COURSE GUIDELINES

Course Title: Calculus and Analytic Geometry

Course No. MAT 221  No. of Credits 5

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Associate Degree Designation: MS

Contact hrs/wk: Lecture 5

Lecture/Discussion

Lab

Course Prerequisites: A grade of C or better in MAT 124, or MAT 110 and MAT 113, or equivalent, or placement based on placement test score.

Catalog description:
Analytic geometry, functions, limits and continuity, the derivative, integrals, techniques and applications of differentiation, applications of integration, logarithmic and exponential functions, and trigonometric functions.

Course content (list of topics normally covered):

1) Limits: algebraic computation; graphical interpretation; connection to slope and velocity; relationship to continuity and differentiation; L'Hôpital’s Rule.

2) Derivatives: differentiation formulas, including chain rule and derivatives of arbitrary elementary functions; higher order derivatives; implicit differentiation; differentials; applications, including related rates, optimization and curve sketching.

3) Integrals: Definite and indefinite; substitution; applications, including volume of solids of revolution, arc length and work.

Topics from MAT 222, such as integration by parts, may be covered, for example, to prevent problems when students transfer before taking MAT 222.

Content-based department proficiencies:

- Be able to determine whether or not a given function is continuous on an interval.
- Be able to determine the derivative of a given function approximately from its graph, and precisely from a formula; be able to interpret the result, and interpret the meaning of derivative in practical applications.
- Be able to evaluate definite and indefinite integrals and interpret their meaning in practical applications.
- Be able to apply the Fundamental Theorem of Calculus to elementary functions.

Colleges-wide proficiencies assigned to course:
Students should be able to demonstrate the following:

A. Analytical skills Performance Indicators: Students should be able to:
1. Interpret and synthesize information and ideas.
4. Select and apply scientific and other appropriate methodologies.

B. Quantitative skills Performance Indicators: Students should be able to:
1. Solve quantitative and mathematical problems.
2. Interpret graphs, tables, and diagrams.

Representative textbooks used for the courses:
Calculus of a Single Variable. Larson et al.
Calculus, 9th ed. Thomas/Finney.
Calculus – Concepts and Contexts, 2nd ed. James Stewart.
Calculus. Ostebee and Zorn Saunders, 2nd ed.

Approved April 22, 2006