It is the prerogative of the Math 122 team to change the course during the term at our discretion. Any changes will be communicated via the course website, so be sure to check it frequently. Course announcements, exam information, and other details will be regularly posted to the course website.

You are expected to be fully aware of the following policies and expectations, so review this information carefully and ask your instructor if you have further questions.

1. **Prerequisites:** You must have taken and passed Math 121 or its equivalent. If you received a D in Math 121, you should consider retaking it. Any questions regarding your readiness for the course should be resolved immediately.

2. **Course Coordinator:**
Huilan Li  
hl377@drexel.edu  
215-571-3602  
Korman 256
A list of all of the faculty members on the Math 122 team, including contact information and office hours, can be found on the course website. Mailboxes for all instructors are in Korman 206.

3. **Textbook:** *Calculus: Early Transcendentals, 9th Ed.*  
Anton, Bivens, Davis - John Wiley & Sons 2009.

4. **Course Description and Learning Outcomes:** The focus of Math 122 is the study of integration of single-variable functions, including various integration techniques and applications. Upon successful completion of Math 122, students should be able to

   • Understand the Fundamental Theorem of Calculus and how it relates differentiation and integration.
   • Demonstrate a proficiency in various integration techniques such as substitution, parts, and partial fractions.
   • Understand the definition and interpretations of the definite integral.
   • Use the definite integral to solve physical problems such as area, volume and arc length calculations.
   • Mathematically model a system with descriptive differential equations and be able to find physically meaningful solutions.
   • Demonstrate knowledge of a polar coordinate system, including the techniques and applications for differentiating and integrating polar functions.

5. **Course Format:** Your calculus class will meet four times a week. During class your instructor will be presenting lectures on the course material and engaging the class in discussion and problem sessions. There will be a short quiz that takes place in class each week.

6. **Attendance:** Regular attendance is essential for success in this course. You are responsible for all the material discussed in class. The quarter system moves very quickly -- if you don't do your work regularly, it is easy to fall behind.

7. **Assigned Problems:** The assigned problems listed in this syllabus have been chosen to illustrate the concepts and techniques that you are expected to master. These problems will NOT be turned in or graded. It is your responsibility to work on all of these problems regularly and in detail. Only doing the problems yourself that you will acquire the skills needed for proficiency in the course. **Reviewing class notes and reading the textbook are excellent ways to determine the solutions to assigned problems.**
8. **Quizzes:** Once a week there will be an in-class quiz, which will cover material discussed up to that point in the class. Each quiz will be worth 10 points so there will be 100 available points for the entire term. Your final in-class quiz grade will be the total number of points obtained divided by 90 – any final quiz grade over 100 will be considered as extra credit. **There are no make-up quizzes. You must be present in your scheduled class to take the quiz.**

9. **Midterm Exams:** There will be two midterm exams during the term: April 27 and May 25. These exams will be common exams (all students take the exam at the same time) given during the 8:00 – 8:50 a.m. exam period. There will be a **SINGLE make-up exam** for anyone who misses one of the two regularly scheduled midterms. It will be given during the 10th week of the term and will be comprehensive for the material covered on the two midterm exams.

10. **Final Exam:** There will be a comprehensive two-hour final exam scheduled during the final exam week at the end of the term.

**Your university ID is REQUIRED for all exams. You must know your section number for all exams. Five points will be deducted from your exam grade if you do not write down your correct section number on your exam. All exams are closed book and closed notes. No calculators or other electronic devices are permitted for any of the exams.**

11. **Course Grades:** Your course average will be computed in one of two ways:

- If your final exam grade is not your highest exam grade then your grade distribution will be
  
  Quiz Average: 20%  
  Midterms: 50% (25% each)  
  Final Exam: 30%

- If your final exam grade is your highest exam grade then your grade distribution will be
  
  Quiz Average: 20%  
  Midterms: 40% (15% for the lower; 25% for the higher)  
  Final Exam: 40%

The letter grade you receive will be based on your course average as follows

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90 - 100</td>
</tr>
<tr>
<td>B</td>
<td>80 - 89</td>
</tr>
<tr>
<td>C</td>
<td>70 - 79</td>
</tr>
<tr>
<td>D</td>
<td>60 - 69</td>
</tr>
<tr>
<td>F</td>
<td>0 – 59</td>
</tr>
</tbody>
</table>

Plus and minus will be assigned at the discretion of the instructor.

12. **Extra Help:** In addition to your instructor’s office hours, you can receive extra assistance in the Math Resource Center (MRC) located in Korman 247. The MRC is staffed by faculty and teaching assistants who can help you with your math courses. No appointment is necessary. Hours and staff schedules can be found at: http://drexel.edu/math/resources/undergraduate/mrc/.

13. **Disabilities and Accommodations:** Students with disabilities requesting accommodations and services at Drexel University need to present a current accommodation verification letter (AVL) to faculty before accommodations can be made. AVL’s are issued by the Office of Disability Services (ODS). For additional information, contact ODS at www.drexel.edu/ods, 3201 Arch St., Street, Suite 210, Philadelphia, PA 19104, 215.895.1401 (V), or 215.895.2299 (TTY).

14. **Academic Honesty:** Cheating and other forms of academic misconduct are serious offenses and are dealt with harshly, e.g. at the very least a 0 on an exam and a letter sent to the Office of Student Conduct. Students should be familiar with the following policies:

- http://www.drexel.edu/provost/policies/academic_dishonesty.asp
- http://www.drexel.edu/studentlife/judicial/honesty.html

15. **Course Drop Policy:** Students should be familiar with the following policy

http://www.drexel.edu/provost/policies/course_drop.asp
<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture topics</th>
<th>Sections</th>
<th>Assigned Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The Indefinite Integral, Integration by Substitution</td>
<td>5.2, 5.3</td>
<td>5.2: 1, 5, odds 9-35, 43, 47, 5.3: odds 1-11, odds 15-53</td>
</tr>
<tr>
<td>2</td>
<td>Area as a Limit &amp; Sigma Notation, The Definite Integral</td>
<td>5.4, 5.5</td>
<td>5.4: odds 1-19, 27, 35, 37, 41, 45, 5.5: 5, 7, 9, odds 13-27, 37</td>
</tr>
<tr>
<td>3</td>
<td>Fundamental Theorem of Calculus, Substitution with Definite Integrals</td>
<td>5.6, 5.9</td>
<td>5.6: 5, 7, 9, odds 13-31, 59, 63, 65, 5.9: odds 1-19, 25, odds 29-47, 51, 59</td>
</tr>
<tr>
<td>4</td>
<td>Exam 1 – Friday 4/27 8:00 – 8:50 a.m. Area Between Two Curves, Volumes by Slicing (Disks &amp; Washers)</td>
<td>6.1, 6.2</td>
<td>6.1: odds 1-17, 35, 37, 6.2: odds 1-25, 39, 41, 47, 49</td>
</tr>
<tr>
<td>5</td>
<td>Length of a Plane Curve, Integration by Parts</td>
<td>6.4, 7.2</td>
<td>6.4: 1, 3, 5, 7, 7.2: odds 1-31, 43, 55</td>
</tr>
<tr>
<td>6</td>
<td>Integration by Partial Fractions, Improper Integrals</td>
<td>7.5, 7.8</td>
<td>7.5: 1, 3, 5, 7, 11, 17, 19, 23, 29, 33, 39, 41, 7.8: odds 1-29</td>
</tr>
<tr>
<td>7</td>
<td>Modeling with Differential Equations, Separation of Variables</td>
<td>8.1, 8.2</td>
<td>8.1: 1, 3, 27, 29, 31, 33, 8.2: odds 1-13, 29, 31, 33, 35, 55, 59</td>
</tr>
<tr>
<td>8</td>
<td>Exam 2 – Friday 5/25 8:00 – 8:50 a.m. Integrating Trigonometric Functions, Trigonometric Substitutions</td>
<td>7.3, 7.4</td>
<td>7.3: odds 1-47, 59, 7.4: odds 1-25, 33, 37, 43</td>
</tr>
<tr>
<td>9</td>
<td>Memorial Day Mon. 5/28 (Holiday) Parametric Equations; Tangent Lines and Arc Length for Parametric Curves, Polar Coordinates</td>
<td>10.1, 10.2</td>
<td>10.1: odds 3-17, odds 45-51, 10.2: odds 1-11, odds 17-37 (except 19c), 41, 43, 45</td>
</tr>
<tr>
<td>10</td>
<td>Tangent Lines, Arc Length, and Area for Polar Curves</td>
<td>10.3</td>
<td>10.3: odds 1-9, 19, 21, odds 25-45</td>
</tr>
</tbody>
</table>

Note: The last day of class is Monday, June 11.
Outcomes List for Math 122 Calculus II
Spring 2011-2012

General Information:
The purpose of this Outcomes List is to give you a concrete summary of the material you should know, and the skills you should acquire, by the end of this course. If you understand all of the concepts summarized on this Outcomes List, review all of the assigned problems listed on the syllabus, and review all of the additional problems listed below, then you should be adequately prepared for the exams. Understand though that the problems below are representative; there is no guarantee that the problems on the exam will look exactly like these.

5.2 Relate integration and differentiation as operations on functions. Given a differentiation rule, construct the associated indefinite integration rule. Be able to integrate polynomials, exponential functions, trigonometric functions, and inverse trigonometric functions, i.e. know Table 5.2.1.

In addition to reviewing the assigned problems from 5.2, look at:
Example (within the chapter): 4
Quick check exercise (at the end of the chapter): 2
Regular problems (exercises at the end of the chapter): 10, 36

5.3 Simplify a complicated integral to a known form by using a substitution of variables.

In addition to reviewing the assigned problems from 5.3, look at:
Examples 10, 11; Quick check exercise 2; Regular problems 24, 30, 48

5.4 Understand and evaluate the summation (sigma) notation. Use the summation operation's basic properties and formulas. (You do not need to memorize the formulas in Theorem 5.4.2; if they are needed, they will be provided to you). Denote the approximate area under a curve and over an interval as a sum, and find the exact area using a limit of the approximation. Find the net-signed area between a function and an interval using a limit.

In addition to reviewing the assigned problems from 5.4, look at:
Examples 2, 4; Quick check exercises 2, 3; Regular problems 8, 50

5.5 Evaluate the definite integral of a function over a given interval using geometry. Know some useful properties of the definite integral, i.e. Theorems 5.5.3, 5.5.4, and 5.5.5.

In addition to reviewing the assigned problems from 5.5, look at:
Examples 1, 2; Quick check exercise 3; Regular problems 6, 10, 18, 38

5.6 Use one part of the Fundamental Theorem of Calculus (FTC) to evaluate definite integrals via antiderivatives. Use another part of the FTC to compute derivatives of integrals.

In addition to reviewing the assigned problems from 5.6, look at:
Examples 3, 7, 10; Regular problems 22, 32, 60
5.9 Evaluate definite integrals using a substitution of variables.

In addition to reviewing the assigned problems from 5.9, look at:
Example 3; Quick check exercise 2; Regular problems 4, 10, 22, 36

6.1 Find the area between the graphs of two functions over an interval of interest. Find the area enclosed by two graphs which intersect.

In addition to reviewing assigned problems from 6.1, look at
Example 2; Quick check exercise 3; Regular problems 4, 6, 14, 18

6.2 Find the volume of a solid that consists of known cross-sectional areas. Use the method of disks and washers to find the volume of a solid of revolution formed by revolving a region in the $xy$-plane about the $x$-axis, $y$-axis, or any other horizontal or vertical line.

In addition to reviewing assigned problems from 6.2, look at
Examples 1, 3, 6; Quick check exercises 1, 4; Regular problems 10, 22, 40, 42

6.4 Find the arc length of a smooth curve in the plane described as a function of $x$ or as a function of $y$.

In addition to reviewing assigned problems from 6.4, look at
Quick check exercise 4; Regular problem 6

7.2 Use integration by parts to evaluate various integrals, including integrands involving products of functions, isolated logarithmic functions, or isolated inverse trigonometric functions.

In addition to reviewing assigned problems from 7.2, look at
Examples 4, 7; Quick check exercise 3; Regular problems 12, 22, 28

7.5 Be able to recognize an improper rational function, and perform the necessary long division to turn it into a proper rational function. Write down the partial fraction decomposition for a proper rational function, compute the unknown coefficients in the partial fractions, and integrate each partial fraction.

In addition to reviewing assigned problems from 7.5, look at:
Examples 2, 3, 5; Quick check exercises 4, 5; Regular problem 18

7.8: Given an improper integral, which either has an infinite interval of integration or an infinite discontinuity, be able to evaluate it using a limit. Determine if such an integral converges (and if so, what it converges to) or diverges.

In addition to reviewing assigned problems from 7.8, look at:
Examples 2, 3, 7; Quick check exercises 1, 2; Regular problems 12, 24

8.1 Be able to verify that a given function is a solution to a differential equation. Given a description in words of how some quantity changes in time and given the initial value of that quantity, be able to set-up and solve an initial-value problem that models the description.

In addition to reviewing assigned problems from 8.1, look at:
Regular problems 30, 32, 34
8.2 Be able to solve first-order separable equations by separating and integrating. Be able to solve initial-value problems for first-order separable equations. Know (i.e. memorize) the initial-value problems and solutions for both the exponential growth and exponential decay models, and be able to answer questions based on these models. You do not need to memorize equations for other models (e.g. Logistic Model, Newton’s Law of Cooling), but be able to answer questions based on these models if you are given the equations.

In addition to reviewing assigned problems from 8.2, look at:
Examples 3, 4; Quick check exercises 2, 3; Regular Problems 6, 36(a)

7.3 Know antiderivatives for all six elementary trigonometric functions. Evaluate integrals that involve powers of sine, cosine, tangent, and secant by using appropriate trigonometric identities and reduction formulas.

In addition to reviewing assigned problems from 7.3, look at:
Examples 2, 3, 4; Quick check exercise 2; Regular problems 18, 44, 60

7.4 Evaluate integrals that involve particular expressions (see Table 7.4.1) by making the appropriate trigonometric substitution. Evaluate integrals that involve quadratic expressions by first completing the square and then making the appropriate substitution.

In addition to reviewing assigned problems from 7.4, look at:
Examples 3, 4; Quick check exercise 3; Regular problems 4, 26, 38

10.1 Sketch a parametric curve by eliminating the parameter, and indicate the orientation of the curve. Given a curve and an orientation, find parametric equations that generate the curve. Without eliminating the parameter, find \(\frac{dy}{dx}\) and \(\frac{d^2 y}{dx^2}\) at a given point on a parametric curve.

In addition to reviewing assigned problems from 10.1, look at:
Example 7; Regular problems 10, 18

10.2 Describe points and curves in both polar and rectangular form, and be able to convert between the two coordinate systems. Know (i.e. memorize) the formulas for the basic shapes in polar coordinates: circles, lines, limaçons, cardioids, rose curves, and spirals.

In addition to reviewing assigned problems from 10.2, look at:
Example 2; Quick check exercise 4(a, b, c, e, f, g); Regular problem 10

10.3 Compute the slope of the tangent line to a polar curve at a given point. Find the arc length of a polar curve. Find the area enclosed by a polar curve or curves.

In addition to reviewing assigned problems from 10.3, look at:
Examples 1, 4, 9; Quick check exercises 1, 5; Regular Problems 36