

MTH132-040 special section of Calculus I
Recommended for life science majors
Fall 2008
Supported by National Science Foundation*

Instructor: Dr. C. Chiu (Dr. P. Bates for Spring 09)

Biology consultant: Dr. J. Jackson (Microbiology, MSU)

Graduate teaching assistant: TBA

Prerequisite: same as MTH132.

Course description: The objective of this course is to learn the basic concepts and techniques of calculus: limit, continuity, differentiation and integration. This course is important because it transitions from high school mathematics to higher mathematical thinking with analytical rigor. It is also important because of its wide applicability in many fields, from science and engineering to economics and social science. The traditional first-semester calculus focuses on applications in mechanics and physics. This course will break this tradition and contain a balanced set of application examples in biology, chemistry and physics with emphasis on biological applications.

List of contents: We emphasize that the mathematical content of this section is essentially the same as all other MTH132 sections. Considering the special nature of this section, that students expect to major in the life sciences, we will integrate more biological examples into the course and emphasize applications of calculus in medical and biology fields. We will cover the following subjects:

- **Limits and continuity:** Formal definition; limits at infinity.
- **Differentiation:** Formal definition; rules including the chain rule; derivatives of polynomials, trigonometric functions and exponential functions.
- **Applications of derivatives:** Related rates; Extreme values; graphing; optimization.
- **Integration:** Riemann integrals; definite and indefinite integrals; substitution; area between curves.

Computer aided teaching and learning : Lecture notes and other learning materials will be provided through internet. All homework assignments will be completed online and graded by LON-CAPA. LON-CAPA is an open-source freeware Learning Content Management System, developed in the College of Natural Science at Michigan State University. With LON-CAPA, an instructor can create and/or assemble individualized assignments with a large variety of conceptual questions and quantitative problems. "Individualized" means that each student sees a slightly different computer-generated problem. This encourages collaboration between students on a conceptual level, but prevents blind copying of answers.

* Participation in statistical comparison surveys is voluntary.