# Math 2250 Syllabus

## 1. COURSE INFORMATION

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**Office hours: Monday 2-5pm**

Driftmeier 210, 8:45-9:55 MWF
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**Book: Hass/Weir/Thomas, University Calculus, Third Edition, Early Transcendentals**

## 2. COURSE SCHEDULE

Students are required to read each section of the book before we discuss it in class. We will start each section with **a brief quiz** measuring reading comprehension. Each section below is listed with the date of the quiz. You need to have read the section before the quiz.

| Topics | Sections | Reading Quiz Dates |
|---|---|---|
| Limits as a concept. Limit Rules. One-Sided Limits | 2.1-2.2, 2.4-2.5 | (no quiz) |
| Continuity | 2.5 | 8/21 |
| Limits involving infinity | 2.6 | 8/23 |
| Average rates of change. Definition of Derivative. | 3.1-3.2 | 8/25 |
| Product and quotient rules. | 3.3 | 8/28 |
| Derivative as rate of change. | 3.4 | 8/30 |
| Objects in flight. Fitting, predicting, and intercepting. | Lab 1 | (no quiz) |
| Derivatives of trigonometric functions. | 3.5 | 9/8 |
| Changing units. Compositions. Chain Rule. | 3.6 | 9/11 |
| Throwing a ball from a rotating arm | Lab 2 | 9/13-9/15 |
| Implicit Differentiation. | 3.7 | 9/18 |
| Derivatives of Inverse and Logarithmic Functions. | 3.8 | 9/20 |
| Derivatives of Inverse Trig Functions. | 3.9 | 9/20 |
| Related Rates | 3.10 | 9/22 |
| Linearization, Taylor's Theorem, Error Analysis | 3.11++ | 9/27 |
| **Extra office hours** | | 7-9pm, 10/1 |
| **First Exam** | 2.1-2.6 (not 2.3), 3.1-3.11++ | 10/2 |
| **Discussion of First Exam** | | 10/4 |
| Maxima and Minima, Mean Values. | 4.1-4.2 | 10/6 |
| The First and Second Derivative Tests. | 4.3-4.4 | 10/11 |
| L'Hôspital's rule. | 4.5 | 10/13 |
| Optimization | 4.6 | 10/16 |
| Newton's Method. | 4.7 | 10/23 |
| **Extra Office Hours** | | 10/29, 7-9pm |
| **Second Exam** | 2.1-2.2,2.4-2.6, 3.1-3.11++, 4.1-4.7 | 10/30 |
| **Discussion of Second Exam** | | 11/1 |
| Targeting with a rotating arm. | Lab 3 | (no quiz) |
| Antiderivatives and Differential Equations | 4.8 | 11/10 |
| Sums, area, sigma notation | 5.1-5.2 | 11/13 |
| Definite Integral. | 5.3 | 11/17 |
| The fundamental theorem of calculus. | 5.4 | 11/27 |
| Indefinite Integral and $u$-substitution | 5.5 | 11/29 |
| Area between curves | 5.6 | 12/4 |
| **Final Exam (7-10pm)** probably in MLC | (all course material) | 12/12/2017 |

## 3. PREREQUISITES

Students are expected to have a solid foundation in high-school algebra and trigonometry, equivalent to that offered in the MATH 1113 precalculus course, in order to enroll in the course. The course webpage contains a 23 question diagnostic self-test covering this material. Generally speaking, to be successful in this course, you should be able to answer at least 17 of these questions correctly. Students scoring less than 12 questions correct should not enroll in this course, but switch to MATH 2200 or MATH 1113.

## 4. COURSE GOALS

Students will develop computational fluency with differentiation and integration. Students will learn to model and solve optimization problems using derivatives. Students will integrate and solidify their knowledge of calculus through real-world "laboratory" exercises based on applied mathematics, and learn writing by preparing technical reports on these scenarios.

## 5. DISCLAIMER

The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.

## 6. PRINCIPAL COURSE ASSIGNMENTS

**This course has a substantial workload.** Student responsibilities include:

- Regular reading assignments in the calculus book, previewing the material we are about to cover in lecture. These will be assessed with quick "reading comprehension" quizzes at the start of class.
- Weekly homework assignments using the "WebWork" system.
- Memorizing Anki flashcards. These will be assessed with surprise "memorization" quizzes at the start of class.
- Three lab assignments on applied aspects of calculus.
- Two midterm examinations, in class.
- One final exam, three hours in length.

For this class, we're using a web-based homework system called `WebWork`. The login link is

$$\text{https://webwork.math.uga.edu/webwork2/Math2250\_Cantarella\_F17/}$$

Your username comes from your uga.edu email address. If your email address is `jones@uga.edu`, then your username is `jones`. Your password is your nine-digit 810 number, without spaces.

`WebWork` lets you try the homework questions as many times as you like until the assignment is due. The system will tell you whether or not you have the right answer. This lets you correct your work immediately. After the assignment's due date, the system will show you the correct answer for each problem when you try it (but your answers won't be scored). The funny thing about `WebWork` is that **the due dates are absolute**. Since the system shows you the answers immediately after the due time, I can't give extensions on homework. You may complete assignments in advance if you want to.

You are welcome to work together on `WebWork` problems, but be warned: **the problems are a little different for each student**, so copying other students answers won't work. It is certainly possible to solve many of the homework problems using online tools such as Wolfram—Alpha. You should use these tools with care. If you are stuck on a problem, using the "Show steps" option on Alpha can give you good information about how to solve a problem. On the other hand, if you become dependent on tools like Alpha, you are likely to do very poorly on the exams.

When you first login to `WebWork`, you'll see three buttons on the left. Use the "Change Email" button to enter your email address and the "Change Password" button to change your password. Then try "Begin Problem Sets" to see how the system works. You can select a set and print it out in PDF format to work out the problems on paper if you like. Your problems will be the same when you login again to enter the answers.

## 7. GRADING AND WP/WF POLICY

**This class has standards-based grading.** This means that there is no set number of points which guarantees that a given grade will be assigned; instead, the instructor considers all of the student work produced during the semester and

makes a judgement about whether the work (as a whole) provides evidence that the student has met a certain standard. Three basic categories of work are considered with different weights:

(1) Timed, supervised, in-class calculations (exams). 60% (20% for each exam, 20% for final).
(2) Long-form outside of class written work (labs). 30% (10% for each lab).
(3) Computer-based homework and in-class quizzes. 10%.

Here are the standards:

- A: The student has computational mastery of the course and errors are very rare. They can set up and solve nonroutine word problems. The student understands the theoretical aspects of the course and can apply the main theorems of the course, such as the Intermediate Value Theorem or Mean Value Theorem. The student shows effective technical communication skills in the written assignments, makes appropriate models, explains them clearly, and draws correct conclusions from them.
- B: The student has computational expertise, but may make occasional errors. They can set up and solve standard word problems, and understand the theoretical basis of the course well enough (for instance) to distinguish between differentiability and continuity. The student's technical communications in the lab assignments are mathematically coherent, but the explanations are sometimes unclear or confusing.
- C: The student demonstrates basic computational skills, has some conceptual understanding of the meaning of the derivative and integral, and can do most of a routine word problem. The student's technical communications are only approximately correct, but the explanations show understanding of the situation.
- D: The student can do routine calculations, including a moderate chain rule application, and can find the equation of the tangent line, but struggles to set up a routine word problem. The student's technical communications address the assignments, but may not allow you to solve the problem in practice.

In order to receive a grade of "WP" you must have scored at least 50% of the homework points and 40% of the exam points available by the date of withdrawal.

## 8. ATTENDANCE POLICY

Students are expected to attend class regularly. Students who miss more than 6 classes (two weeks of class) may be withdrawn from the course by the instructor.

## 9. ACADEMIC HONESTY

In this class, we maintain a cooperative culture of honesty. This means that you are responsible for your own honesty, and for reporting the academic honesty violations of others. As a University of Georgia student, you have agreed to abide by the University's academic honesty policy, "A Culture of Honesty," and the Student Honor Code. All academic work must meet the standards described in "A Culture of Honesty" found at: www.uga.edu/honesty. Lack of knowledge of the academic honesty policy is not a reasonable explanation for a violation. Questions related to course assignments and the academic honesty policy should be directed to the instructor.

It is perfectly acceptable to work on homework problems in groups in this course. However, the help you should get from your fellow students should enable you to complete the problem on your own. Recruiting another student to complete the homework for you, or to simply provide answers to the problems, is a violation of the honesty policy.

## 10. REQUIRED COURSE MATERIAL

Some version of the book is required, but you're welcome to use a previous edition (cheap!) instead of the current one. Students are required to download and install the shareware "Anki" application to complete the memorization assignments. A specific model of TI-30 calculator will be required for the exams (I will announce the calculator as soon as the math department decides on the common final policy).

## 11. MAKE-UP EXAMINATIONS

**No makeup examinations will be given in the course.** If you are absent from a scheduled exam, and your absence is excused (generally, this requires a medical or legal explanation, with supporting documentation), the portion of the course grade determined by the missing exam will be divided equally between the other exams (including the final exam). Students with an excused absence from both in-class exams and the final will be withdrawn or given a grade of "I".