Math 111: Techniques of Calculus II

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Class Hours: T/Th 9:05-9:55
Class Room: 220 Hammond bldg.

Course Description

This course will take calculus to the next dimension! We will use calculus to study functions of more than one variable. We will learn about differentiation, optimization, integration, and differential equations. All of our examples will be related to managerial, life, and social sciences.

Required Materials

The required textbook is Applied Calculus by Soo T. Tan, 9th edition. Note, there is a version of this book subtitled “A brief approach,” which does NOT have the right numbering of homework problems. If you buy it, you will have to rely on classmates to get the correct homework problems for each assignment.

Prerequisites

Prerequisite: Math 110 or equivalent.

Course Objectives

Successful students will:

1. find a possible best-fit functions for a given data set and explain the strengths and weaknesses of such an approximation;

2. identify relevant information using (partial) derivatives and (double) integrals;

3. recognize and solve real-life optimization problems (maxima and minima) in one or more variables;
4. use numerical methods to approximate optimum solutions;

5. recognize and classify ordinary differential equations and know how to solve them (or approximate a solution);

6. recognize systems of ordinary differential equations and determine equilibrium point(s).

Course Structure

Homework

Homework will be due every class period at the beginning of class. Most homework assignments will consist of problems from the book. The assigned problems will be posted on Canvas at least two weeks before the due date. You are expected to write legibly and turn your assignments in on time. Late work is not generally accepted. If you believe your circumstances warrant an exception to this rule, please send me an email or talk to me during office hours. The lowest two homework grades will be dropped in your final grade calculation. This is meant to account for unforeseen circumstances preventing you from turning in homework on time.

Quizzes

Quizzes will be given at the beginning of class, typically every other Tuesday. There are no makeup quizzes, so to get a positive score on your quiz, you must attend class on quiz day. If you believe your circumstances warrant an exception to this rule, please send me an email or talk to me during office hours. The lowest quiz grade will be dropped in your final grade calculation. This is meant to account for unforeseen circumstances preventing you from coming to class on a quiz day.

Midterm

We will have one midterm. The exam will be 75 minutes, you will not be allowed to use a calculator. The date of the midterm is October 9th, from 6:00-7:15, the location will be announced when it has been determined.

Final

The final exam will be cumulative. It will be an hour and 50 minutes, more details will be announced once determined by the university.

Grading Policy

Your final grade will be calculated using the following percentages:

- Homework: 25%
- Quizzes: 20%
- Midterm: 25%
• Final Exam: 30%

There is no extra credit.

Letter grades will be assigned according to the following percentage ranges:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage Range</th>
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<tbody>
<tr>
<td>A</td>
<td>93%-100%</td>
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<tr>
<td>A-</td>
<td>90%-93%</td>
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<tr>
<td>B</td>
<td>83%-87%</td>
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<tr>
<td>B-</td>
<td>80%-83%</td>
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<tr>
<td>C</td>
<td>73%-77%</td>
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<tr>
<td>C-</td>
<td>70%-73%</td>
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<td>D</td>
<td>60%-70%</td>
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<tr>
<td>F</td>
<td>0%-60%</td>
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<tr>
<td>C+</td>
<td>77%-80%</td>
</tr>
<tr>
<td>B+</td>
<td>87%-90%</td>
</tr>
</tbody>
</table>

Course Policies

During Class

I understand that the electronic recording of notes will be important for class and so computers will be allowed in class. Please refrain from using computers for anything but activities related to the class. Eating and drinking are allowed in class but please refrain from it affecting the course. Try not to eat your lunch in class as the classes are typically active.

Attendance Policy

You are expected to attend every class that you can. Missing too many classes will likely impact your grade, not because I’ll keep track, but because you won’t learn the material and will do poorly on the homework/quizzes/exams. Education is a joint responsibility. I will help you as much as I can, but ultimately it is up to you whether or not you choose to put forth the effort required to learn the material.

Academic Integrity

In order to ensure all students have a fair and equal opportunity to succeed in this course, the Math Department is committed to enforcing the University’s academic integrity policy. Below is a description of academic misconduct, and the department’s responsibilities when misconduct is suspected.

Academic Misconduct

In this course, academic misconduct includes, but is not limited to:

• Copying the work of another student on an exam, quiz, or assignment;
• Passing off the work of another individual as your own;
• Using non-approved devices or aids on exams, quizzes, or assignments;
• Having unauthorized possession of exams or quizzes;
• Engaging in deception in order to extend or reschedule an exam, quiz, or assignment;
• Facilitating acts of academic misconduct by others.
When Academic Misconduct is Suspected

If a student is suspected of academic misconduct, the instructor’s duties are to:

- Confidentially inform the student of the allegation;
- Enter the charge and recommended sanctions on an Eberly College of Science Academic Integrity form;
- Ask the student to meet in order to review the form and discuss the charges and sanctions. The student can choose to accept or contest the allegation at this point.

Note that a student’s refusal to meet with the instructor or respond to the charges within a reasonable period of time is construed as acceptance of the allegation and proposed sanctions.

Once the Academic Integrity form has been accepted or contested by the student, it is sent to the College’s Academic Integrity Committee for adjudication. A student cannot drop or withdraw from the course during the adjudication process.

Sanctions

If a student accepts an academic misconduct allegation, or if he is found guilty during adjudication, possible sanctions include:

- A warning;
- Reduction of the assignment grade (including reduction to zero);
- Reduction in the final course grade;
- An F in the course.

In addition, the student will be unable to drop or withdraw from the course.

Please see the Eberly College of Science Academic Integrity homepage for additional information and procedures.

Late Drop

Students may add/drop a course without academic penalty within the first ten calendar days of the semester. A student may late drop a course within the first twelve weeks of the semester but accrues late drop credits equal to the number of credits in the dropped course. A baccalaureate student is limited to 16 late drop credits. The late drop deadline for Fall 2018 is Friday, November 9th.

Deferred Grades

Students who are currently passing a course but are unable to complete the course because of illness or emergency may be granted a deferred grade which will allow the student to complete the course within ten weeks after the last day of classes. Note that deferred grades are limited to those students who can verify and document a valid reason for not being able to take the final examination. For more information see DF grade
Students with Disabilities

Penn State welcomes students with disabilities into the University’s educational programs. If you have a disability-related need for reasonable academic adjustments in this course, contact the Office for Disability Services (ODS) at 814-863-1807 (V/TTY). For further information regarding ODS, please visit the Office for Disability Services Web site at http://equity.psu.edu/ods/. In order to receive consideration for course accommodations, you must contact ODS and provide documentation (see the documentation guidelines at http://equity.psu.edu/ods/guidelines/documentation-guidelines). If the documentation supports the need for academic adjustments, ODS will provide a letter identifying appropriate academic adjustments. Please share this letter and discuss the adjustments with your instructor as early in the course as possible.
Schedule

The schedule is tentative and subject to change.

**Week 01, 08/20 - 08/24:** Functions of many variables

**Week 02, 08/27 - 08/31:** Partial Derivatives

**Week 03, 09/03 - 09/07:** Minima and maxima of functions of many variables

**Week 04, 09/10 - 09/14:** Least squares regression

**Week 05, 09/17 - 09/21:** Constrained maxima and minima and Lagrange multipliers

**Week 06, 09/24 - 09/28:** Total differentials

**Week 07, 10/01 - 10/05:** Review for midterm

**Week 08, 10/08 - 10/12:** Double integrals (Midterm on 10/9)

**Week 09, 10/15 - 10/19:** Applications of double integrals

**Week 10, 10/22 - 10/26:** Differential equations

**Week 11, 10/29 - 11/02:** Separation of variables

**Week 12, 11/05 - 11/09:** Applications and separable differential equations

**Week 13, 11/12 - 11/16:** Approximate solutions of differential equations

**Week 14, 11/19 - 11/23:** Thanksgiving

**Week 15, 11/26 - 11/30:** Special applications

**Week 16, 12/03 - 12/07:** Review for final exam

**Week 17, 12/10 - 12/14:** Final Exam date TBA