جامعة الزيتونة الأردنية
Al–Zaytoonah University of Jordan
كلية العلوم وتكنولوجيا المعلومات
Faculty of Science and information Technology

" عراقة وجودة"
"Tradition and Quality"

QF01/0408-4.0E	**Course Plan for Bachelor program - Study Plan Development and Updating Procedures/ Mathematics Department**

Study plan No.	**2021/2022**	**University Specialization**	**Bachelor of Mathematics**
Course No.	**0101205**	**Course name**	**Calculus (3)** for Engineering
Credit Hours	**3**	**Prerequisite/ Co-requisite**	**Calculus (2)** for Engineering

Course type	☐ MANDATORY UNIVERSITY REQUIREMENT	☐ UNIVERSITY ELECTIVE REQUIREMENTS	☐ FACULTY MANDATORY REQUIREMENT	✓Support course family requirements	☐ Mandatory requirements	☐ Elective requirements
Teaching style	☐ **Full online learning**		☐ **Blended learning**		✓**Traditional learning**	
Teaching model	☐ **1 Synchronous: 1 asynchronous**		☐ **1 face to face : 1 asynchronous**		✓**2 Traditional**	

Faculty member and study divisions' information (to be filled in each semester by the subject instructor)

Name	Academic rank	Office No.	Phone No.	E-mail	

Division number	Time	Place	Number of students	Teaching style	Approved model

Brief description

3-dimentional space, vectors, lines and planes in 3-space, Functions of two or more variables, partial derivatives and multiple integrals.

Learning resources

Course book information (Title, author, date of issue, publisher ... etc)	Calculus, 10th edition By Howard Anton, Irl Bivens and Stephen Davis.
Supportive learning resources (Books, databases, periodicals, software, applications, others)	1 CALCULUS, 10th Edition, by Finney and Thomas. 2 Calculus: One and Several Variables, Salas, John Wiley, 10th Edition (2006) 3 Vector Calculus" Susan Colley. Pearson Prentice Hall, 3rd Edition (2006)
Supporting websites	• Calculus at S.O.S. Mathematics • http://www.sosmath.com/calculus/calculus.html • Visual Calculus; tutorials and demos • http://archives.math.utk.edu/visual.calculus/index.html • Calculus online • http://www.ugrad.math.ubc.ca/coursedoc/math100/index.html • Online tutorials and quizzes • http://www.math.hmc.edu/calculus/tutorials/
The physical environment for teaching	✓Class room ☐ labs ☐ Virtual educational platform ☐ Others

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Necessary equipment and software	
Supporting people with special needs	
For technical support	

Course learning outcomes (S = Skills, C= Competences K= Knowledge,)

No.	Course learning outcomes	The associated program learning output code
Knowledge		
K1	Identify the parametric and polar curves, three dimensional space and vectors	MK 2
K2	Define the functions of several variables and their domains and range	MK 1
K3	Recognize the concept of limits and continuity of a function of several variables.	MK 1
K4	Recognize the partial derivatives of first and high order for a function of several variables	MK 1
K5	Calculate the partial derivatives and the total differential for a function of several variables	MK 1
K6	Evaluate the double and triple integrals	MK 4
Skills		
S1	Exercise the fundamental notions of calculus with functions of several variables	MS 4
S2	Use different techniques of double and triple integral to solve problems related to areas or volumes of geometric shapes	MS 4
S3	Construct the graph of functions of several variables in the 3-space.	MS 5
Competences		
C1	Work profissionaly with multivariable functions.	MC 2
C2	Develop the individual's ability to communicate and interact with other mathematical courses	MC 1

Mechanisms for direct evaluation of learning outcomes

Type of assessment / learning style	Fully electronic learning	Blended learning	Traditional Learning (Theory Learning)	Traditional Learning (Practical Learning)
Midterm exam	30%	30%	**30%**	30%
Participation / practical applications	0	0	**20%**	30%
Asynchronous interactive activities	30%	30%	**0**	0
Final exam	40%	40%	**50%**	40%

Schedule of simultaneous / face-to-face encounters and their topics

Week	Subject	learning style	Reference
1	Polar coordinates. Graphs in polar coordinates	Lecture	705-730
2	Rectangular coordinates in 3-space. Introduction to vectors,	Lecture	767-785

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	Norm of a vector.		
3	Dot product, Cross product.	Lecture	785-813
4	Lines and Planes in 3-space	Lecture	813-821
5	Quadratic Surfaces, First exam 20%	Lecture	821-840
6	Functions of several variables and level curves. Domain and range of functions of several variables	Lecture	906-917
7	Limits of functions of several variables. Continuity of functions of several variables.	Lecture	917-927
8	Partial Derivatives. Chain Rule and implicit differentiation	Lecture	927-960
9	Directional derivatives, gradient and tangent planes.	Lecture	960-977
10	Extrema of functions of several variables. Second exam 20%	Lecture	977-989
11	Double integrals. Double integrals over non-rectangular regions.	Lecture	1000-1018
12	Double integrals in polar coordinates. Solving exercises	Lecture	1018-1026
13	Triple Integrals in rectangular coordinates.	Lecture	1039-1048
14	Triple Integrals in cylindrical coordinates	Lecture	1048-1053
15	Triple Integrals in spherical coordinates	Lecture	1053-1058
16	**Final Exam**		