

# MATH-273 Calculus III

Sec. 1 4 credits

Eric Kuennen

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**Instructor:** Dr. Eric Kuennen  
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**Class Time/Place:** Mon, Wed, Thurs, Fri: 12:40-1:40 in Swart Hall 5

**Office Hours:** My officially designated office hours are:  
Mon, Tue, Wed, Thurs, Fri: 9:10-10:10 am  
Mon, Wed, Fri: 3:00-4:00 pm

When I am not teaching a class, I am usually in my office and available to meet with you. My class schedule is posted on my door. Feel free to stop by at any time, or make an appointment.

**Course Webpage:** (D2L) <https://uwosh.courses.wisconsin.edu/>

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**Prerequisites:** Mathematics 172 (Calculus II) with a grade of C or better.

**Textbook/coverage:** *Calculus: Concepts and Contexts* (3<sup>rd</sup> edition) by James Stewart. We will cover most of chapters 9-13. (These chapters are also available separately under the title *Multivariable Calculus: Concepts and Contexts*)

**Calculator:** Department policy allows the use of TI-83 Plus calculators on exams. The TI-89 or TI-92 (or similar calculator with symbolic capability) will not be allowed. Cell phone calculators may not be used.

**Course Description:** This course extends single variable calculus to higher dimensions, providing vocabulary and techniques for understanding fundamental equations of nature, physics, economics, etc, and important background needed for statistics, computer graphics, bioinformatics, etc. This course develops tools for describing curves, surfaces, solids and other geometrical objects in three dimensions, and methods for solving optimization problems with and without constraints.

**Content:**

- Chapter 9: Vectors and Geometry of Space: Dot and Cross Products, Lines, Planes and Surfaces, Cylindrical and Spherical Coordinates.
- Chapter 10: Vector Functions: Space Curves, Calculus of Vector Functions, Arc Length and Curvature, Kinematics.
- Chapter 11: Partial Derivatives: Functions of Several Variables, Limits and Continuity, Partial Derivatives, Tangent Planes and Linear Approximation, Chain Rule, Directional Derivatives and gradients, Optimization.
- Chapter 12: Multiple Integrals: Double Integrals, Iterated Integrals, Surface Area, Triple Integrals, Change of Variables in Multiple integrals, Applications.
- Chapter 13: Vector Fields: Line Integrals, Green's Theorem, Curl and Divergence, Surface Integrals, Stoke's Theorem and Divergence Theorem.

## Course Objectives:

- To communicate problem solutions and techniques of multivariable calculus in clear and well-organized written form, including the proper use of notation.
- To provide convincing arguments to show that your solutions are correct.
- To be able to argue your solutions using multiple routes of explanation (e.g., numerically, graphically, verbally, algebraically).
- To learn to communicate mathematically. This includes reading mathematics (by reading your textbook), speaking mathematics (by working in groups and discussing math with your classmates and myself) and writing mathematics (writing clear solutions to problem sets).
- To understand the concepts of the course well enough to explain them to a younger sibling.
- To be able to use calculus to solve applied problems.
- To improve your abilities to solve problems that require several steps.

**Expectations/attendance:** This course will make use of in-class group work and collaborative learning, and so you are expected to attend every class session and participate in group and class discussions. You are expected to read the text and work on the assigned exercises outside of class on a regular basis. The pace of this class will be fast, and the material is very sequential; if you do not keep up, you will be lost. If you are absent from class, you are responsible for the material covered. Arrange to copy another student's notes and be informed of any announcements made during class. As a rule of thumb, you should expect to spend 8 hours a week studying for this course.

**Homework Exercises.** Exercises from the text will be assigned on a daily basis for you to practice on. Success in the course requires that you work on these homework exercises, as actually "doing" mathematics is the only way to understand mathematics. The assigned exercises will not be collected or graded, but they will be the primary model I use to write the exams.

**Problem Sets.** Graded problem sets will be due roughly every 2 weeks. You are encouraged to work in groups on the problem sets; however each student must submit only their own work. No late problem sets will be accepted.

**Computer Lab Projects.** UWO has a full site license for the Computer Algebra System **Maple**. This software can be accessed using any PC or Mac at any computer lab on campus. I will use Maple during in-class demonstrations, and we will hold class in the computer lab several times throughout the semester. Computer lab projects will be due roughly every 3 weeks. You are encouraged to work in groups on the computer lab projects; however each student must submit only their own work. No late computer lab projects will be accepted.

**Exams:** There will be 3 midterm exams given. Coverage will be announced in class prior to each exam. There will be a final exam during our last class period. This exam will be comprehensive. All exams are in-class and closed book and closed notes. NO make-ups for exams will be given unless I have agreed to give you one before the scheduled exam time.

**Grading:** The graded Problem Sets and Computer Lab Assignments will comprise 20% of your grade. The exams (3 midterms and a final exam) will each count as 20% of your grade.

To calculate your grade at any point in the term, use the scale below:

A	90-100%	AB	86-89%	B	80-85%	BC	76-79%
C	70-75%	CD	66-69%	D	60-65%	F	0-59%

The grading scale I use at the end of the term most likely will not vary from the above scale, and will be no more strict. Grades are based on performance, not need.

**Dropping / Incompletes** According to the Student Bulletin, the primary responsibility of dropping a class resides with the student. March 19 is the last day to withdraw from the course. A student wanting to drop a course after that deadline may appeal with a REQUEST FOR LATE DROP FORM describing relevant extenuating circumstances beyond the student's control. According to the Student Bulletin, an Incomplete grade can be assigned only when a student is unable to complete the course work because of illness, injury, or other extenuating circumstances beyond the student's control.

**Academic Misconduct:** Any form of academic misconduct including cheating on a quiz or exam, or in any way seeking to claim credit for the work or efforts of another person will be dealt with in accordance with system policy UWS 14, as referred to in the UW Oshkosh Student Discipline code. (<http://www.tts.uwosh.edu/dean/studentdisciplinecode.html>) Penalties that may be imposed include a failing grade for the course, disciplinary probation, and expulsion from the university.

#### **Suggestions:**

- Mathematics is not a spectator sport! You must get in the game and try it yourself. Even if you understand what is going on in class, you will not be successful on the exams unless you practice on the homework problems. You are encouraged to work in groups on your homework. Being able to communicate mathematically with others is a great way to understand mathematics. If your group is having difficulty with the homework, come to me for help. Class participation is crucial to success in a math class. Please feel free to ask questions and answer questions.
- The pace of this class will be fast. Do not fall behind. To be successful in mathematics requires a consistent effort. Do not work in spurts or just cram before the exams. Don't wait until you have fallen behind to seek help from me. This course will contain new and difficult ideas and it is always worthwhile to discuss homework or issues you have with the course with me. I interpret such consultation as a sign of strength and interest.
- In this class I will expect you to know *why* as well as *how*. Think about the fundamental ideas and why the techniques work as well as how to apply them. Each exam will contain problems unlike those you have done before, but understanding the ideas will enable you to do all the problems.
- Read the text book! Often you will have to read the same section two or three times to understand all of what is being discussed. Don't simply use the text as a source of examples and exercises. Actually reading the text will help you understand the main ideas of the course and help your ability to communicate mathematically and solve problems.
- Between each class and the next, review your notes and work the assigned exercises. It is very important to do these exercises. We will go over questions from these exercises in class, but you will benefit most by working on the problems before we give away their solutions in class.
- Plan to spend at least eight hours per week outside of class studying calculus.