北京交通大學
BEIJING JIAOTONG UNIVERSITY

Beijing Jiaotong University

2020 Summer Program

MATH 300 Multivariable Calculus

Course Outline

Term: June 01-July 03,2020

Course Code: MATH 300

Instructor: Professor Vadim Olshevsky

Home Institution: University of Connecticut

Office Hours: By Appointment

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Credit: 4

Course Description: This is a third course in the calculus sequence that provides a thorough introduction to multivariable calculus. It focuses on functions of several variables, differential and integral calculus of two and three variables, and their applications, and vectors and the geometry of curves and surfaces in three-dimensional space.

Course Objectives: The goal of the course is to provide a strong foundation and mastery of calculus in two and three variables and the geometry of vectors, lines, planes, curves, and surfaces for students who intend to continue in mathematics, physics, engineering, computer science, and other quantitative disciplines such as economics and finance.

Required Textbooks:

Calculus: Early Transcendentals, 8th Edition, by James Stewart with the WebAssign Access Code. Can be purchased directly at

https://www.cengage.com/c/calculus-early-transcendentals-8e-stewart/9781337771498#compare-buying-options

It is important that you purchase both the textbook and the WebAssign code, the latter is necessary for the homework assignments.

Homework: There will be online WebAssign homework assignments for each section of the text. Each assignment will be made available on several days before the section is covered in class. The due date for each assignment will be set by your instructor and will generally be two or three days after the material is covered in class. You will get five attempts for each question.

Grading & Evaluation		**Grade**	**Range**
Attendance and participation:	10%	A	90-100
Homework:	30%	B	80-89
Midterm:	30%	C	70-79
Final:	30%	D	60-69
		F	0-59

Course Schedule:

Week1: Introduction, vectors in three-dimension, dot and cross products, lines and planes in three dimension, implicit/parametric surfaces, curves and arc length.

Week2: Functions of several variables, limits and continuity, partial derivatives, tangents, differentiability, the chain rule, gradient and directional derivatives.

Week3: Extrema, Lagrange multipliers, and double integrals.

Week4: Double, triple and line integrals, change of variables.

Week5: Curl, Green's, Stoke, and Divergence Theorems.

Detailed Course Outline:

Week	Chapter	Topic
		1.1 Introduction and notation 1.2 Space and vectors in three-dimension
1	1 Geometry, space, surfaces and curves	1.3 Dot and cross products 1.4 Lines and planes in three-dimension
		1.6 Implicit and parametric surfaces
		1.7 Curves, arc length
		2.1 Limits and continuity 2.2 Partial derivatives
2	2 Differential calculus of functions of several variables	2.3 Tangent, planes, differentiability 2.4 The chain rule
		2.5 Gradient and directional derivatives
		Exam 1
		3.1 Extrema
3	3 Extrema and double integrals	3.2 Lagrange multipliers
		3.4 Double integrals over rectangles
		3.5 Double integrals over general regions
		3.6 Double integrals in polar coordinates
4	4 Triple and line integrals	4.1 Triple and line integrals
		4.2 Change of variables
		Exam 2
	5 Vector fields and integral Theorems	5.1 Curl, Green's Theorem, Flux
5		5.2 Stoke/Divergence Theorems
		Final Exam

		Discussion of final exam

Student responsibilities/expectations: The main course material will be presented through lectures. A discussion session, to be held every Friday will offer an opportunity for students to discuss course material and assigned problems with a teaching assistant (TA). Students are advised to keep pace with the course material as it is being presented. Consequently, students should endeavor to attend class and discussion sessions, and spend sufficient time working on assigned homework problems. If for any reason a student misses a class, he/she should endeavor to obtain the notes and learn the missed material. Students should not hesitate to ask questions or seek additional assistance to ensure that they are staying on pace with the class.

Examinations: There will be two midterm exams plus one cumulative final exam. The exams will contain problems to solve and definitions, brief explanations of concepts, and simple proofs.