



# SYLLABUS

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MTH 241 LR Section P (10231)  
College Calculus 3

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Winter Session 2020

SUNY University at Buffalo  
Mathematics Department





# INSTRUCTOR INFORMATION



Michael Casper

## Michael Casper

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Contact



# COURSE INFORMATION

## Prerequisites

1. MTH 142 with recommended grade of C or higher.

## Delivery Mode

This is an online course with in-person exams.

## Required Hardware

1. Textbook – J. Stewart, *Calculus: Early Transcendentals*.
  - The 8th custom UB edition is the official version.
  - The standard 8th edition is also sufficient.
  - The 7th editions (custom UB or standard) are also sufficient.
  - Whichever edition you choose, make sure it contains Chapter 12 – Chapter 16
2. Computer with an up-to-date internet browser.
3. Internet Connectivity: consistent access to high speed internet for the duration of the course.

## Required Software

1. **This Course Website** – This is the main portal for our class. It contains the syllabus and all information regarding lectures and assignments.
2. **UBlearns** – Our course UBlearns page will be used as a place to post announcements, grades, and any other sensitive information while the course is in progress.
3. **Piazza** – The online discussion board for our class. (free)

4. **Zoom** – Video conferencing software for the online recitations. (free)
5. **WeBWork** – The online homework system for our class. It is a free system sponsored by the Mathematical Association of America (MAA) with a server right on campus in the UB Math Department. (free)

## Recommended Software

1. [Geogebra](#) Very nice graphing software. (free)
2. [WolframAlpha](#) Website that provides nice computational and graphical services in a search engine format. (free)
3. [Maple](#), [Mathematica](#), or [Matlab](#) These are heavy duty computational programs (more than we really need) but some of them are free to download as a UB student.

## Course Description

Geometry and vectors of  $n$ -dimensional space; Green's theorem, Gauss theorem, Stokes theorem; multidimensional differentiation and integration; application to 2- and 3-D space. This course is a controlled enrollment (impacted) course. Students who have previously attempted the course and received a grade other than W may repeat the course in the summer or winter; or only in the fall or spring semester with a petition to the College of Arts and Sciences Deans' Office.





# ASSESSMENTS

Your final grade will be determined by your performance on the following assessments: Homework Assignments, the Exam Registration Form, and the two Midterm Exams.

## Homework

On average, there will be approximately 2-4 problem sets assigned for each lecture date.

- They are all due on Thursday, January 23, 2020 at 11:59pm ET.
- Your grade for each individual homework set will be calculated as the percentage of your correct answers in that set. Each individual assignment is worth 100 HW points.
- Your final Homework grade (with a max of 100), will then be calculated by adding up your individual homework set scores (for a max of 3400 HW points) and dividing by 31.
- As a result of this, anyone with 3100 or more HW points will end up with a 100 final Homework grade.

## Exam Registration Form

The exam registration form is how you communicate to the instructor where you will be taking each of your exams. It is extremely important that you fill this out correctly and by the deadline. Please see the [Exam Registration](#) section of the Course Handbook for further instructions on how to complete this form.

- The form is due on Tuesday, January 7, 2020 at 11:59pm ET.
- See the [Exam Registration page](#) for further details on how this will be graded.

## Midterm Exams

There are two paper-based midterm exams given on the dates listed in the [Course Schedule](#). These exams must be taken **in-person** either at UB or an instructor approved off-campus testing center. Please note the exams are not administered online but rather in a paper-based format.

## Allowable Material

For each midterm exam, you are allowed one 8.5"x11" formula sheet (one-side only) handwritten on the instructor-supplied pdf (this will be distributed once the Add/Drop period has ended). No calculators or electronic devices will be allowed. **Make sure you bring a photo ID with you to the proctoring site.**

## Midterm Exam 1

Content: Ch.12 - Ch.14

Date: Wednesday, January 15, 2020

Time: 12pm-3pm ET (it is a 3 hour exam)

Location: To Be Determined (room Fillmore 170 if taken at UB)

## Midterm Exam 2

Content: Ch.15 - Ch.16

Date: Friday, January 24, 2020

Time: 12pm-3pm ET (it is a 3 hour exam)

Location: To Be Determined (room Fillmore 170 if taken at UB)

## Final Exam

There is no cumulative final exam given for this class.





# GRADING

## Your Course Average

Your final average will be found by averaging your grades with the following weights:

Assessment	Weight
Exam Registration Form	2%
Homework	23%
Highest Midterm Exam	45%
Lowest Midterm Exam	30%

## Your Letter Grade

Your final letter grade will be determined from your final average by applying the cutoffs:

Final Average	Letter Grade
93-100%	A
90-93	A-
87-90	B+
83-87	B
80-83	B-
77-80	C+

Final Average	Letter Grade
73-77	C
70-73	C-
65-70	D+
60-65	D
0-60	F

## Incomplete Grades

An incomplete grade (I) will only be given under extraordinary circumstances. Additionally, an incomplete will only be given if you have a passing average on all previously graded work in the course.

## Some Relevant Course Policies

- [Academic Integrity Policy](#)
- [Attendance Policy](#)
- [Exam Registration Policy](#)
- [Exception Policy](#)
- [Late Policy](#)







# SCHEDULE

There are 4 types of dates on our class calendar: Lecture, Exam, Homework, and Administrative.

## Lecture Dates

On each scheduled lecture date (in addition to the assigned material) we will have:

- **Recitation** at 1-1:50pm (Eastern Time)

The lecture dates represent the recommended pacing of the course. You are strongly encouraged to have **all assigned material** completed by the end of that lecture day. This means watch the assigned lecture videos, take notes, read the corresponding section in the text, and complete all assigned homework. Don't forget that you can get started earlier in the week or even on the previous weekend! This way you will be able to take full advantage of that day's scheduled recitation if you have questions.

## Exam Dates

The following are all important dates regarding the exams for this course:

- **Exam Date 0**
  - Tuesday, January 7, 2020 at 11:59pm ET
  - Final deadline for submitting the required Exam Registration Form.
- **Exam Date 1**
  - Wednesday, January 15, 2020 at 12pm-3pm ET
  - Midterm Exam 1 (3 hour exam)
- **Exam Date 2**
  - Friday, January 24, 2020 at 12pm-3pm ET
  - Midterm Exam 2 (3 hour exam)

# Homework Dates

The deadline for **all graded homework** assignments is:

- **HW Date:** Thursday, January 23, 2020 at 11:59pm ET

Even though the homework assignments are all due on this day for grading purposes, you should have each one completed by the end of its assigned lecture date. This way you stay on pace with the material. *You will not have success in this course if you fall behind on the homework.* The extra time you are given here should only be spent tidying up a few loose ends, not for completing entire assignments.

## Administrative Dates

A few other important dates to remember:

- **First Official Day of Classes** - Monday, January 6, 2020
- **Last Day to Drop/Add** - Tuesday, January 7, 2020
- **Last Day to Resign** - Friday, January 17, 2020
- **MLK Jr Day** - Monday, January 20, 2020 - No Class
- **Last Day of Classes** - Friday, January 24, 2020
- **Final Grades Published** - Wednesday, January 29, 2020 by 11:59pm ET





# CALENDAR

## Week 1

Date	Event Type	Description
Jan 6 (Mon)	Lecture Date 1	Sections 12.1, 12.2, 12.3 & Recitation
Jan 7 (Tue)	Lecture Date 2	Sections 12.4, 12.5, 12.6, 13.1 & Recitation
Jan 7 (Tue)	Exam Date 0	Exam Reg Form Due at 11:59pm ET
Jan 8 (Wed)	Lecture Date 3	Sections 13.2, 13.3, 13.4 & Recitation
Jan 9 (Thu)	Lecture Date 4	Sections 14.1, 14.2, 14.3 & Recitation
Jan 10 (Fri)	Lecture Date 5	Sections 14.4, 14.5, 14.6 & Recitation

## Week 2

Date	Event Type	Description
Jan 13 (Mon)	Lecture Date 6	Sections 14.7, 14.8 & Recitation
Jan 14 (Tue)	Lecture Date 7	Sections 15.1, 15.2, 15.3 & Recitation
Jan 15 (Wed)	Exam Date 1	Exam 1 (Lecture Dates 1-6)
Jan 16 (Thu)	Lecture Date 8	Sections 15.4, 15.6, 15.7 & Recitation
Jan 17 (Fri)	Lecture Date 9	Sections 15.8, 16.1, 16.2 & Recitation

# Week 3

Date	Event Type	Description
Jan 21 (Tue)	Lecture Date 10	Sections 16.3, 16.4, 16.5 & Recitation
Jan 22 (Wed)	Lecture Date 11	Sections 16.6, 16.7 & Recitation
Jan 23 (Thu)	Lecture Date 12	Sections 16.8, 16.9 & Recitation
Jan 23 (Thu)	HW Date	All graded homework is due at 11:59pm ET
Jan 24 (Fri)	Exam Date 2	Exam 2 (Lecture Dates 7-12)





# COURSE POLICIES

## Academic Integrity

Students must be familiar with and abide by the university's policies and procedures on [Academic Integrity](#). Any violation of this policy will be pursued to the fullest extent of university policy.

## Attendance Policy

- **Technological Attendance:** We will be using UBeats and UBeats (email) for all official course communications, therefore it is required that you check both of these platforms daily.
- **Lecture Attendance:** You are expected to watch all assigned lecture videos in their entirety by the assigned lecture date. Attendance records will be kept, but will not be used in grade calculations.
- **Recitation and Office Hour Attendance:** Attendance in the recitations and office hours (discussion board) is optional although highly recommended.

## Calculator and Reference Policy

**Calculators:** Use of calculators, cell phones, and any other electronic devices is not allowed during the exams.

**Outside References:** During the exams, you are allowed one 8.5"x11" formula sheet (one-side only) handwritten on the instructor-supplied pdf (this will be distributed once the Add/Drop period has ended). You are not allowed to use any other outside references during the exams.

# Copyright Policy

All course material is protected under applicable copyright law and the academic integrity policy of the university.

- **Unauthorized Distribution:** Reproduction and distribution of material is prohibited without the instructor's consent. Copies may be made for private, individual study, but should not be shared with unauthorized users.
- **Unauthorized Possession:** Possession of any material from previous courses is prohibited.

Any violation of this policy will be pursued to the fullest extent allowable by law and university policy.

# Curve Policy

All grades are calculated as described in the grading section of this syllabus. There is no curve in this course. Homework assignments and exams are designed to assess your individual understanding of the learning outcomes. Your grade is completely within *your control* and based solely on *your performance*.

# Email Policy

It is required that your university (buffalo.edu) email address be used for all official course email correspondence.

While we encourage everyone to ask questions, email should only be used for personal matters. **Any questions related to the course that are not of a personal nature should be asked on the discussion board or during recitation.** Please allow 48 hours during the work week for a response from the instructor. Emails will not be answered over the weekend.

# Exam Date and Time Policy

- **Date:** All exams must be taken on the scheduled exam day.

- **Time:** All exams must be started at the scheduled time.
- **No Exceptions** will be made for either of these policies.

## Exam Location Policy

It is the student's responsibility to find a testing facility, schedule an appointment with this facility, and obtain instructor approval of their arrangements. The testing facility does not need to be the same for every exam.

Every student has two options for where to take each exam :

- **On-campus at UB** - This is included with your tuition.
  - If you are taking an exam at UB, the testing arrangements have already been made for you. However, you still need to fill out the exam registration form.
- **An approved testing facility outside of UB** - The testing site might charge an extra fee.
  - The testing facility must be located in the US or Canada.
  - The testing facility should be in a university or college although alternative locations will be considered on a case-by-case basis. In almost all cases, public libraries and high schools are not acceptable test sites and will not be approved.
  - The testing facility should have a dedicated, unbiased proctor that will be present for the duration of the exam.
  - The testing facility should have a dedicated room, used specifically for proctoring exams.

## Exam Make-up Policy

Due to the shortened schedule, there will not be any make-up exams.

## Exam Registration Policy

Everyone, regardless of where they are taking the exam, needs to complete the exam registration form.

- Failure to complete the exam registration form by the required deadline and subsequently obtain instructor approval of your exam arrangements will result in an “F” in the course.

## Exam Regrade Policy

Any request for an exam regrade must be made within 3 business days of the original exam date.

- This is a complete regrade of the exam, with the possibility that questions originally marked correct might be changed to incorrect (so it is possible that your exam score might go up, stay the same, or be lowered in the process).

## Exception Policy

Requests for exceptions to any policy or grading assessment described in this syllabus will not be granted. This is to ensure that all students are given equal opportunity to succeed in this class and are all graded by the same set of standards.

## Fees

Your chosen testing site might charge you an extra fee for their proctoring services. This fee is the student's responsibility. If you take the exams at UB there is no fee beyond the normal fees charged with your tuition.

## Late Policy

All assignments are due by the posted due date and time. Late submissions will not be accepted; deadlines will not be extended for any reason.

- Do not save homework assignments until the last minute. There might be a slight difference in the server clock time with your local clock time.



Once a problem set closes, it will not be reopened for any reason.

# Office Hour Policy

Participation with the discussion board and office hours in general is optional and will not be graded; although it is highly recommended.

- If you choose to participate in the discussion board it is expected that:
  - You are up-to-date on all lecture material and readings.
  - Your discussion board post follows all correct formatting guidelines.
- You can post questions on the discussion board at any time. However, please be advised that questions will usually be answered during normal business hours (9-5pm). It is our goal to have all questions answered within 24 hours during the work week (but most likely much sooner).

# Recitation Policy

Attendance is optional and will not be graded; although it is highly recommended. If you choose to participate in a recitation it is required that:

- You have both watched and taken notes on the lecture material up through that day.
- You come prepared with your notes and attempted homework solutions readily available.

Please be aware that:

- The instructor reserves the right to check your lecture notes for completion at any time during the recitation. You may be asked to leave if your notes are found to be missing or incomplete.
- Each online recitation will be recorded and posted in the Recitation Archive.





# FURTHER INFORMATION

## Accessibility Resources

If you have any disability which requires reasonable accommodations to enable you to participate in this course, please contact the [Office of Accessibility Resources](#) in 60 Capen Hall, 716-645-2608 and also the instructor of this course during the first week of class. The office will provide you with information and review appropriate arrangements for reasonable accommodations.

## Changes to the Syllabus

This syllabus is subject to amendments as needed. Changes will be announced to the class electronically via email and posted on the course UBlerns page.

## Controlled Enrollment Courses

This is a Controlled Enrollment Course. If you need to repeat this course in the future (because you failed it, resigned from it, etc. at the first attempt) you may be forced to do it in a UB summer or winter session. Registering to repeat this course in a Fall or Spring semester may be difficult or impossible. For more information see the [Repeat Policy in the UB Undergraduate Catalog](#).

## Critical Campus Resources

### Sexual Violence

UB is committed to providing a safe learning environment free of all forms of discrimination and sexual harassment, including sexual assault, domestic and dating violence and stalking. If you have experienced gender-based violence (intimate partner violence, attempted or completed sexual assault, harassment, coercion, stalking, etc.), UB has resources to help. This includes academic accommodations, health and counseling services, housing accommodations, helping with legal protective orders, and assistance with reporting the incident to police or other UB officials if you so choose. Please contact UB's Title IX Coordinator at 716-645-2266 for more information. For confidential assistance, you may also contact a Crisis Services Campus Advocate at 716-796-4399.

## Mental Health

As a student you may experience a range of issues that can cause barriers to learning or reduce your ability to participate in daily activities. These might include strained relationships, anxiety, high levels of stress, alcohol/drug problems, feeling down, health concerns, or unwanted sexual experiences. Counseling, Health Services, and Health Promotion are here to help with these or other issues you may experience. You can learn more about these programs and services by contacting:

- Counseling Services
  - 120 Richmond Quad (North Campus), 716-645-2720
  - 202 Michael Hall (South Campus), 716-829-5800
- Health Services
  - Michael Hall (South Campus), 716-829-3316
- Health Promotion
  - 114 Student Union (North Campus), 716-645-2837

## Portfolio

If you are completing this course as part of your UB Curriculum requirements, please select an 'artifact' from this course that is representative of your learning and upload it to your UBPortfolio account. Templates have been created for this purpose. Artifacts include homework assignments, exams, research papers, projects, lab reports, presentations, and other course materials. Your final UB Curriculum requirement, UBC 399: UB Curriculum Capstone, will require you to submit these 'artifacts' as you process and reflect on your achievement and growth through the UB Curriculum. For more information, see the [UB Curriculum Capstone website](#).



# LEARNING OUTCOMES

## Assessed in HW & Exam #1

1. Understand vectors in two and three dimensional space and their geometric interpretation.
2. Add vectors and multiply vectors by scalars.
3. Compute dot product and cross product of two vectors and understand the properties of these operations.
4. Write equations of lines and planes in the three dimensional space.
5. Classify quadratic surfaces based on their equations.
6. Compute derivatives and integrals of vector functions.
7. Compute arc length and curvature of a space curve described by a vector function.
8. Understand and compute velocity and acceleration of a particle moving in the three dimensional space.
9. Compute limit of a function of several variables at a point.
10. Verify continuity of functions of several variables.
11. Compute partial derivatives of a function of several variables.
12. Apply the chain rule to compute partial derivatives.
13. Compute directional derivatives and the gradient of a function and understand the meaning of these notions.
14. Write an equation of the tangent plane to the graph of a function of two variables and interpret it as a linear approximation of the function.
15. Compute critical points of a function of two variables.
16. Use the second derivative test to classify critical points of a function of two into local minima, local maxima, and saddle points and understand the geometrical interpretation of this classification.
17. Use the method of Lagrange multipliers to solve constrained optimization problems in two and three variables.

## Assessed in HW & Exam #2

1. Compute integrals of functions of two variables over regions of the  $xy$ -plane using cartesian and polar coordinates.
2. Apply double integrals to compute moments and centers of mass of lamina, and to compute surface areas.
3. Compute triple integrals using cartesian, cylindrical, and spherical coordinates.
4. Compute line integrals, directly, using the fundamental theorem for line integrals, and using Green's Theorem.
5. Compute curl and divergence of a vector field.
6. Compute surface integrals, directly, using Stokes' theorem and using the divergence theorem.

## Meta

The following learning outcomes will be assessed in **all Homework, Midterm Exams #1-2**:

