1 Information for Math 205a

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Fall 2008
Monday, Wednesday, and Friday  10:10 - 11:00 a.m.  Stevenson Ctr 1120
Thursday                        1:10 -  2:00 a.m.  Buttrick Hall 206

Instructor: Prof. Bruce Hughes
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Catalog description:

> Mathematics 205a - 205b. Multivariable calculus and linear algebra. Vector algebra and geometry; linear transformations and matrix algebra. Real and complex vector spaces, systems of linear equations, inner product spaces. Functions of several variables and vector-valued functions: limits, continuity, the derivative. Extremum and nonlinear problems, manifolds. Multiple integrals, line and surface integrals, differential forms, integration on manifolds, the theorems of Green, Gauss, and Stokes. Eigenvectors and eigenvalues. Emphasis on rigorous proofs. Enrollment limited to first-year students with test scores of 5 on the Calculus BC advanced placement examination or the approval of the director of undergraduate studies. 205a is a prerequisite for 205b. Credit is not given for both 205a-205b and 170b, 175, 194, or 204. [4-4] Hughes.

Prerequisites: This course is for highly motivated first-year students with a solid background in single-variable calculus (demonstrated by a 5 on the Calculus BC advanced placement exam) and a strong interest in constructing and understanding proofs.

Who should take Math 205ab? All qualified prospective mathematics majors are encouraged to take this course. Other qualified science and engineering students with a strong interest in mathematics should consider it. The main criteria are that the student has a 5 on the Calculus BC advanced placement exam, an excellent background in single-variable calculus, and a fascination with the theoretical side of mathematics. Math 205ab is an alternative to Math 175 (Second Year Accelerated Calculus) and Math 204 (Linear Algebra). All of the material from Math 175 and Math 204 will be covered in Math 205ab, but Math 205ab will go much further and deeper.

Textbook: Multivariable Mathematics: Linear Algebra, Multivariable Calculus, and Manifolds by Theodore Shifrin (published by John Wiley & Sons, Inc. 2005).

Syllabus: We will cover chapters 1 through 5 of the textbook this semester (the rest of the book will be covered in Math 205b).

Mid-Term Exams: Three tests will be given during the semester on the following dates:

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Wednesday, September 24
Wednesday, October 29
Wednesday, November 19
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Final Exam: A final examination will be given on Thursday, December 18 from 3:00 - 5:00 p.m.

Homework: Homework is an important component of this course and will be assigned daily. Some assignments will be collected and graded, others will be discussed in class by students and the instructor. On some assignments students will not be allowed to work together. On others, students are encouraged to work together. However, a student should not present as their own work solutions to which they did not make a substantial contribution. Collaborators in a solution should be acknowledged. Avoid looking up solutions in books. If you do use a book, be sure to site the source (including page number). You may not consult solution sheets distributed in previous years

Grades: Your final grade will be determined from a total of 1000 possible points as follows:

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Three tests.....................................................100 points each
Final exam......................................................150 points
Homework (including in-class presentations and participation)...550 points
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Attendance: Attendance is expected for each class meeting. More than two absences will be considered "excessive" on the mid semester progress reports. See the College of Arts and Science policy on class attendance in the University Bulletin.

Honor System: Vanderbilt's Honor Code governs all work in this course. It is a violation of the Honor Code to consult homework solution handouts, tests, or test solution handouts from previous semesters.

Web links

Web Resources for Undergraduate Mathematics Majors: The American Mathematical Society maintains a very useful page for undergraduate mathematics majors at

`http://www.ams.org/outreach/undergrad.html`

It includes information on summer programs (Research Experiences for Undergraduates), semester programs, graduate studies in mathematics, clubs, undergraduate journals, competitions, careers, jobs and much more.

Notes on Proofs by Greg Friedman: pointers for beginners on how to do proofs.

`http://faculty.tcu.edu/gfriedman/proofnotes.pdf`

Shifrin's list of errata for his book.

`http://www.math.uga.edu/~shifrin/Multivariable.html`

TeX and LaTeX: A guide to using TeX in the micro computer labs at Vanderbilt.

`http://www.math.vanderbilt.edu/ourequip/basics/texinlab.html`

For all other links for TeX information and downloads.

`http://www.math.vanderbilt.edu/~schectex/wincd/`

Digital Resources related to Multivariable Mathematics: Mathematical Association of America's Digital Classroom Resources.

`http://www.mathdl.org/jsp/index.jsp`

Collection of Tools for Multivariable Calculus.

`http://www.math.uri.edu/~bkaskosz/flashmo/tools/`