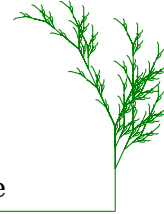# MATH 455
Mathematics in Biology and Medicine

FALL 2023 COURSE INFORMATION

TIMES/ LOCATION:
Mondays, Wednesdays, and Fridays 10:00 - 10:50 AM
in ENGRG E204

INSTRUCTOR:
Mayla Boguslav
`mayla.boguslav@colostate.edu`; Weber 115; 508-579-4684
Office hours: to be determined with your input. Please contact me by email rather than through Canvas.

TEXT:
The official text is *Mathematical Models of Biological Systems*, Hugo van den Berg, Oxford University Press, 2011 [MMBS].
This text is available through the CSU library.
Chapters 1-5 in MMBS are core to the course. We will also draw from chapters 6-9. We will also use other materials that will be provided.

GOALS:
- learn some broadly applicable *mathematics* as it arises out of the biomedical sciences–including linear and nonlinear ordinary differential equations,

- gain an overview of key topics in mathematical biology through the eyes of mathematics and modelling,

- understand and experience through problems and group work key themes in biology and science, such as *metabolism*, *nonlinearity*, *enzymes and catalysts*, and *systems*,

- experience interdisciplinary science and team science through group projects and the interdisciplinary nature of the topic,

- (modified from a geometry textbook of John Oprea:) see science for what it is–not the compartmentalized courses of a standard university curriculum, but a unified whole, mixing together mathematics (linear algebra, differential equations, geometry, probability,...), chemistry, physics, biology, and maybe even geology...*and integrating theory and practice...* (so that) students are transformed from calculators into thinkers, and

- contribute exciting, high-quality posters based on the group projects to a poster session.

PREREQUISITES:
MATH 229 or 369 (Linear Algebra), Math 340 or 345 (Introduction to Ordinary Differential Equations), MATH/BZ 348 (Theory of Population and Evolutionary Ecology), MATH 271/272 (Maths for Chemists), or MATH 255 (Maths for Biological Scientists).

CLASS STRUCTURE:
Class time will be a combination of lecture, discussion, and interactively working on problems and projects. You will often be expected to prepare for class by, for example, doing some reading, working on problems, group work, or posting to a Canvas Discussion Post. Fridays will generally be more discussion-based including group work days, guest lecturers, or presentations.

FEEDBACK...	... is a gift and always appreciated from students. I will provide feedback throughout the class in the form of grades and discussions in class.
ASSESSMENT:	▶ **Homework, In-class activities, Quizzes, and Canvas Discussion Posts** (200 points) All of these activities are to be taken seriously and accomplished with pride, both in the content of your responses and the presentation. You may be asked to type your homework using LaTex. Please hand in your homework during class time. If you cannot make it to class, please send me an email with it. Homework may occasionally be in the form of making a video or preparing a presentation to me or to the class. Some days something will be turned in during class for credit. For some discussion posts, you will be asked to respond to other posted comments. Please be respectful in your posts and responses to posts, and follow any posted guidelines.
	▶ **Final Project** (200 points) The final project will consist of preliminary written reports, a final written report prepared in LaTex, presentations to the class, as well as a poster to be presented at the Mathematics Department's 300-400 level course poster session, tentatively scheduled for the morning of Thursday, December 7 from 8:00 - 11:00 AM.
	The total number of points possible in the course is therefore 400. The standard map from points to letter grade will be used.
MISSING CLASS:	Attendance and participation is part of the course. It is impossible to make up missed class and in-class work, although I might grant some free days in determining the grade.
	Late homework and projects are not accepted without my prior permission. If you are missing class for a university-sponsored event, please send me an email and provide written documentation at least a week prior to the event in order to make arrangements regarding the work you will be missing.
MISSING A QUIZ OR EXAM:	In case of an emergency or illness, please notify me within 24 hours of a missed quiz.
CSU RESOURCES:	The following link provides policies relevant to courses and resources to help with various challenges encountered - `https://col.st/2FA2g`.
POLICY ON ACADEMIC INTEGRITY:	This course will adhere to the CSU Academic Integrity Policy as found on the Student Responsibilities page of the CSU General Catalog and in the Student Conduct Code. By handing in homework, exams, and projects you certify that this is your own work or the work of the group. You are encouraged to discuss homework solution strategies with fellow students, but the final write-up must be your own. Misrepresenting someone elses' work as your own (plagiarism; this includes submitting work from a Solutions Manual or an on-line homework web site as your own), possessing or using unauthorized reference information in any form that could be helpful while taking an exam (for example a calculator not explicitly permitted), or doing assigned problems with the aid of a computer algebra system that has not explicitly been permitted are examples of cheating.

At a minimum, violations will result in a grading penalty in this course and a report to the Student Resolution Center. More information can be found at `http://tilt.colostate.edu/integrity`.

DISABILITIES:

Colorado State University is committed to providing reasonable accommodations for all persons with disabilities. Students with disabilities who need accommodations must first contact Resources for Disabled Students before requesting accommodations for this class. Resources for Disabled Students (RDS; `http://www.rds.colostate.edu`) is located in room 100 of the General Services Building. The Student Disability Center (SDC; `https://disabilitycenter.colostate.edu/`) is located in the TILT building. Their phone is (970) 491-6385 (V/TDD). Students who need accommodations in this course must contact the instructor in a timely manner (at least one week before examinations or quizzes) to discuss needed accommodations.

ADDENDA AND AMENDMENTS:

I reserve the right to amend (or clarify) this course description at any time. You will be notified in class of any changes. It is your responsibility to attend class or have someone in class notify you of any announcements.