

Course Name: Math 242 - Multivariable and Vector Calculus (4 credits)
Section Number: Section 02

Which version: Mathematics and Engineering majors: Math 242 is required.
(UMB degrees) Physics majors: Both Math 240 and 242 are accepted, but 242 is recommended.
Mathematics minor: Both Math 240 and 242 are accepted.
Students with credit for Math 240 should enroll in Math 242R (1 credit).

Description: This course is an introduction to the calculus of functions of several variables. It begins with the study of the basic objects of multidimensional geometry: vectors and vector operations, various coordinate systems, and the elementary differential geometry of vector functions and space curves. After that we extend the tools of differential and integral calculus to multidimensional problems. The course continues with line and surface integrals, including various extensions of the Fundamental Theorem of Calculus to multidimensional integrals and applications to vector fields.

Pre-requisites: MATH 141 or an equivalent course on differential and integral calculus of single variable functions (including trigonometric, exponential, and logarithmic).

Schedule: TuTh 11:00am - 12:15pm AND Tu 12:30pm - 1:20pm in W-01-064.
For every hour in class, you should dedicate at least three additional hours studying for this course. Students should not make any travel plans that would require them to leave before May 23, 2015.

Textbook: Lecture notes provided by the instructor.
Recommended supplemental textbook: Multivariable Calculus: Concepts and Contexts, 4th edition, by James Stewart. ISBN-10: 0495560545

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Office hours: By appointment: TuTh 9:30am-10:40am, Tu 2:00pm-3:00pm, and Th 1:00pm-2:00pm in S-03-091. Please use the online form at <http://catazara.youcanbook.me/> to schedule a 10 or 20 minute appointment, at least 3 hours in advance. You can stop by without a confirmed appointment, but I may be unavailable.

Assignments: *Exams:* There will be two in-class exams (currently scheduled for March 3rd and April 7th), plus a cumulative final during the final exam period. Make-up exams will be allowed only with an official excuse. In all other situations, a missed exam will get a score of zero. Calculators will not be allowed on exams.

Quizzes: Each Tuesday, during the discussion session, there will be a 10-minute quiz on the topics covered the previous week. There will be no make-up quizzes, but the lowest two scores will not be counted.

Homework: For each section you will have an online problem set, using WeBWorK: <https://webwork2.umb.edu/webwork2/m242-cz/>. Homework will normally be due each Tuesday evening. Late homework will be penalized. Some homework will consist of group projects.

Grading:	Exam 1: 100 points	A : 90%
	Exam 2: 100 points	B : 80%
	Final exam: 200 points	C : 70%
	Quizzes: 100 points	D : 60%
	Homework: 100 points	

Attendance: Regular class attendance is required and active class participation is expected. Students are responsible for material and announcements missed due to an absence. Please come to class on time and turn off your cell phone before the class begins.

Student conduct: Students are required to adhere to the University Policy on Academic Standards and Cheating, to the University Statement on Plagiarism and the Documentation of Written Work, and to the Code of Student Conduct as delineated in the University Catalog and Student Handbook. The Code is available online:
http://www.umb.edu/life_on_campus/policies/community/code

Special accommodations: Section 504 of the Americans with Disabilities Act of 1990 offers guidelines for curriculum modifications and adaptations for students with documented disabilities. If applicable, students may obtain adaptation recommendations from the Ross Center for Disability Services, Campus Center, UL Room 211, (617-287-7430). The student must present these recommendations and discuss them with each professor within a reasonable period, preferably by the end of Drop/Add period.

Expectations: Students enrolled in this course are expected to be:

- Motivated and disciplined;
- Adequately familiar with background material;
- Committed and actively involved in their own learning;
- Able to work in groups;
- Secure enough to ask for help.

- Goals:** By fully participating in all course activities, students should be able to:
- Understand the fundamental concepts of multivariable and vector calculus;
 - Use multivariable and vector calculus to solve problems;
 - Build and improve portable skills;
 - Appreciate the beauty and power of mathematics.
- Additional help:** Academic Support Programs offers a variety of tutoring and tutorial formats to support students in their undergraduate and graduate coursework. The Math Resource Center offers tutoring in mathematics, computer science, and information technology, either in one-on-one or in group format. More information is available at http://www.umb.edu/academics/vpass/academic_support/tutoring/
- We will be using Piazza for class discussion. Rather than emailing questions to me, I strongly encourage you to post your questions on Piazza. If you have any problems or feedback for the developers, email team@piazza.com. Find our class page at: <https://piazza.com/umb/spring2015/math240242/home>
- Changes:** Any changes or class cancellations will be announced in class or by e-mail or will be posted online. Course materials and announcements are posted on the piazza account: <https://piazza.com/umb/spring2015/math240242>

Tentative course schedule:

Dates	Topics	Discussion	Comments
Jan 27, 29	Rectangular and curvilinear coordinates. Vectors.	Introduction.	
Feb 3, 5	Dot product. Cross product. Lines and planes.	Coordinates.	Add/drop: Feb 2
Feb 10, 12	Vector functions. Calculus of vector functions. Arclength and curvature.	Vectors.	
Feb 17, 19	Functions of Several Variables. Limits and continuity. Partial derivatives.	Vector functions.	
Feb 24, 26	Differentiability. Chain Rule. Directional Derivatives.	Functions of several variables.	
Mar 3, 5	Exam # 1. Optimization.	Directional derivatives.	Exam 1: Mar 3
Mar 10, 12	Implicit functions. Level sets as surfaces. Constrained Optimization.	Optimization.	
Mar 17, 19	Spring Break		
Mar 24, 26	Double Integrals. Iterated Integrals. Triple Integrals.	Constrained optimization.	
Mar 31, Apr 2	Integrals in polar, cylindrical, and spherical coordinates.	Integrals in rectangular coordinates.	
Apr 7, 9	Exam # 2. Generalized coordinates. Integrals in generalized coordinates.	Integrals in curvilinear coordinates.	Exam 2: Apr 7.
Apr 14, 16	Line integrals. Conservative fields. Green's Theorem. Applications of line integrals.	Integrals in generalized coordinates.	
Apr 21, 23	Parametrizations of surfaces. Surface integrals.	Line integrals.	PWF: Apr 22
Apr 28, 30	Divergence Theorem. Orientations.	Surface integrals.	
May 5, 7	Stokes Theorem. Fundamental Theorems.	Divergence Theorem.	
May 12	Review.	Stokes Theorem.	
May 19	Final Exam		