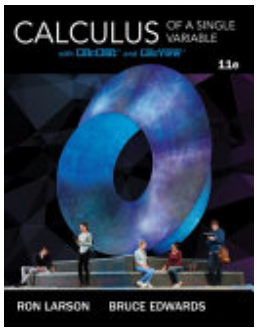
Course Number and Name: MAT 271 Section Name - *Unified Calculus III*
Term Dates: Section Start Date - Section End Date
Meeting Location: Section Meeting Building Section Meeting Room
Meeting Days & Times: Section Meeting Days; Section Start Time - Section End Time
Lecture/Lab Hours: 4.00 Lecture Hours
Credits: 4.00
Prerequisite(s): ENG-097; MAT-172
Corequisite(s): Course Coreqs
Course Description: This course provides additional topics in calculus and analytic geometry. Topics include indeterminate forms, vector functions and calculus, functions of several variables, multiple integrals, partial derivatives, directional derivatives, divergence, curl, line integrals, and Green's Theorem.

Course Learning Outcomes

Upon successful completion of this course, students will be able to:

1. Understand how vectors are used in mathematics, science, and engineering demonstrated by accurate identifications, computations, and applications.
2. Understand how the calculus of vector-valued functions streamlines the study of multidimensional calculus demonstrated by accurate notations, differentiating, integrating, and applications.
3. Use functions of more than one variable to study multidimensional problems demonstrated by accurate notations, identifications, computations, and applications.
4. Apply multiple integrals to find areas, volumes, mass, moments, and center of mass.
5. Know the definition of vector fields and apply them in relation to line integrals.

Course Materials



Calculus of a Single Variable - Included in Cengage Unlimited
Authors: Ron Larson, Bruce H. Edwards
Publisher: Cengage Learning
Publication Date: 2016-12-05

Grading

Letter Grade	Percentage
A	90-100
B+	87-89
B	80-86
C+	77-79
C	70-76
D+	67-69
D	60-66
F	< 60

Class Schedule

CLASS WEEKS	TOPICS	Learning Activity

CLASS WEEKS	TOPICS	Learning Activity
2.5	Chapter 11: Vectors and the Geometry of Space Vectors in the Plane Space Coordinates and Vectors in Space The Dot Product of Two Vectors The Cross Product of Two Vectors Lines and Planes in Space Surfaces in Space Cylindrical and Spherical Coordinates	Mix of the following as appropriate: • Lecture • Class Discussion • Essays • Student Practice • Group Work • Homework – textbook/software
2.5	Chapter 12: Vector-Valued Functions Differentiation and Integration of Vector-Valued Functions Velocity and Acceleration Tangent Vectors and Normal Vectors Arc Length and Curvature	Mix of the following as appropriate: • Lecture • Class Discussion • Essays • Student Practice • Group Work • Homework – textbook/software
3	Chapter 13: Functions of Several Variables Limits and Continuity Partial Derivatives Differentials Chain Rules for Functions of Several Variables Directional Derivatives and Gradients Tangent Planes and Normal Lines Extrema of Functions of Several Variables Lagrange Multipliers	Mix of the following as appropriate: • Lecture • Class Discussion • Essays • Student Practice • Group Work • Homework – textbook/software

3	Chapter 14: Multiple Integration Iterated Integrals and Area in the Plane Double Integrals and Volume Change of Variables: Polar Coordinates Center of Mass and Moments of Inertia Surface Area Triple Integrals and Operations Triple Integrals in Cylindrical and Spherical Coordinates	Mix of the following as appropriate: • Lecture • Class Discussion • Essays • Student Practice • Group Work • Homework – textbook/software
2	Chapter 15: Vector Analysis Vector Fields Line Integrals Conservative Vector Fields and Independence of Path Green's Theorem	Mix of the following as appropriate: • Lecture • Class Discussion • Essays • Student Practice • Group Work • Homework – textbook/software
2	Testing (Including Final)	

Experiential Learning

Students must complete an experiential learning activity that connects course content to career applications. This activity may be a content specific assignment or practical skill that is applied within a course assignment. This assignment supports the general education learning outcomes of scientific/critical thinking and quantitative reasoning; oral and written communication; and information literacy/technological competency.

Academic Policies

See College Catalog for more information: http://onlinecatalog.ucc.edu/content.php?catoid=10&navoid=2858

Americans with Disabilities Act (ADA)

Union College offers reasonable accommodations and/or services to persons with disabilities. Any student who has a documented disability and wishes to self-identify should contact the Coordinator of Disability Support Services at (908) 709-7164, or email disabilitysvc@ucc.edu. Accommodations are individualized and in accordance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1992. In order to receive accommodations, students must be registered with Disability Support Services. Students should register with the office as soon as possible. Accommodations are not official until the Faculty Accommodations Alert Form(s) are issued from the student to his/her instructor(s).

Family Educational Rights and Privacy Act (FERPA)

The FERPA Statement can be found at https://www.ucc.edu/admissions/the-family-education-rights-and-privacy-act/.

Equal Opportunity Statement

Union College does not discriminate and prohibits discrimination, as required by state and/or federal law, in all programs and activities, including employment and access to its career and technical programs.

Union College Mission Statement

Transforming Our Community. . . One Student at a Time

Suggested Teaching Methodologies

1. Material is presented in a lecture format (videos are available for online sections but may be used for campus sections as well)
2. It is recommended that some time be set aside for problem solving in teams or independently

Mapping Course Learning Outcomes to Learning Activities and Evaluation Methods

Course Learning Outcomes (CLO's)	Learning Activities	Evaluation Methods
Understand how vectors are used in mathematics, science, and engineering demonstrated by accurate identifications, computations, and applications.	Mix of the following as appropriate: • Lecture • Class Discussion • Student Practice • Group Work • Homework – textbook/software	Written assignments Quizzes & Tests Classroom discussion
Understand how the calculus of vector-valued functions streamlines the study of multidimensional calculus demonstrated by accurate notations, differentiating, integrating, and applications.	Mix of the following as appropriate: • Lecture • Class Discussion • Student Practice • Group Work • Homework – textbook/software	Written assignments Quizzes & Tests Classroom discussion
Use functions of more than one variable to study multidimensional problems demonstrated by accurate notations, identifications, computations, and applications.	Mix of the following as appropriate: • Lecture • Class Discussion • Student Practice • Group Work • Homework – textbook/software	Written assignments Quizzes & Tests Classroom discussion
Apply multiple integrals to find areas, volumes, mass, moments, and center of mass.	Mix of the following as appropriate: • Lecture • Class Discussion • Student Practice • Group Work • Homework – textbook/software	Written assignments Quizzes & Tests Classroom discussion
Know the definition of	Mix of the following as appropriate:	Written assignments

vector fields and apply them in relation to line integrals.	• Lecture • Class Discussion • Student Practice • Group Work • Homework – textbook/software	Quizzes & Tests Classroom discussion

Please note: *all programs must integrate in one or more courses, discipline-specific course learning outcomes that reflect the College learning outcomes of scientific/critical thinking and quantitative reasoning, oral/written communication, and information literacy.*