

Math 155. Calculus for Biological Scientists

Spring 2017

Course Website: www.math.colostate.edu/~shipman/math155

Please review the course website for details on the course and policies.

Living organisms grow, reproduce, and move around. They *change*. With Calculus, we will study the nature of this change and quantify it by asking questions such as How fast it is changing? How much? and Into what? Biological examples motivate mathematical concepts, which in turn lead us to ask new questions about biology. Math 155 is a math course, but one that is also a science course.

Section

Class Meeting Time and Place: MTWF

Instructor:

Office Hours:

The office hours of all Math 155 instructors are **open** to all students in all sections. You are **welcome** and **encouraged** to come. See the course website for the schedule.

Course Coordinator: Dr. Patrick Shipman

Prerequisites: Basic courses in algebra (such as Math 117/118), logarithmic and exponential functions (such as Math 124), and trigonometry (such as Math 125).

Course Materials:

• *Required:* Frederick R. Adler. *Modeling the Dynamics of Life: Calculus and Probability for Life Scientists* 2nd Ed. Brooks Cole, 2005. ISBN 0-534-40486-3.

or

Frederick R. Adler. *Modeling the Dynamics of Life: Calculus and Probability for Life Scientists* 3rd Ed. Brooks Cole, 2013. ISBN 0-8400-6418-7.

Reduced pricing or book rental (and ebook access during shipping time) is available for this text through the publisher's website: <http://www.cengagebrain.com/micro/math155>

• *Optional:* A graphing calculator such as the TI-83 or TI-84 is highly recommended. These are available in the bookstore. It is important that you have the manual for your calculator. You will not be allowed to use a TI-89, a TI-Nspire CAS, or any calculator that does symbolic manipulation on the exams or quizzes. It is prohibited to use your cell phone as your calculator on exams or quizzes. The instructor or exam proctor has the right to check your calculator during the exam and any programs you have put on it to be sure they are permissible.

• *Optional:* G. Mueller, R. I. Brent. *Just-in-Time Algebra and Trigonometry for Calculus*, 3rd Ed. Pearson, 2005.

Syllabus: We will cover most of Chapters 1-4 of the Adler book. A tentative syllabus is available at the course website. You are expected to read each section of the book that is covered.

The **Course Goals** are

- to learn how to build and read mathematical models of biological phenomena,
- to gain a working knowledge of the key tools of calculus—*derivatives*, which quantify *rates of change* of functions, and *integrals*, which sum up rates of change, and
- to understand key concepts of science such as *equilibrium*, *stability*, and *rate of change*, both in terms of mathematical descriptions and biology.

Grading:

Grades will be based on

Written Homework: 50 points total

WebWorK Online Homework: 50 points total

Quizzes: 100 points total

Midterm examination 1 (Thursday, February 23, 5:00-6:50 pm): 100 points

Midterm examination 2 (Thursday, April 6, 5:00-6:50 pm): 100 points

Final Exam (Wednesday, May 10, 7:30 am - 9:30 am): 100 points

Exams: There will be two common exams and a final. *Note* that the common midterm exams are held on Thursday evenings and you are **REQUIRED** to be there. The rooms will be announced in class; the dates and times are noted above.

Cellphones must be turned off during the exam and must remain in a bag during the entire exam. A ringing cellphone or use of an unauthorized electronic device (in any form: clock, calculator, camera, notepad, toy, ...) during the exam may lead to disqualification (0 points) from the exam. Exam scores cannot be contested after the following exam.

Exam conflicts/Alternate arrangements: The only excused absences from exams are official university-approved absences. If a CSU event conflicts with an exam or the final, or if you are ill, you must submit the *alternate exam time request form* that you can find on the course website (under "Information and Grading Policies"), together with supporting documentation (e.g. a letter from the athletics department) to your section teacher. This request, including documentation, must be submitted at least 8 days before the exam (or, in the case of sudden illness, as soon as reasonably possible). If you need alternate exam arrangements through Resources for Disabled Students, submit the RDS qualification letter at least 8 days before the first exam to your section teacher. Alternate exam requests are processed once per exam; failure to submit requests, including documentation, in time can mean that no alternative arrangements will be possible! If you have questions concerning alternate exams, please contact the course coordinator, Dr. Shipman (shipman@math.colostate.edu).

Quizzes: A quiz will be given in class most weeks on days as indicated on the calendar (or by your instructor in case there are changes). If you miss a quiz, you will receive a zero (no make-ups). However, your lowest three quiz grades will be dropped, which includes any zeros. This includes missed quizzes due to illness or emergencies. Missing a quiz is strongly discouraged.

Readings: A weekly reading will be assigned on a topic of mathematics in biology. The weekly readings are available at the course website (see the calendar or the class resources page). You may earn one extra credit point (up to a maximum of 10 extra credit points) by correctly answering a question on the quiz pertaining to the reading or an extra credit problem, as determined by your instructor.

Written Homework: (50 points) Homework problems to be handed in (HW) will be posted on the course webpage under the “Homework” link. For some of the homeworks, you may need to download and print a .pdf file. Some problems will be designated as practice problems, and some problems will be assignments to be handed in. Assigned HW will be collected, and selected problems will be graded. See the course calendar for the HW Schedule. One written HW assignment will be dropped. If you fail to hand in a HW assignment, you will receive a zero. No late HW will be accepted. Please visit office hours for HW questions.

Each of the 11 written homework assignments will be worth the same number of points, and your Written Homework score will be determined by your percentage correct on the assignments after dropping the lowest score. A complete solution to a written homework problem must include not only the final answer but also the (legible!) work needed to obtain the solution. Do not leave it until the evening before the due date to work on the homework problems.

Homework that is turned in should NOT look like scrapwork. It must show all of your *relevant* work clearly and legibly.

WebWorK Online Homework: (50 points) We will be using the system WebWorK (there is no relation to the University’s RamCT, and you **cannot** access it through RamWEB) for part of the homework assignments. To do these problems, you have to log in via the course homepage <http://www.math.colostate.edu/~shipman/math155>. Select the “WebWorK” tab under the “Homework” page link, and then the log in link. Your user name is set to your university eName. This is typically your university email name, *e.g.* the address `myname@rams.colostate.edu` has eName `myname`. Your initial password is set to your CSU ID number (this is the 9-digit number on your university ID card, starting with 8). Please as a first step change your password. As the login is not encrypted, do not choose the same password as used for any important login (such as banking or email).

WebWork homework is due at 8pm on the days indicated on the course calendar (www.math.colostate.edu/~shipman/Calendar); a WebWorK homework will be due most Tuesdays or Wednesdays and Fridays. However, there is a grace period until midnight (on the server!) that is to make up for clock drift or network issues. We initialize the data base for WebWorK with the students registered the weekend before classes start. If you registered for the course late, you might not yet have been added to WebWorK. In this case, talk ASAP to your section instructor to be added. You must provide your CSU eName and your CSU-ID, otherwise we will not be able to transfer grades correctly. Also talk to your section instructor in case you cannot log into WebWorK or have forgotten your password.

Your WebWorK score out of 50 points will be determined by the your percentage correct on the WebWorK assignments.

Academic Integrity: The University Policy on Academic Integrity (see CSU General Catalog) is enforced in this course. Misrepresenting someone else’s work as your own (plagiarism) and possessing unauthorized reference information in any form that could be helpful while taking an exam are examples of cheating. Submitting work from a Solutions Manual or an on-line homework web site as your own are examples of plagiarism. Students judged to have engaged in cheating may be assigned a reduced or failing grade for the assignment or the course and may be referred to the Office of Conflict Resolution & Student Conduct Services for additional disciplinary action.

Expectations, Help, and Support

Work Load: Students generally consider Math 155 to be a challenging course. We do assume that you know the material covered in the prerequisite courses. As a rough estimate of your time commitment, in addition to the 4 classes a week you are likely to need 8-12 hours a week just for review, homework and learning. Plan this time into your semester schedule now.

MATH 155 is a course in which you need to work continuously. You should not attempt to learn the material just in the week before each exam.

In addition, you are **expected** to attend and *participate in* (not doing sudoku puzzles, *etc.*) class regularly. We assume that you are aware of all announcements made in class and that you have read and understood the information in this course information sheet and on the course website. All audible signals of *cell phones* must be turned off at the start of class.

Office Hours: You are welcome to come to the office hours of any of the course section instructors. Office hours will be held in the Calculus Center, located in Room 17 of the Weber Building. The schedule is posted online. You are encouraged to form study groups. Perhaps you would like to form a group that meets in the Great Hall during or immediately before one of the office hours.

Problem Session: One of the office hours of one instructor may be held as a weekly 1-hour problem session. The time and place will be announced.

Free Tutoring: Free tutoring is available for this course through the Arts and Sciences Tutoring Program. The program is located in the Russell George Great Hall in The Institute for Learning and Teaching (TILT), and runs 5 p.m. to 10 p.m., Sunday-Thursday evenings during the academic year. No appointment is necessary, and all students are welcome. More information and the tutoring schedule is available through a link on the “Study Resources” tab on the course website. A tutor for calculus topics is there any time, but a tutor specifically for Math 155 will be there at times to be posted on the course website.

Explore the “Study Resources” page on the course website for more resources, such as past exams and private tutors.

Best wishes for a productive, successful time in **Math 155!**