

# COURSE DESCRIPTION

## SCIENTIFIC PROGRAMMING

### MA 360-2B

### SPRING 2025

DEPARTMENT OF MATHEMATICS  
UNIVERSITY OF ALABAMA AT BIRMINGHAM

**Course Instructor:** Dr. Carmeliza Navasca

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**Office:** UNIVERSITY HALL 4010

**Phone:** (205) 934-2154

**Preferred Methods of Contact:** Email is the preferred method of contact if you have questions. Please expect a response within 24 hours on weekdays and a slower response on weekends (OR Emails received after 5 pm on Friday will be returned Monday morning). Include course number in the subject line of your email for a faster response. I am available to meet with you virtually via Zoom by appointment during my virtual office hours (see below for my scheduled virtual office hours).

**Office Hours:** TBA

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#### Course Info

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**Meeting times:** TR, 9:30–10:45 AM Central Time

**Meeting location:** HHB 221

**Prerequisite:** Grade of C or better in MA 126 or equivalent. *Any student who has not fulfilled the prerequisite will be dropped from the class.*

**Credits:** 3 semester hours

**Required Textbook:** (1) *Insight Through Computing: A MATLAB Introduction to Computational Science and Engineering* by Charles F. Van Loan and K.-Y. Daisy Fan, SIAM, 2010.

(2) *Python Programming And Numerical Methods: A Guide For Engineers and Scientists* by QingKai Kong, Timmy Siau and Alexandre Bayen.

Free <https://pythonnumericalmethods.berkeley.edu/notebooks/Index.html>

(3) *Think Python: How to Think Like a Computer Scientist* by Allen B. Downey, O'Reilly, 2nd Edition, 2015. Free PDF at

<http://greenteapress.com/thinkpython2/thinkpython2.pdf>

(4) *Scientific Computing with Python 3* by Claus Fuhrer, Jan Erik Solem, Olivier Verdier. Free PDF in Canvas.

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#### Important Dates

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**First day of our class:** January 14, 2025

**Martin Luther King Holiday:** January 20, 2025

**Last day to drop without paying full tuition:** January 21, 2025

**Spring Break:** March 10 – March 16, 2025

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*Date:* January 14, 2025.

**Last day of our class:** April 24, 2025

**Final Exam/Project Due Date:** Thursday, May 1, 2025

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### Course Policies

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- Please make sure that you are able to receive e-mail through your Blazer-ID account. Official course announcements may be sent to that address.
- If you are contacted by the Early Alert Program, you should consider taking advantage of the services it offers.
- If you wish to request a disability accommodation please contact DSS at 934-4205 or at *dss@uab.edu*.

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### Course Description

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Programming and problem solving using Matlab and Python. Emphasizes the systematic development of algorithms and programs. Topics include iteration, functions, arrays, Matlab graphics, image processing and robotics. Assignments and projects are designed to give the students a computational sense through complexity, dimension, inexact arithmetic, randomness, simulation and the role of approximation.

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### Objectives of the Course

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Upon successful completion of the course, a student

- (1) develops and implements algorithms from a mathematical given problem;
- (2) develops programming skills to produce working codes;
- (3) learns the basic principles of scientific computing, i.e. algorithms and software tools for science, math and engineering problems

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### Class Management via Canvas

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- Homework problems will be posted in canvas (<http://www.uab.edu/online/canvas>). All other materials (class announcements, codes, grades and etc.) will be posted in canvas. Students should log in to canvas everyday.
- Homework assignments, projects and activities will only be collected on canvas.

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### Assessment Procedures

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- Student achievement will be assessed by the following measures:
  - **Weekly homework.** Homework will be assigned on a weekly basis. There will be no extension of deadlines for any reason. Late homework will be not be accepted. Homework contributes 20% to the course average.
  - **Projects.** Each project contributes 10% to the course average. There will be six projects. (We may have less than six projects or more than six projects. Thus, the individual project contribution will be adjusted accordingly.)
  - **Final project.** The final contributes 20% to the course average.

Grading Scheme: 20 % homework, 60 % projects and 20% final project

- Your course performance is your course average (including the final exam score). This is a number between 0 and 100.

- Your final grade is determined according to the following table:

|                     |        |       |       |       |          |
|---------------------|--------|-------|-------|-------|----------|
| Course performance: | 88-100 | 75-87 | 62-74 | 50-61 | below 50 |
| Final Grade:        | A      | B     | C     | D     | F        |

- There will be a group project or activity in this course. Please make sure to check the group project instructions page to locate your group and your group space in Canvas. In this group project activity, you will collaborate with other students to submit a report/video/presentation. As a team, you will work together to break the project up into separate tasks and decide on the tasks or sub-tasks each member is responsible for. Be sure to leave enough time to put all the pieces together before the group assignment is due and to make sure nothing has been forgotten. At the end of the project, you will be required to fill out a group self-evaluation form to evaluate other team members' contributions to the project. This peer evaluation score is worth 15% of your group project grade.

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### Tips

- By working steadily and regularly, you will increase your chances to succeed in this course.
- Remember, being a full-time student is a full-time job.

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### UAB Policies and Resources

- Non-Academic Student Code of Conduct (<https://www.uab.edu/students/conduct/>)
- DSS Accessibility Statement

Accessible Learning: UAB is committed to providing an accessible learning experience for all students. If you are a student with a disability that qualifies under Americans with Disabilities Act (ADA) and Section 504 of the Rehabilitation Act, and you require accommodations, please contact Disability Support Services for information on accommodations, registration and procedures. Requests for reasonable accommodations involve an interactive process and consist of a collaborative effort among the student, DSS, faculty and staff. If you are registered with Disability Support Services, please contact DSS to discuss accommodations that may be necessary in this course. If you have a disability but have not contacted Disability Support Services, please call (205) 934-4205, visit (<https://www.uab.edu/students/disability/>), or their office located in Hill Student Center Suite 409.

- Title IX Statement

The University of Alabama at Birmingham is committed to providing an environment that is free from sexual misconduct, which includes gender-based assault, harassment, exploitation, dating and domestic violence, stalking, as well as discrimination based on sex, sexual orientation, gender identity, and gender expression. If you have experienced any of the aforementioned conduct we encourage you to report the incident. UAB provides several avenues for reporting. For more information about Title IX, policy, reporting, protections, resources and supports, please visit (<https://www.uab.edu/titleix/>) for UAB's Title IX, UAB's Equal Opportunity, Anti-Harassment, Duty to Report, and Non-Retaliation policies.

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### Academic Honor Code

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The University of Alabama at Birmingham expects all members of its academic community to function according to the highest ethical and professional standards. Academic misconduct undermines the purpose of education. Such behavior is a serious violation of the trust that must exist among faculty and students for a university to nurture intellectual growth and development. Academic dishonesty and misconduct includes, but is not limited to, acts of abetting, cheating, plagiarism, fabrication, and misrepresentation. Candidates are expected to honor the UAB Academic Honor Code as detailed in the most current UAB Student Catalog. Please consult this resource (<https://www.uab.edu/students/one-stop/policies/academic-honor-code>) for additional information regarding the specific procedures to be undertaken when a student violates the UAB Academic Honor Code.

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### **Non-harassment, Hostile Work/Class Environment**

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The UAB College of Arts and Sciences expects students to treat fellow students, their Course Instructors, other UAB faculty, and staff as adults and with respect. No form of hostile environment or harassment will be tolerated by any student or employee.

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