

**SU DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE**  
**SYLLABUS (Tentative)**  
**MATH 201 *Calculus I***

- Background** The Calculus ushered in modern science and challenged the vision of poets, theologians and philosophers. It serves as the basis for much of today's science and technology.
- Objectives** To better understand the mathematics which is the foundation for modern science, with emphasis on applications, approximations, and the role of proof. To develop higher level thinking skills; in particular, to practice drawing on previous knowledge to approach new problems.
- Intended Audience** Students wanting an intermediate Calculus course that prepares them for further study in mathematics, science, and engineering.
- Prerequisite** Trigonometry and MATH 140 or equivalent.
- Text** *Calculus: Early Transcendentals, Single Variable* by Stewart; 7<sup>th</sup> edition, Brooks/Cole Publishing, 2011. ISBN 978-0538498678.
- Technology** A computer Algebra system or Mathematica (computer software available in campus labs).

**Topics (not necessarily in this order)**

Approximate No.  
of Class Hours

**Preparation for Calculus (Chapter 1)**

Review of prerequisite mathematics, including algebra, functions (polynomial, rational, trigonometric, exponential, and logarithmic), inverse functions, and graphing techniques. Fundamentals of a computer Algebra system including using the Help Menu; defining and evaluating functions; plotting functions and changing scales in plots; and solving equations.

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**Limits, Continuity, and the Derivative (Chapter 2)**

Tangent lines; velocity; definition of the derivative; symbolic, graphical, and numerical approaches to limits; properties of limits; one-sided limits; limits involving infinity; continuity; the Intermediate Value Theorem; and using a computer Algebra system to find limits.

14

**Differentiation (Chapter 3)**

Differentiation of algebraic and transcendental functions; the Chain rule; implicit differentiation; rates of change; higher order derivatives including acceleration; linear approximation; and finding derivatives using a computer Algebra system.

16

**Applications of Differentiation (Chapter 4)**

Finding and classifying extreme values; the Mean Value Theorem; the Extreme Value Theorem; slope, concavity and points of inflection; L'Hôpital's Rule; curve sketching; optimization; Newton's Method and antiderivatives. Using a computer Algebra system to explore applications.

18

**Testing, Review, and Optional Topics**

Possible topics include: exponential growth and decay, related rates and hyperbolic functions.

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56

**EVALUATION**

Homework, Lab work, quizzes: 20-40%  
 In-class examinations: 40-60%  
 Comprehensive Final Exam: 20-40%

*Free tutoring is available for this course in the Spring and Fall semesters.*

NOTE: ONCE A STUDENT HAS RECEIVED CREDIT, INCLUDING TRANSFER CREDIT, FOR A COURSE, CREDIT MAY NOT BE RECEIVED FOR ANY COURSE WITH MATERIAL THAT IS EQUIVALENT TO IT OR IS A PREREQUISITE FOR IT.