

MTH 234-701: Multivariable Calculus

Course Syllabus - Summer A 2018

Instructor:	Joshua Ruiter
Lectures:	Mondays and Thursdays 6-8:30pm, Tuesdays 6-9:15pm
Location:	Birmingham Groves High School
“Office” Hours:	Mondays and Tuesdays 5:30-6pm, Thursdays 8:30-9:30pm
Instructor’s e-mail:	ruiterj2@math.msu.edu
Course Web Page:	To access your class page, go to https://www.math.msu.edu/classpages/ , choose “200-Level Courses”, then your section. The other course web page is D2L.msu.edu, where you can find an electronic copy of this syllabus.

Teaching Philosophy: Learning takes place while doing homework. My role is to prepare you (through lectures) to build understanding while doing homework. You will be best prepared for tests and quizzes by putting significant effort into homework.

Math 234 is about the geometry of curves and surfaces. It is vitally important that you learn to visualize and sketch the curves and surfaces that we study. The ability to draw good pictures of curves and surfaces is much more important (and much more difficult) than evaluating double integrals. For many problems in this course, the first step is to draw a picture.

From past experience, I have found that students want to avoid drawing these pictures, either because it is hard or because they think it is irrelevant. It is hard, but it is not irrelevant. In grading your tests, I will give significant partial credit for an answer with an accurate drawing and correct setup, but with algebra errors in evaluating an integral. If you do not draw a picture and set up the wrong integral, it does not matter if your algebra is accurate.

Required Course Materials

Webwork: <https://www.math.msu.edu/webwork/>

Deadline to pay for webwork: May 25 at 10 a.m.

Textbook: Custom MSU MTH234 Calculus III

<http://services.cengagebrain.com/course/site.html?id=2679085>

Prerequisites and Course Description:

- The prerequisites for the class are MTH 133 or MTH 153H or LB 119.
- Students entering MTH 234 should have a firm grasp on Calculus 1 and 2 including all differentiation and integration techniques, as well as basic algebra operations (e.g. solving quadratic equations).
- In MTH 234 we will be learning about vectors in space, functions of several variables, partial differentiation, multiple integrals, vector fields and finally line and surface integrals. We will use these tools to help us understand and apply some big theorems: Green’s Theorem, Stokes’ Theorem, and the Divergence Theorem. All covered material is relevant for tests and for the final exam.

Course Objectives: Upon completion of this course, the student should be able to do the following.

- visualize and think about objects in 3-dimensional space
- understand the concepts of derivatives and integrals for vector-valued functions and functions of multiple variables
- describe curves and surfaces as vector-valued functions using parametric representations
- understand the concepts of vector fields and calculus of vector fields
- perform calculations based on the concepts and techniques of multivariable calculus

Attendance: You will not be graded on your attendance. However, students are responsible for all of the material covered in class, so it will be very difficult to do well in the course without attending regularly.

Class Expectations:

1. Reviewing lecture notes is considered a part of the homework assignment. It is necessary that you review the notes after each lecture in order to understand the course material in depth in preparation for exams.
2. You are expected to check the class website on a regular basis. This is where homework assignments, supplementary reading materials and class announcements will be posted.
3. You are expected to pay attention and engage your brain during class.
4. You are expected to spend at least 3 hours between each lecture working on your homework, reading the book, lecture notes and supplementary materials.

Homework: You are required to do homework through Webwork. To register for Webwork, go to <https://www.math.msu.edu/webwork/> and follow the instructions.

There is a fee that helps the Mathematics department create, maintain, and develop Webwork. The fee is due on May 25th at 10am, and Webwork can be used for free until then. The fee is non-refundable, so if you drop the class after paying the fee, you will not be refunded. If you are unsure whether or not you will drop the class, use Webwork without paying until a few days before.

If you forget to pay and get dropped from Webwork, go to the Webwork help page and use your MSU Net ID and password. Find the correct section and pay the fee, following the directions on that page. There is a processing time of up to 2 hours after you pay the fee, and your account will be back online after that. The work you have done will be saved.

Always remember that purpose of doing Webwork is to **learn**, not to get points. While Webwork is a part of your grade, the points from a single Webwork problem do not significantly impact your grade, so it is not worth stressing over. I understand how frustrating it is to know you did the problem right, but be off by a small mistake, and get no partial credit from Webwork. If you are confident that you understand the way to solve a problem, and just can't get Webwork to agree, just move on to the next problem.

Quizzes: There will be five 15-minute quizzes. Your lowest quiz score will be dropped, so your quiz score will be the average of your four best quizzes. Quizzes will take place at the beginning of class on the scheduled day. That is, if you miss the first 15 minutes of class on the day of a quiz, you will miss the quiz and there will not be an opportunity to make it up.

Midterm Exams: There will be two 90-minute midterm exams. *Any test missed without an authorized excuse will count as zero.* No notes, books, calculators, or smart devices of any type will be allowed during any quiz, exam, or final.

Final Exam: There will be a 120-minute final exam on the last day of class. *You must take the final exam in order to pass this course.* The university has strict requirements for exceptions; more information can be found here: <http://www.reg.msu.edu/ROInfo/Calendar/FinalExam.aspx>

Make-up Policy: Students who have made travel plans prior to the beginning of the summer session for an exam day and have documentation showing this may request accommodations for missing the exam. However, students must request this from their instructor during the first week of class. After the first week no travel accommodations will be granted.

Make-ups for exams will only be given for medical or emergency absences and only with a written excuse from a doctor or other authorized individual. Such exams are given only in extreme cases that are approved by the instructor as sufficiently convincing and serious.

If you will be absent the day of a quiz, and notify me two full class periods in advance, I will discuss options for making up a quiz. You will need to take the quiz before the scheduled date.

Evaluation: Your course grade will be based on the **maximum score** of the following two calculations:

20% Five quizzes, lowest dropped 10% Webwork Homework 20% Midterm Exam 1 20% Midterm Exam 2 30% Final exam	20% Five quizzes, lowest dropped 10% Webwork Homework 20% Best of 2 Midterm Exams 50% Final Exam
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Final grades will be assigned based on the following table:

4.0 Grade	4.0	3.5	3.0	2.5	2.0	1.5	1.0	0.0
% Grade	[90-100]	[85-90)	[80-85)	[73-80)	[65-73)	[60-65)	[55-60)	[0,55)

There will be no extra credit. Don't even ask. It would be unfair of me to give extra credit or make up opportunities to one student without providing the same opportunity to the whole class.

The best way to improve your grade is to study more and get a few more points on the final exam. A few more points on the final exam is worth much more than an entire assignment on webwork, in terms of final grade calculation.

Important Dates

Class Begins	May 14
Webwork fee due	May 25
Midterm Exam I	May 31
Midterm Exam II	June 21
Final Exam	June 28

Grading Disputes: If you have any questions regarding the grading of an exam or lab, your paper must be handed back to the instructor for re-grading at the end of the class period during which you received it. *Once a graded paper has left the classroom, no grading changes will be made.*

Students with Disabilities: Michigan State University is committed to providing equal opportunity for participation in all programs, services and activities. Requests for accommodations by persons with disabilities may be made by contacting the Resource Center for Persons with Disabilities at 517-884-RCPD or on the web at rcpd.msu.edu. Once your eligibility for an accommodation has been determined, you will be issued a Verified Individual Services Accommodation ("VISA") form. Please present this form to me at the start of the term and/or at least a week prior to the accommodation date (test, project, etc.). Requests received after this date may not be honored.

Academic Honesty: Cheating in any form will not be tolerated and will be reported. You will receive a zero on any assignment in which there is a case of cheating. This includes, but is not limited to, plagiarism, failure to give proper citations, and copying another's work.

If you are preparing an assignment and have a question about whether you are adhering to this policy, please ask your instructor. If you work on an assignment with other students, you must give credit to your collaborators. MSU's policy on academic integrity can be found at the following URL:
<https://www.msu.edu/~ombud/academic-integrity/index.html>.

Mandatory Reporting: If you tell me that you were sexually assaulted, or you heard that someone you know was sexually assaulted, then I am required by university policy to report it to someone. I tell you this not to dissuade you from talking to me about it, but simply to let you know that I am not allowed to keep such things confidential. If you want to talk to someone who will keep it confidential, I recommend talking to someone at the Ombudspersons office. See ombud.msu.edu.

Schedule

We will cover all sections from the textbook on this schedule in this order, though we may get slightly ahead or behind.

Week 1

May 14 Welcome!

Section 12.1: Three Dimensional Coordinate Systems

Section 12.2: Vectors

May 15 *Section 12.3:* The Dot Product

Section 12.4 The Cross Product

Section 12.5: Equations of Lines and Planes

May 17 Quiz 1

Section 12.6 Cylinders and Quadratic Surfaces

Section 13.1: Vector Functions and Space Curves

Week 2

May 21 *Section 13.2:* Derivatives and Integrals of Vector Functions

Section 13.3: Arc Length and Curvature

May 22 *Section 13.4:* Motion in Space: Velocity and Acceleration

Section 14.1: Functions of Several Variables

May 24 Quiz 2

Section 14.2: Limits and Continuity

Section 14.3: Partial Derivatives

Week 3

May 28 Memorial Day - No class

May 29 *Section 14.4:* Tangent Planes and Line Approximations

Section 14.5 The Chain Rule

Section 14.6: Directional Derivatives and the Gradient Vector

May 31 Time for review and questions

Exam 1 *Sections 12.1-14.5*

Week 4

June 4 *Section 14.7* Maximum and Minimum Values

Section 15.2 Iterated Integrals

June 5 Quiz 3

Section 15.3: Double Integrals Over Regions

Section 15.4 Double Integrals in Polar Coordinates

June 7 *Section 15.5:* Applications of Double Integrals

Section 15.7 Triple Integrals

Week 5

June 11 Quiz 4

Section 15.8: Triple Integrals in Cylindrical Coordinates

Section 15.9: Triple Integrals in Spherical Coordinates

June 12 *Section 16.1:* Vector Fields

Section 16.2: Line Integrals

June 14 Quiz 5

Section 16.3: The Fundamental Theorem for Line Integrals

Section 16.4 Green's Theorem

Week 6

June 18 *Section 16.5:* Curl and Divergence

Section 15.6: Surface Area

June 19 *Section 16.6:* Parametric Surfaces and Their Areas

Section 16.7: Surface Integrals

June 21 Time for review and questions

Exam 2: *Sections 14.6-16.6*

Week 7

June 25 *Section 16.8:* Stoke's Theorem

Section 16.9: The Divergence Theorem

June 26 Time for review and questions

June 28 Final Exam

June 29 Opportunity to view final exams, time to be announced later