MATH 237: Calculus III, Spring 2014

pulcher et utilis

SYLLABUS

Course Description: MATH 237 is a university course in multivariate calculus and vector analysis, the culmination of the traditional calculus sequence. Serving as both an introduction to the study of higher mathematics and as a service course for the physical sciences, MATH 237 is especially relevant for students majoring in: biology, chemistry, computer science, engineering, mathematics, philosophy, physics, and quantitative finance.

The course will cover vector geometry, calculus of vector-valued functions, differentiation and integration of multivariate functions, and vector analysis. Each topic will be developed from first principles; treatment will include theory as well as applications. This corresponds to chapters 10-14 of the textbook. A detailed list of course goals appears in the last item below.

Prerequisites: Completion of MATH 236 with a grade of C- or higher, or consent of the instructor.

Text: *Calculus*, by Taalman and Kohn.

Class Meetings: TTh 3:30-4:45 and W 3:35-4:25, all in Burruss 0033.

Professor: Elizabeth Θ Brown, PhD., brownet@jmu.edu, (540) 568-8763,
http://educ.jmu.edu/∼brownet

Office Hours: T 2-3:15, 5-5:30, W 12:20-1:10, and by appointment, in Roop 122 (inside of Roop 119).

Science and Math Learning Center: The SMLC, 200 Roop Hall, offers free tutorial assistance on a walk-in basis. The center is open 11am-4pm Monday through Thursday.

On-line Course Materials: On-line course materials, including a copy of this syllabus and assignments, are posted on the course web site,
http://educ.jmu.edu/∼ brownet/237/

This course will also the class discussion software Piazza on an experimental basis. The Piazza site for this class is:

https://piazza.com/jmu/spring2014/math237/home

Exams: There will be mid-term exams in class on February 20, March 27, and April 17.

There will be no make-up exams, except in cases of what I construe to be documented emergencies.

Exercises: Exercises will be assigned each class. There will be a weekly exercise to hand in, and problems for self-study. In-class exercises during the Wednesday disucssion may also be graded.

Grading: Semester grades will be based on home- and class- work, midterms, and the final. An individual student's score for the course will be computed according to whichever of the following processes results in the greater score for that student:

Home- and classwork 20%, mid-terms 20% each, final 20%, OR home- and classwork 20%, worst mid-term 10%, two best midterms 20% each, final 30%. The resulting scores will be curved to produce semester grades.

Attendance and Class Conduct: Students who miss more than four class meetings will recieve an F for the course. All cell phone use is prohibited. Students who text during class will be asked to leave.

Honor Code: Violation of the JMU honor code is in essence theft from other students, and will be treated with corresponding gravity. In this course, collaboration with other students from class on homework is encouraged. Exam efforts must be strictly individual.

Special Circumstances: Any student who requires special arrangements because of a physical, mental, psychiatric or religious condition should speak with me during the first week of class. Our conversation will remain confidential, except for communication with the Office of Disability Services, if necessary. Please also see me if relevant new circumstances arise during the term.

University Policies: A complete statement of university policies concerning syllabi can be found at: www.jmu.edu/syllabus.

Course Goals as a List:

(1) To further students' understanding of mathematical method, the logical structure of mathematics, and stylistic conventions of mathematical argument. Logical structure pertains to the precise relationships between axiom, definition, theorem, and proof. Stylistic conventions include pellucid language, as well as exactness, elegance, and efficiency of expression. Students will realize these goals by:
   (a) Giving orderly, cogent, reasoned arguments about the content of the course.
   (b) Writing logically robust proofs and solutions to problems.
   (c) Using theorems, ideas, and intuition from the course content to make and critically evaluate relevant conjectures in the context of class discussion.

(2) For students to achieve conceptual understanding of, and computational proficiency in, the following topics:
   (a) Vector geometry and operations in $\mathbb{R}^2$ and $\mathbb{R}^3$.
   (b) Calculus of vector-valued functions, including the underlying algebra, differentiation, integration, and selected applications thereof.
   (c) Calculus of multivariate functions, including the underlying algebra, differentiation, integration, and selected applications thereof.
   (d) Classical theorems of vector analysis, including line integrals, Fundamental Theorem of Line Integrals, Green's Theorem, Stokes' Theorem, and the Divergence Theorem.