MAT221 Analytical Geometry & Calculus I
Course Information
(Revised May 2019)

Course Description: An introduction to analytic geometry, limits, continuity, differential and integral calculus of single variable functions, and related applications.

Prerequisite: MAT187; or
MAT151 and MAT182; or
appropriate placement test score

Title: Thomas’ Calculus Early Transcendentals, Single Variables, 14th edition

Author: Weir, Hass

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Textbook Coverage

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MAT221 Learning Outcomes and Standards:

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

1. (Evaluation/Analysis level) Define and evaluate limits algebraically, numerically, or graphically.
2. (Knowledge/Recall level) Define various types of discontinuity.
3. (Evaluation level) Use multiple methods to differentiate functions.
4. (Application/Analysis level) Use the concepts of calculus to graph a function.
5. (Application level) Solve real-world applications using derivative.
6. (Evaluation level) Approximate the zeros of a function.
7. (Evaluation level) Integrate functions.
8. (Evaluation level) Define and evaluate definite integrals.
9. (Application level) Solve applications using integral calculus.
10. (Application level) Incorporate technology to support the problem-solving process.

Standards:

1a. Evaluate limits algebraically, numerically, or graphically.
1b. Use the precise definition of limit to prove the existence of a limit.
2a. Determine the continuity of a function algebraically or graphically.
2b. Apply the Intermediate Value Theorem to show the existence of a zero.
3a. Use the limit definition to find the derivative of a function.
3b. Find the derivative of polynomial, radical, rational, exponential, logarithmic, trigonometric and inverse trigonometric functions by applying appropriate rules of differentiation.
4. Accurately determine the relative extreme, the concavity, and the points of inflection of a function using the First and Second Derivative Tests.
5. Solve motion, free-fall, related rates, optimization, and other applied problems using appropriate derivatives.
6. Use Newton’s Method to approximate the zeros of a function.
7. Evaluate the indefinite integrals of polynomial, radical, rational, exponential, logarithmic, trigonometric and inverse trigonometric functions by applying the appropriate rules of integration.
8a. Apply the Fundamental Theorem of Calculus to accurately evaluate definite integrals.
8b. Use the upper and lower sums to approximate the area of a region.
9a. Solve initial value problems by applying appropriate integral calculus.
9b. Use correct integral calculus to solve motion problems.
10. Use a graphing calculator and/or computer software to verify the accuracy of graphs, integrals, and derivatives.