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Course Number, Title and Credits

MATU 117 - Calculus III - 4 credits

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 hypersurfaces, parametric equations, multiple integrals using several different coordinate systems, line integrals, Green's Theorem, the Divergence Theorem and Stokes Theorem.

Prerequisite: MATU 115 Calculus I and MATU 116 Calculus II

Course Learning Outcomes

1. Assess the continuity and differentiability of a given function.
2. Evaluate limits, derivatives, or integrals by using appropriate techniques.
3. Analyze the relationship between the integral of a function and the related area using integrals and the Fundamental Theorem of Calculus.
4. Analyze the relationship between a function’s equation and its graph using limits and derivatives.
5. Apply differentiation techniques to model and solve real world problems.

Required Textbooks

Ron Larson, Calculus, 10th Edition, ISBN: 1285057090, Cengage

Letter Grade/Percentage Equivalents

Grades are determined on a straight-scale basis using the following scales.

A	94%-100%	A-	90%-93%	B+	87%-89%
B	84%-86%	B-	80%-83%	C+	77%-79%
C	74%-76%	C-	70%-73%	D+	67%-69%
D	64%-66%	D-	60% - 63%	F	59% and below

Methods of Evaluation for Determining Grades

Assignment Detail for Course:

Assignments	**Possible Points**
Homework	150
Quizzes (Top 8 out of 9)	200
Exams	400
Final Exam	250
Total Points Possible in Course	**1000**

Course Outline:

Module	**Topics & Assignments**
Module 1	• 11.1. Vectors in the Plane • 11.2. Space Coordinates and Vectors in Space • 11.3. The Dot Product of Two Vectors • **Homework 1** • **Quiz 1**
Module 2	• 11.4. The Cross Product of Two Vectors in Space • 11.5. Lines and Planes in Space • 11.6. Surfaces in Space • 11.7. Cylindrical and Spherical Coordinates • **Homework 2** • **Quiz 2**
Module 3	• 12.1. Vector-Valued Functions • 12.2. Differentiation and Integration of Vector-Valued Functions • 12.3. Velocity and Acceleration • **Homework 3** • **Quiz 3**

Module 4	• 12.4. Tangent Vectors and Normal Vectors • 12.5. Arc Length and Curvature • 13.1. Introduction to Functions of Several Variables • **Homework 4** • **Quiz 4** • **Exam 1**
Module 5	• 13.2. Limits and Continuity • 13.3. Partial Derivatives • 13.4. Differentials • 13.5. Chain Rules for Functions of Several Variables • **Homework 5** • **Quiz 5**
Module 6	• 13.6. Directional Derivatives and Gradients • 13.7. Tangent Planes and Normal Lines • 13.8. Extrema of Functions of Two Variables • 13.9. Applications of Extrema • **Homework 6** • **Quiz 6**
Module 7	• 14.1. Iterated Integrals and Area in the Plane • 14.2. Double Integrals and Volume • 14.3. Change of Variables: Polar Coordinates • **Homework 7** • **Quiz 7**
Module 8	• 14.5. Surface Area • 14.6. Triple Integrals and Applications • 14.7. Triple Integrals in Other Coordinates • **Homework 8** • **Quiz 8** • **Exam 2**
Module 9	• 15.1. Vector Fields • 15.2. Line Integrals • 15.3. Conservative Vector Fields and Independence of Path • 15.4. Green's Theorem • **Homework 9** • **Quiz 9** • **Final Exam**

Academic Integrity

The University of Massachusetts Global is an academic community based on the principles of honesty, trust, fairness, respect and responsibility. Academic integrity is a core University value, which ensures respect for the academic reputation of the University, its students, faculty and staff, and the degrees it confers. The University expects that students will conduct themselves in an honest and ethical manner

and respect the intellectual work of others.

Submitting to faculty work completed by the use of any artificial intelligence tool without permission and/or when prohibited by class policy. When faculty require the use of technology, including artificial intelligence, as a part of an assignment for the course, there is no violation. Students are reminded to consult syllabi, assignment sheets/rubrics, program documents and their faculty. Use of artificial intelligence, when permitted, must be correctly cited in the assignment.

The UMass Global online library provides resources to support research, proper citation styles, and the safe and responsible use of generative artificial intelligence or Gen AI.

- The Academic Integrity and Plagiarism Avoidance page provides guidance to help students better understand academic integrity and includes tips on how to avoid plagiarism.
- The Citing Sources page offers guidance on how to properly cite using APA, MLA, and Chicago styles.
- The Artificial Intelligence Resource Guide for Students provides advice for understanding and appropriately using generative artificial intelligence tools such as ChatGPT and Bard.

UMass Global's Office of Accessible Education

Students who require disability-related services or accommodations to access their educational experience can register with the Office of Accessible Education (OAE). The Office of Accessible Education (OAE) is committed to ensuring equal educational access and opportunity for all members of our academic community. Students will be provided equitable and reasonable accommodations and services that are in compliance with Section 504 of the Federal Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 (ADA)/Americans with Disabilities Act Amendments Act of 2008 (ADAA). Registration with OAE is on a voluntary, self-identifying basis. Please visit the Office of Accessible Education (OAE) website for more information about how to register for services, eligibility requirements, and information about potential academic accommodations and services.

Our university is committed to ensuring equal access for all students. Let us know about any accessibility barriers you encounter using any of our online systems or websites by submitting a Feedback or Accessibility Concern Submission Form. We'll do our best to improve things and get you the information you need.

UMass Global’s CARES Team

The CARES team is a campus-wide team of appointed staff and faculty responsible for identifying, assessing, and responding to concerns and/or disruptive behaviors by students, faculty/staff, and community members who struggle academically, emotionally, or psychologically, or who present a risk to the health or safety of the university or its members.

Individuals may refer themselves or other community members of concern by emailing

cares@umassglobal.edu or by filling out a referral form here. The CARES Team provides short term assessment, intervention, support, and recommendations of resources to those referred and engaged in the process.

UMass Global's Title IX Statement

The University of Massachusetts Global strives to maintain and foster a climate that promotes respect and human dignity. Sexual misconduct and relationship violence in any form is antithetical to the university's mission and core values, violates university policies, and may also violate federal and state law. The office of Title IX is primarily concerned for students' safety and well-being and is tasked with investigating all reports of sexual misconduct experienced by our community members. Title IX prohibits sex-based and gender-based discrimination and harassment, which includes discrimination based on pregnancy and/or pregnancy-related complications, parental status, and marital status. Students expecting or experiencing pregnancy-related complications, that may require educational accommodations, should contact the University's Title IX Coordinator and/or the Office of Accessible Education.

The University and Title IX's prohibition of sex discrimination also covers sexual harassment, sexual violence, and any other form of sexual misconduct. We offer options and resources to all students affected by these issues and are committed to providing a fair, thorough, and prompt investigation and adjudication process. If you or someone you know has been impacted by sexual assault, dating, and domestic violence, stalking, or sexual exploitation, please visit the University's Title IX Resource Page to access additional resources and information.

UMass Global's staff and faculty are tasked with reporting any possible sex or gender-based discrimination or Title IX violations to the University's Title IX Coordinator at civilrightscomplaints@umassglobal.edu.

Click on this Link to our University Title IX Policy