UMass Boston
Department of Mathematics

Semester: Spring 2014

Course Name: Math 242 - Multivariable and Vector Calculus (4 credits)
Math 240 - Multivariable Calculus (3 credits)
Math 242R - Multivariable and Vector Calculus - reduced credit (1 credit)

Section Number: Section 02 (combined section)

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. Math 240 topics end here. Math 242 and 242R continue with line and surface integrals, including various extensions of the Fundamental Theorem of Calculus to multidimensional integrals and applications to vector fields.

Which version: (UMB degrees)
Mathematics and Engineering majors: Math 242 is required.
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).

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, Tu 12:30pm - 1:20pm in W-01-020.
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 25, 2014.

Textbook: Lecture notes provided by the instructor.
Supplemental textbooks (copies are available on reserve in the Healey Library):
Multivariable Calculus, by Jon Rogawski
Multivariable Calculus, by William Briggs and Lyle Cochran.
Multivariable Calculus: Concepts and Contexts, by James Stewart.

Instructor: Catalin Zara, Associate Professor of Mathematics.
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Office hours: By appointment, TuTh 9:30am - 10:30am and 3:30pm - 4:30pm in S-03-091. Please use the online form available 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 not be in my office or available.

Exams: There will be two in-class exams (currently scheduled for March 4 and April 8), 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.

Homework: For each section you will have an online problem set, using WeBWorK.

`https://webwork2.umb.edu/webwork2/m242-cz/`

Repeated late homework will be penalized.

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. If you are repeatedly late or otherwise perturb the learning environment, you will be penalized.

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	

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/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.

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/`

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/spring2014/math240242`

Tentative course schedule:

Dates	Topics	Discussion	Comments
Jan 28, 30	Rectangular and curvilinear coordinates. Vectors.	Introduction.	
Feb 4, 6	Dot product. Cross product. Lines and planes.	Coordinates.	Add/drop: Feb 3
Feb 11, 13	Vector functions. Calculus of vector functions. Arclength and curvature.	Vectors.	
Feb 18, 20	Functions of Several Variables. Limits and continuity. Partial derivatives.	Vector functions.	
Feb 25, 27	Differentiability. Chain Rule. Directional Derivatives.	Functions of several variables.	
Mar 4, 6	Exam # 1. Optimization.	Directional derivatives.	Exam 1: Mar 4
Mar 11, 13	Implicit functions. Level sets as surfaces. Constrained Optimization.	Optimization.	
Mar 18, 20	Spring Break		
Mar 25, 27	Double Integrals. Iterated Integrals. Triple Integrals.	Constrained optimization.	
Apr 1, 3	Integrals in polar, cylindrical, and spherical coordinates.	Integrals in rectangular coordinates.	
Apr 8, 10	Exam # 2. Generalized coordinates. Integrals in generalized coordinates.	Integrals in curvilinear coordinates.	Exam 2: Apr 8; PWF: Apr 10
Apr 15, 17	Line integrals. Conservative fields. Green's Theorem. Applications of line integrals.	Integrals in generalized coordinates.	
Apr 22, 24	Parametrizations of surfaces. Surface integrals.	Line integrals.	
Apr 29, May 1	Divergence Theorem. Orientations.	Surface integrals.	
May 6, 8	Stokes Theorem. Fundamental Theorems.	Divergence Theorem.	
May 13	Review.	Stokes Theorem.	
May xx	Final Exam (Math 240, 242, and 242R)		

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WeBWorK (Online Homework System):
https://webwork2.umb.edu/webwork2/m242-cz/
http://webwork.maa.org/wiki/Category:Students

A Brief Introduction to WeBWorK

1. Go to **https://webwork2.umb.edu/webwork2/m242-cz/**

2. Login using your UMB email username and your UMB student ID as password. If your UMB email is John.Smith001@umb.edu and your UMB student ID is UMS087654321, then your username is john.smith001 and your initial password is ums087654321 (all l**owercase**).

3. Click on the **Password/Email** button (top left corner). Change your password. Type your current email address. Click on **Change User Options**. After receiving the confirmation message(s) in green, click on the **Sets** button (top left corner).

4. Select the first problem set and download a hardcopy (select PDF). You will need the Adobe Acrobat Reader to do this. Open the file and print it. At this point you no longer need to be connected.

5. Work the problems, and when you have the answers (all, or just some of them), reconnect to WeBWorK, with your new password.

6. Click on the first problem set link, then on **Problem 1**. Navigate through the problems, either by clicking on **Next** or directly on the problem numbers on the left. Type your answers in the spaces provided. Be very careful with brackets.

7. Click on **Preview Answers.** If what you see is what you wanted your answer to look like, click **Submit Answers.** If not, correct your input, and preview again, until you get the desired form.

8. After you submit the answer(s) for each problem, WeBWorK tells you which answers are correct / incorrect. You can fix the incorrect answer(s) now, or you can return to this problem later. Your answers are saved, and WeBWorK will remember them when you login later.

9. Click on **Next** to go to the next problem, or on **Prob. List** to see the list of all problems in this problem set, if you want to jump to another problem.

10. When you finish the session, click on **Logout**