow you to use for this course, along with instructions on making an appointment and paying fees.**

FSU Testing Center

Course exams may be taken at the main campus [FSU Testing Center](#) at no cost to FSU students. Review the FSU Testing Center website and follow all applicable instructions prior to making an exam appointment in the main campus facility.

AI Policy

This course encourages the responsible and ethical use of generative AI tools to support your learning. Read instructions for each assignment carefully as AI use guidelines may vary depending on the assignment. If you are uncertain if an application of AI is appropriate, be sure to ask.

- Review AI results. Generative AI is highly vulnerable to inaccuracy and bias. It is your responsibility to verify the validity of all AI results. You should assume AI output is wrong unless you either know the answer or can verify it with another source.
- Cite all AI use. You may not represent output generated by AI as your own work. Disclose the use of AI in your assignments. When citing AI use, include the name of the AI tool (eg, Gemini) and vendor (eg, Google), as well as a description of how it was used (eg, checking grammar or spelling, brainstorming topics, creating an outline).
- Save a transcript of AI interactions. For each assignment, save a transcript of your interactions with AI. If you ever need to explain why or how you used AI in your assignment, the transcript will provide concrete evidence of your actions and decisions regarding your AI usage, including your drafting and revision process.
- Use AI tools approved by the university. When using generative AI tools, be cautious about what you share as AI tools not licensed through the university retain and share information you provide them. Instead, use tools licensed through the university, such as Microsoft Copilot and Google Gemini. These tools are subject to data privacy agreements that protect your information and work. Make sure you are logging in with your FSU credentials and not via a personal account.

Canvas Support Statement

Canvas works best with Chrome or Firefox browsers. If you use Safari and notice issues on either your mobile or desktop devices, please switch to Chrome or Firefox.

Need help with Canvas?

FSU Canvas Support

Office of Digital Learning and Academic Technology

Email: canvas@fsu.edu

Phone: (850) 644-8004

Website: support.canvas.fsu.edu

Hours: 8am to 5pm, Monday - Friday

