COURSE DESCRIPTIONS

Faculty	Science and Information Technology				
Department	Mathematics			**NQF level**	6
Course Title	Calculus III	**Code**	505201	**Prerequisite**	505102
Credit Hours	3	**Theory**	3	**Practical**	0
Course Leader	Osama Ala'yed	**email**	alayedo@Jadara.edu.jo		
Lecturers	Osama Ala'yed	**emails**	alayedo@Jadara.edu.jo		
Lecture time	10:00-11:30 Sun- Tues	**Classroom**	D406		
Semester	First	**Production**		**Updated**	2020

ShortDescription
Three-dimensional coordinate systems; vectors: dot product, projections, cross product, parametric equations of lines, planes in 3-spaces; vector-valued functions: calculus of vector valued functions, change of parameters, arc length, unit tangent and normal vectors; functions of two or more variable: domain, limits, and continuity; partial derivatives; differentiability; total differentials; the chain rule; the gradient; directional derivatives; tangent planes; normal lines; maxima and minima of functions of two variables; Lagrange multipliers; multiple integrals: double integral.

Course Objectives
On completion of this course, students should be able to: 1. Write equations of planes and lines in 3-space and distinguish them from any other equations. 2. Distinguish between vectors and scalars. 3. Use partial differential when dealing with functions of several variables. 4. Evaluate double integrals over general regions.

Learning Outcomes
A. Knowledge - Theoretical Understanding
a1. Demonstrate the basic concepts of calculus.
B. Knowledge - Practical Application
a2. Compute limits and partial derivatives of functions of several variables.
C. Skills - Generic Problem Solving and Analytical Skills
b1. Apply vector operations in space and Construct equations of lines and planes in space.
D. Skills - Communication, ICT, and Numeracy
b2. Classify extreme values of a function of two variables and apply them to optimization problems.
E. Competence: Autonomy, Responsibility, and Context

c1. Evaluate double integrals in rectangular coordinate systems
Teaching and Learning Methods
Lectures, discussions, and solving selected problems
Assessment Methods
Participation questions, quizzes, assignments, and exams

Course Contents					
Week	**Hours**	**CLOs**	**Topics**	**Teaching & Learning Methods**	**Assessment Methods**
1	1.5	a1, b1	Three-dimensional coordinate systems	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
	1.5		Vectors		
2	3	a1, b1	The dot product	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
			The cross product		
3	3	a1, b1	The cross product (Cont.)	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
4	3	a1, b1	Lines	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
5	3	a1, b1	planes	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
6	3	a1	Cylinders and quadric surfaces	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
7	1.5	a1, b1	Vector functions and space curves	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
	1.5		Derivatives and integrals of vector functions		
8	1.5	a1, b1	Derivatives and integrals of vector functions	Lectures, discussions, and	Participation question,

	1.5		Arc length	solving selected problems	quiz, homework
9	1.5	a1, a2	Functions of several variables, level curves, level surfaces	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
	1.5		**Midterm Exam 30%**		
10	1.5	a1, a2	Partial derivatives, Limit and continuity	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
	1.5		Equality of Mixed partials, Differentiability		
11	1.5	a1, a2	Gradient and directional derivative	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
	1.5		chain rule		
12	3	a1, a2	The Gradients as a normal, Tangent line, Tangent plane	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
13	1.5	a1, b2	Maximum and Minimum values	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
	1.5		Second partial test		
14	3	a1, b2	Maxima and Minima with side conditions	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
15	3	a1, c1	Sigma notations. The double integral over a rectangle.	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
16	Final Exam				

Infrastructure	
Textbook	Stewart, J., Clegg, D. K., & Watson, S. (2020). *Calculus: early transcendentals*. Cengage Learning.
References	1) Anton, H., Bivens, I. C., & Davis, S. (2016). *Calculus: Early Transcendental Single Variable*. John Wiley & Sons. 2) Salas, S. L., Etgen, G. J., &Hille, E. (2006). *Calculus: one and several variables*. John Wiley & Sons.
Required reading	Salas, S. L., Etgen, G. J., &Hille, E. (2006). *Calculus: one and several variables*. John Wiley & Sons.

Electronic materials	
Other	

Course Assessment Plan							
Assessment Method		**Grade**	**CLOs**				
			a1	**a2**	**b1**	**b2**	**c1**
First(Midterm)		30	6	6	18	0	0
Second (if applicable)							
Final Exam		50	6	6	18	14	6
Coursework		20					
Coursework assessment methods	Assignments	10	2	2	2	2	2
	Case study						
	Discussion and interaction	5	1	1	1	1	1
	Group work activities						
	Labtests and assignments						
	Presentations						
	Quizzes	5	0	0	0	5	0
Total		100	15	15	39	22	9

Plagiarism
Plagiarism is claiming that someone else's work is your own. The department has a strict policy regarding plagiarism and, if plagiarism is indeed discovered, this policy will be applied. Note that punishments apply also to anyone assisting another to commit plagiarism (for example by knowingly allowing someone to copy your code). Plagiarism is different from group work in which a number of individuals share ideas on how to carry out the coursework. You are strongly encouraged to work in small groups, and you will certainly not be penalized for doing so. This means that you may work together on the program. What is important is that you have a full understanding of all aspects of the completed program. In order to allow proper assessment that this is indeed the case, you must adhere strictly to the course work requirements as outlined above and detailed in the coursework problem description. These requirements are in place to encourage individual understanding, facilitate individual assessment, and deter plagiarism.