Math 155. Calculus for Biological Scientists
Fall 2017

Website https://csumath155.wordpress.com
Please review the course website for details on the schedule, extra resources, alternate exam request forms, written homework, webwork link, etc. See Canvas for grades and discussion forum.

Living organisms grow, reproduce, and move around. They *change*. With calculus, we will study the nature of this change and quantify it. 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.

We will investigate the *Fundamental Theorem of Calculus* in biological contexts. It says: *If we know how fast something is growing and how much we started with we can figure out how much we have. If we know how much of something we have at every moment in time we can figure out how fast it is changing.*

Class Meeting Time and Place:

Section 3: MTWF10:00-10:50 TILT 221

Section 6: MTWF12:00-12:50 WAGAR 232

Instructor and Course Coordinator:
Dr. Cameron Byerley
Email: cameron.byerley@colostate.edu

Office: Inside Calculus Center, Weber 17B
Office Hours are in the Calculus Center or by appointment.
The office hours of all Math 155 instructors are **open** to all students in all sections. Dr. Byerley's office hours are MW 1:00 to 2:00 pm. You are **welcome** and **encouraged** to come. See the course website or Calculus Center website for the Calculus Center schedule.

You can also use the Canvas discussion forums to ask questions that might apply to other students in the class. For example, questions about homework, questions about tests and quizzes, questions about general grading policies, etc.

Prerequisites: Conceptual understanding of material covered in 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* 3nd 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`

Less expensive e-text The course textbook is available through the CSU Bookstores Inclusive Access Program in partnership with Unizin Engage. You have immediate access to the online e-text by clicking on the Unizin Engage link within the course menu in Canvas. Please note, there is a cost for the e-text. The bookstore will charge your student account for the cost of the e-text after the Add/Drop date. **You must opt-out of the Unizin Engage e-text before the Add/Drop date to avoid bookstore charges.** However, this text is required for the course. Please look for emails from the bookstore about opting out as well as charges to your student account. Once you choose to opt-out, you will no longer be allowed to access the e-text in Canvas.

Free Online Book Thompson, Patrick. *Calculus: Newton meets Technology.* Free online book available at http://patthompson.net/ThompsonCalc/. Occasionally, we will take homework problems or use animations from this book. It has good dynamic visualizations that are not possible in a print textbook.

• *Required* A graphing calculator such as the TI-83 or TI-84 is highly recommended. 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. If you do not want to purchase a calculator, you can check graphing calculators out from the Calculus Center while you are inside the Calculus Center, use Desmos, a free online graphing calculator for homework, and borrow a handheld graphing calculator from a friend for tests.

Required: An iclicker. Here is a link to FAQ about iclicker use at CSU.
http://ttc.colostate.edu/iclicker-student-faq/
I will use iclickers to take attendance for attendance points.

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

Schedule: We will cover most of Chapters 1-4 of the Adler book and some homework questions from Thompson's book. A tentative schedule 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 represent how much a quantity has accumulated given its rate of change.

To understand key concepts of science such as *equilibrium*, *stability*, and *differential equations*, both in terms of mathematical descriptions and biology.

Grading:

The total number of points possible in the course is 600.
Pretest: 10 points
10 Written Homeworks: 50 points total

WebWorK Online Homework (scaled): 80 points total
Attendance (drop three days): 20 points total
11 Quizzes, 10 points each (drop two) : 90 points total
Midterm examination 1 September 28th 5:00 pm to 6:30 pm: 100 points
Midterm examination 2 November 2nd 5:00 pm to 6:30 pm: 100 points
Final Exam Wednesday, December 13th, 7:30 am to 9:30 am : 150 points
Extra Credit: Up to 15 points, at the discretion of your instructor.

Grades will be assigned with the following system:
A: 540-600 points
B: 480- 539 points
C: 420-479
D: 360-419
F: Below 360 points.

Note on Canvas grades Grades entered in Canvas are approximate and may not take into account dropped quizzes, the dropped homework and extra credit. Grades will be calculated by formula in syllabus and may differ slightly than Canvas grades.

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 next exam is taken.

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, 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. Byerley.

Quizzes: A quiz will be given in class most weeks on Fridays 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 two quiz grades will be dropped, which includes any zeros. This includes missed quizzes due to illness or emergencies. Missing a quiz is strongly discouraged. There will be no quizzes on the weeks of Midterms, or the week before the final.

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, so start early!

Each of the 10 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.

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

Extra Credit You have three chances to go to the Calculus Center to earn extra credit. Three points per visit. After Exam 1 and Exam 2 solve all the problems you missed neatly on a separate piece of paper and bring it to the tutors. They will ask you questions about what you learned from your mistakes then sign a paper saying you came. After the Pretest you can earn extra credit by picking up your scantron form and seeing what you missed with a tutor. There will be a few more extra credit options involving reading about biology or asking biology professors where calculus is used in biology.

WebWorK Online Homework: (80 points) We will be using the system WebWorK (there is no relation to the University's RamCT, and you can**not** access it through RamWEB) for part of the homework assignments. To do these problems, you have to log in via the course homepage. 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 12:00 noon on the days indicated on the course calendar on website; a WebWorK homework will be due most Tuesdays and Thursdays. The Webwork is due at noon to encourage students to use the Calculus Center in the morning when it is typically less busy. You are much more likely to get a tutor to yourself if you do not procrastinate!

We initialize the data base for WebWorK with the students registered on Tuesday, August 22nd. 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 80 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. To pass Math 155, you will also have to understand and be able to use many ideas from prerequisite classes. We wish that everyone remembered what they have learned before, but if this is not the case, make use of Calculus Center tutoring and workshops to catch up. 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.

Calculus Center Workshops There will be workshops almost every week in the Calculus Center (Weber 17) designed by the Calculus Center graduate students to help you succeed in your course. The workshop schedule with all details is available on the Calculus Center webpage. The workshops focused on Math 155 content are August 23rd, August 30th, September 14th, September 27th, October 12th, October 25th, November 1st, and November 29th.

Free Tutoring:
Calculus Center The Calculus Center is a great place to meet students from your class and get help. The schedule for which hours have a Math 155 tutor are available on the Calculus Center Website: http://www.math.colostate.edu/calculuscenter/
TILT 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.

Formal Syllabus The formal syllabus for this course (including gtPathways-specific information) can be found here: www.math.colostate.edu/syllabi/MATH155Syllabus.pdf.

Disabilities Colorado State University is committed to providing reasonable accommodations for all persons with disabilities. Students with disabilities must first contact Resources for Disabled Students before requesting accommodations for this class. RDS has website: http://www.rds.colostate.edu Students who need accommodations in this class must contact instructor in a timely manner (at least one week before examinations) to discuss needed accommodations.
Other Difficulties Students who do not have a documented disability, but are having difficulties in class due to other reasons such as being a single parent, having a family member with a serious illness, having a disabled child, having a physical accident (such as concussion), etc. should also contact Dr. Byerley for assistance and problem solving. There are a variety of services on campus such as very inexpensive childcare, counseling, services for veterans, services for athletes, etc. and Dr. Byerley would be happy to help you research support options.

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