

**MAT 301 : Calculus III**  
**Fall 2009**  
**MWF 10:30 am - 11:20 am, Hubbard 213**

**Instructor:** Dr. Brad Emmons

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**Office Hours:** 10:30 - 11:30 Tuesdays and Thursdays, or by appointment

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### **Course Materials**

Calculus, 3rd Edition by Strauss, Bradley, Smith (required)

### **Introduction**

In this course, mathematics begins. While the first two semesters of Calculus gave you a nice introduction to the limit, the derivative, and the anti-derivative, in this course we will attempt to introduce a higher level of rigor. As you know, the introduction of these concepts enhanced our understanding of the universe and motion. And you have perhaps been exposed to applications of calculus to economics, the social sciences, computer science, or other disciplines. But what exactly is the nature of a limit? Were we careful enough in our treatment of it in Calculus I? We will begin the semester by investigating limits of sequences and series, and learn some cool things along the way.

After that we will begin our study calculus in higher dimensions. The calculus that you have been exposed to so far has dealt with functions of one variable. But for most phenomena in nature there are several variables at work. For instance, can you think of what variables might come into play when you are considering what temperature it is outside? What does the derivative mean now in this case? Can we integrate a function of several variables? We will explore these questions over the next two semesters.

### **Exams**

There will be two in-class exams as well as a final cumulative exam. The exams will test your understanding of concepts, your ability to work through some of the computations, as well as your ability to apply the techniques to certain applications. The first exam is scheduled for Friday, October 2, the second exam is scheduled for Friday, November 6. The final exam will be held on Saturday, December 19 from 11:30 - 2:00. All exams will count for 20 percent of your final grade. There will be NO make-ups for missed exams. Please look over your schedule as soon as possible. If you see a potential conflict, inform me immediately.

### **Homework**

The best way to learn Mathematics is to solve problems. Homework will be assigned at the end of each class period and collected the following class period. I will choose 4 or 5 problems to grade in each assignment. To earn full credit for a problem, a complete solution to the problem must be submitted. Just writing down the answer will not earn full credit. In addition to points for each graded problem, 5 points on each assignment will count for completeness and neatness of the graded assignment. Late assignments will not be graded, but they will be eligible for the 5 completion points. If you are not in class the day an assignment is collected, you may turn in your assignment into my office later that day. However, your assignment will be considered late. The homework is designed to help you identify where you might have difficulties. If you encounter any trouble with an assignment or a concept, seek help! The homework will count for 20% of your final grade.

### **Quizzes**

Every other Friday, starting with September 11th, we will have an in-class quiz. There will be a total of 6 quizzes throughout the semester. You should treat the quizzes as mini-exams, covering material from approximately 2 weeks worth of course work. The quizzes will consist of 4 or 5 problems similar to problems from your graded homework, and they are to make sure that you are keeping up with the concepts presented in class, and to identify where you are having problems before you take the exams. The quizzes will count for 20% of your final grade.

### **Attendance**

Attendance in MAT 112 is extremely important. Although there is no official attendance policy, note that if you are not in class on a particular day, your homework will not be graded for a score. I will also

require that you be in class at 10:30 am and no later. If you are late to class, you may stay to enjoy the wonderful learning experience. However, your homework assignment for the day will be considered late.

### **Grading**

Your grade in this course will be based on three main factors: homework, quizzes and exams. The homework will be worth 20% of your final grade, the quizzes 20%, and the exams 60%. In addition to these factors, minor ethereal factors such attendance, class participation, attitude, and improvement over the course of the semester can also affect your grade. To determine your final grade, 90–100% = A, 80–89% = B, 70–79% = C, 60–69% = D, 59 and below = F, with the top two percents receiving a + and the bottom two percents receiving a –.

### **Important Dates**

Friday, September 11 – Quiz I  
Friday, September 25 – Quiz II  
Friday, October 2 – Exam I  
Monday, October 12 – Fall Break  
Friday, October 16 – Quiz III  
Friday, October 30 – Quiz IV  
Friday, November 6 – Exam II  
Friday, November 20 – Quiz V  
Wednesday, November 25 - Sunday, November 29 – Thanksgiving Break  
Friday, December 11 – Quiz VI  
Monday, December 14 – Last Day of Classes  
Saturday, December 19, 11:30 - 2:00 – Final Exam

### **Suggestions**

Come to class with your homework assignment completed every day  
Study for at least 30 minutes each day in addition to completing your homework assignment  
Read the section we will be covering in class *before* arriving to class  
Do not fall behind!  
Come to office hours to discuss homework and concepts. I am here to help!

## Syllabus

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Week 1	September 2	Course Policies, Syllabus, Basic Terms
	September 4	Section 8.1 – Sequences and their Limits
Week 2	September 7	Section 8.2 – Infinite Series ; Geometric Series
	September 9	Section 8.3 – The Integral Test; $p$ -Series
Week 3	September 11	Section 8.4 – Comparison Test, <b>Quiz I</b>
	September 14	Section 8.4 – (continued)
	September 16	Section 8.5 – The Ratio Test and the Root Test
Week 4	September 18	Section 8.5 – (continued)
	September 21	Section 8.6 – Alternating Series; Absolute and Conditional Convergence
	September 23	Section 8.6 – (continued)
Week 5	September 25	Section 8.7 – Power Series, <b>Quiz II</b>
	September 28	Section 8.7 – (continued)
	September 30	Review
Week 6	October 2	<b>Exam I</b>
	October 5	Section 8.8 – Taylor and Maclaurin Series
	October 7	Section 8.8 – (continued)
	October 9	Section 9.1 – Vectors in $\mathbb{R}^2$
Week 7	October 12	<b>NO CLASS</b>
	October 14	Section 9.1 – (continued)
	October 16	Section 9.2 – Coordinates and Vectors in $\mathbb{R}^3$ , <b>Quiz III</b>
Week 8	October 19	Section 9.2 – (continued)
	October 21	Section 9.3 – The Dot Product
	October 23	Section 9.3 – (continued)
Week 9	October 26	Section 9.4 – The Cross Product
	October 28	Section 9.4 – (continued)
	October 30	Section 9.5 – Parametric Representation of Curves; Lines in $\mathbb{R}^3$ , <b>Quiz IV</b>
Week 10	November 2	Section 9.5 – (continued)
	November 4	Review
	November 6	<b>Exam II</b>
Week 11	November 9	Section 9.6 – Planes in $\mathbb{R}^3$
	November 11	Section 9.6 – (continued)
	November 13	Section 10.1 – Introduction to Vector Functions
Week 12	November 16	Section 10.1 – (continued)
	November 18	Section 10.2 – Differentiation and Integration of Vector Functions
	November 20	Section 10.2 – (continued), <b>Quiz V</b>
Week 13	November 23	Section 10.3 – Modelling Ballistics and Planetary Motion
	November 25	<b>NO CLASS</b>
	November 27	<b>NO CLASS</b>
Week 14	November 30	Section 10.3 – (continued)
	December 2	Section 10.4 – Unit Tangent and Principle Unit Normal Vectors; Curvature
	December 4	Section 10.4 – (continued)
Week 15	December 7	Section 10.5 – Tangential and Normal Components of Acceleration
	December 9	Section 10.5 – (continued)
	December 11	Review, <b>Quiz VI</b>
Week 16	December 14	Review