

MATH 133 – Intensive Calculus for the Physical and Life Sciences 1

Fall 2006

MTWRF 10-10:50, Swords 359

Syllabus

Instructor: Prof. David Damiano, 341 Swords, 793-2476/3374
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Office Hours: TF 9-10 AM, MWF 1-2 PM and by appointment.

Teaching Assistant: Hieu Phan (e-mail: hphan07@holycross.edu). Hieu is a Computer Science Major who has also taken courses in mathematics and physics. As a first-year student, he took MATH 133-134. Hieu will hold weekly problem sessions, time to be arranged.

Course Home Page: <http://mathcs.holycross.edu/~dbd/math133/math133.html>

Course Materials (available in the College Bookstore): *Single Variable Calculus: Concepts and Contexts 3*, James Stewart, Thomson Brooks-Cole.

Quick Summary: MATH 133 is the first semester of a two semester sequence in single variable calculus, MATH 133-134. (Taking the first semester does not commit you taking the second semester.) We will study differentiation and integration of functions defined on subsets of the real numbers and that take values in the real numbers. We will also study the applications of these concepts to the physical and life sciences. This semester we will cover material in Chapters 1-4 of the text. We will make use of graphing calculators throughout the semester. The subject matter of this course is identical to that of MATH 131, which uses the same text.

Prerequisites: Four years of high school mathematics. No prior exposure to calculus is assumed. Students who have had calculus in high school should consider Math 126, Math 131, Math 136, or Math 241 depending on the amount and level of calculus they have taken and their academic plans.

Intended Audience: This course is an introductory course designed for students who are interested in pursuing a major in mathematics or the sciences or who are participating in the pre-medical program. The word “intensive” in the title refers to the fact that the class meets every day of the week. Other calculus courses meet three or four days a week, so that this course provides additional class time for class discussion and review of the material. The course is open to first and second year students and majors and non-majors. **Note: Students who have earned credit for a course equivalent to Calculus 1 or above cannot enroll in MATH 133. Students cannot receive credit for more than one of Math 125, 131, 133.**

Class Format: We will use a variety of formats in class, including lecture, small group discussion and student presentation of homework problems. In addition to material in the text we will occasionally work from “discussion” sheets that will be handed out in class. You will be assigned to groups at the beginning of the semester and these groups will change once or twice during the semester. One of the strengths of working in a group is that you can pool your knowledge and talents to help each other learn. One of the weaknesses is that if some group members are more

conscientious than others, they can end up doing a disproportionate amount of the work. To avoid or remedy this problem, periodically there will be the opportunity for no-fault group therapy, that is, to think about the dynamics of your groups and to discuss the dynamics with me if the need should arise.

Calculators: Graphing calculators have become the de facto norm for high school and college mathematics and science courses. On particular occasions, including assignments, quizzes, and tests, the use of calculators *may* be prohibited. This will be announced in class when the activity is announced so that you have the necessary time to prepare for working without a calculator. Keep in mind that while it is useful to be fluent in the use of calculators, calculator fluency alone is not a substitute for understanding.

The Calculus Workshop: This is a drop-in tutoring center for students with questions about calculus. The hours are 7-9 PM, Sunday through Thursday in Swords 328. The tutors are upper class mathematics majors.

Learning Tips. Here are several suggestions to help you learn calculus.

- In class: Take careful notes. If you don't understand an idea or point being made or calculation, ask about it. We have plenty of time to answer questions but you must ask them. When opportunities arise to talk in groups or present material at the board, take advantage of them. Talking about mathematics is an important way to formulate your understanding of the concepts.
- Out of class: Reread your class notes as soon after class as possible. Summarize your notes for the next class and reread your summaries to prepare for the next class. Read the text before attempting assignments. Mark up the text not just by highlighting but by commenting about concepts and calculations in the margins. Rewrite ideas in your own words and fill in the gaps in the text's calculations. Also, note things that you don't understand so that you can ask about them in class.
- Using the Book: Mathematics text books are often difficult to read. In part, this is because language of mathematics has developed over many hundreds of years into a precise and concise mode of expression. In particular, mathematics, including calculus, is expressed in a dense but rich symbolic language. Learning calculus necessarily involves mastering this symbolic language. Accordingly, mathematics must be read differently than ordinary prose. One must be attentive to every line and every word of the text and to every symbol that appears on the page.
- Homework: The goal of assignments is to help you develop your understanding of the material. This is accomplished both by basic calculations which help to become fluent in the symbolic language of mathematics, and by more open-ended thought problems which allow you to explore ideas. You should attempt homework problems *after reading the text and your notes*. The least effective way to learn the material is to parrot examples in the text that appear to be close to a particular homework problem. You may also find it helpful to discuss homework problems with other students in the class. It is, however, essential that you write up your own solutions and do not copy those of anyone else.
- Office Hours: If you find that you have additional questions that you would like to ask outside of class, which is quite common in calculus, please see me in office hours. While I'm pleased

to speak with students about calculus any time, it's important for your benefit that you seek assistance before assignments are due.

- **Quiz and Test Preparation:** There will be eight weekly quizzes during the semester. These will consist of two or three questions and will cover homework which is handed in on that day. These will be given at the beginning of class, so it is important that you have your questions answered prior to that class. There will be three in-class hour exams that will cover the material covered since the preceding test. You should begin studying for tests at least one week in advance; you should organize your studying so that you progress through all the material that is covered on the test; you should study from the text and class notes; and you should make use of office hours and the Calculus Workshop. It is important to break up your studying into manageable chunks of time that are spread over each day of the week before the test. The final exam is a three-hour comprehensive exam, so you should allow more time to study for the final than you do for hour exams. To help you prepare, there will be sample quizzes and tests that we will review in class prior to the quiz or test. These will either be distributed in class or be posted on the course webpage.

Grading: Your total course percentage will be made up from homework, participation, quiz and exam grades as follows:

Homework	10 %
Class Participation	5 %
Weekly Quizzes ($6 \times 2.5\%$ each)	15 %
Hour Exams ($3 \times 15\%$ each)	45 %
Final Exam	25 %
Total	100 %

You may drop 2 quiz grades for a total of 6 quizzes that count for credit. Each graded assignment, quiz and exam will receive a numerical score which will contribute to the appropriate percentage. At the end of the semester, total course percentages will be used to determine final grades. I do not use an absolute scale to determine letter grades.

Academic Honesty: The Department of Mathematics and Computer Science adheres to the College's policy on Academic Honesty, which may be found in the College Catalogue. In addition, the department has formulated the attached statement intended to amplify the policy as to how it might apply in mathematics and computer science.

Course Schedule (As of 8/30/06):

Generally, homework will be due on Fridays or the days of quizzes. We will go over homework and a sample quiz on the previous day. Hieu Phan will hold weekly problem sessions, usually the night before homework is due or before a quiz or test. Any changes to the schedule of assignments, quizzes, or exams will be announced in class.

- Quiz 1: Friday, September 8.
- Quiz 2: Friday, September 15.
- Quiz 3: Friday, September 22.
- **Test 1: Friday, September 29.**
- Quiz 4: Friday, October 13.
- Quiz 5: Friday, October 20.
- Quiz 6: Friday, October 27.
- **Test 2: Friday, November 3.**
- Quiz 7: Tuesday, November 14.
- Quiz 8: Tuesday, November 21.
- **Test 3: Tuesday, December 5.**
- **Final Exam: Thursday, December 14, 8:30 - 11:30 AM.**