

Math 1180, Section 001
Spring 2018

Course Syllabus

Instructor of Record:

Owen Lewis (olewis at math dot utah dot edu)

Office: LCB 301

Textbook:

Modeling the Dynamics of Life: Calculus and Probability for Life Scientists, 3rd Edition, by F. Adler.

ISBN 10: 0840064187

ISBN 13: 978-0840064189

Classroom & Hours:

CSC 25

MWF 9:40 - 10:30 am

Computer Labs:

LCB 115

Tues. 8:35 - 9:25 or 9:40 - 10:30 am

Lab Leader:

Bridget Fan (gfan at math dot utah dot edu)

Office Hours:

Weds. 1:00 - 2:00 pm (This can be changed to suite the classes needs)

or by appointment.

Website:

<https://utah.instructure.com/courses/478049>

I will be posting course announcements and assignments to the Canvas page.

Course Information:

Math 1180, Stats for Biologists is a 3-credit semester course.

Course Discription:

Probabilistic models of biological systems and their analysis. Derivation and analysis of stochastic dynamical systems describing growth, diffusion, and selection. Introduction to probability theory including distributions, random variables, and probability density functions. Applications of binomial, exponential, Poisson, and normal distributions. Statistical methods including parameter estimation, maximum likelihood, hypothesis testing and regression. Computer lab using Maple.

Prerequisite:

“C” or better in Math 1170.

Expected Learning Outcomes: Upon successful completion of this course, a student should be able to:

- Understand and apply the axioms of probability, including the definition and interpretation of conditional probability and independence.
- Graphically display probability distributions and probability density functions of random variables, and compute the mean, median, variance and other descriptive statistics.
- Use joint distributions to describe relationships between random variables and summarize them with the covariance and correlation.
- Understand the assumptions behind the random variables that follow the binomial, geometric, Poisson, exponential, and normal distributions, and apply them to compute probabilities of events.

- Know how to use maximum likelihood to estimate parameters and compare models.
- Understand hypothesis testing, p-values and confidence limits, and correctly interpret results in scientific papers.
- Be familiar with the fundamental statistical methods of the t-test, chi-square test, and linear regression.
- Use modern software to practice hands-on applications of acquired mathematical concepts in computational projects.
- Use modern statistical software to analyze and display scientific data.

Assignments and Grading

Homework:

Homework will be assigned on an approximately weekly basis. It will be posted to the course webpage and handed in during lecture. No late homework will be accepted. Your two lowest homework grades will be dropped and will not affect your final grade in the class.

Quizzes:

We will have an in-class quiz nearly every week. The first week of class, weeks where we have midterms, and some holiday shortened weeks may be exceptions. These quizzes will be short (2 to 3 questions each) and only occupy a small portion of the class period. Your two lowest quiz scores will be dropped and will not affect your final grade in the class.

Labs:

You will meet for one hour weekly (Tuesdays at your designated time) for a computer lab with Bridget Fan. Lab assignments are due weekly on the following Monday and account for 15% of your grade. The material covered in labs will be fair game for tests.

Midterms:

There will be two (in-class) midterm exams approximately 5 and 10 weeks into the course. They will take place on Friday, the 9th of Feb. and Friday, the 16th of March. No make-up tests will be offered. These dates are set in stone; plan accordingly.

Midterm Dates: 2/9/2018 & 3/16/2018

Final Exam:

There will be a cumulative final exam. It will also be given in class. The university has scheduled our final to take place on Wednesday, May 2nd, from 8 to 10 am. No make-up exams will be offered; plan accordingly.

Final Exam Date: 12/12.

Grading:

The grading for the course will be broken down as follows:

- Final: 30%
- Midterms: 15% Each
- Quizzes: 10%
- Homework: 15%
- Labs: 15%

Your grades on each quiz and exam will be based not only on the correctness of your solution, but also on the clarity of its presentation. If I cannot decipher your work, then I will not give you credit for it. Work will only be “regraded” if I receive, in writing, an explanation as to why you believe you deserve more credit than you were originally given.

Other Information

Holidays:

There will be no class meeting on Mon. the 15th of Jan. due to the MLK holiday.

There will be no class meeting on Mon. the 19th of Feb. due to Presidents Day.

There will be no class meeting on Mon. the 19th, Weds. the 21st, or Fri. the 23rd of March due to Spring Break.

Drop Date:

The final day to drop classes is Fri. the 19th of Jan.

Tutoring Lab:

T. Benny Rushing Mathematics Student Center (adjacent to JWB and LCB), Room 155

M - Th 8 am - 8 pm

F 8 am - 6 pm (closed Saturdays, Sundays and holidays)

They are also offering group tutoring sessions. If you're interested, inquire at the Tutoring Lab.

<http://www.math.utah.edu/ugrad/tutoring.html>

Private Tutoring:

University Tutoring Services, 330 SSB (they offer inexpensive tutoring). There is also a list of private tutors at the Math Department office in JWB233.

Computer Lab:

Located in the T. Benny Rushing Mathematics Student Center, Room 155C.

M - Th 8 am - 8 pm

F 8 am - 6 pm

Link to computer lab website:

<http://www.math.utah.edu/ugrad/lab.html>

Helpful Resources:

Kelly MacArthur has a large number of helpful materials on her website. She has recorded a whole series of lectures for other calculus courses and posted the videos online. The videos can be found at the following site.

<http://www.math.utah.edu/lectures/>

Her website also has a lot of review materials that are useful this course. I particularly encourage you to look at the reviews of Algebra and Trigonometry. Every year I find that a poor mastery of this material causes calculus students the most difficulties.

Disclaimers and Important Statements:

Student Responsibilities:

All students are expected to maintain professional behavior in the classroom setting, according to the Student Code, spelled out in the Student Handbook. Students have specific rights in the classroom as detailed in Article III of the Code. The Code also specifies proscribed conduct (Article XI) that involves cheating on tests, plagiarism, and/or collusion, as well as fraud, theft, etc. Students should read the Code carefully and know they are responsible for the content. According to Faculty Rules and Regulations, it is the faculty responsibility to enforce responsible classroom behaviors, and I will do so, beginning with verbal warnings and progressing to dismissal from and class and a failing grade. Students have the right to appeal such action to the Student Behavior Committee. <http://regulations.utah.edu/academics/6-400.php>

Students with Disabilities:

The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability & Access, 162 Olpin Union Building, 581-5020 (V/TDD). CDA will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in alternative format with prior notification to the Center for Disability & Access.

Addressing Sexual Misconduct:

Title IX makes it clear that violence and harassment based on sex and gender (which includes sexual orientation and gender identity/expression) is a civil rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veterans status or generic information. If you or someone you know has been harassed or assaulted, you

are encouraged to report it to the Title IX Coordinator in the Office of Equal Opportunity and Affirmative Action, 135 Park Building, 801-581-8365, or the Office of the Dean of Students, 270 Union Building, 801-581-7066. For support and confidential consultation, contact the Center for Student Wellness, 426 SSB, 801-581-7776. To report to the police, contact the Department of Public Safety, 801-585-2677(COPS).

Wellness:

Personal concerns such as stress, anxiety, relationship difficulties, depression, cross-cultural differences, etc., can interfere with a student's ability to succeed and thrive at the University of Utah. For helpful resources contact the Center for Student Wellness at www.wellness.utah.edu or 801-581-7776.

If you have any questions, contact Owen Lewis: [olewis at math dot utah dot edu](mailto:olewis@math.utah.edu)