

## Course Outline: Math 1830, Spring 05

The web page for this course can be found at <http://livetoad.org/>. Please check there frequently for announcements, changes, due dates, solutions, scores, and other goodies.

### Introduction

Welcome to Calc II! This is a new course, designed for students in mathematics, education, and science. Perhaps the most succinct way to summarize the difference between this course and the standard one, populated mainly by engineering students, is that this course covers fewer topics, but covers them in much more depth. This course is *not* an honors course. It is not meant to be harder than the standard one. It is also not easier.

Rather, the course is designed around both the observed strengths and the perceived needs of the target population. It has been noted that the students in these majors excel in the standard course, but that this success does not prepare them well for the subsequent classes in their majors. There is a historical drop in grades earned, and a historical rise in failures, for students in mathematics, education, or science who take courses beyond calculus.

How can it be that students can perform so well in calculus and struggle in subsequent courses? We believe that the types of skills emphasized in the standard, engineering-oriented calculus are not the skills needed to succeed in majors in mathematics, science, or education. Engineers may need extensive exposure to a wide range of purely technical math skills, but other students need to explore the subject in more depth, to learn to think critically and demand a thorough understanding of the conceptual foundations. (Engineers need these skills, too, but they learn them in their own major courses.)

In this course we will cover essentially the same material as does the standard course, but rather than drill the umpteenth integration technique we will pause frequently to explore the new definition or theorem in some depth. Altho you will not be learning to give formal proofs of theorems, you will be required to justify your solutions in an intellectually rigorous way, using clear, concise English. Writing is important to this course.

I have mentioned that the core syllabus has removed some of the topics found in a traditional calculus course. We will still explore some of these topics, but we will do so not as part of the lecture-and-drill routine, but rather in a series of computer labs. In these labs you will be asked to experiment with the concept in some depth, and then write up your results in a lab report. Your scores on these lab reports will depend on your ability to express yourself using clear English and mathematical syntax.

There is one other component of this class which will emphasize conceptual understanding, and that is classroom discussion. I expect you to read the text before coming to class, and be prepared to ask and answer questions. You should always bear in mind that if you have a question about something, then so does at least half the class. Being confused is not a sign that you are not understanding. If you are confused, then interrupt me, and I will try to re-explain — or to ask one of your peers to explain things differently. Often you will find that you learn as much from your peers as from me. So, you must expect that during class discussions I may call on you by name to answer a question or offer an explanation.

## Exercises and quizzes

Each week I will choose roughly 100 exercises from the text. I will post these assignments on the web, with due dates. I will not collect your homework, but I will use the assigned exercises as a pool of questions for 5-point, multiple-choice quizzes. Each quiz will emphasize the most recent material, but individual questions may be drawn from *any* of the assignments posted to that point.

In all there will be between 20 and 25 quizzes — that is, 1 or 2 each week. Your 10 best quiz scores will count towards your final grade. I will not give any prior notice on the dates of the quizzes. I will not give make-up quizzes under any circumstances. If you miss a quiz then that will be one of the scores you drop.

The first exercise set is already posted, and I expect you to complete it by Thursday. It covers prerequisite material from algebra and trig. This material is covered in appendices A–E of the text. We will not review it in class, but I will be happy to meet you during my office hours and help you with your own review of it.

## Computer labs

Every Friday we will meet in the math department computer lab, UH 1000. Altogether there will 13 computer labs, each worth 15 points. Your 10 best lab scores will count towards your final grade. I will not accept late lab reports, nor allow labs to be made up because of absences, for any reason whatsoever. If you miss a computer lab then that will be one of the scores you drop.

After we work thru the lab together you will be asked to continue the investigation and answer some in-depth questions. The first draft of your report will be due at the end of the lab. I will comment on your report and return it to you at the beginning of the next class. Your final lab report will be due at the beginning of the following class.

In your lab reports I expect careful reasoning written in clear English sentences and correct mathematical formulas. You will be marked down for poor English or mathematical syntax. Clear exposition of mathematical concepts is a goal which distinguishes this course from the course aimed at engineers.

## Plagiarism

I encourage you to work together. Studies show that students who work together consistently out-perform those who do not. However, your own work must be written in your own words. Do not “divide up the labor”. Do not copy from one another. Copying is cheating, and can result in your getting an F in this course. If I see two or more lab reports with portions which are identical or nearly identical to one another, then each of these reports will get an F, no matter who copied whom. If it happens a second time you will get an F in the course.

## Exams

We will have two midterm exams, worth 100 points each, and a comprehensive final exam, worth 200 points. The exam dates are listed on the calendar below. The exam questions will be similar to those found on the quizzes and computer labs. Hence some of the questions will require written justification.

I will give make-up exams only in case of a documented exigency, such as illness or a funeral. If you are sick the day of the exam then you must call or email that same day if you expect to be able to make up the exam. Otherwise you must arrange for a make-up exam ahead of time. If I am not in my office then you can leave a voice mail message. If you fail to show up for an exam and do not contact me about it until afterwards then you will not be able to make up that exam — you will get a 0 for that exam.

## Blue books

All three exams will be written in blue books. Before each exam you must purchase a blue book (size:  $8.5 \times 7$ , 8 leaves/16 pages) and bring it to me. *Do not write your name nor anything else on the blue book before you give it to me!* If you forget to buy one beforehand then I will be selling them during the exam for \$1. You can get them a lot cheaper than that in the bookstore.

## Calculators

You will not be allowed to use a calculator of any kind on any of the quizzes nor any of the exams. I will strive to make sure that all computational problems can be completed without a calculator.

## Grades

Your final grade will be determined from the distribution of total points earned. I will post the class histogram, and this should give you a clear idea of where you stand. Historically 85% of total points earns an A; 75% earns a B; and 65% earns a C. However these are just historical observations, not rigid targets.

If you want me to post your scores under a nickname then bring me a  $3 \times 5$  card with your name, an email address, and the nickname you want to use — preferably something not obvious! I will not accept email requests to email or post your scores or final grade. If you want me to post your scores then you must bring me a  $3 \times 5$  card.

If you stop attending class then I will give you an IW grade. There are two points during the semester for submitting IW grades: the 4th and 10th weeks. After the 10th week an IW grade is impossible, so if you stop attending after this point then you will get an F.

## Extra credit

Some students inevitably ask about extra credit. This semester the only extra-credit option centers on the ideas expressed in *Radical Equations*, by Robert Moses and Charles Cobb. If you want the option later in the semester of earning some extra credit then you must obtain the book and start reading it as soon as possible. On exam 1 I will have some optional, short-answer and multiple-choice questions about the book, to verify that you have read the book. These questions will be wholly optional, and they will not count towards your final grade. However, if you do not get at least 80% on these optional questions then you will not have the option of doing the extra-credit project.

If you do get at least 80% then you must submit an outline for a curriculum aimed at students in the transition either from basic skills to algebra or from algebra to calculus. Your curriculum must be based on Robert Moses' ideas. If I approve your outline then you will develop the lessons and their pedagogical justification and submit these for grade at the beginning of the final exam.

### Office hours

My office is UH 4080e. The phone number is 419 530 2975. My email address is simply paul.hewitt, at utoledo.edu. My office hours for this class are one-half hour before and one-half hour after each class. At these times you can call or stop by without an appointment and I am sure to be there. I am also available at other times, but for these you must make an appointment. Feel free to ask for appointments at other times if you cannot make it to my regular office hours. If you call me when I am not in my office then you can leave a voice mail message and I will get back to you as soon as I can.

### Calendar

<i>ML King Day</i>	Mon	17 Jan
Exam 1	Thu	3 Mar
<i>Last Day to Withdraw</i>	Fri	4 Mar
<i>Spring Break</i>	Mon–Fri	7–11 Mar
Exam 2	Tue	26 Apr
Final Exam	Thu	5 May, 12:30–14:30