The Hashemite University		**Advanced Calculus (101401) 3 Credit Hours**
Faculty of Science		**Pre-requisite: 101201**
Department of Mathematics	**Course Syllabus**	**Summer Semester 2021/2022**

Course Information

Lecture's Time	9:20-10:35 Sun, Mon, Tue, Wed.
Lecture's Room	134 ل.ز
Instructor	Dr. Mohammad Safi
Office Location	Math 316
Office Hours	By appointment
Text Book	Advanced Calculus, by Wilfred Kaplan ,5th edition.
References	(1) Advanced Calculus and its Applications to the Engineering and Physical Sciences by J. Amazigo and L. Rubenfeld (1980). (2) Calculus of Several Variables, by S. Lang. (3) Vector Calculus, by J. Marsden and A. Tromba.
Website	http://staff.hu.edu.jo/safi

Grading Policy and Exam Material:

	Evaluation	Exam Material
First Exam	30 %	Chapter 2
Second Exam	30 %	Chapter 3 & Chapter 4
Final Exam	40 %	All Chapters

Teaching and Learning Methods

- Illustrating each new concept by examples.
- Illustrating theorems which constitute the core of the course.
- Solving some examples and assigning homework.
- Discussing some of the student’ s solutions of some homework problems.
- Making exams followed by a discussion of the problems of each exam.

Week	Section	Topics
		Chapter 2: Differential Calculus of Functions of Several Variables
1	2.1	Functions of Several Variables
	2.2	Domains and Regions
	2.3	Functional Notation * Level Curves and Level Surfaces
	2.4	Limits and Continuity
	2.5	Partial Derivatives
	2.6	Total Differential * Fundamental Lemma
2	2.7	Differential of Functions of n Variables * The Jacobian Matrix
	2.8	Derivatives and Differentials of Composite Functions
	2.9	The General Chain Rule
	2.10	Implicit Functions
	2.12	Inverse Functions *Curvilinear Coordinates
	2.14	The Directional Derivative
	2.15	Partial Derivatives of Higher Order
	2.16	Higher Derivatives of Composite Functions
3	2.18	Higher Derivatives of Implicit Functions
	2.19	Maxima and Minima of Functions of Several Variables
	2.20	Extrema for Functions with Side Conditions * Lagrange Multipliers
		Chapter 3: Vector Differential Calculus
3	3.2	Vector Fields and Scalar Fields
	3.3	The Gradient Field
	3.4	The Divergence of a Vector Field
4	3.5	The Curl of a Vector Field
	3.6	Combined Operations
	3.7	Curvilinear Coordinates in Space **rn** Orthogonal Coordinates
		Chapter 4: Integral Calculus of Functions of Several Variables
4	4.3	Double Integrals
	4.4	Triple Integrals and Multiple Integrals in General
	4.5	Integrals of Vector Functions
5	4.6	Change of Variables in Integrals
	4.7	Arc Length and Surface Area
	4.8	Improper Multiple Integrals
	4.9	Integrals Depending on a Parameter * Leibnitz's Rule
		Chapter 5: Vector Integral Calculus
5	5.2	Line Integrals in the Plane
	5.3	Integrals with Respect to Arc Length Basic Properties of Line integrals
6	5.4	Line Integrals as Integrals of Vectors
	5.5	Green’ s Theorem
	5.6	Independence of Path * Simply Connected Domains
	5.7	Extension of Results to Multiply Connected Domains
7	5.8	Line Integrals in Space
	5.9	Surfaces in Space * Orientability
	5.10	Surface Integrals
	5.11	The Divergence Theorem
	5. 12	Stokes's Theorem