مركز الاعتماد
وضمان الجودة
ACCREDITATION & QUALITY ASSURANCE CENTER

The University of Jordan

Accreditation & Quality Assurance Center

Course Syllabus

Course Name:Calculus III

Course Syllabus

1	Course title	**Calculus III**
2	Course number	0301201
3	Credit hours	3
	Contact hours (theory, practical)	3
4	Prerequisites/corequisites	0301102
5	Program title	B.Sc. Mathematics
6	Program code	
7	Awarding institution	The University of Jordan
8	School	Science
9	Department	Mathematics
10	Course level	College requirement
11	Year of study and semester (s)	3rd or 4th year, and 2nd or summer semester
12	Other department (s) involved in teaching the course	None
13	Main teaching language	English
14	Delivery method	On Campus
15	Online platforms(s)	■Moodle ■Microsoft Teams □Skype□Zoom □Others…………
16	Issuing/Revision Date	10th Oct, 2022

17 Course Coordinator:

Name:Majd Mhailan   Contact hours: 8:30 – 9:30, 9:30 – 10:30, 1:30 – 2:30

(Sun., Tue., Thu.)

                                          10:00 – 11:30 (Mon., Wed.)

Office number:216   Phone number: 22080

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18 Other instructors:

Name: Prof. Nabil Shawagfeh,

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Contact hours:1:00 – 2:30 (Mon., Wed.)

Name: Prof. Iryna Komashynska

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Name: Dr. Ayat Ababneh

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Name: Dr. Mariam Al-azaizeh

Office number: ——

Phone number: 22100

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Contact hours: 1:00 – 2:30 (Mon., Wed.)

19 Course Description:

Three dimensional space and vectors rectangular coordinates in 3-space; spheres, cylindrical surfaces; quadric surfaces; 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, curvature, 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, double integrals in polar coordinates; triple integrals; triple integrals in cylindrical and spherical coordinates; change of variables in multiple integrals; Jacobian

20 Course aims and outcomes:

A- Aims:

1. Write equations of planes and lines in3-space.
2. Distinguish equations planes from any otherequations.
3. Distinguish between vectors andscalars.
4. Use partial differential when dealing with functions of severalvariables.
5. Measure the curvature at any point on two or three spacecures.

B- Intended Learning Outcomes (ILOs):

Successful completion of the course should lead to the following outcomes:

A. Knowledge and Understanding Skills: Student is expected to A1. Recognize the three dimensionalspace.

A2.　　Know vectors which are quantities with magnitude anddirection.

B2.　　Represent problems using three dimensional space and several variable

C. Subject- Specific Skills: Student is

C1 . 　Write equations of lines and planes with a vector help. Find the curvature of a curve and the three
C2 . 　unit vectors. Name and sketch cylinders and quadric surfaces.
C3 . 　Calculate limits of several variable functions. Differentiate functions of several variables, and use the chain rule.
C4 　　Calculate the directional derivatives, and find the maximum and minimum values of functions in two

D. Creativity /Transferable Key Skills/Evaluation: Student is expected to
D1.　　Use the concepts of partial derivatives' in deferent branches of mathematics physics

21. Topic Outline and Schedule:

Topic	Week	Instructor	Achieved ILOs	Evaluation Methods	Reference

Chapter 12: Vectors and the Geometry of Space
12.1 Three-dimensional coordinate systems
    Exercises: 3, 5, 8, 9, 10, 11, 12, 16, 17, 19, 20, 21, 22, 27, 28, 31, 34, 40,41
12.2 Vectors
    Exercises: 4, 6, 15, 18, 21, 25, 26, 29,41
12.3 The dotproduct
    Exercises: 1,2,5,8,10,15,19,22,24,25,26,27, 28,32,34,36,37,38,40,43,46,53,55,56
12.4 The crossproduct
    Exercises: 1,4,13,14,19,20,27,29,34,35,37,38,45
12.5 Equations of lines andplanes
    Exercises:
    1,2,3,4,5,7,10,11,12,14,16,17,19,20,21,22,24, 26,27,30,31,34,37,38,44,46,48,49,52, 56,59,61,62,63,64,68,70,72,73,75,76,78,79
12.6 Cylinders and quadric surfaces
    Exercises: 3,5, 11– 36, 41,42,43,44
	1-5		A1, A2, C1, C3	Exam	

Chapter 13: Vector Functions
13.1 Vector functions and space curves
    Exercises:1,2,4,7,11,14,16,17,26,27
13.2 Derivatives and integrals of vector functions
    Exercises:3,6,9,12,17,19,24,25,27,33,36,41
13.3 Arc length andcurvature
    Exercises:
    1,3,4,13,14,17,19,22,25,28,31,44,48,49
	6-7		B1, C2	Exam	

Chapter 14: Partial Derivatives
14.1 Functions of severalvariables
    Exercises: 9,10,12,14,15,17,19,20,21,22,29,31,
    44,48,49
14.2 Limits andcontinuity
    Exercises: 5,7, 8, 9, 10, 12, 13, 14, 16, 17, 18,
    21, 29, 33, 37,38,40,41
14.3 Partialderivatives
    Exercises: 15,21,26,28,29,31,36,39,41,
    43,46,51,57,63,72,76
14.4 Tangent planes and linearapproximation
    Exercises:1,4,6,11,12,14,17,19,31,46
14.5 The chainrule
    Exercises: 2,4,8,11,13,15,21,24,29,32,45,48,54
14.6 Directional derivatives and the gradient vector
    Exercises: 4, 8, 10, 11, 15, 20, 21, 24, 28, 39, 43,
    54,55
14.7 Maximum and minimumvalues
    Exercises: 1,5,8,12,13,16,29,33,35,39,40,43,46
14.8 Lagrangemultipliers
    Exercises: 3,6,8,11,19,27,28,31,34,40
	8-13		B2, C4,
			C5, C6,
			D1
				Exam	

Chapter 15: Multiple Integrals
15.2 Iterated integrals
    Exercises: 4,7,9,12,16,19,23,26,27,28,31
15.3 Double integrals over general regions
    Exercises:5,6,11,12,19,21,24,26,28,31,
    34,41,43,44,45,46,49,51
	14-15		C7	Exam	

22 Evaluation Methods:

Opportunities to demonstrate achievement of the ILOs are provided through the following <u>assessment methodsand requirements</u>:

ILO/s	Learning Methods	Evaluation Methods	Related ILO/s to the program
	Lectures	**Exam**	**A1, A4, B1, D1**

23 Course Requirements

Data Show

24 Course Policies:

1. Attendance is absolutely essential to succeed in this course. You are expected to attend every class; please notify your instructor if you know you are going to be absent. All exams must be taken at the scheduled time. Exceptions will be made only in extreme circumstances, by prior arrangement with the instructor.
2. If a student is absent for more than 10% of lectures without an excuse of sickness or due to other insurmountable difficulty, then he/she shall be barred from the final examination also he/she will get a failing grade in this course.
3. Medical certificates shall be given to the University Physician to be authorized by him. They should be presented to the Dean of the Faculty within two weeks of the student's ceasing to attend classes.
4. Test papers shall be returned to students after correction. His/her mark is considered final after a lapse of one week following their return.
5. Cheating is prohibited. The University of Jordan regulations on cheating will be applied to any student who cheats in exams or on homework.

25 References:

A- Required book (s), assigned reading and audio-visuals:

James Stewart (2012) Calculus (Early Transcendentals), 8th Edition, Thomson, Metric international version, Canada.

B- Recommended books, materials, and media:

(1)   G. Thomas (2005) Calculus, 11th edition, Addison Wesley (Person Education).
(2)   R. Smith and R. Minton (2007) Calculus, 3rd edition, McGraw Hill.
(3)   Howard Anton, Irl Bivens and Stephen Davis (2005) Calculus, 8th edition, John Wileyand sons Inc., New York.

26 Additional information:

Name of Course Coordinator: Majd Mhailan   Signature: ---------------------- Date: 10-10-2022
Head of Curriculum Committee/Department: Prof. Ahmad Al Zghoul-- Signature: ------------------------------------
Head of Department: -Prof. Manal Ghanem - Signature: -M. Ghanem
Head of Curriculum Committee/Faculty: --------------------------------------- Signature: ----
Dean: Mahmoud Jaghoub Signature: --