National Taiwan University of Science and Technology

2019 Summer Program

MATH 300 Multivariable Calculus

Course Outline

Term: July 01-August 02,2019

Class Hours: 18:00-19:50 (Monday through Friday)

Course Code: MATH 300

Instructor: Professor Vadim Olshevsky

Home Institution: University of Connecticut

Office Hours: TBA and By Appointment

Email: olshevsky@gmail.com

Credit: 4

Class Hours: According to the regulations of Minister of Education, R.O.C, 18 class hours could be counted as 1 academic credit in all universities in Taiwan. This course will have 72 class hours, including 40 lecture hours, professor 10 office hours, 10-hour TA discussion sessions, 2-hour review sessions, 10-hour extra classes.

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	Date	Chapter	Topic
	07/01/2019		1.1 Introduction and notation 1.2 Space and vectors in three-dimension
1	07/02/2019	1 Geometry, space, surfaces and curves	1.3 Dot and cross products 1.4 Lines and planes in three-dimension
	07/03/2019		1.6 Implicit and parametric surfaces
	07/04/2019		1.7 Curves, arc length
	07/08/2019		2.1 Limits and continuity 2.2 Partial derivatives
2	07/09/2019	2 Differential calculus of functions of several variables	2.3 Tangent, planes, differentiability 2.4 The chain rule
	07/10/2019		2.5 Gradient and directional derivatives
	07/11/2019		Exam 1
	07/15/2019		3.1 Extrema
3	07/16/2019	3 Extrema and double integrals	3.2 Lagrange multipliers
	07/17/2019		3.4 Double integrals over rectangles
	07/18/2019		3.5 Double integrals over general regions
	07/22/2019		3.6 Double integrals in polar coordinates
4	07/23/2019	4 Triple and line integrals	4.1 Triple and line integrals
	07/24/2019		4.2 Change of variables
	07/25/2019		Exam 2
	07/29/2019	5 Vector fields and integral Theorems	5.1 Curl, Green's Theorem, Flux
5	07/30/2019		5.2 Stoke/Divergence Theorems
	07/31/2019		Final Exam
	08/01/2019		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 all class meetings and discussion sessions, be early for class, 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 before the next class meeting. Students should not hesitate to ask questions or seek additional assistance to ensure that they are staying on pace with the class. Students will be expected to come to class prepared and ready to participate actively. Please, turn off your cell phones and put aside any unrelated material before class begins. Students should exhibit a sense of responsibility and respect towards fellow students. Late-coming to class or early departure from class meetings will not be allowed.

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.