SYLLABUS

Calculus III

MAT 340

Spring 2005

Wayne State College
School of Natural and Social Sciences
COURSE DESCRIPTION:

MAT 340 Calculus III

Spring 2005
Semester Hours: 4

Instructor: Dr. J. Bauer
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Email: jebauer1@wsc.edu
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Description: A continuation of MAT 240 including solid analytic geometry, partial differentiation, multiple integrals, infinite series, and vector analysis.

The course is required for the Mathematics major and Mathematics endorsement and is also required of other science-based programs.

Prerequisite: “C-“ grade or better in MAT 240.

Class Meeting Time/Place: 11:00-11:50 MTWF, CS 132

COURSE COMPETENCIES: The course will adhere to the Mathematical Association of America content goals as reported in Preparing for a New Calculus: Conference Proceedings. These goals are:

• The emphasis of calculus shall be on the fundamental concepts of the subject, not on symbolic manipulation.
• The topics in calculus shall be approached symbolically, graphically, numerically and in verbal and written form.
• Calculus shall emphasize modeling the real world and
providing experience with problem solving.

· Appropriate technology shall be available at all times for graphing, numerical computations, and symbolic manipulations.

· Students are expected to "think" and not just perform routine operations. This expectation will be reflected in exercises, projects, examinations, and written assignments.

Course Goals: It is the course's intent;

A. to provide a sound working base in functional analysis,
B. to provide the student with the basic skills to differentiate and integrate multivariate functions,
C. to provide the student with the basic skills to differentiate and integrate vector and vector-valued functions,
D. to increase the student's ability to apply proper mathematical tools to specific situations, with an emphasis on techniques, and function representation (polar coordinates, parametric equations, and vector),
E. to increase the student's ability to think abstractly,
F. to increase the student's ability to work independently and collaboratively on mathematics,
G. to introduce graphing and computing technology and apply it to the study of math,
H. to create a positive outlook toward mathematics, and
I. to provide a realistic view of its involvement in the applied sciences.

INSTRUCTIONAL MATERIALS:

References:


* Learning by Discovery (ISBN: 0-88385-083-4)
* Applications of Calculus (ISBN: 0-88385-085-0)


Recommended Equipment: Graphing Calculator

Resources/Equipment: MATLAB (accessible on the Mathematics server, gauss) and other CASes, such as MuPad (part of Scientific Notebook accessible on WSC network)
COURSE OUTLINE:

I. Vectors and the Geometry of Space
   - Plane Vectors
   - 3D Vectors
   - Scalar Product
   - Vector Product
   - Vector Representation of Lines and Planes
   - Spatial Surfaces
   - Cylindrical and Spherical Coordinates

II. Vector-Valued Functions
    - Vector-Valued Functions
    - Calculus of Vector-Valued Functions
    - Velocity and Acceleration
    - Tangent and Normal Vectors
    - Arc Length and Curvature

III. Multivariate Functions
     - Introduction to Functions of Several Variables
     - Limits and Continuity
     - Partial Derivatives
     - Differentials
     - Chain Rules
     - Directional Derivatives
     - Tangent Planes and Normal Lines
     - Extrema
     - Lagrange Multipliers

IV. Multiple Integration
    - Iterated Integrals
    - Double Integrals
    - Change of Variables: Polar Coordinates
    - Center of Mass and Moments of Inertia
    - Surface Area
    - Triple Integrals
    - Change of Variables: Jacobians
V. Vector Analysis
   • Vector Fields
   • Line Integrals
   • Conservative Fields
   • Green's Theorem
   • Parametric Surfaces
   • Surface Integrals
   • Divergence Theorem
   • Stoke's Theorem

EVALUATION: Student may be evaluated on the basis of test scores, lab assignments, homework, and attendance. Grades are determined on 10% intervals, i.e. the 90s are an A, the 80s a B, and ... Student will be given a comprehensive final to be taken on __________________________. Homework will count no more than 40% of a student's grade, and borderline cases will be determined by attendance. The score received on the final by the student will be incorporated into the student's score in the following manner;

• If the score on the final exam is higher than the student's final class average then the final exam will count 50%.
• If the score on a final exam is the same or no more than 30 points below the student's final class average, then the final will count 0%.
• If the score on the final exam is more than 30 points below the student's final class average, then the final counts 20%.
• If the student does not take the final exam then a 0% will be averaged into the student's score at 50%.
WSC STATEMENT OF STUDENT RESPONSIBILITIES:

Wayne State College strives to develop students of a wide range of academic abilities through quality teaching and support. It is our desire to prepare students to accept the privileges, duties, and responsibilities of global citizens; to develop moral and ethical values, to encourage creative ability and develop aesthetic judgments, to encourage the ability to think critically about their world and work; and to promote competence in and understanding of fields of knowledge which required of educated people.

To this end we, the faculty and staff of WSC, have established a standard of student responsibilities in the following statement:

All students will:

Take responsibility for their education. This will include:

- Being knowledgeable of academic requirements and college policies concerning registration, academic standing, payment of tuition and fees, withdrawal and graduation.
- Initiating communication with faculty, advisors and administration regarding questions, concerns and intellectual dialogue.

Cultivate an attitude of integrity both in and out of the class. Integrity is demonstrated by:

- Showing courtesy, dependability, honesty and respect for instructor expectations concerning attendance, assignments, deadlines and appointments.
- Showing courtesy and respect toward others with diverse points of view in and out of class.
- Displaying a positive work ethic and a genuine interest in welfare of others.
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