Beijing Jiaotong University

2020 Summer Session

MATH 300 Multivariable Calculus

Course Outline

Term: July 13—August 7, 2020

Class Hours: 18:00-19:50 (Monday through Thursday) + Problem Solving Session with TA on Friday (week 1 & 3) or Thursday (week 2 & 4).

Code: MATH 300

Instructor: Dr. Arup Mukherjee

Home Institution: Montclair State University, New Jersey, USA

Office Hours: To be announced at the beginning of the course

Email: mukherjeea@montclair.edu

Credit: 4

Class Hours: This course will have 52 class hours, including 32 lecture hours, 8 lecturer office hours, 8-hour TA discussion sessions, 4-hour review sessions.

Course Description: Three-dimensional coordinate systems, Vectors, Dot & Cross Products, Lines & Planes; Vector functions, Derivatives and Integrals of Vector functions; Functions of several variables, Partial derivatives, Directional derivatives, Maxima & Minima; Double & Triple Integrals and Applications; Vector Fields, Line Integrals, Curl & Divergence, Greens, Stokes, and Divergence Theorems.

Course Objectives: (Learning Goals)

- Learn three-dimensional coordinate systems and vectors, understand the dot, cross, and scalar tripe product for vectors, and learn their applications to geometry (lines and planes).
- Learn how to use Calculus (derivatives & integrals) on curves in space (vector valued functions).

- Learn differential Calculus (partial derivatives, chain rule, directional derivatives, and the gradient vector) on Functions of Several Variables; Learn to determine Maximum and Minimum values.
- Learn integral Calculus (double integrals and triple integrals) on Functions of Several Variables; Learn about change of variables & Polar coordinates.
- Learn Calculus (Line Integral, Fundamental Theorem, Green's Theorem, Curl & Divergence, Stokes and Divergence Theorems) on Vector fields.
-

Required Textbooks: Calculus, 8th Edition, Early Transcendentals, by James Stewart & a TI-84+ Calculator

Grading & Evaluation: This course will have one Mid-Term and a Comprehensive Final Exam. Additionally, home-work and short in-class quizzes will be given. The grade breakdown is as follows:

Mid-Term	**30 %**
Final	**40 %**
Home Work/In class work	**10 %**
Attendance & Participation	**10 %**
Short In-class Quizzes	**10 %**

Percentage scores based on the above breakdown will translate to Letter Grades according to

> 90%	**>80% & <90%**	**>70% & <80%**	**>60% & <70%**	**< 60%**
A	**B**	**C**	**D**	**F**

Academic Dishonesty: Academic dishonesty is any attempt by a student to submit (1) work completed by another person without proper citation or (2) to give improper aid to another student in the completion of an assignment, such as plagiarism. ***No student may intentionally or knowingly give or receive aid on any test or examination, or on any academic exercise***, that requires independent work. This includes, but is not limited to using technology (i.e., instant messaging, text messaging, or using a camera phone) or any other unauthorized materials of any sort, or giving or receiving aid on a test or examination without the express permission of the instructor.

Each ***student is individually responsible*** for understanding what constitutes cheating or plagiarism. The student must also be aware that the ***consequences for doing the above listed offences are severe***. Whenever you have doubt about what constitutes cheating or plagiarism, contact me.

Course Schedule:

		Topics	Sections in the Textbook
Week 1	**Mon**	Three-Dimensional Coordinate Systems Vectors, Dot Product	Section 12.1 Section 12.2, 12.3
	Tues	Dot Product (continued) & Cross Product Lines and Planes in Space	Section 12.3, 12.4 Section 12.5
	Wed	Vector Functions & Space Curves Calculus of Vector Functions	Section 13.1 Section 13.2
	Thurs	Catch-up Arc Length and Curvature	 Section 13.3
Friday, Week 1: Problem Solving Session with TA (Vectors and Vector Functions)			
Week 2	**Mon**	Functions of two/three variables & Partial Derivatives	Section 14.1 Section 14.3
	Tues	Tangent planes & Linear approximations The Chain Rule	Section 14.4 Section 14.5
	Wed	Catch-up Directional derivatives & Gradient	 Section 14.6
	Thurs	Review and Catch-up (lecture) + separate TA-review session (problems)	
Friday, Week 2: Mid-Term 1			
Week 3	**Mon**	Maximum & Minimum Values Lagrange Multipliers	Section 14.7 Section 14.8
	Tues	Double Integrals over Rectangles Double Integrals over general regions	Section 15.1 Section 15.2
	Wed	Double Integrals in Polar Coordinates Triple Integrals	Section 15.3 Section 15.6
	Thurs	Vector Fields Line Integrals	Section 16.1 Section 16.2
Friday, Week 3, Problem Solving Session (Optimization & Multiple Integrals)			
Week 4	**Mon**	Fundamental Theorem for Line Integrals Greens Theorem	Section 16.3 Section 16.4
	Tues	Curl & Divergence Surface Integrals	Section 16.6 Section 16.7
	Wed	Stokes Theorem Divergence Theorem	Section 16.8 Section 16.9
	Thurs	Review & Catch-up (during lecture) + separate TA-review session (problems)	
Friday, Week 4, Final Exam			