ST. FRANCIS ACADEMY

A division of St. Francis Methodist School

Curriculum Description for St. Francis Baccalaureate

MATHEMATICS 224 – CALCULUS 3

Course Description: Infinite series, partial differentiation, and iterative integrals, with applications. Credit 4 hours.

Prerequisite: MATH 223, *Calculus 2*

Outcomes

- Knowledge of the definitions and convergence properties of sequences and infinite series
- Knowledge of the uses of vectors in analytic geometry
- Knowledge of the differential and integral calculus of multi-variable functions
- Ability to apply the techniques of multi-variate calculus to the solution of practical problems from a variety of disciplines

Objectives

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

- define the terms “sequence” and “infinite series”
- apply the various convergence tests for infinite series (such as the integral, divergence, comparison, ratio, and root tests) to determine if an infinite series converges or diverges
- define absolute and conditional convergence for an infinite series
- define, differentiate, and integrate a power series
- produce an approximation to an arbitrary function using a Taylor or Maclaurin series
- use parametric equations to describe a curve in two-dimensional or three-dimensional space
- describe the geometrical properties of vectors and define the operations of vector addition, scalar multiplication, dot product, and cross product
- describe a unit vector
- parametrically specify a line in space using a point and a tangent vector
- parametrically specify a plane in space using a point and a normal vector
- convert between rectangular, cylindrical, and spherical coordinates
- define and differentiate a vector-valued function
- find a vector that is tangent to a curve in two-dimensional or three-dimensional space
- define multi-variable functions and give a geometrical description of a function of two variables
- compute the limits of multi-variable functions
- identify continuous and discontinuous multi-variable functions
- define and evaluate the partial derivatives of multi-variable functions and define the total differential of a multi-variable function
- present a geometrical interpretation of limits, continuity, the partial derivative, and the partial integral for multi-variable functions

- calculate directional derivatives and gradients for functions of two or three variables
- identify the properties of multi-variable functions, such as intervals of increasing or decreasing value, points of discontinuity, asymptotes, domain, range, and extrema
- construct graphs of multi-variable functions
- evaluate double and triple integrals in rectangular, cylindrical, and spherical coordinates
- use multiple integration to find the volumes and masses of solids in three-dimensions
- apply the techniques of differentiation and integration to solve problems in the natural sciences, business, and the social sciences

Textbooks:

[Required] ***Calculus – Full Edition***, Eighth Edition, by Howard Anton, Irl Bivens, and Stephen Davis. John Wiley and Sons, Inc., New York, New York (2005).

Course Content: Chapter 10: Infinite Series
Chapter 12: Three-Dimensional Space; Vectors
Chapter 13: Vector-Valued Functions
Chapter 14: Partial Derivatives
Chapter 15: Multiple Integrals

Course Requirements:

Attendance: Although not mandatory, class attendance is strongly recommended and vigorously encouraged. Students who are absent will be responsible for both the material missed in class and any announcements made in class.

Homework: Since homework is an integral part of the course, assignments will be made on a regular basis. Students are encouraged to work together on the homework assignments, but simply copying another student's homework is strongly discouraged (negative consequences of this academic strategy are usually experienced during quizzes and the final examination).

Quizzes: All quizzes will be closed-book and closed-note. If necessary, a formula sheet will be provided. Graphing calculators will not be allowed during the quizzes. Quizzes will be loosely based on the assigned homework. A total of five quizzes will be given during the semester. Every student's lowest quiz score will be dropped at the end of the semester. Students who cannot take a quiz at the scheduled time (due to emergency) should notify the instructor prior to the quiz.

Final Exam: The final exam will be closed-book and closed-note. A formula sheet will be provided. Graphing calculators will not be allowed during the final exam. THE FINAL EXAM WILL BE COMPREHENSIVE. Students who cannot take the final exam at the scheduled time (due to emergency) should notify the instructor prior to the exam.

Evaluation:

Course grades will be based on: four quizzes (100 pts. each), and the final exam (120 pts.) for a total of 520 points. Course grades will be assigned as follows:

A: 100%-93%	A–: 92%-90%	
B+: 89%-87%	B: 86%-83%	B–: 82%-80%
C+: 79%-77%	C: 76%-73%	C–: 72%-70%
D+: 69%-67%	D: 66%-63%	D–: 62%-60%
F: 59%-0%		

Policy Regarding Academic Integrity: Academic honesty and Academic Integrity are expected in this class for all work submitted for a grade. Students are responsible for understanding, and following academic honesty and integrity policy.

THIS DOCUMENT IS SUBJECT TO ANNOUNCED CHANGES