

Math 325 Math Models and Applications Syllabus
Agnes Scott College, Spring 2025
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Monday, Wednesday, Friday, 11:30 - 12:20, Buttrick 215

Office hours: Mon 1:00-1:45, Tues 2:00-3:00, and by appointment.

Textbook: Shiflet and Shiflet, Introduction to Computational Science, 2nd edition, ISBN 978-0691160719. The companion website is <https://ics.wofford-ecs.org>.

Plan: We'll cover most of sections 1, 2, 4-8, 11, and 13, as well as extra material on voting and gerrymandering. Topics include growth and decay, epidemics, computational error, modeling with data, global warming, matrices, networks, agent-based modeling, and gerrymandering. There's a more detailed schedule below, but it's subject to change.

Assignments and quizzes: You will have some homework assignments that will be turned in in class, as well as some in-class assignments and quick-review quizzes on the material. Assignments will be posted on Canvas. This is a 4-credit course. In addition to in-class time, you will be spending time outside of class on various activities. The first and most important activity is to regularly read the text and to work through and understand the examples in each section. You should try to spend time on this every day.

Projects: There will be four projects throughout the semester. You will work in groups of three (and fill out peer evaluations at the end of each project). For each project, you will turn in a paper and give a presentation in class. There will be more details on Canvas.

Honor code and group work: All students are expected to follow the honor code throughout the semester; all projects and assignments should be pledged.

Getting help: My office hours are above - these are times when I'm guaranteed to be in my office waiting to talk to someone. If you want to see me at other times, please let me know and we'll find a time. Finally, I can't emphasize enough that your classmates are your best source of help.

Course goals: Learn to
Understand and evaluate the use of mathematics in modeling the real world
Create and use our own mathematical models
Communicate mathematics effectively, both orally and in writing

Assessment: Homework and quizzes 20%, each project 20% (12% paper, 7% presentation, 1% peer/self evaluations).

Late work: Late work won't be accepted.

Attendance: I expect you to be at every class, on time. Attendance is mandatory on project presentation days. Tardiness or absence on other days will have no (direct) effect on your grade, unless you miss a quiz.

Date	Topic
Wed 1/15	Introduction, 1.1, 1.2 Modeling
Fri 1/17	More 1.1, 1.2; Google Colab; 2.1 System dynamics tool tutorial 1
Mon 1/20	MLK Day - no classes
Wed 1/22	2.2 Unconstrained growth and decay
Fri 1/24	More 2.2
Mon 1/27	2.3 Constrained growth
Wed 1/29	More 2.3; start 7.6 garden growth project
Fri 1/31	Work on projects
Mon 2/3	2.5 Drug dosage
Wed 2/5	More 2.5
Fri 2/7	More 2.5
Mon 2/10	Present projects
Wed 2/12	Discuss projects
Fri 2/14	Population growth with interactions - 4.1, 4.2
Mon 2/17	4.3 More population growth
Wed 2/19	Start project 4.3 Spread of disease
Fri 2/21	5.2
Mon 2/24	More 5.2
Wed 2/26	Present projects
Fri 2/28	Discuss projects
Mon 3/3	6.1, 8.1 Simulation and data, 8.3 Empirical models
Wed 3/5	More 8.3
Fri 3/7	More 8.3
Mon 3/10 - Fri 3/21	Peak Week/Spring Break
Mon 3/24	13.2 Matrices for populations
Wed 3/26	More 13.2
Fri 3/28	More 13.2

Date	Topic
Mon 3/31	13.3 Leslie matrices
Wed 4/2	More 13.3
Fri 4/4	More 13.3
Mon 4/7	Work on projects
Wed 4/9	Work on projects
Fri 4/11	More 13.5
Mon 4/14	Present projects
Wed 4/16	Discuss projects
Fri 4/18	Spring Holiday
Mon 4/21	Gerrymandering
Wed 4/23	Gerrymandering
Fri 4/25	Work on projects
Mon 4/28	Gerrymandering
Wed 4/30	Apportionment
Fri 5/2	Apportionment
Mon 5/5	Present projects
Wed 5/7	Discuss projects

Course evaluation: Your feedback on the course is extremely valuable to me, the math department, and the administration. In particular, I take your comments very seriously and use them to improve the course the next time I teach it. You are responsible for completing an evaluation of the course at the end of the semester.

Title IX: Agnes Scott is here to help you if you have experienced any form of sexual harassment or violence, dating or domestic violence, or stalking. Please talk to any faculty or staff member with whom you feel comfortable. Faculty and staff members want to support you and have been trained to help. They will also inform the Title IX office so that you learn about options available to you. If you do not want college administrators to know what you have experienced, you may talk to the chaplain, as well as nurses or counselors in the Wellness Center with complete confidentiality. They will not tell anyone what you share with them unless you give your express permission. You may contact the Title IX Coordinator directly at T9Coordinator@agnesscott.edu.

Inclusion: This course adheres to the principles of diversity and inclusion integral to the Agnes Scott community. We respect people from all backgrounds and affirm people's decisions about gender expression and identity. Please let me know your preferred name or gender pronoun if different from the class roster. The Gay Johnson McDougall Center for Global Diversity and Inclusion is centered and grounded in dismantling systems of oppression, including structural and systemic racism, as well as empowering each individual to take action that uplifts and builds community. Students can contact them at diversity@agnesscott.edu or 404.471.6118.

ADA: Agnes Scott College seeks to provide equal access to its programs, services and activities for people with various abilities. If you will need accommodations in this class, please contact the Office of Academic Advising and Accessible Education (404-471-6150) to complete the registration process. Once registered, please contact me so we can discuss the specific accommodations needed for this course.