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, September 27, the second exam is scheduled for Friday, November 1. The final exam will be held on Thursday, December 12 from 1:00 - 4:00 p.m. All exams will count for 25 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. At the end of each section, there are a variety of exercises that you can look at to help understand concepts and hone your skills. I will suggest problems for you to attempt from the end of the section, but I will not grade these. Instead, I will assign weekly problem sheets that will be collected and graded. These problems will be more in-depth than the drill-type activities and will require more exposition on your part. You will be graded on content, organization and completion of the assignments. In addition to the graded problems, each assignment will carry 5 completion points. To earn 5 out of 5 of the completion points, the assignment must be written up neatly and thoroughly with complete solutions to all of the assigned problems. Late homework will not be graded, but you may still earn completion points on late assignments. 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!

Attendance
Attendance in MAT 301 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 12:30 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 two main factors: homework and exams. The homework will be worth 25% of your final grade and the exams 75%. In addition to these factors, minor ethereal factors such as 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 27 – Exam I
- Monday, October 14 – Fall Break
- Friday, November 1 – Exam II
- Wednesday, November 27 - Sunday, December 1 – Thanksgiving Break
- Monday, December 9 – Last Day of Classes
- Wednesday, December 12, 1:00 p.m. - 4:00 p.m. – 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!
| Week 1 | August 30 | Course Policies, Syllabus, Section 9.1  
        |          | Section 9.2 – Series and Convergence |
| Week 2 | September 2 | Section 9.3 – Integral Test and $p$-series  
        | September 6 | Section 9.4 – Comparisons of Series |
| Week 3 | September 9 | Section 9.5 – Alternating Series  
        | September 13 | Section 9.6 – Ratio and Root Test  
        |          | Section 9.7 – Taylor Polynomials and Approximations |
| Week 4 | September 16 | Section 9.8 – Power Series  
        | September 20 | Section 9.9 – Representation of Functions by Power Series |
| Week 5 | September 23 | Section 9.10 – Taylor and Maclaurin Series  
        | September 27 | Exam I |
| Week 6 | September 30 | Section 10.1 – Conics and Calculus  
        | October 4 | Section 10.2 – Plane curves and Parametric Equations |
| Week 7 | October 7 | Section 10.3 – Parametric Equations and Calculus  
        | October 11 | Section 10.4 – Polar Coordinates and Polar Graphs |
| Week 8 | October 14 | NO CLASS  
        | October 18 | Section 10.5 – Area and Arc Length in Polar Coordinates |
| Week 9 | October 21 | Section 10.6 – Polar Equations of Conics and Kepler’s Laws  
        | October 25 | Section 11.1 – Vectors in the Plane |
| Week 10 | October 28 | Section 11.2 – Space Coordinates and Vectors in Space  
          | November 1 | Exam II |
| Week 11 | November 4 | Section 11.3 – Dot Product of Two Vectors  
          | November 8 | Section 11.4 – Cross Product of Two Vectors in Space |
| Week 12 | November 11 | Section 11.5 – Lines and Planes in Space  
          | November 15 | Section 11.6 – Surfaces in Space |
| Week 13 | November 18 | Section 11.7 – Cylindrical and Spherical Coordinates  
          | November 22 | Section 12.1 – Vector-Valued Functions |
| Week 14 | November 25 | Section 12.2 – Differentiation and Integration of VVF  
          | November 29 | NO CLASS |
| Week 15 | December 2 | Section 12.3 – Velocity and Acceleration  
          | December 6 | Section 12.4 – Tangent Vectors and Normal Vectors |
| Week 16 | December 10 | Section 12.5 – Arc Length and Curvature |