Prerequisites: C- or above in Math 1271 or equivalent

Credits: 4

Course Objectives
In Calculus I (Math 1271) we were introduced to the main players on calculus– the derivative and the integral – and how they relate, the focus of Calculus II is on their use, both within mathematics and in applications. Broadly speaking, the class has four main goals (below each goal is a list of topic we will study to help us reach it):

- Learning how to integrate complicated functions.
  - techniques of integration (including integration by parts, simple trig substitutions, partial fractions); basic numerical integration; improper integrals; arc length; area of surface of revolution
- Using integration techniques to solve differential equations, especially those coming from physical or social systems.
  - separable differential equations; Euler’s method; exponential growth and decay.
- Using sequences and series to compute/approximate numbers or functions.
  - sequences and series, comparison and ratio tests; Taylor series and polynomials
- Studying geometric objects in two and three dimensions using tools from calculus.
  - parametric curves and polar coordinates; review of conic sections; vectors in three dimensions, dot product, cross product, lines, planes, cylinders, quadric surfaces; cylindrical and spherical coordinates

Grading Scale: Your grade will be weighted in the following categories...

Quizzes: almost every Monday, Wednesday and Friday and worth 20% of the final grade

Exams: 3 exams 60-minute in-class exams each worth 15% of the final grade

Final Exam: worth 35% of the final grade in-class on Monday, May 8 from 1:30-4:20pm

Quizzes
There will be a quiz nearly every Wednesday (with the exception of exam days). These quizzes will cover the material from the suggested homework list. There will be no make-up quizzes. At the end of the semester your lowest 3 quiz scores will be dropped. You may use a scientific calculator or lower (no graphing calculators) on quizzes, but they are not required.

Exams
There will be three exams. The exams will take place during the first hour of class and consist problems that are similar to those discussed in class and in the homework.

Exam 1: Monday, February 13 (roughly covering 5.5-8.4)
Exam 2: Wednesday, March 8 (roughly covering 9.1-10.6)
Exam 3: Monday, April 17 (roughly covering 11.1-11.11)
No books, notes, computers or calculators allowed on exams.

**Homework**
Suggested homework will be assigned each class period. You will not be required to turn this homework in, but it is strongly suggested that you complete and understand these problems because similar problems will appear on the quizzes. If you are deeply stuck on a particular problem please send me an email and/or bring that problem to office hours and ask a question about it there. Most of the assigned problems will be odd numbers so that you can check your answers in the back of the book.

**Calculator Policy**
Only scientific calculators are allowed on quizzes and homework. Scientific calculators are inexpensive, have one-line displays and cannot display graphs of functions, perform symbolic manipulations, or store text in memory. If you are unsure whether your calculator is allowed, check with me before the day of the quiz. Cell phones and internet-connected devices are not allowed on quizzes, exams, and the final exam.

**Attendance**
Attendance will not be taken in class, but will be key to understanding the information presented in the textbook. This means that although there is not a percentage assigned to attendance, your presence in class will be reflected in the grades you receive on quizzes and on exams. Simply put, although it is not required that you attend class, it will be a necessary tool for success in the course.

**Succeeding In This Course**
This course will not be easy. It will require that you understand things conceptually, not merely mechanically. I will assign a substantial amount of work for you to do. It is important that you do this work if you wish to succeed. You will at times get confused while doing this homework because I will assign problems that require you to extend the concepts I have covered in class. I recognize that being confused is frustrating, but be assured it is an important and fruitful part of the learning process.
You should expect to spend 9 to 12 hours per week outside of class for your own preparation. Regular practice of assigned problems will increase your likelihood of success, as is true for any skill. The material in this course is covered at a steady and fairly rapid pace, so it will be important not to fall behind.

**Disability Accommodations**
The University is committed to providing quality education to all students regardless of ability. Determining appropriate disability accommodations is a collaborative process. You as a student must register with Disability Services and provide documentation of your disability. The course instructor must provide information regarding a course’s content, methods, and essential components. The combination of this information will be used by Disability Services to determine appropriate accommodations for a particular student in a particular course. For more information, please reference Disability Services: http://ds.umn.edu/student—services.html.

**Academic Freedom and Responsibility**
Academic freedom is a cornerstone of the University. Within the scope and content of the course as defined by the instructor, it includes the freedom to discuss relevant matters in the classroom. Along with this freedom comes responsibility. Students are encouraged to develop the capacity for critical judgement and to engage in a sustained and independent search for truth. Students are free to take reasoned exception to the views offered in any course of study and to reserve judgement about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled.*

Reports of concerns about academic freedom are taken seriously, and there are individuals and offices available for help. Contact the instructor, the Department Chair, your adviser, the associate dean of the college, or the Vice Provost for Faculty and Academic Affairs in the Office of the Provost. [Customize with names and contact information as appropriate for the course/college/campus.]

* Language adapted from the American Association of University Professors ”Joint Statement on Rights and Freedoms of Students”.
Additional Remarks and Policies

- **Academic Honesty:** I encourage you to collaborate with others on suggested homework, but cheating on exams or quizzes is not acceptable under any circumstances. As you are students of the University of Minnesota, I expect you to follow the student code of conduct which can be found at: http://www1.umn.edu/regents/policies/academic/Student_Conduct_Code.html.

- **Incompletes:** No incomplete grades will be given except in extraordinary circumstances. Moreover, to be eligible for an "I" you must successfully complete 70% of the course.

- **This Document:** You are responsible for knowing and adhering to the contents of this document. **Should the need arise, I reserve the right to add homework problems and assignments throughout the semester as well as alter the material to be covered on exams.**

- **Respect:** I expect us to behave like adults and to respect one another. Failure to do this is grounds for immediate removal from my class. Egregious incidents will be reported to the University for disciplinary action.

*Sexual Harassment:* "Sexual harassment" means unwelcome sexual advances, requests for sexual favors, and/or other verbal or physical conduct of a sexual nature. Such conduct has the purpose or effect of unreasonably interfering with an individual’s work or academic performance or creating an intimidating, hostile, or offensive working or academic environment in any University activity or program. Such behavior is not acceptable in the University setting. For additional information, please consult Board of Regents Policy: http://www1.umn.edu/regents/policies/humanresources/SexHarassment.html

*Equity, Diversity, Equal Opportunity, and Affirmative Action:* The University will provide equal access to and opportunity in its programs and facilities, without regard to race, color, creed, religion, national origin, gender, age, marital status, disability, public assistance status, veteran status, sexual orientation, gender identity, or gender expression. For more information, please consult Board of Regents Policy: http://www1.umn.edu/regents/policies/administrative/Equity_Diversity_EO_AA.html.

- **Mental Health and Stress Management:** As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance and may reduce your ability to participate in daily activities. University of Minnesota services are available to assist you. You can learn more about the broad range of confidential mental health services available on campus via the Student Mental Health Website: http://www.mentalhealth.umn.edu.

- **Frustration:** You will get confused sometimes. This is ok. If your confusion is causing you to get frustrated, this too is ok. Please, before giving up on the class, give up on the problem/activity that is causing the frustration.

- **Course Schedule**

  Please find a course schedule attached. Note that this is a tentative schedule and is subject to change throughout the semester.
<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Sections</th>
<th>Events</th>
<th>Problems</th>
</tr>
</thead>
</table>
| 1    | 1/18 | Intro, 5.5 & 7.1 | | 5.5: # 9, 17, 21, 27, 29, 33, 47  
7.1: # 3, 5, 9, 11, 15, 17, 19, 27, 29, 33, 35, 37, 47, 48, 57, 72 |
| 2    | 1/23 | 7.2 & 7.3 | | 7.2: # 1, 3, 5, 11, 13, 15, 23, 25, 33, 41, 47, 67  
7.3: # 3, 5, 7, 11, 17, 19, 21, 23, 27, 29, 34, 35 |
|      | 1/25 | 7.4 & 7.5 | Quiz 1 | 7.4: # 1, 3, 5, 9, 11, 19, 25, 29, 37, 39, 41, 47, 53  
7.5: # 1, 3, 5, 7, 11, 15, 17, 19, 23, 27, 29, 31, 41, 45, 49, 59, 61, 71, 73, 79, 81 |
| 3    | 1/30 | 7.8 | | 7.8: # 2, 7, 9, 13, 17, 21, 25, 29, 31, 39, 49, 51, 53, 57, 61, 79 |
|      | 2/1  | 8.1 & 8.2 | Quiz 2 | 8.1: # 9, 11, 13, 15, 33, 39, 41  
8.2: # 7, 13, 15, 17, 27, 33 |
| 4    | 2/6  | 8.3 (& 8.4) | | 8.3: # 1, 15, 21, 23, 25, 27, 31  
8.4: # 1, 3, 5, 9 |
|      | 2/8  | 9.1 & Review | Quiz 3 | 9.1: # 1, 3, 5, 7, 9, 11, 15 |
| 5    | 2/13 | Exam 1 | |  |
|      | 2/15 | 9.2, 9.3 & 9.4 | Quiz 4 | 9.2: # 3, 5, 7ab, 9, 11, 19a, 21, 23  
9.3: # 1, 5, 11, 15, 19, 21, 43, 45  
9.4: # 1ab, 3, 5, 7, 9 |
| 6    | 2/20 | 9.5 & 9.6 | | 9.5: # 1, 3, 5, 7, 9, 31, 35, 37  
9.6: # 1, 3, 5, 11 |
|      | 2/22 | 10.1 & 10.2 | Quiz 5 | 10.1: # 1, 5, 7, 9, 11, 15, 21, 25, 27, 33ac  
10.2: # 1, 3, 5, 7, 11, 17, 29, 33, 37, 51, 54 |
| 7    | 6/27 | 10.3 & 10.4 | | 10.3: # 1a, 3a, 5, 11, 17, 19, 23, 25, 29, 33, 37, 47, 54, 55, 57, 61, 65  
10.4: # 1, 3, 7, 11, 23, 27, 29, 37, 41 |
|      | 3/1  | 10.5 (& 10.6) | Quiz 6 | 10.5: # 5, 11, 15, 19, 25, 27, 33, 37, 47, 55  
10.6: # 1, 3, 9, 13, 17, 21, 23, 31, 37 |
<p>| 8    | 3/6  | 11.1 &amp; Review | | 11.1: # 3, 5, 11, 15, 17, 25, 37, 43, 69, 73, 75, 77, 81, 87 |
|      | 3/8  | Exam 2 | |  |</p>
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/13 &amp; 3/15</td>
<td></td>
<td>Spring Break</td>
</tr>
<tr>
<td></td>
<td>3/22</td>
<td>11.3</td>
</tr>
<tr>
<td>10</td>
<td>3/27</td>
<td>11.4</td>
</tr>
<tr>
<td></td>
<td>3/29</td>
<td>11.5</td>
</tr>
<tr>
<td>11</td>
<td>4/3</td>
<td>11.6 &amp; 11.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4/5</td>
<td>11.8 &amp; 11.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>4/10</td>
<td>11.10 (&amp; 11.11)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4/12</td>
<td>12.1 &amp; Review</td>
</tr>
<tr>
<td>13</td>
<td>4/17</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4/19</td>
<td>12.2</td>
</tr>
<tr>
<td>14</td>
<td>4/24</td>
<td>12.3 &amp; 12.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4/26</td>
<td>12.5</td>
</tr>
<tr>
<td>15</td>
<td>5/1</td>
<td>12.6</td>
</tr>
<tr>
<td></td>
<td>5/3</td>
<td></td>
</tr>
<tr>
<td>5/8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*The answer should be (D) diverges.*