SOUTHERN UNIVERSITY AND A&M COLLEGE
DEPARTMENT OF MATHEMATICS

MATH 365
ADVANCED CALCULUS

Course Description: Advanced topics of calculus include a review of vector and vector calculus, linear approximations of vector valued functions of several variables, the derivative matrix, real valued functions, multiple integrals, line integrals, surface integrals, and theorems of Green, and Stokes' divergence theorem.

Intended Audience: This course is designed for students who have completed Multi variable calculus and preparing to take Analysis and upper level Mathematics and majoring in a science, and engineering program.

Course Credit: 3 hours

Prerequisite: Multivariable Calculus (Math 364)

Text Book: Vector Calculus by J.E. Marsden and A.J. Tromba, Freeman , 5th edition

General goals:

1. To provide the student with the skills of vector calculus operations which are needed for further study in mathematics;
2. To provide the student with the skills necessary to be able to give reasonable explanations.
3. To provide the student with the critical thinking skills required to solve problems in physics and in engineering.

Learning Outcomes:

1. Students will be able to perform the vector calculus operations by applying addition, subtraction, scalar multiplication, dot product, and cross product.
2. Students will be able to work with power series by applying the iterated derivatives.
3. Students will be able to take derivatives of multivariable functions by using appropriate rules.
4. Students will be able to use the chain rule by applying necessary rules.
5. Students will be able to take derivatives of multivariable functions by using appropriate rules.
6. Students will be able to perform vector calculus operations by partial derivatives, and matrix partial derivatives.
7. Students will be able to do double and triple integrals by applying appropriate methods and rules.
8. Students will be able to understand change of variables by applying the change of variable theorem.
9. Students will be able to differentiate vectors to understand gradient, divergence and curl by using the appropriate rules.

10. Students will be able to compute line integrals of vector functions by using definition and in differential forms
11. Students will be able to define the integral of scalar functions over a surface by generalization of area of surface
12. Students will be able compute surface integrals of vector fields by developing the notion of integral.
13. Students will be able to use Greens, divergence, and Stokes theorems by combining vector differential calculus and vector integral calculus.

Assessment Measures:
Instructor created exams, quizzes and homework

COURSE CONTENTS:
1. The Geometry of Euclidean Space
2. Differentiation
3. Vector Valued Functions
5. Double Integrals
6. The Triple Integrals, Change of Variables Formula
7. Integrals over Path and Surfaces
8. The Integral Theorems of Vector Analysis

Instructor:

Office:

Office Hours

THE COURSE GRADE:

3 Tests	. . . . .	300 pts
HW, QUIZZES , Class Participation		
Writing Assignment	. . . . .	up to 100 pts
FINAL	. . . . .	200 pts

TOTAL up to 600 pts

FINAL GRADES:

90% - 100% A
80% - 89% B
70% - 79% C
55% - 69% D
Below 55% F

Assignment

1. Student Survey … 15 pts

You will be asked to write about you in the following questions as you complete your survey.

- Name, address, telephone (cell) number, e-mail address, where you can be reached.
- What is your major?
- Where are you from?
- What was your last math class (anywhere?)
- What college mathematics classes have you taken?
- From Math 265 (Calculus II) and 364 (Calculus III) list the topics that you have learned.
- What is your current GPA?
- What concerns, if any, you have about this course?
- What is your study plan for this course?
- How many credit hours (or classes) are you taking this semester?
- If you work, where and how many hours per week?
- If you are on scholarship, what kind and how much does it cover for your study?
- What is your future plan?
- What else would you like me to know about you?

2. Portfolio (Optional) … 15 pts

Due Final Exam Day

Portfolio is a collection of a student's best work for the course.

1) Copy of the tests with attached correction (i.e. redo the four tests)
2) With the summary indicate that
    i) The student's understanding of Mathematics (from the course)
    ii) The student's ability to learn mathematics, and
    iii) The student's ability to apply mathematics to the real-world;

3) One solved problem from each section
4) Commentary from the student concerning what (s)he has learned from this work; and
5) Self evaluation

ACADEMIC DISHONESTY:

Adhere to honesty and integrity in work submitted for credit in this course and adheres to SUBR's Code of Conduct. (Refer to current Catalog.)

DISABILITY STATEMENT:

Students that are considered as having a disability are to provide the professor with a letter from the Department of Special Education stating the appropriate accommodations required of this course. If you have a documented disability, then please discuss it with personnel at 771-3950 in Room 125 of Blanks Hall.

SUGGESTED OR REQUIRED READING: See professor.