Math 204-Spring 2025

Honors Mathematics II

General information

Class time: MT(W)ThF 11-11:50am
Class location: Lopata 201
Instructor: Greg Knese
Email: geknese AT wustl DOT edu
Office hours: M 1-2pm, W 10-11am
Th 12-1pm

Office location: Cupples I Room 214
Discussion meeting: W 11-11:50am
Assistant to the Instructor: John Naughton
AI Email: j.naughton AT wustl DOT edu

Course description

This is the second half of an *intensive* one-year calculus sequence for first year students with a strong interest and background in mathematics with an emphasis on rigor and proofs. This is a 4 credit hour course. This means students are expected to devote a minimum of 8 hours to the course outside of class.

Topics: Matrices, linear systems, and determinants. Eigenvalues and eigenvectors, diagonalization, and the spectral theorem. Scalar and vector fields, differential and integral calculus of several variables, and the fundamental theorems of Green, Gauss, and Stokes. Restricted to first year students who have completed Math 203 in the fall semester. Math 204 can replace Math 233 in major/minor requirements.

Learning Goals

—Learn to read, hear, digest, write, speak, and produce rigorous definitions, theorems, and proofs.
—Learn the motivations and applications of linear algebra and multivariable calculus.
—Master linear algebra both at a computational and theoretical level.
—Master multivariable calculus both at computational and theoretical level.
—Learn to ask questions and be skeptical of mathematical arguments and motivations for topics discussed.

Textbook

Tom Apostol, Calculus Vol II.
You should have your own copy because we will have required readings from the book. We will cover so much material that it will not be possible to discuss everything in class. We will discuss where to obtain a copy of the text.

Exams

There will be two in-class midterm exams (**February 13 and March 27**) and a final exam. The final exam is **May 6, 2025, 10:30am-12:30pm**. The exams will not be overly cumulative but previous material is inevitable.

Homework

We will have weekly homework assignments. These will be submitted via gradescope.com.

Grading philosophy: We are learning to do rigorous mathematics. Our goal is to write iron-clad logical and understandable proofs. In previous computational math courses, one may receive partial credit for having some idea correct or you may get the benefit of the doubt on certain mistakes. In proof writing, the writer does not get the benefit of the doubt. It is much better to confess that you do not how to write something rigorous than to pretend that you can. Obviously when learning something new you may not have complete awareness of when you are doing something wrong—but the goal we strive for is to attain this awareness.

Collaboration: You may discuss the homework verbally with other students provided you have already given the homework a serious attempt. If you have already solved a problem and someone asks you about it, then any help you provide should consist of hints or suggestions and never complete solutions. In particular, homework should be written up independently and it should not be possible to tell who worked with whom. Do not search or post requests for solutions to HW. Do not post any course materials online or offline.

Dropping/Late policy: Your two lowest homework scores will be dropped. This policy is designed to take care of all instances where a student cannot complete an assignment on time so that the instructor does not need to make subjective judgement calls. Late homework will not be accepted so that solutions can be posted in a timely manner.

Course Schedule

The class will meet Monday through Friday, 11-11:50am. I hope to cover Chapters 1-5, 8-12. We will not follow a fixed schedule for the topics.

Every Wednesday class time will consist of a discussion section led by a graduate student (John Naughton). The discussion will begin with a 10 minute quiz and the remainder of the time will be spent on discussing problems.

Your lowest two quiz scores will be dropped. The same philosophy as with homework applies.

If a class needs to be cancelled, then the contact hours will be replaced with some combination of outside reading and recorded lectures.

Grade breakdown

Homework: 40%
Midterm exams: 12.5%+12.5% = 25%
Quizzes: 10%
Final exam: 25%
Letter grade breakdown: A+=(97,100], A=(93,97], A-=[90,93], similar for B,C,D. Finally, F=[0,60).

The Pass/Fail policy is that you must get at least a C- to earn a "Pass".