Calculus II

MATH 161A - Fa 2017 (4 Credits)

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Phone: 262-524-7142

Class: MWF 8–9:10am in RK 206
Office: Math House 100
Office Hours: MW 9:30am–10:30am & 1pm–2pm,
            Tues 1:15pm–2:45pm,
            Fri 9:30am–10:30am
            or by appointment

Prerequisite: MAT160

Course Description:
Calculus is a central course to a liberal arts education. Its development stands out as a cornerstone to the industrial and technological revolutions. Its uses extend to virtually every science and social science field. Beyond actual calculus applications, learning calculus also fosters critical thinking and problem solving skills – important in many areas.

This is a second course in calculus which focuses on but is not limited to integration, infinite series, and applications. This course is a prerequisite for Math 207, 208, 210, 305, 309, and 324 as well as some courses in Chemistry.


Course Objectives:
This course is intended to introduce students to

• Applications involving integration;
• Integration Techniques;
• Differential Equations;
• Sequences and Series;
• Parametric and Polar Equations (if time)

Intended Learning Outcomes:
Upon successful completion of this course the student will be able to demonstrate:

1. To understand the fundamental concepts of the integral calculus and infinite series along with connecting them with real world problems from other disciplines.

2. To value mathematics and develop an ability to communicate mathematics, both in writing and orally.

3. To develop mathematical reasoning and problem-solving abilities.

We intend to cover some or most of chapters 6, 7, 8, 9, 10, and 11 in the text.
Course Policy:

**Attendance:** Attendance is required for this course. It is your responsibility for any content discussed over classes you missed.

**Homework:** Roughly, 3-5 (maybe more, maybe less) homework problems will be assigned on a daily basis to be turned in the subsequent class period. Each problem in an assignment will be graded out of 3 points based on correctness, neatness, and completion. Note that due to the frequency of homework assignments, **no late homework will be accepted unless the instructor warrants an extremely excusable reason.** Mathematics is learned best with study groups. As a result, you are encouraged to work together on your homework. However, you should not just copy a friend’s homework. **All work should be your own!** In addition, homework solutions should not just consist of an answer with no work unless the problem is simply looking for a quick answer, i.e., true/false questions.

**Lab:** The lab will principally serve two purposes: (1) provide opportunities to present solutions to worked out problems, and (2) provide additional time in which to ask questions on particular assigned homework problems.

Attached to the end of this syllabus is a listing of problems from the text from which, on lab days, I will randomly select for you to present. The presentations comprise of 5% (each point earned contributing 1% to your final grade) and attendance comprises of 5%. Each absence after the first will lower the attendance contribution by 1%. For presentations, the instructor reserves the right to award partial credit for partially correct solutions. In all, your lab grade comprises 10% of your Calculus grade.

**Exams:** There will be a total of 6 exams in this class: **5 Semester Exams and 1 Final Exam.** The tentative dates of the midterm exams are: Sept. 22, Oct. 13, Nov. 3, Nov. 17, and Dec. 8. The final exam for this class, which is comprehensive, is on **Dec. 19th, 2017 at 8am.** I do not have the power to move this exam. Do not book any travel arrangements during this time!

Also, **calculators will not be allowed for exams!** Make-ups for the two tests will only be allowed under **EXTREME** circumstances. Please notify me well in advance of such situations.

**Grading Criteria:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Lab</td>
<td>10%</td>
</tr>
<tr>
<td>Homework</td>
<td>5%</td>
</tr>
<tr>
<td>Semester Exams (5)</td>
<td>12% Each</td>
</tr>
<tr>
<td>Final Exam (Comprehensive)</td>
<td>25%</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
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Grading Scale:

- A [92, 100]
- AB [88, 92]
- B [82, 88]
- BC [78, 82]
- C [70, 78]
- D [60, 70]
- F [0, 60]
Additional Resources:

**Learning Commons:**
Beyond my office hours, extra math help can be found (free) in the Learning Commons housed in the lower level of the library.

**Academic Integrity:** All work on assignments, quizzes, and tests is expected to be your own and represent your ability in course content. The Carroll University Academic Integrity Policy is located in your student handbook. Please familiarize yourself with this policy. If a student violates this policy in any way, the instructor or College reserves the right to impose a sanction of failure on the assignments/assessment or failure in the course.

**Accommodation for Disabilities:**
If you need accommodations for a documented disability, or are considering obtaining documentation, you should make an appointment with Martha Bledsoe, our disabilities coordinator, no later than the first week of class. She can be reached by calling 262-524-7335 or contacting her via e-mail at wyc@carrollu.edu.

**Canvas (LMS):** This class will use Canvas for various purposes. Your grades will be posted there when available. Please keep track of your grades yourself as well, and if you notice any errors, please let me know as soon as possible.

The instructor and the University reserve the right to modify, amend, or change the syllabus, course requirements, grading policy, etc., as needed. Students will be notified of any changes during the lecture periods.
Why Am I Studying Calculus?

Over the years of my teaching career, I have been asked the question: “When are we ever going to use this?” I find it to be a fun question to answer because, truthfully, it’s used all around us. Recently, I discovered an an excellent Ted Talk by Prof. Jeffrey Heys of Montana State University that beautifully puts it. Here, I summarize his words and add one addendum that I believe should also be stated. In that talk, he stated the following three reasons for studying calculus along with some examples he stated and some that I have included. His three reasons revolve around mathematical modeling.

• Predicting the future.
  – Being able to analyze the market and determine how prices will increase/decrease.
  – Forecasting the weather day-to-day/hour-to-hour.
  – Analyzing how games are played and predicting the best moves to make, i.e., game theory.

• To save production costs by determining feasibility of a product through mathematical modeling.
  – Designing fuselages for aircraft mathematically and determining if they are aerodynamically sound.
  – Simulating electrical generators being turned on at specified times to determine if the aircraft load can be handled.
  – Simulating risks as an actuary.

• Unethical reasons.
  – The health sciences are a driving force here. Pacemakers, MRIs, breathing apparatuses, and dosage rates for pharmaceutical drugs are a few technological advancements that utilize calculus. Mainly, it would be unethical to test ideas on patients before determining if the idea is feasible.

In addition to his three reasons, there needs to be a fourth...

• To broaden your knowledge and make you more intelligent.
  – There may be a possibility that you’ll never actually touch calculus again. Regardless, learning calculus will make you a better person intellectually and build confidence in problem solving.

I hope that you enjoy this class and continue further in mathematics. Treat this class as a plot builder to a really great adventurous story. You need it to make the cool stuff make sense!

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Math 161 Homework:

§Pg. 267 1 - 49 odd (not 33)
§Pg. 422 9 - 37 odd
§6.1 1 - 3, 5 - 7, 11, 12, 13, 16, 20, 23, 25, 27, 36, 48, 53, 57
§6.2 2, 3, 5, 7, 8, 11, 12, 14, 16, 21, 23, 25, 28, 31, 32, 39, 40, 43, 47, 48, 50, 54, 56, 57, 62
§6.4 1, 2, 4, 5, 7, 8, 9, 11, 13, 15, 18, 19, 23, 26
§7.1 3, 5, 7, 8, 10, 11, 13, 15, 16, 23, 24, 29, 31, 34, 37, 39, 48, 52, 62, 63, 66, 69
§7.2 1, 3, 4, 7, 10, 13, 17, 18, 21, 31, 34, 47, 55, 65
§7.3 3, 5, 8, 11, 15, 19, 23
§7.4 1, 7 - 12, 14, 15, 19, 23, 24, 29, 30, 45, 47, 48, 50, 65
§7.5 Do as many as you can. Start with the odds.
§7.7 2, 5, 6, 7, 13, 17, 19, 20, 22, 34, 35, 37
§7.8 2, 5, 6, 7, 9, 11, 13, 14, 20, 21, 22, 27, 29, 30, 31, 36, 49, 51, 53, 54, 57, 59
§8.3 23, 24, 25, 29, 30, 32, 34
§8.5 1, 2, 3, 5, 6, 8, 10
§9.1 1 - 4, 7, 9 - 11, 14, 17
§9.2 1 - 4, 6, 9, 12, 18, 21, 23, 27
§9.3 1, 2, 3, 9, 14, 16, 18, 19, 21, 33, 45, 47, 48, 52
§9.4 1, 2, 3, 5, 6, 9, 19
§9.5 1 - 4, 7, 8, 11, 16, 17, 18, 24, 26, 28, 32, 37
§11.1 1 - 5, 9, 10, 15 - 18, 23 - 27, 29, 32, 35 - 37, 39, 41, 45, 47, 48, 53, 55, 56, 69, 73, 74, 77, 78, 79
§11.2 1, 2, 5, 9, 15, 16, 17, 19, 22, 23, 25, 26, 29, 30, 31, 32, 37, 41, 43, 44, 45, 52, 53, 57, 58, 59, 75, 76, 85, 86, 87
§11.3 3, 5, 7, 8, 13, 14, 15, 16, 21, 24, 25, 26, 29, 31, 36, 38, 39
§11.4 1 - 5, 7, 10, 15, 17, 19, 20, 21, 22, 23, 29, 30, 33
§11.5 2, 4, 5, 7, 8, 11, 13, 19, 23, 24, 25, 28, 29, 32, 33
§11.6 1, 2, 3, 6, 7, 9, 11, 18, 19, 21, 23, 25, 26, 29, 35, 36, 39, 40, 43
§11.7 Do as many as you can. Start with the odds.
§11.8 1, 2, 5, 6, 7, 9, 10, 14, 15, 17, 18, 19, 20, 24, 25, 29, 30, 32, 33 (and more if you can)
§11.9 1, 2, 3, 4, 5, 8, 9, 10, 11, 13, 15, 17, 25, 29, 32
§11.10 2, 3, 5, 7, 9, 10, 13, 16, 17, 19, 27, 28, 47, 52, 63, 73, 74, 75
§10.1 5, 7, 8, 9, 10, 11, 12, 13, 14, 19, 20, 21, 24, 25, 26, 27, 28, 41, 42
§10.2 1, 3, 4, 7, 11, 13, 15, 17, 18, 29, 31, 32