

Text: *Modeling the Dynamics of Life: Calculus and Probability for Life Scientists, 2nd, by Frederick Adler*

Course Goals: Compute and interpret limits at finite values and to infinity; determine when it is appropriate to use L'Hôpital's Rule and compute in those instances. Evaluate the continuity of a function on an interval. Correctly compute and interpret first and second derivatives for polynomial, logarithmic, exponential, and trigonometric functions. Use product, quotient, and chain rules to compute derivatives. Use graphical, numerical, and algebraic means to identify equilibria of discrete-time dynamical systems and classify their stability. Find and interpret extrema of continuous and discrete functions. Use the Mean Value Theorem, Intermediate Value Theorem, and Extreme Value Theorem to draw conclusions about extrema and roots of certain continuous functions.

Study applications to population, reproduction, drug concentration, selection, harvesting, and food intake using all of the aforementioned skills.

Instructor Notes:

- The course deals with both continuous and discrete functions, something our regular calculus sequence does not. This is the primary way in which the course differs from math 251.
- Students in this course are exclusively human physiology, biology, geological science, and environmental science majors. Inclusion of applications to biology included in homework and on tests is critical to the success of this course. It's worth letting them know that you aren't a mathematical biologist (or are you?), but that you are there as a facilitator of mathematics to applications that hopefully have relevance for them.
- Consider assigning a course project involving biological modeling.
- Lecture guides available from Mike Price upon request.

WEEK	SECTIONS TO COVER	Notes
1	2.1, 2.2, 2.3	2.1 Derivative concepts before formal limits is always a little risky
2	2.4, 2.5, 2.6	
3	2.7, 2.8, 2.9 <i>(Winter) Martin Luther King Jr. Day holiday Monday</i>	
4	2.10 <i>Review for Midterm</i> <i>Midterm 1</i>	1 st midterm (Chapter 2 exam)
5	1.5, 1.6	
6	1.10, 3.1, 3.2	
7	3.2, 3.3	3.3 Easily the most important section in the book, if you give two midterm exams try to get it onto the second exam in addition to the final

8 3.4 2nd midterm (Chapter 2 exam) on Friday
3.4 Avoid detailed proofs of MVT, IVT, EVT if you can stomach it.
The time is better spent on good conceptual understanding of the
theorems and how they can be carefully applied.
Review for Midterm, Midterm 2

9 3.5, 3.6
(Fall) *Thanksgiving holiday Thursday/Friday.*

10
Catch-up, review
(Spring) *Memorial Day holiday Monday*

11 Final exam during scheduled time (registrar.uoregon.edu/common/cals/finalscal.htm)

Other Important Dates (http://registrar.uoregon.edu/calendars/academic?field_schedule=Fall+2011):

Monday of 2 nd week	Last day to drop without a “W” (but only 75% tuition refund)
Wednesday of 2 nd week	Last day to add a class
Sunday after 7th week	Last day to drop --- period!

- **Lecture handouts available from Mike Price upon request**