

COURSE OUTLINE
MT. HOOD COMMUNITY COLLEGE DISTRICT
Gresham, Oregon 97030

* New _____
 * Revised 10/25/2006
 * Review only (no changes) _____
 (Date)

* COURSE TYPE Please check appropriate box:

- Lower Division Collegiate
 Occupational Supplementary
 Occupational Preparatory
 Other Education, Including General Ed & Adult Ed

COURSE TITLE Calculus I: Differential Calculus

COURSE NUMBER MTH 251 COURSE CREDIT 4

* Lecture Hours 4 | _____ Lab Hours _____ | _____ Seminar Hours _____ | _____
 Wkly/Term Wkly/Term Wkly/Term

* GRADING STATUS:

- Letter Grade Only
 S/U Only
 Optional
 No Grade

* HEADCOUNT LOADING:

- Yes
 No * Factor _____

Guided Studies Requirement:
 Student must be proficient in:

- Reading (RD90)
 Writing (WR90)
 Mathematics (MTH20)
 Not applicable

For Instruction Office Use Only General Education Category Apply general requirement or distribution to:		
AA _____	AS _____	AS/OT-Bus _____
AAS _____	AGS _____	
VP Approval _____	Date _____	

Sara Williams, Mathematics 10/25/06

1) Prepared by _____ Date _____

4) Approved by Dean _____ Date _____

2) Approved by Distance Education Admin. _____ Date _____

5) Curriculum Committee _____ Date _____

3) Approved by Department Chair _____ Date _____

6) Approved by VP for Student Learning _____ Date _____

* See legend/definition for explanation

COURSE DESCRIPTION: (for catalog)

This is the first course of the calculus sequence covering the concepts, computations, and applications of differential calculus. Functions and derivatives will be modeled symbolically, numerically, graphically, and in words. A CAS-capable graphing calculator is required.

PREREQUISITE:

MTH 111 and MTH 112 with a C or better or suitable performance on the placement exam.

INSTRUCTIONAL MATERIALS REQUIRED OF STUDENT: (text, supplies, etc.)

Text, CAS-capable graphing calculator.

STUDENT LEARNING OUTCOMES:

Upon successful completion of this course, the student will be able to:

1. **Communicate** effectively (orally and in writing) a problem solving process, results, and conclusions using mathematical terminology and correct mathematical syntax.
2. Apply mathematical reasoning and **modeling** to solve problems arising from the real world. Mathematically model problem situations verbally, numerically, visually, graphically, and/or algebraically.
3. Identify **connections** among verbal, numeric, visual, graphical, and algebraic models.
4. Determine if a solution is reasonable and **verify results**. Also, determine if answers are equivalent: from the textbook, from the calculator, and answers developed by hand.
5. Evaluate **limits** using numerical, graphical, and symbolic methods.
6. Determine if a function is **continuous** on a given interval. Identify points of discontinuity from graphs and symbolically.
7. Determine the derivative of a function from the **limit definition**.
8. Determine if a function is **differentiable** on a given interval. Identify points where a function is not differentiable.
9. Apply **symbolic derivative rules** to compute derivatives.
10. Demonstrate the relationships between a function and its **first and second**.
11. Interpret the **meaning of the derivative** in any situation.
12. Use derivatives to solve application problems involving **rates of change**.
13. Approximate function values using **tangent lines**.
14. Identify **critical points**, local extrema, global extrema, minima, maxima, and inflection points for a given function.
15. **Optimize** application situations.
16. **Summarize** the main ideas and applications of differential calculus.

GENERAL INSTRUCTIONAL METHODS:

A calculus course that meets the spirit of the AMATYC and NCTM Standards emphasizes conceptual understanding, mathematical modeling of real-world applications, multiple representations of a problem (and solutions), appropriate use of technology, and mathematical problem solving. This represents a shift away from technique mastery and algorithmic skills. For students to see mathematics as an integrated whole, the above objectives should be presented in a connected fashion and not treated as discrete topics or concepts as the listing of objectives might suggest.

EVALUATION PROCESS:

Assessment is based on a variety of methods noted below. Assignments will be completed both in and out of class. Assessment of individual work as required. A grade of C or better is a prerequisite for Math 252.

- Worksheets/Projects/In-depth application problems
- In-class Individual Exams
- Team Exams
- Writing Assignments/Journals
- Daily Homework

