



UMass Global in partnership with Westcott Courses

Course content approved by University of Massachusetts Global.

Course Title: Calculus III  
Course Code: MATU 117  
Credits: 4  
Credit Provider: UMass Global  
Proctored Final: Yes

## Textbook Requirement

Free Digital Textbook by OpenStax by Rice University! The textbook needed for this course is free.

Textbook link: <https://openstax.org/details/books/calculus-volume-3>

## Course Description

Presents a study of differentiation and integration of functions of several variables, parametric curves and surfaces, and the calculus of vector fields. Topics are inclusive of, but not limited to, multivariable vector functions, partial derivatives, directional derivatives, surfaces and hyper surfaces, parametric equations, multiple integrals using several different coordinate systems, line integrals, Green's Theorem, the Divergence Theorem and Stokes Theorem.

### Prerequisite:

[High School AP Calculus BC] or Calculus II or a higher level calculus course. The course must be taken from a U.S. regionally accredited college within the last 10 years and received a C or better.

### Approvals for this Course

none

## Learning Outcomes

At the conclusion of this course, students should be able to:

1. Understand vector algebra and elementary differential vector calculus.
2. Perform and interpret geometrically partial differentiation and directional derivatives.
3. Find tangent planes and solve minimum/maximum problems with and without constraints.
4. Perform and interpret geometrically multiple integration using multiple coordinate systems.
5. Work with vector fields and vector integral theorems.

- Demonstrate real-world problem solving skills. Analyze the problem and break it into parts, recognize the concepts applicable to the parts, recognize the relationship between the parts, write the concepts in proper algebraic representations, solve the problem in symbols, interpret the final results.

## Methods Of Evaluation

Homework Quizzes 15%

Chapter Tests 60%

Final Exam 25%

Students must complete all coursework before they take the Proctored Final Exam.

(You must get at least 60% on this final in order to pass the class with a C or better.)

### Proctored Final: 25%

This course goes towards a 4-year degree; thus, it requires a proctored final.

Students are responsible for proctoring fees.

We have an approved online proctor service that students can use if they have a web camera with their computer. This can be a laptop with a built in camera or a desktop with a web cam. This service charges \$60 for group sessions and double for private sessions. A student can also be proctored at college testing center, Sylvan Learning Center, Prometric Testing center, or Pearson Vue Testing Center. No other options are available.

A valid driver's license or State ID must be shown at the testing center. An expired license or State ID will not be accepted. Use this link to help you find a college testing center or Sylvan Learning center near your home:

Proctored Final

The final exam is a comprehensive final covering all of the chapters of the course. Other than scratch paper, you may view the "Authorized Materials" list for the final exam for each class.

\*Students must obtain a 60%

or better on the final exam in order to get a C or better in the class.

The 60% rule was set in place to protect the integrity of online education by requiring a display of competency in exchange for a grade. All schools which are regionally accredited adhere to online standards. Your college is accepting this course because it goes through a regionally accredited university, which tells your college that standards have been met. Your college will not accept a class from a school that is not regionally accredited, because they know the standards won't be met.

## Assessment

A 90-100 A Clearly stands out as excellent performance and, exhibits mastery of learning outcomes.

B 80-89 B Grasps subject matter at a level considered to be good to very good, and exhibits partial mastery of learning outcomes.

C 70-79 C Demonstrates a satisfactory comprehension of the subject matter, and exhibits sufficient understanding and skills to progress in continued sequential learning.

D 60-69 D Quality and quantity of work is below average and exhibits only partial understanding and skills to progress in continued sequential learning.

F 0-59 F Quality and quantity of work is below average and not sufficient to progress.

## **Instructional Process**

In this course we will explore mathematical concepts, methods and applications from life issues, business and finance, social and environmental issues. Civic and social issues will be used as problems to apply the subject principles. Using the civic, social, and life related examples will help students understand the subject at a deeper level. After an introduction in each section, problems will be solved that start with the easiest examples and move slowly to the more advanced problems with Student Interactive Problems (SIP) in between. The SIPs are important! They give you a chance to slow down and make sure you understand the material. If you get the problem correct, continue on with the next example. If you get the problem wrong, you will be taken to a page that works out the problem in detail. The SIPs play a large part in storing the topics along with their procedures into your long-term memory. Each homework set contains applications for that lesson. These real life applications create a better understanding of math in our world and how it applies to every day life.

## **Content Menu**

## Chapter 1 - Conic Section Review

|                          |     |     |
|--------------------------|-----|-----|
| 1.1 Conic Section Review | 1.1 | 1.1 |
| Chapter 1 Test           |     |     |

## Chapter 2 - Vectors in the Plane

|  |     |     |
|--|-----|-----|
| 2.1 Vectors in the Plane                   | 2.1 | 2.1 |
| 2.2 Vectors in Three Dimensions            | 2.2 | 2.2 |
| 2.3 The Dot Product                        | 2.3 | 2.3 |
| 2.4 The Cross Product                      | 2.4 | 2.4 |
| 2.5 Equations of Lines and Planes in Space | 2.5 | 2.5 |
| 2.6 Quadric Surfaces                       | 2.6 | 2.6 |
| 2.7 Cylindrical and Spherical Coordinates  | 2.7 | 2.7 |
| Chapter 2 Test                             |     |     |

## Chapter 3 - Vector-Valued Functions

|  |     |     |
|--|-----|-----|
| 3.1 Vector-Valued Functions and Space Curves | 3.1 | 3.1 |
| 3.2 Calculus of Vector-Valued Functions      | 3.2 | 3.2 |
| 3.3 Arc Length and Curvature                 | 3.3 | 3.3 |
| 3.4 Motion in Space                          | 3.4 | 3.4 |
| Chapter 3 Test                               |     |     |

## Chapter 4 - Differentiation of Functions of Several Variables

|                                    |     |     |
|------------------------------------|-----|-----|
| 4.1 Functions of Several Variables | 4.1 | 4.1 |
| 4.2 Limits and Continuity          | 4.2 | 4.2 |

|   |     |     |
|---|-----|-----|
| 4.3 Partial Derivatives                       | 4.3 | 4.3 |
| 4.4 Tangents Planes and Linear Approximations | 4.4 | 4.4 |
| 4.5 The Chain Rule                            | 4.5 | 4.5 |
| 4.6 Directional Derivatives and the Gradient  | 4.6 | 4.6 |
| 4.7 Maxima/Minima Problems                    | 4.7 | 4.7 |
| 4.8 Lagrange Multipliers                      | 4.8 | 4.8 |
| Chapter 4 Test                                |     |     |

## Chapter 5 - Multiple Integration

|   |     |     |
|---|-----|-----|
| 5.1 Double Integrals over Rectangular Regions                 | 5.1 | 5.1 |
| 5.2 Double Integrals over General Regions                     | 5.2 | 5.2 |
| 5.3 Double Integrals in Polar Coordinates                     | 5.3 | 5.3 |
| 5.4 Triple Integrals  | 5.4 | 5.4 |
| 5.5 Triple Integrals in Cylindrical and Spherical Coordinates | 5.5 | 5.5 |
| 5.7 Change of Variables in Multiple Integrals                 | 5.7 | 5.7 |
| Chapter 5 Test  |     |     |

## Chapter 6 - Vector Calculus

|                                |     |     |
|--------------------------------|-----|-----|
| 6.1 Vector Fields              | 6.1 | 6.1 |
| 6.2 Line Integrals             | 6.2 | 6.2 |
| 6.3 Conservative Vector Fields | 6.3 | 6.3 |
| 6.4 Green's Theorem            | 6.4 | 6.4 |
| 6.5 Divergence and Curl        | 6.5 | 6.5 |
| 6.6 Surface Integrals          | 6.6 | 6.6 |
| 6.7 Stokes' Theorem            | 6.7 | 6.7 |
| 6.8 The Divergence Theorem     | 6.8 | 6.8 |
| Chapter 6 Test                 |     |     |

## Course Content Menu

This course is online and your participation at home is imperative. A minimum of 8 - 10 hours per week of study time is required for covering all of the online material to achieve a passing grade. You must set up a regular study schedule. You have five months of access to your online account with a thirty-day extension at the end if needed. If you do not complete the course within this time line, you will need to enroll in a second term.

## Schedule

Below is the suggested time table to follow to stay on a 16 week schedule for the course. The following schedule is the minimum number of sections that need to be completed each week if you would like to finish in a regular semester time frame. You do not have to adhere to this schedule. You have five months of access plus a 30 day extension at the end if needed. You can finish the course as soon as you are able, with a minimum coursework time of at least four weeks.

| Week | Complete Sections |
|------|-------------------|
| 1    | 1.1 - 2.1         |
| 2    | 2.2 - 2.3         |
| 3    | 2.4 - 2.5         |
| 4    | 2.6 - 2.7         |
| 5    | 3.1 - 3.2         |
| 6    | 3.3 - 3.4         |
| 7    | 4.1 - 4.2         |
| 8    | 4.3 - 4.4         |
| 9    | 4.5 - 4.6         |
| 10   | 4.7 - 4.8         |
| 11   | 5.1 - 5.2         |
| 12   | 5.3 - 5.5         |
| 13   | 5.6 - 5.7         |
| 14   | 6.1 - 6.2         |
| 15   | 6.3 - 6.4         |

|            |           |
|------------|-----------|
| 16         | 6.5 - 6.6 |
| Final Exam |           |

## Code of Conduct:

It is the student's responsibility and duty to read the information below and become acquainted with all provisions of what constitutes academic misconduct involving cheating and plagiarism. Students are required to read each statement below, and the given repercussion. There are no exceptions to these policies, and the pretext of not reading each part will not be deemed as a reasonable excuse to contest the policies.

### Code of Ethics:

Regulations and rules are necessary to implement for classroom as well as online course behavior. Students are expected to practice honesty, integrity and respect at all times. It is the student's responsibility and duty to become acquainted with all provisions of the code below and what constitutes misconduct.

### Respectful communications:

When contacting Westcott Courses, you agree to be considerate and respectful. Communications from a student which are considered by our staff to be rude, insulting, disrespectful, harassing, or bullying via telephone, email, or otherwise will be considered a disrespectful communication and will result in a formal warning.

We reserve the right to refuse service. If we receive multiple disrespectful communications from person(s) representing the student, or the student themselves, the student will be excluded from taking future courses at Westcott Courses.

### Grading information and proctored final policies:

The grading rules are put in place to protect the integrity of online education by stopping grade inflation, which is done by demanding a display of competency in exchange for a grade. By agreeing to the terms of service agreement, you agree to read the 'Grading' Policy from within your account, and the 'Proctored Final Information' page, if applicable. You have 24 hours after your first log-in to notify us if you do not agree to the grading policy and proctored final policy ( if applicable ) outlined in the pages inside of your account, otherwise it is assumed that you agree with the policies. There are no exceptions to these policies, and the pretext of not reading the pages will not be deemed as a reasonable excuse to contest the policies.

The definition of academic cheating is an act of dishonesty in order to obtain a higher grade in the course, and to gain an advantage over other students in the course.

To maintain academic standards, students are expected to practice honesty, integrity and respect at all times. Students who violate the policies of cheating, plagiarizing, or other academic misconduct will result in following actions.

1) Cheating in any way on the final exam results in an F on the final and an F in the class.

This includes, but is not limited to any form of collaboration, use of unauthorized materials, receiving or providing unpermitted assistance on the exam, using outside digital assistance such as a cell phone, tablet, ETC. to communicate with others or access outside websites, having someone else take the exam for you, taking an exam for another student, failing to stop working on the exam when the time is up.

Final exams are secure tests and the intellectual property of Westcott Courses. Taking screen shots of a digital final or copying a paper test is stealing our intellectual property and cheating. It is equivalent to stealing a copy of the final exam off an instructor's desk. When one student obtains the questions on a final, it means that other students who don't have the questions on the final are at a disadvantage. Once a final exam has been compromised it is no longer secure, and the exam is unfair for those who have not performed an act of dishonesty to gain the advantage.

Each of the infractions above represents a result of performing an act of dishonesty in order to obtain a higher grade in the course, and to gain an advantage over other students in the course. The result of any of the above offenses is an F in the course. Students who violate the above policy may retake the course after a first offense; however, a second offense will result in expulsion and students will no longer be able to take other courses at Westcott Courses.

Students are responsible for clicking on the "Proctored Final Information" link (which is on student's Main Menu), and reviewing the list of Authorized Materials for each course's final exam. Since each course is different, the "Authorized Materials" for each final is different. For example, some courses permit notes, while others do not.

2) Plagiarism: All of the following are considered plagiarism, and will result in a zero on the plagiarized assignment, and there are no opportunities to redo the assignment.

Merriam-Webster defines plagiarism as "the act of using another person's words or ideas without giving credit to that person"

Plagiarism includes, but is not limited to:

- \* having somebody else write your assignment for you
- \* turning in an assignment that contains work that is not your own
- \* changing words in phrases, sentences and/or blocks of text without giving credit to the source (paraphrase)
- \* copying ideas, phrases, sentences or entire blocks of text without giving credit to the source
- \* not crediting the correct source by providing incorrect information

Plagiarism is an act of fraud, and can usually be avoided by using quotation marks and citing the source of the material. Instructors apply plagiarism software to find assignments that contain plagiarized material.

Again, assignments that contain one of the above infractions will receive a zero on the assignment and the student will not have the opportunity to redo the assignment.

It is important to note that saving all your assignments to the end of the course, and then turning in multiple assignments that have been plagiarized will result in zeros on all of those assignments. This may mean that you no longer have enough points in the course to pass the class. Thus, turning in assignments one at a time and waiting for instructor feedback in-between is important for learning and making sure that you maximize your possible points.

If you have questions, please read more information about plagiarism at [plagiarism.org](http://plagiarism.org), or ask your instructor.

**Other Examples of Academic Misconduct:**

- 1) Other forms of cheating include altering an exam and submitting it for regarding, providing false excuses to postpone due dates, fabricating data or references, claiming that Westcott Courses lost your test and/or quiz scores, sending emails to Westcott claiming you did not know what you were doing was cheating.
- 2) Unauthorized collaboration - working with others on graded course work without specific permission of the instructor, including homework assignments, programs, quizzes and tests.
- 3) Copying Westcott Courses content and posting it on the internet. This includes assignments, quizzes, and tests.

By signing up for a course, you are legally signing a contract that states that the person who is named taking this course is the actual individual doing the course work and all examinations. You also agree that for courses that require proctored testing, that your final will be taken at a college testing center, a Sylvan Learning center, or at home using the online proctor. Also, the individual signed up for this course will be the one taking the test. Failure to do so will be considered a breach of Westcott Courses policies.

**Important Notes:**

This syllabus is subject to change and / or revision during the academic year. Students with documented learning disabilities should notify our office upon enrollment, as well as make sure we let the testing center know extended time is permitted. Valid documentation involves educational testing and a diagnosis from a college, licensed clinical psychologist or psychiatrist.