Math 149 – Calculus/Precalculus II


Enrollment: Elective for AM and other majors by placement exam with consent of the AM Director of Undergraduate Studies.


Other required material: Maple access

Prerequisites: MATH 148 Calculus/Precalculus I

Objectives:
1. Students will be able to use differentiation for finding extrema, related rates, and solving optimization problems.
2. Students will be able to differentiate implicit, inverse, and inverse trigonometric functions.
3. Students will be able to find antiderivatives and solve simple first-order differential equations.
4. Students will be able to compute definite integrals of simple functions by using Riemann sums and by using the Fundamental Theorem of Calculus.
5. Students will be able to use integration in simple applications to geometry, science, and engineering.
6. Students will develop their ability use Maple for exploring mathematical concepts by completing laboratory assignments.
7. Students will develop their ability to communicate mathematical ideas by completing a writing project and presentation assignments.

Lecture schedule: four 50 minute (or 3 75 minute) lectures per week

Laboratory/Recitation schedule: one 75 minute period per week, alternating laboratory with recitation.

Course Outline: Hours
1. Introduction and Review
   a. Uses of dy/dx notation
2. Applications of Differentiation
   a. Related rates
   b. Maxima and minima, mean value theorem, first derivative test
   c. Concavity, flexpoints, graphing
   d. Optimization
3. Differentiation Techniques 10
   a. Implicit differentiation
   b. Inverse functions
   c. Inverse trigonometric functions and their derivatives
4. Additional Applications of Differentiation 10
   a. Differentials
   b. Newton’s method
   c. Antiderivatives and differential equations
5. Integration 10
   a. The definite integral
   b. Fundamental theorem of calculus, areas
   c. Integration by substitution, numerical integration
6. Applications of Integration 7
   a. Geometric applications of integration
   b. Physical applications of integration
7. Exponential and Logarithmic Functions 3

Total: 56

Assessment:

Attendance 0-5%
Homework 0-5%
Maple Laboratory 0-5%
Recitation 0-5%
Writing Project ± 5% Bonus
Quizzes 10-15%
Midterm Examinations 45-50%
Final Exam 25-30%

Syllabus prepared by: Patrick Dale McCray and Susan Sitton
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