HOUSTON COMMUNITY COLLEGE SYSTEM

Calculus III

COURSE SYLLABUS

Math2415-CRN # 52174

Fall 2011, MoWe 5:00PM-7:00PM Stafford Center, Learning Hub Rm 202

Instructor: Dr. A. Mesarwi
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Catalog Description:
Calculus III. A survey of advanced topics in calculus including vectors and vector-valued functions, partial differentiation, Lagrange multipliers, multiple integrals, Jacobians, divergence and Stokes' theorems. Prerequisite: MATH 2414. 4 credit (4 lecture).

Prerequisites:
Math 2414: Pass with a "C" or better

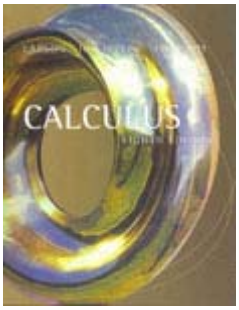
Course Intent:
This course provides a detailed study of vector-valued functions with space geometry. Functions of several variables and Lagrange multiplers. Multiple integration with applications, as well as integration in polar, spherical, and cylindrical coordinates. Change of variables and Jacobians. And finally, vector analysis that includes Green's theorem, Divergence theorem, and Stokes' theorem.

Audience:
This course is intended basically for students who are pursuing degrees in mathematical sciences and engineering and who are required by the nature of their respective curricula to enroll in the 3 -semester calculus series. Students enrolled in other areas not requiring calculus may wish to take this course as an elective to broaden their mathematical background provided the necessary prerequisites have been met.

Course Objectives:
Upon completion of this course, a student should be able to:
1. apply calculus to vectors and vector-valued functions
2. describe and use partial differentiation
3. apply Lagrange multipliers to solve problems.

4. solve multiple integrals.
5. find the Jacobian using determinant notation.
6. apply Green's theorem to evaluate line integrals around a bounded area.
7. apply the Divergence theorem and Stokes' theorem to specific problems.

Textbook:
Calculus With Analytic Geometry
by Ron Larson, Robert P. Hostetler, & Bruce H. Edwards, 9th Edition
Publisher: Houghton Mifflin Company
Pub. Date: January 2005
ISBN-13: 9780618502981



Student Learning Outcomes

1. Understand vector functions, operations with them (including differentiation and integration), and their application to motion in space
2. Understand real functions of several variables, operations with them (including differentiation and integration), optimization of multivariable functions, and their application to physical problems
3. Compute multiple integrals in Cartesian, polar, cylindrical, and spherical coordinates, and apply multiple integrals to physical problems;
4. Solve problems using the Fundamental Theorem of Line Integrals, Green's Theorem, the Divergence Theorem, and Stokes' Theorem.

Course Outline:
Instructors may find it preferable to cover the course topics in the order listed below. However, the instructor may choose to organize topics in any order, but all material must be covered.

UNIT/TIME	TEXT REFERENCE
Unit I - Vectors and the Geometry of Space (10 Hours)	***Sections*:** 11.1, 11.2, 11.3,11.4, 11.5, 11.6, 11.7

This unit presents vectors and the Geometry of Space. The instructor should emphasize vectors in a plane, space coordinates and vectors in space, the dot product of two vectors, he cross product of two vectors in space, lines and planes in space, and surfaces in space. The unit concludes with cylindrical and spherical coordinates.

Unit II - Vector-Valued Functions ***Sections*:**
(12 Hours) 12.1, 12.2,12.3,12.4, 12.5

This unit presents functions of several variables. The instructor should emphasize vector-valued functions, differentiation and integration of vector-valued functions, velocity and acceleration, and tangent and normal vectors. The unit concludes with arc length and curvature.

Unit III - Functions of Several Variables ***Sections*:**
(12 Hours) 13.1, 13.2, 13.3, 13.4, 13.5, 13.6, 13.7, 13.8 13.9, 13.10

This unit includes functions of several variables. The instructor should emphasize limits and continuity, partial derivatives, differentials, chain rules for functions of several variables, directional derivatives and gradients, tangent planes and normal lines, extrema of functions of two variables, and applications of extrema of functions of two variables. This unit concludes with Lagrange multipliers

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Unit IV - Multiple Integration ***Sections*:**
(16 Hours) 14.1, 14.2, 14.3, 14.4, 14.5, 14.6, 14.7, 14.8

This unit includes the basic concepts of multiple integration. The instructor should emphasize iterated integrals and area in the plane, double integrals and volume, change of variables: Polar Coordinates, center of mass and moments of inertia, surface area, triple integrals and applications, and triple integrals in cylindrical and spherical coordinates. This unit concludes with a discussion of Jacobians.

Unit V - Vector Analysis ***Sections*:**
(14 Hours) 15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7, 15.8

This unit includes the basic concepts of vector analysis. The instructor should emphasize vector fields, line integrals, conservative vector fields, independence of path, Green's Theorem, Parametric Surfaces, Surface Integrals and Divergence Theorem. This unit concludes with a discussion of Stokes's Theorem.

Grading Policy:

Semester grade is determined based on the followings:

Test 1	**9/21**	**15%**
Test 2	**10/13**	**15%**
Test 3	**11/8**	**15%**
Test 4	**12/8**	**15%**
Quizzes		**10%**
Final	**12/12**	**30%**

NO MAKE UP TESTS WILL BE GIVEN.

Make-up Policy:

No make-up tests will be given. If you miss a test, the grade for the Final will also be substituted for the missed test.

Cell Phone Policy:

All cell phones must be muted or turned off during class. Cell phone activity during class time is deemed to be disruptive to the academic process. Cell phone usage, of any kind, is expressly prohibited during examinations..

Attendance:

It is important that you attend all classes. Attending class regularly is an essential element for success. Research has shown that the single most important factor in student success is attendance. You are expected to attend all lectures regularly. You are responsible for materials covered during your absences. Class attendance is checked daily and attendance policy will be enforced. Although it is your responsibility to drop a course for nonattendance, the instructor has the authority to drop you for excessive absences (over 6 hours).
It is a good practice to find a friend or a buddy in class who would be willing to share class notes or discussion or be able to hand in paper if you unavoidably miss a class. Class attendance equals class success.

Departmental Policies:

1. Each instructor must cover all course topics by the end of the semester. The final exam is comprehensive and questions on it can deal with any of the course objectives.
2. Each student should receive a copy of the instructor's student syllabus for the course during the first week of class.
3. A minimum of three in class tests and a comprehensive final departmental examination must be given. The final examination must be taken by all students.
4. All major tests should be announced at least one week or the equivalent in advance.
5. The final exam must count for at least 25 to 40 percent of the final grade.

6. The final course average will be used in the usual manner (90-100 **"A"**; 80-89 **"B"**; 70-79 **"C"**; 60-69 **"D"**; Below 60 **"F"**).
7. Either an open book or a take home major test may be given at the discretion of the instructor.
8. Any review sheet should be comprehensive and the student should not feel that classroom notes, homework, and tests may be ignored in favor of the review sheet for any examination.

Academic Honesty: Students are required to maintain the highest degree of academic honesty. Dishonesty hinders academic growth and learning. Cheating may result in dismissal from the entire Houston Community College System. Any student who cheats will be dropped from the course with a grade of F. Talking, using cell phones, or using unauthorized material during testing, will be considered as cheating.

Resource Materials: Any student enrolled in Math 2415 at HCCS has access to the Academic Support Center where they may get additional help in understanding the theory or in improving their skills. The Center is staffed with mathematics faculty and student assistants, and offers tutorial help, video tapes and computer-assisted drills. Also available is a student's Solutions Manual which may be obtained from the Bookstore. Students may access online tutoring using http://www.hccs.askonline.net/.

Suggested Methods:
It is helpful to begin each class with questions concerning the material discussed and the assigned homework problems. In presenting new material, it is suggested that an explanation be followed by students working examples in class. Students should be encouraged to work the review exercises at the end of each chapter. Also, they should be encouraged to visit the Academic Support Center at their respective colleges.

Americans with Disabilities Act (ADA):
Any student with a documented disability (physical, learning, psychiatric, vision, hearing, etc.) who needs to arrange reasonable accommodations must contact the Disability Support Services Office at this college at the beginning of the semester. To make an appointment, call 713-718-7910. Professors are authorized to provide only the accommodations requested by the Disability Support Office.