

Course Syllabus
MATH 231EL1/2: Engineering Calculus II

Faculty:

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The Plan:

Normally calculus courses at the U of I (as well as most other universities) work in the following way: there are lectures two or three days a week with a Professor and recitation sections one or two days a week with a graduate teaching assistant. This is the same format that we will follow this semester, with some modifications.

This particular course is a collaboration between the Department of Mathematics and the College of Engineering. There are two faculty associated with the course, Professors Bronski and Kozlowski. Most of your day-to-day interactions will be with Professor Bronski; Professor Kozlowski will be handling much of the behind the scenes organization necessary to make the class run. The teaching assistants are drawn from Mathematics and Engineering. The lectures will mainly focus on the more theoretical aspects of calculus, while in recitation sections you will work together in groups on worksheets designed to introduce you to ways in which Engineers use mathematics.

The lectures will be delivered asynchronously. The course moodle page has weekly video lectures that you can watch any time over a two or three day span. There will be a few simple quiz questions that you will need to answer after watching the lectures. You can take as many attempts as you need to get a perfect score on these questions, so you can think of these as free points. These will count towards your webassign grade. During the previously scheduled lecture hours (9-10,10-11) I will be available for questions, etc in an online office hours. I **MAY** reschedule part of these office hours for the convenience of students who are out of the country, if there is demand. I will not be taking attendance but I would *strongly encourage* you to attend online office hours regularly, and to ask questions. The video lectures are much shorter than a face-to-face lecture would be. This is because there are no question during the video lecture. These questions are an important part of the learning process, so I hope that you will come

Recitation sections will mostly be run synchronously over Zoom. In recitations you will work in small groups on engineering oriented calculus worksheets. This is one of the special features of the course that we do not want to lose. However we understand that some students may not be able to make recitation sections. We **WILL** make some kind of accommodation to allow those students to get credit for the work done in recitations.

I am also going to try to schedule some weekly outdoor "quad hours" where I can meet with students safely in a face-to-face manner. Obviously this will be subject to a number of factors, including weather.

Technology:

We are going to use a few different platforms for this course. They are

- **Webassign** This is an online homework platform used at the U of I for a number of courses, including the entire calculus sequence. You will need to purchase access to Webassign. Details will be posted to the course moodle (see below), or can be found at https://www.cengage.com/coursepages/UIUC_Calculus (clickable). Webassign includes access to an electronic copy of the textbook (Stewart, Early Transcendentals). If you plan on taking Calc III in the spring (required for many of you) it will probably be cheaper if you purchase multi-semester access.
- **Gradescope** You will upload completed worksheets in your recitation sections using Gradescope, as well as written homework.
- **Zoom** Recitation section, office hours, etc will be conducted via Zoom. I am guessing that you all got at least some exposure to Zoom in the spring.
- **Moodle** Moodle and Compass are the two Learning Management Systems (LMS) used at the U of I. We will be using Moodle to manage the class. This is the place to go for the video lectures, written homework assignments, class announcements, etc.

[optional] Campuswire This is an optional discussion forum for the class. If you have questions about the course you can post them here and get answers from your peers, the teaching assistants, and the professors. You all should have received an invitation to join the class discussion page.

Assessments: Final grade will be based on a number of different assessments. The course will be worth 100 points in total, broken out as follows:

- Final Exam at 15 points.
- 6 Midterms at 10 points each.
- Webassign assignments at 8 points.
- Worksheets at 9 points.
- Written Homework at 8 points.

The midterms will be done through the Computer Based Testing Facility (CBTF) and have been requested for the following dates.

- Wednesday Sept 9
- Wednesday Sept 23
- Wednesday Oct 7
- Wednesday Oct 21
- Wednesday Nov 4
- Wednesday Nov 18

The midterms will last 50 minutes and will probably be scheduled in the morning. The exams will cover roughly the previous 2-3 weeks worth of material. The final will be cumulative and will test your knowledge of all of the course material. The

final exam will probably be run through CBTF as well, and will probably last 3 hours.

Webassign assignment will be done online through cengage. The written homework and worksheets will be uploaded to Gradescope.

TUTORING ROOM:

There will be a virtual tutoring room that will be staffed by teaching assistants. Details will be posted to the course moodle page.

It is best if you think about problems first, then come to the tutoring room with questions. Almost no one understands mathematics on the first exposure. You should read both the lecture notes and the textbook when working on homework, and attend the tutoring room as needed, to maximize your chances of doing well in the class.

I would like to strongly encourage you to keep up to date with the class. This course has short assignments due frequently. This is at least in part in an effort to make sure that you keep up with the course. It can be difficult to catch up once one gets behind, so don't get behind.

Schedule of Topics

Week 1 : Complex numbers, Taylor polynomials.

Week 2 Definition of the limit, one sided limits and limit laws, using Taylor series to evaluate limits

Week 3* Labor day, limits at infinity, continuity.

Week 4 Implicit differentiation, logarithmic differentiation, differentials. related rates

Week 5* Mean & extreme value theorems, maxima and minima , curve sketching

Week 6 Area, Riemann sums, definite integral. fundamental theorem of calculus and indefinite integral. Techniques of integration: substitutions

Week 7* , Techniques of integration: Integration by parts, trig integrals, Trig substitutions

Week 8 , Partial fractions, strategies of integration.

Week 9* Improper integrals, volumes.

Week 10 Integrals for work, arc length and surface area. Sequences.

Week 11* Sequences and series. Integral and comparison tests.

Week 12 Alternating series, absolute convergence, ratio and root tests.

Week 13* Power series and Taylor series. Convergence and remainder terms.

Thanksgiving Break

Week 14 & 15 Calculus with parametric and polar curves, plotting, review.

Finals Week