



# Modeling in Mathematical Biology

MAP 4484/5489

Spring 2023

## Instructor



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Office: 460 Little Hall



Office Hours:

- TBA
- By appointment

## Lecture



Mondays/Wednesdays/Fridays



Period 6 (12:50–1:40pm)



219 Little Hall

## Web Site



Canvas:  
<https://elearning.ufl.edu/>

## Course Description

MAP 4484/5489 is an introduction to modeling methods used in mathematical biology. It is neither a traditional biology nor mathematics course. No knowledge of biology and only basic knowledge in differential equations and linear algebra is required.

At the end of the course, students will be expected to demonstrate elementary competence in the terminology, concepts, and methodologies used within the discipline of mathematical biology. Students will learn to formulate, analyze, and simulate various models of biological systems.

**Prerequisites:** A grade of C or better in MAP 2302 and (MAS 3114 or MAS 4105).

## Textbook

*Essential Mathematical Biology* by Nicholas F. Britton

<https://doi.org/10.1007/978-1-4471-0049-2>

Additional readings will be posted on the course web site.

## Software

Homework assignments and projects may require computer skills using software such as **MATLAB**, **GNU Octave**, **Mathematica**, **Maple**, **Excel**, **Google Sheets**, **Python**, etc.

Some of this software is available to download to personal computers for no cost, while others are available through **UFApps** (<https://info.apps.ufl.edu/>), **GatorCloud** (<https://cloud.it.ufl.edu/>), and in computer labs (<https://labs.at.ufl.edu/computer-labs/>).

## Communication

**Course Announcements:** Posted on **Canvas**. It is the student's responsibility to make sure they receive notifications for this course.

**Discussion Board:** Homework/content questions should be posted on our class discussion board on **Canvas Discussions**.

**Personal Matters:** Students may e-mail the instructor via **Canvas Inbox** or **e-mail** using their official UF e-mail address.

## Tentative Lecture Schedule

<b>Week 1</b> (Jan. 9–13)	Introduction to Modeling
<b>Weeks 2–5</b> (Jan. 18–Feb. 10)	Population Growth
<b>Weeks 6–9</b> (Feb. 13–Mar. 10)	Interacting Populations
<b>Week 10</b> (Mar. 20–24)	Cancer Growth and Treatment
<b>Weeks 11–12</b> (Mar. 27–Apr. 7)	Infectious Diseases
<b>Weeks 13–14</b> (Apr. 10–21)	Biological Motion
<b>Week 15</b> (Apr. 24–26)	Project Presentations

## Grading Scheme

20% Homework

20% Projects

30% Midterm Exam

30% Final Exam

Your final course grade will be no lower than the following:


A-=[90,93) A=[93,100]  
B-=[80,83) B=[83,87) B+=[87,90)  
C=[70,76) C+=[76,80)  
D=[60,70)  
E=[0,60)


*Grades are based only on academic work and are calculated using the same criteria for all students. It is unethical to bring to your instructor's attention the possible impact of your mathematics grade on your future plans, including graduation, scholarships, jobs, etc.*


More information on UF grading policies (including requests for withdrawal (W) or incomplete (I\*/I) grades) may be found at:


<https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>


## Academic Calendar Dates


 **Mon., Jan. 9**  
First day of class


 **Fri., Jan. 13**  
Last day to drop/add courses with no fee liability

 **Mon., Jan. 16**  
No Classes (Martin Luther King Jr. Day)

 **Mon., Mar. 13–Fri., Mar. 17**  
No Classes (Spring Break)

 **Fri., Apr. 14**  
Last day to withdraw from courses with W

 **Wed., Apr. 26**  
Last day to petition to your college for late withdrawal

 **Wed., Apr. 26**  
Last day of class

## Homework

Written homework assignments showing all work with proper notation will be due bi-weekly via electronic submission through Canvas.

**No** homework scores will be dropped at the end of the semester.

## Projects

You will have the opportunity to work as part of a team on projects. During the first half of the semester, there will be 2 minor projects, and during the second half of the semester, there will be 1 major project. (Students enrolled in MAP 5489 will work on their own for the major project.)

The topics will be decided by the instructor for the minor projects. For the major projects, the instructor will suggest topics, but you are welcome to propose others that interest you. In any case, the final topic and scope of work will be negotiated with the instructor well in advance.

For the minor projects, your team will give an oral presentation. For the major project, your team will give an oral presentation and write a 5–10 page paper (due on the last day of class).

**Project 1 Presentations** February 8 and 10

**Project 2 Presentations** March 6 and 8

**Project 3 Presentations** April 21, 24, and 26

## Exams

**Midterm Exam** Friday, March 10 during lecture

**Final Exam** Thursday, May 4 from 7:30am–9:30am

There are no exam retakes or corrections, no lowest exam will be dropped, and there will be no extra credit assignments to erase the consequences of a bad exam score.

## Make-Up Policy for Homework/Exams

Make-up homework/exam work is allowed only when written evidence of an official University excused absence is provided (<http://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>).

The instructor must be notified as soon as possible, preferably **before** the homework due date or exam with as much advanced notice as possible. A detailed account of the situation and supporting documents are required.

*If you do not have an official University excused absence, but are unable to complete homework on time for any reason, see the **Late Policy** below.*

## Late Policy for Homework

**Late submissions will receive a point deduction of 10% per day late.** Note that late days are counted in 24-hour periods. For example, if the cutoff for on-time submission is 11:59pm, submitting between 12:00am–11:59pm the next day is one day late, and so on. Every assignment has a hard deadline, usually 2 days past the original due date, and late submissions (penalty or not) are **not accepted after the hard deadline**.

## Health and Wellness Resources

- U Matter, We Care  
<https://umatter.ufl.edu>
- Counseling and Wellness Center  
<https://counseling.ufl.edu>
- Student Health Care Center  
<https://shcc.ufl.edu>
- University Police Department  
<https://police.ufl.edu>
- UF Health Shands Emergency Room/Trauma Center  
<https://ufhealth.org/emergency-room-trauma-center>
- GatorWell Health Promotion Services  
<https://gatorwell.ufsa.ufl.edu>
- COVID-19 Testing/Vaccines  
<https://one.ufl.edu>

## Academic Resources

- CLAS Academic Resources (tutoring, study groups)  
<https://academicresources.clas.ufl.edu/>
- UF Student Success (tutoring, coaching)  
<https://studentsuccess.ufl.edu>
- Computing Help Desk  
<https://helpdesk.ufl.edu>
- Career Connections Center  
<https://career.ufl.edu>
- Library Support  
<https://uflib.ufl.edu/find/ask/>
- Writing Studio  
<https://writing.ufl.edu/writing-studio/>

**Important Note:** Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.

## Attendance

Attending lectures are vital to the learning process. Furthermore, a huge part of the transition into your professional careers is being where you are supposed to be when you are supposed to be there. As such, your attendance is expected at every lecture. Furthermore, our focus is on the tasks at hand and not on extraneous activities such as chatting, texting, surfing the web/social media, etc.

The use of personal electronics such as laptops, tablets, and cell phones is distracting to the other students and the instructor. Their use can degrade the learning environment. Therefore, students are not permitted to use these devices during the class period (unless they are being used solely for note taking purposes).

## Classroom/Online Behavior

To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed.

## Accessibility and Accommodations

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. 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**.

## Diversity, Inclusion, and Equity

I am committed to diversity and inclusion of all students in this course. I acknowledge, respect, and value the diverse nature, background and perspective of students and believe that it furthers academic achievements. It is my intent to present materials and activities that are respectful of diversity: race, color, creed, gender, gender identity, sexual orientation, age, religious status, national origin, ethnicity, disability, socioeconomic status, and any other distinguishing qualities.

## Honesty Policy Regarding Cheating, Plagiarism, etc.

UF students are bound by *The Honor Pledge* (<https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>) 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 Student Conduct Code (<https://sccr.dso.ufl.edu/process/student-conduct-code/>) specifies a number of behaviors that are in violation of the honor 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 or consult with the instructor in this class.

## Online Course Evaluations

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>.

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 <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

## In-Class 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.