



Minzu University of China
MATH 375 Multivariable Calculus
Summer 2020

Basic Information

Class hours: Monday through Thursday, 2 hours each day
Discussion: Friday, 1 hour (60 minutes)
Review Section: Saturday, 1 hour (60 minutes)
Office Hours: 2 hours (According to professors' teaching plan)
Field Trip: China Science & Technology Museum
Credit: 4
Total contact hours: 60 (50 minutes each)
Instructor: Mingshen Wu

Course Description

Even if Multivariable calculus is a classic course, the contents of this course lay the foundation of advanced math and physics study and research. The main topics are Vector Analysis and Vector Operations; Lines, Planes and Curves in 2-Dimension and 3-Dimension Spaces with Parametric Forms; Polar and Spherical Coordinates; Derivative and Integration on Vector Functions; Vector Fields Analysis Including Gradient, Curl and Divergence; Green's theorem and Stokes' theorem.

Objectives

This course will dynamically guide students move from single variable to multivariable functions. Students will

- Study and understand spaces from 2D to 3D or higher dimension spaces
- Learn the definitions and properties of vector and matrices, and their operations
- Study regular function to vector and matrix functions
- Develop a clear understanding of the fundamental concepts of multivariable calculus
- Be able to work out practical problems with the concepts

Textbook

Calculus Early Transcendentals, 7th Edition, by James Stewart

Prerequisites

Calculus I and II

Course Outline

Week 1	<ul style="list-style-type: none"> ● Review basic integration and differentiation rules and skills ● Dot product and cross product ● Cylinders and quadric surfaces, space curve ● Derivative and integrals of vector functions, arc length
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Week 2	<ul style="list-style-type: none"> ● Velocity and Acceleration, Functions of Several Variables ● Limits and continuity of a multivariable function ● Partial derivatives of multivariable functions ● Tangent planes and linear approximations ● Directional derivatives and gradient
Week 3	<ul style="list-style-type: none"> ● Double integral over rectangles ● Double integral over general regions, polar coordinates ● Surface area ● Triple integration
Week 4	<ul style="list-style-type: none"> ● Triple integrals in Cylindrical and Spherical coordinates ● Vector fields ● Line integral, fundamental theorem for line integrals ● Green's theorem, curl and divergence ● Curl and divergence ● <i>Field Trip: visiting China Science and Technology museum</i>
Week 5	<ul style="list-style-type: none"> ● Surface Integrals ● Stokes' Theorem (Review and final exam)

Field Trip (FT)

Since people had counting numbers mathematics has been developed together with human evolution. The real-world practices challenge mathematicians to do deeper and advanced research. To the contrary, the development of mathematics allows human being to know the universe better and deeper. Mathematics has been applied to all science branched and our daily life. This course will arrange one class meeting time to visit **China Science & Technology Museum** (located at 北京市朝阳区北辰东路5号). Through this activity hope students will elevate the appreciation of mathematics and motivation of learning math well. Students will be requested to write an essay of this experience and share at the discussion time. This activity is of 5% overall credit.

Grading Policy

Instructor will assign homework. Course Teaching Assistant (TA) will lead a discussion section on Friday every week.

Tests: There will be two quizzes (that will be give during week two and week four), a midterm (week three) and a final exam.

Credit distribution:

Attendance 5%; FT 5%; Quizzes 30%; Midterm 30%; Final exam 30% Grading scale: Letter grades will be assigned by the following percentages:

97-100	A+	87-89	B+	77-79	C+	67-69	D+	Below 60	F
94-96	A	84-86	B	74-76	C	64-66	D		
90-93	A-	80-83	B-	70-73	C-	60-63	D-		

A grade of C or above may be considered as CR if taking this course as "Credit/no credit".

Exam Policy

No make-ups for missed quiz/exams by any reason. For legitimate absences, the quiz/exam may be excused. Instructor will consider replacing it by presenting homework.



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Attendance Policy

Attending all class meetings is required. Missing one (unexcused) class meeting day may be still considered as a good attendance. Attendance is of 5% of overall course credit. Missing one additional day would reduce 2.5%, so if a student missing three or more unexcused class meeting days the student will NOT receive attendance credit. Missing more than half of an hour (late come or early leave) may be considered as an absence. Students are responsible for missed course work by any reason. Summer sessions move fast! Be ready to work hard to achieve your goal.

Academic Integrity

Students are responsible for the honest completion and representation of their work, for the appropriate citation of sources, and for respect of others' academic endeavors. Students who violate these standards must be confronted and must accept the consequences of their actions.

If a solid proof of cheating/plagiarism found, the student may fail the course or disqualified from the class.

Disability Help

Please let me know as soon as possible if anyone who has a disability which may require some modification of seating, testing or other class requirements so that appropriate arrangements may be made.

Expectations on Students' Learning and Behaving

- You should come to classroom on time, and have a note book, a scientific calculator with you.
- You should shut down or mute your cellphone while entering the classroom and keep it out of your sight.
- Your motivation is the key to learn well. Be concentrated in classroom.
- You are encouraged to ask or answer question(s) in classroom, if any.
- Practice shows that classroom discussion is an efficient and effective way of learning.
- You are encouraged to join a group work in classroom, sharing ideas and contribute to a team work.
- Instructor will assign classroom practical problems solving activities time to time, so be sure to follow instruction to do "hands on and minds on" work on these practices.
- Instructor may have some challenging questions to motivate students thinking and reasoning. You are encouraged to make a classroom presentation, if there is a chance to do so. Correctly or productively presenting a challenge question in the classroom may be awarded extra credit.
- Understanding is everything! To Study well, you must pay attention to instructor's explanation. For each example shown in classroom, the instructor intends to show you the problem-solving process, a logical idea, or a special case study to you. You should take notes and review after class to make sure you understand and be able to solve the problems again independently.
- By any reason, if you miss a class, you should copy notes from a classmate. While catching up, you may see the solution of an "example". Take a minute to think about how you would solve each problem before reading the solution. Asking for help if needed in or out of classroom.
- Absolutely no cheating! Cheating is indeed to cheat yourself. You lose the opportunity of logical thinking and logical reasoning if you steal an answer from someone else. Cheating may stain your personal character. Cheating may be punished and may ruin your future career!
- Working hard! You should have a clear goal: Coming to the summer school you are willing to learn the knowledge that is required by your academic program and/or your study plan. Do your best to learn well while enjoying yourself. Best wishes!