

Math 163: Integrated Calculus and Analytic Geometry I

Meets: MWF 9:00–10:25a in SL 137

Final Exam: Saturday, April 28, 3:30–5:00p

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General Information and Goals

Calculus is one of the outstanding intellectual achievements of the human mind, in addition to being the foundation of many applications of mathematics to physics, chemistry, biology, statistics, economics, and many other natural and social sciences. The roots of calculus go back to Eudoxus, Archimedes and other Greek thinkers more than 2000 years ago, but the calculus as we know it began with the work of Isaac Newton, Gottfried Leibnitz, and other mathematicians of the 17th century with many improvements in understanding, development of applications, and refinements and extensions of the theory in the 18th and 19th century. Much more recently, beginning in the second half of the 20th century, machines have been developed that, with human guidance, can solve calculus problems. In this course, we will keep all of these threads in mind as we learn about calculus and try to connect it to areas that are of interest to each of you.

Math 163 here at IUPUI forms the mathematical foundation for many majors in Science and Engineering but is taken by many other students as well. The course is open to all students who have the appropriate mathematical background in algebra and trigonometry, equivalent to a grade of "C" in Math 159. The course will cover Chapters 1 to 6 of the

Text: *Calculus*, 5th edition(2003), by James Stewart

My goals for you in this course are

Short term goal: That you master the ideas and computations of the course, both theoretical and applied.

Long term goal: That you recognize the uses or ideas of calculus as you see them in your professional or your personal life and that you know or can quickly relearn the computations that are important to you throughout your life.

Attendance, Homework, Quizzes, and MAPLE Projects

To quote from my colleague, Professor Morton: "Attendance is required to do well in this class. Based on experience, we can say with a fair degree of certainty, that if you do not come to class, you will not pass the course. Learning mathematics requires steady and persistent effort. Coming to class and making an effort to focus on the material

being discussed is half the battle. The other half is practicing the concepts by doing the homework.”

It is important to read the text, both before and after coming to class. Reading before will prepare you for the discussion in class and reading after will help solidify your understanding. Reading mathematics books is a skill that will take time to master, but will pay off in your later study both in other math classes, but also in any classes that depend on reading detail. One of the biggest differences between reading mathematics and other kinds of reading is that to be successful in reading mathematics, you must read slowly and pay attention to the details you are reading. If you have trouble with material from the textbook, please ask me about it in class or office hours.

Homework will be assigned regularly and will be collected sporadically with grading mostly to check the work you are doing: 2 points for most problems attempted with substantive work, 1 point for about half of the problems attempted with substantive work, 0 points for most problems not attempted with substantive work or no paper turned in. Make-up/late homework will **not** be graded for credit.

Quizzes based on the homework will be announced in advance and will be the done the last ten minutes or so of the class. No make-up/late quizzes will be graded for credit; the two lowest quiz grades will be dropped, with missed quizzes counted as zeros.

MAPLE is a ‘computer algebra system’ (well-known competitors are DERIVE and MATHEMATICA). A computer algebra system is a computer program that recognizes algebraic and other mathematical symbols and can do computations with them in their *symbolic form!* This contrasts with numeric engines, such as MATLAB, which can only do numerical computations, giving answers as numbers, and accurate to a fixed accuracy. There will be 13 MAPLE Projects to be completed in the course. Late projects will be accepted, but the grade will be docked 15% for each class day late the project is turned in.

The developing schedule for the course will be announced in class, but will also be on the website for the class, updated regularly.

Test, Exam, and Grading Policies

In addition to the course-wide, departmental, Final Exam on April 28, there will be 5 tests during the semester, of which two, Test 2 and Test 4, will be “mastery tests” (see below). Each test will be contribute about 12% of the grade, the homework, quizzes, and MAPLE Projects, together, will contribute about 15 – 20% of the grade, and the Final Exam will be responsible for the the remaining 20 – 25% of the grade.

Tests 1, 3, and 5 will be ordinary tests with 100 points possible and partial credit will be granted for answers that are mostly, but not completely correct. The grading scale on each test is not fixed, but will be announced after each test. Test 1 will be in early February and will cover Chapters 1, 2, 3.1, 3.2, and 3.4. Test 3 be in mid-March and will cover Chapters 3.8, 3.9, 3.10, and 4. Test 5 will be in mid-April and will cover Chapters 5.1, 5.2, 5.3, and 6.

Test 2, on computation of derivatives (3.3, 3.5, 3.6, 3.7, and 3.8), and Test 4, on computation of integrals (5.3, 5.4, and 5.5), cover the most basic and fundamental skills in the course and will be mastery tests. By “mastery test” I mean that the tests will cover material that must be mastered for success in the course. For these tests, no partial credit

will be given – each answer is completely correct, or it will receive no credit. BUT, the tests may be repeated at arranged times until noon on April 28th or until a score of 90 or more is achieved. Each test will have 20 questions. A perfect score is 110 points, but for each incorrect answer, 10 points will be deducted. That is, on the first day the test is given, you will receive 110 points if you get all 20 questions correct, 100 points if you miss 1 question, 90 points if you miss 2 questions, 30 points if you get only 12 correct, and -30 points if you get only 6 correct. After the first day, 100 points will be the maximum score, given for no wrong or 1 wrong, and otherwise the scoring will be the same. I expect everyone will get 90 points or more on each of Test 2 and Test 4 after taking the tests no more than three or four times because the tests will contain no "hard" questions.

The Department of Mathematical Sciences enforces course-wide policies for the Final Exam in Math 163. These same policies will apply for all tests and quizzes in the course. These policies include:

- No calculators, cell phones, pagers, ipods, or other electronic devices are permitted to be on during the tests.
- No notes, books, or other of your papers may be used during the tests.
- The only items permitted on your desk during the test are the test paper and scratch paper provided by the instructor, and pen, pencil, and eraser.
- No bulky clothing or hats are permitted to be worn during the test.
- No talking will be permitted in the test room until *all* the tests have been turned in.
- If a student **MUST** miss a scheduled test or exam, the student should supply a legitimate reason and evidence for the reason to the instructor at least a week before the test or exam so that an alternate test can be scheduled. For the Final Exam, the alternate exam date is the evening of April 27. For unexpected emergencies, the student should notify the instructor as soon as possible and provide evidence of the emergency in order for an alternative test or exam to be scheduled.

A sample final and the official final from Fall 2006 will be on the Department's webpage.

General Academic Policies

The work you submit for homework, MAPLE Projects, quizzes, tests, and exams must be your own. For homework and MAPLE Projects you will probably find it beneficial to consult with other students about the material and this kind of conversation and collaboration is encouraged. At the end of the consultation, however, each participant is expected to prepare their own summary of the discussion and their own solution to the problem or project. More information about student conduct can be found at

<http://registrar.iupui.edu/misconduct.html>

More information concerning adaptive services for learning or other disabilities at IUPUI can be found at

<http://life.iupui.edu/aes/>

The policies for this class will be those derived from IUPUI's policies on academic conduct and adaptive services.