MATH 125

Calculus I

Fall, 1999

Syllabus

Chapter 1. Limits and Continuity
1.1 Rates of change and limits
1.2 Rules for finding limits
1.4 Extensions of the limit concept
1.5 Continuity
1.6 Tangent lines

Chapter 2. Derivatives
2.1 The derivative of a function
2.2 Differentiation rules
2.3 Rates of change
2.4 Derivatives of trigonometric functions
2.5 The chain rule
2.6 Implicit differentiation and rational exponents
2.7 Related rates of change

Chapter 3. Applications of Derivatives
3.1 Extreme values of functions
3.2 The mean value theorem
3.3 The first derivative test for local extreme values
3.4 Graphing with y' and y''
3.5 Limits as x -> infinity, asymptotes, and dominant terms
3.6 Optimization
3.7 Linearization and differentials
3.8 Newton's method

Chapter 4. Integration
4.1 Indefinite integrals
4.2 Differential equations, initial value problems, and mathematical modeling
4.3 Integration by substitution - running the chain rule backwards
4.4 Estimating with finite sums
4.5 Riemann sums and definite integrals
4.6 Properties, areas and the mean value theorem
4.7 The fundamental theorem
4.8 Substitution in definite integrals
4.9 Numerical integration

Chapter 5. Applications of Integrals
5.1 Areas between curves
5.2 Finding volumes by slicing
5.3 Volumes of solids of revolution -- disks and washers
5.4 Cylindrical shells
5.5 Lengths of plane curves
5.6 Areas of surfaces of revolution
5.7 Moments and centers of mass
5.8 Work

The section on Preliminaries contains important and useful information which should be reviewed at the start of the semester and referred back to as needed during the semester.