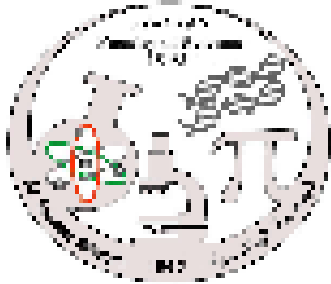



<b>The Hashemite University</b>	 	<b>Advanced Calculus (101401) 3 Credit Hours</b>
<b>Faculty of Science</b>		<b>Pre-requisite: 101201</b>
<b>Department of Mathematics</b>		<b>Summer Semester 2021/2022</b>
<b>Course Syllabus</b>		

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

#### Grading Policy and Exam Material:

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

Teaching and Learning Methods	
<ul style="list-style-type: none"> <li>☒ Illustrating each new concept by examples.</li> <li>☒ Illustrating theorems which constitute the core of the course.</li> <li>☒ Solving some examples and assigning homework.</li> <li>☒ Discussing some of the student' s solutions of some homework problems.</li> <li>☒ Making exams followed by a discussion of the problems of each exam.</li> </ul>	

Week	Section	Topics
<b>Chapter 2: Differential Calculus of Functions of Several Variables</b>		
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
<b>Chapter 3: Vector Differential Calculus</b>		
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 $\mathbb{R}^n$ Orthogonal Coordinates
<b>Chapter 4: Integral Calculus of Functions of Several Variables</b>		
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
<b>Chapter 5: Vector Integral Calculus</b>		
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

