

Abilene Christian University

Spring 2012



MATH 186.01: Calculus II

MWF 9:00 - 9:50

Foster Science Building 241

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Course Blog: blogs.acu.edu/1220_MATH18601

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Required Texts: The following text is required for this course and may be purchased in the campus book store, or ordered online at the student's discretion. Please bring this text everyday to class.

Stewart, James, *Calculus: Concepts and Contexts*, Brooks-Cole, 4th edition, 2010. ISBN-10: 0-495-55742-0.

Course Materials: A graphing calculator is required for this course. Calculators will not be loaned out during class and cannot be exchanged between students during tests or quizzes. Students may choose either a TI-83, TI-84, or TI-89 calculator for use in class—**no exceptions or substitutions!**

Course Description: This course expands on the ideas of calculus introduced in Calculus I to techniques of integration and applications of integration. The student successfully completing this course will be able to combine analytic, graphical, numerical, and algebraic methods to solve problems involving integration and power series. The ACU course catalog describes the course as follows:

MATH 186 Calculus II (3-0-3), fall, spring, Continuation of MATH 185.

Techniques for finding anti-derivatives, applications of integration including volumes of solids of revolution, arc length, and center of mass. Sequences, infinite series, and polynomial approximation. Prerequisites: MATH 185.

Success in Calculus II depends, to a large extent, on knowledge of the mathematics that precedes this course: differential calculus (Calculus I), algebra, geometry, a knowledge of functions and graphing, and trigonometry. The following areas are a few of the pre-supposed competencies for this course.

- Use the derivative to analyze where a function is increasing or decreasing, changing concavity, and has maxima/minima. You should be able to algebraically solve for zeros and intercepts of functions, and understand their graphical significance.
- Simplifying rational expressions and expressions involving roots, exponents, exponentials, and logarithms.

- Be able to factor quadratic polynomials and solve for zeros of quadratics using the quadratic formula. Understand the role the discriminant plays in determining the type (real, repeated, complex) of zeros produced.
- Calculate derivatives and differentials of a variety of functions including trigonometric functions.
- Know the values of $\sin(\theta)$, $\cos(\theta)$, $\tan(\theta)$ for $\theta = 0, \pi/4, \pi/2, \pi/6, \pi/3$ and multiples of these angles.
- Understand the geometric interpretation of the derivative involving slopes, tangent lines. Be able to apply the product, quotient, and chain rules for differentiation.
- Know basic geometric formulas for area, volume, and surface area of common figures like squares, right triangles, circles, and their three dimensional solids.
- Know the interpretation of the definite integral as net area under the curve, and understand the idea of a sum of rectangles approximating the integral. These sums are called Riemann sums.
- Know the first and second fundamental theorems of calculus and know several basic anti derivative formulas including, but not limited to the exponential, power functions, and basic trig functions.
- Understand the relationship between position, velocity and acceleration in terms of derivatives and integrals.

Mission Statement: This course supports ACU's mission statement of preparing students for Christian service and leadership throughout the world by providing students a foundational understanding of the mathematical principles such as problem solving and decision making, as well as exposing students to the role of mathematics in a Christian worldview.

Departmental Mission: The mission of the Department of Mathematics is to educate students to be quantitative and analytical thinkers in preparation for Christian service and leadership throughout the world.

Grading Components: This course employs a standard grading scale. The specific grading components and associated percentages are described below.

2250-2500	2000-2249	1751-1999	1501-1750	1500 or less
A	B	C	D	F

Exams (60%): There will be three in-class exams this semester. Each exam will closely resemble the homework (assigned and suggested) and cover approximately one unit of material. Each exam is graded out of 500 points and is worth 20% of your course grade. Practice exams will be made available online prior to each exam. The tentative exam dates are provided below.

Exam 1	Techniques of Integration	Chapter 5	Wednesday, February 15
Exam 2	Applications of Integration	Chapter 6	Wednesday, March 28
Exam 3	Problems Involving Infinity	Chapter 8	Monday, April 30

Daily Work (20%): Homework will be assigned regularly throughout the semester. Homework will normally be made available on the course blog up to one week before it is due. You will always have at least a weekend in which to complete the assignment. You can earn a maximum of 500 points toward your homework grade, but more than 500 points are available. **Homework will not be accepted late.**

Final Exam (20%): A comprehensive final exam will be given in this course. The final exam is scheduled for 8:00-10:00, **Wednesday May 9**. University policy prohibits the giving of any final exam early. You must take the final exam at the allotted time. Make your end of semester plans accordingly. If you do not have too many absences (see the attendance policy section) you may use your final exam to replace your lowest exam grade from the semester. The final exam comprises 20% of your overall semester grade and is worth 500 points.

Course Competencies: The course competencies, written in student performance terms, are detailed in the table below.

Competency	Measurement Instrument	Measurement Standard
<p>Students understand the calculus concepts of integrals and infinite series, and improper integrals; and they can explain how these concepts are related.</p>	<p>In class exams, including final exam.</p> <p>Homework questions</p> <p>Maple explorations</p>	<p>Explain the geometric significance of integrals in various contexts.</p> <p>Apply the properties of p-series integrals to solve problems involving infinite series.</p> <p>Be able link the concept of infinite series with function representation and area.</p>
<p>Students are able to use technology such as a graphing calculator and a computer algebra system (Maple) to interpret numerical, graphical, and algebraic results.</p>	<p>Emphasis on homework/exam questions to be done with the aid of a graphing calculator or Maple.</p> <p>Maple explorations</p>	<p>Clearly outline procedures used to arrive at an answer where technology is involved.</p> <p>Demonstrate the ability to interpret, extend, technological results.</p>
<p>Students model and solve problems in the areas of business, economics, physics, engineering, and biological sciences.</p>	<p>In class exams, including final exam.</p> <p>Homework questions</p> <p>Maple explorations specific to certain phenomenon.</p>	<p>Obtain well-articulated, algorithmic solutions in context.</p> <p>Appropriately model real-world phenomena in multiple representations: parametric, polar, and rectangular.</p>

Attendance Policy: Your regular attendance is both necessary and expected. You are responsible for all material covered while absent and will be expected to take regularly scheduled exams and are responsible for turning in work on the assigned dates. Attendance will be recorded at the beginning of each class. If you come in after attendance is taken you will be counted absent. So make every effort to arrive in class on time, prepared for class. Only university approved absences can exempt you from being counted absent. Per university policy, university approved absences must be cleared with the instructor one week in advance. Make your sponsors aware that failure to comply with this policy will affect your attendance record in this class. The following actions will be taken at different absence levels:

Number of Absences	Consequences
0-5	No action taken
6-7	Students will be emailed notifying them of their current number of absences and reminding them of the attendance policies
8-11	Students with this many absences will be unable to use their final exam to replace a low test grade.
12+	Students with 12 absences will be dropped from the course.

Homework Policy: Homework sets will be assigned periodically throughout the semester. You should form the habit of doing the relevant problems between successive lectures and not try to do the whole set the night before they are due. Solutions will be made available online. I encourage collaboration in this course, but I insist on honesty about it. If you do your homework in a group, be sure it works to your advantage rather than against you. **Good grades for homework you have not thought through will translate to poor grades on exams.** You must turn in your own write-ups of all problems, and, if you do collaborate or use outside resources, you should reference them on your solution sheet. Failure to do so constitutes an act of academic dishonesty.

Make-up Policy: After an exam or assignment has been graded and handed back in class, it will not be accepted for a grade under any circumstance. In the case of a university excused absence, it is the student's responsibility to make arrangements with the instructor regarding due dates. **Exams cannot be made up if missed except under extraordinary circumstances at the discretion of the instructor.** There will not be any work accepted for extra credit.

Academic Integrity Policy: The university policy regarding academic integrity is available online at <http://www.acu.edu/campusoffices/provost>. Students found guilty of an act of academic dishonesty will be subject to the following disciplinary actions in this course.

First Occurrence: A first violation will result in no credit for that particular assignment (even if it is an exam). No makeup will be allowed. The appropriate campus office(s) will be notified of the incident, and a notice of the incident will accompany your university records.

Second Occurrence: A second violation will result in your withdrawal from the course with a grade of F. A recommendation for suspension from the university will be made by the department.

Electronic Devices Policy: Please turn off all cell phones, beepers, pagers, alarms, .mp3 players, etc... unless such devices are being used for class purposes as indicated by your instructor. Headphones, listening to music, texting, and other uses of these devices not for class purposes are strictly prohibited during class. Frequent disruptions or failure to abide by this policy will be viewed as disruptive behavior and are subject to being dismissed from class and being counted absent. If the disruptions continue you will be dropped from the course.

Disability Accommodations: If you have a documented disability and wish to discuss academic accommodations, please feel free to contact me. The ACU Student Disability Services Office (a part of Alpha Academic Services) facilitates disability accommodations in cooperation with instructors. In order to receive accommodations, you must be registered with Disability Services and you must complete a specific request for each class in which you need accommodations. Contact Disability Services at 674-2667 for further information or to set up an appointment.

Tutoring Times: The mathematics department offers tutoring for this course. Tutoring sessions are staffed by undergraduate mathematics students and are come and go events. There are usually several students vying for attention from the student workers so please come prepared to ask specific questions and be respectful of other students seeking help. Tutoring times for this semester are given below. All tutoring for MATH 186 takes place in FSB 204.

Tuesday:	6:30 - 9:00
Thursday:	6:30 - 9:00

Office Hours: Below is my schedule for Spring 2012. The times marked "Office Hours" represent the times I will make myself available to work with you on homework, understanding lectures, or for any other questions you might have. Please take advantage of these opportunities. If you find that none of these times work for you, feel free to email me at john.ehrke@acu.edu or call me at 674-2162 to set up an alternate appointment. No appointment is needed if you attend regularly scheduled office hours. This schedule is posted on the front of my office door as well.

Spring 2012	Monday	Tuesday	Wednesday	Thursday	Friday
8:00 – 8:30	MATH 130		MATH 130		MATH 130
8:30 – 9:00	MATH 130		MATH 130		MATH 130
9:00 – 9:30	MATH 186		MATH 186		MATH 186
9:30 – 10:00	MATH 186		MATH 186		MATH 186
10:00 – 10:30	MATH 440	Office Hours	MATH 440	Office Hours	MATH 440
10:30 – 11:00	MATH 440	Office Hours	MATH 440	Office Hours	MATH 440
11:00 – 11:30	Lunch - Meetings				
11:30 – 12:00					
12:00 – 12:30					
12:30 – 1:00					
1:00 – 1:30					
1:30 – 2:00					
2:00 – 2:30	Office Hours		Office Hours		Office Hours
2:30 – 3:00	Office Hours		Office Hours		Office Hours
3:00 – 3:30	Office Hours		Office Hours		
3:30 – 4:00	Office Hours		Office Hours		