JEFFERSON COLLEGE

COURSE SYLLABUS

MTH 201

CALCULUS III

5 Credit Hours

Prepared by: John M Johny
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Ms. Linda Abernathy, Division Chair, Math, Science, & Business
MTH201: Calculus III

I. CATALOGUE DESCRIPTION

A. Course pre-requisites/co-requisites: MTH 185 with a grade of “C” or better, and reading proficiency

B. 5 semester credit hours

C. Calculus III is a continuation of Calculus II. The student will study vectors in two and three dimensions and calculus of several variables. A graphing calculator is required. (F, S)

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

Note: Each of the following learning outcomes will be measured on at least one in-class exam, but instructors are encouraged to assess them with additional measures including homework, quizzes, and/or projects.

<table>
<thead>
<tr>
<th>Expected Learning Outcomes</th>
<th>Assessment Measures</th>
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<tbody>
<tr>
<td>Apply dot product, cross product, and scalar triple product of vectors to solve problems, especially problems from three dimensional geometry and physics.</td>
<td>Homework</td>
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<td>Quizzes/tests</td>
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<tr>
<td>Solve problems related to planes and lines in a three dimensional rectangular co-ordinate system, and identify and draw different kinds of surfaces</td>
<td>Homework</td>
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<td>Quizzes/tests</td>
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<tr>
<td>Solve problems involving the derivatives and integrals of vector-valued functions, use them to find the arc lengths of space curves, and apply the concepts to solve physics problems involving the velocity and acceleration of moving bodies in the space</td>
<td>Homework</td>
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<td>Quizzes/tests</td>
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<tr>
<td>Solve problems involving limits and partial derivatives of functions of several variables and appropriately apply them to find the equations of tangent planes and normal lines of surfaces and the extreme values of functions of several variables</td>
<td>Homework</td>
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<td>Quizzes/tests</td>
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<td>Solve problems involving multiple integrals under rectangular, cylindrical and spherical co-ordinate systems and use them to find the surface area and volume of 3D objects</td>
<td>Homework</td>
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<td>Quizzes/tests</td>
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<td>Solve problems involving line integrals</td>
<td>Homework</td>
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and surface integrals, and solve problems using Green’s theorem, Stokes’ theorem, and divergence theorem and their application problems from physics

III. COURSE OUTLINE

A. Vectors and the geometry of space
   1. Three-dimensional coordinate systems
   2. Vectors
   3. The dot product
   4. The cross product
   5. Equations of lines and planes
   6. Cylinders and quadric surfaces
   7. Cylindrical and spherical coordinates

B. Vector functions
   1. Vector functions and space curves
   2. Derivatives and integrals of vector functions
   3. Arc length and curvature
   4. Motion in space: velocity and acceleration

C. Partial derivatives
   1. Functions of several variables
   2. Limits and continuity
   3. Partial derivatives
   4. Tangent planes and linear approximations
   5. The chain rule
   6. Directional derivatives and the gradient vector
   7. Maximum and minimum values

D. Multiple integrals
   1. Double integrals over rectangles
   2. Iterated integrals
   3. Double integrals over general regions
   4. Double integrals in polar coordinates
   5. Applications of double integrals
   6. Surface area
   7. Triple integrals
   8. Triple integrals in cylindrical and spherical coordinates

E. Vector calculus
   1. Vector fields
   2. Line integrals
   3. The fundamental theorem for line integrals
   4. Curl and divergence
   5. Parametric surfaces and their areas
   6. Surface integrals

Quizzes/tests
7. Green’s theorem
8. Stoke’s theorem
9. The divergence theorem

IV. METHOD(S) OF INSTRUCTION

A. Lecture
B. Class discussion
C. Textbook

V. REQUIRED TEXTBOOK(S)


I. REQUIRED MATERIAL(S)

Graphics calculator required (TI-83/84 recommended)
Symbolic manipulating calculators prohibited

II. SUPPLEMENTAL REFERENCES

No supplemental references

VIII. METHOD(S) OF EVALUATION

A. Homework 10-20%
B. Classwork 0-20%
   Worksheets and projects may be assigned at the discretion of the instructor to reinforce various concepts.
C. Tests 30-60%
   There will be a minimum of three tests, each covering no more than 2 chapters of material.
D. Comprehensive final examination 15-25%
   All students will be required to take a comprehensive final exam.

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Library; phone 636-471-3169)

X. ACADEMIC HONESTY STATEMENT
Students who are caught cheating or plagiarizing material in this course will not receive credit for the assignment in question and may be dropped from the course with a failing grade. A detailed description of the Academic Honesty Policy statement can be found in the Jefferson College Student Handbook or online at: http://www.jeffco.edu

XI. ATTENDANCE STATEMENT

Students earn their financial aid by regularly attending and actively participating in their coursework. If a student does not actively participate, he/she may have to return financial aid funds. Consult the College Catalog or a Student Financial Services representative for more details.