



ASU
جامعة العلوم التطبيقية الخاصة
APPLIED SCIENCE PRIVATE UNIVERSITY

AMMAN - JORDAN

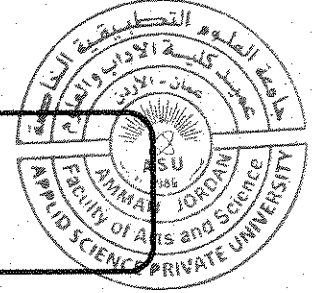


المستوى الذهبي



جامعة كل العرب

Faculty: Arts & Science
Course Syllabus
Semester: Second Academic Year 2020/ 2021



Course Title: Calculus 1
Course No.: 1501110
Prerequisite: none
Concurrent: none
Department: Basic science and humanities
Coordinator: Dr. Mona Khandakji

*** Instructors:**

Name	Office Number	Office Phone	Office Hours (on Teams)	E-mail
Dr.Mona Khandakji,	222	1411	Sun-Tue-Thur:11-12 Mon-Wed: 12:30-1:30	m_khandakji@asu.edu.jo
Dr.Mayada.Abu Humus,	225	1442	Tue-Thur:12-2 Mon-Wed: 11-12:30	abuhomos@asu.edu.jo

*** Course Description:**

Functions: domain, operations on functions, graphs of functions; trigonometric functions; limits: meaning of a limit, computational techniques; limits at infinity, infinite limits; continuity; limits and continuity of trigonometric functions; the derivative; techniques of differentiation, derivatives of trigonometric functions; the chain rule; implicit differentiation; differentials; Roll's Theorem; the mean value theorem; the extended mean value theorem; L'Hopital's rule; increasing and decreasing functions; concavity; maximum and minimum values of a function; graphs of functions including rational functions (asymptotes) and functions with vertical tangents (cusps); anti derivatives; the indefinite integral; the definite integral; the fundamental theorem of calculus ; area under a curve; area between two curves; transcendental functions: inverse functions, logarithmic and exponential functions and their derivatives and integrals; limits (the

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indeterminate forms); hyperbolic functions and their inverses; inverse trigonometric functions; some techniques of integration.

The E-learning platform(Microsoft Teams)will be used for teaching.

* Learning Outcomes :

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

A. Knowledge and Understanding Skills: Student is expected to

A1) Calculate the limit for various types of functions.

A2) Determine whether a given function is continuous at a certain point.

A3) Differentiate and integrate various types of functions.

A4) Sketch the graph of polynomials, trigonometric and rational functions.

A5) Use correctly some famous Theorems in calculus such as: Intermediate Value Theorem, Mean Value Theorem, and Fundamental Theorem of Calculus.

B. Intellectual Analytical and Cognitive Skills: Student is expected to

B1) Students should be able to use mathematical symbols as well as calculus I concepts (limits, continuity, derivatives, applications of the derivative , anti-derivative, the definite and indefinite integral, and the Fundamental Theorem of Calculus) to analyze, graph, and solve real world problems.

C. Subject-Specific Skills: Student is expected to

C1) Calculate limits and determine continuity for functions.

C2) Perform differentiation and integration correctly.

C3) Sketch the graph of polynomial and rational polynomial functions, as well as some transcendental functions.

D. Creativity /Transferable Key Skills/Evaluation: Student is expected to

D1) Use mathematical symbols and mathematical structures to model and solve real world problems.

D2) Choose the correct use of quantifiable measurements of real world situations.



Course Contents and Schedule:

Semester Weeks	Subject
First	1. Functions and models 1.1: Four ways to represent a function Ex: 2,4,7-10, 31-55,72-78
Second	1.2: Mathematical models: A catalog of essential functions Ex: 1-5,6,8,9 1.3: New functions from old functions Ex:1, 3, 5-7, 9-24, 27, 33-36, 39, 43- 47, 49, 50, 51, 61
Third	1.5: Exponential functions Ex: 1,3,11-21,33 1.6: Inverse functions and logarithms Ex: 3-18,21-31,35-41,47-57,63-72,75

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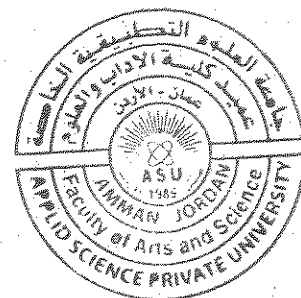


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Fourth	2. Limits and derivatives 2.2 The limit of a function Ex: 7,8,15-17,29-33,38 2.3 Calculating limits using the limit laws Ex: 1, 2, 7, 9-32, 37, 39, 41-46, 48, 49, 51, 52 § 2.5: 2.5 Continuity Ex: 4, 18, 20, 23, 33, 35-39, 43, 45- 47, 51-54, 57, 58, 65, 67
Fifth	2.6: Limits at infinity; Horizontal asymptotes Ex: 3,7,15-38,41-46,48,52-56 2.7: Derivatives and rate of change Ex: 27,29,31,33-38,53,54 2.8: The derivative as a function Ex: 1,3,23,29,37-40
Sixth	3. Differentiation rules 3.1: Derivatives of polynomials and exponential functions Ex: 3-36, 44, 46, 52-55, 57, 68, 70, 74, 75, 77 3.2: The product and quotient rules Ex: 3-9, 11-13, 16-25, 27, 33, 39, 43, 48, 49, 52, 54
Seventh	3.3: Derivatives of trigonometric functions Ex: 1-16, 21-24, 30, 39-49, 52 3.4: The chain rule Ex: 7-17, 23-45, 50, 51, 53, 56, 59, 61, 63, 65, 66, 69, 95-97
Eighth	3.5: Implicit differentiation Ex: 55-21, 24, 26, 37, 49-60, 75-78 3.6: Derivatives of logarithmic functions Ex: 2-23, 26, 27, 29, 33, 41-52, 53, 55
Ninth	3.10: Linear approximations and differentials Ex: 2, 3, 6-11, 13, 15, 17, 19, 20, 23-31 3.11: Hyperbolic Functions Ex: 7-21, 23, 31, 33, 35, 40, 41, 43, 45, 47, 54
Tenth	4. Applications of differentiation 4.1: Maximum and minimum values Ex: 9, 11, 13, 29-45, 47-62, 65-68 4.2: The mean value theorem Ex: 2, 5, 7, 9, 11, 15, 17, 19, 23, 25 4.3: How derivatives affect the shape of a graph Ex: 5-7, 9, 11, 13, 15-17, 19, 25, 31, 37-53
Eleventh	4.4: Indefinite forms and L'Hopital's rule Ex: 1-66, 74, 89, 90
Twelfth	4.5: Summary of curve sketching Ex: 5, 9, 13, 17, 19, 24, 25, 29, 30, 37, 43, 45, 54, 66-69
Thirteenth	5. Integrals 5.2: The definite integral Ex: 34-42,47-50 5.3: The fundamental theorem of calculus Ex: 2, 7-44, 55-62



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Fourteenth	5.4: Indefinite integrals and the net change theorem Ex: 2,5–18,21–46,49,50
Fifteenth	5.5: The substitution rule Ex: 7–48, 53–74, 74, 78, 79, 85, 86
Sixteen	

*** Teaching Methods:**

- Interactive lectures
- Group discussions
- Self reading
- Written assignments

*** Evaluation:**

Midterm Exam	30%	(21/4/2021) (On Microsoft Teams)
Assignments	20%	On Microsoft Teams
Final Exam	50%	

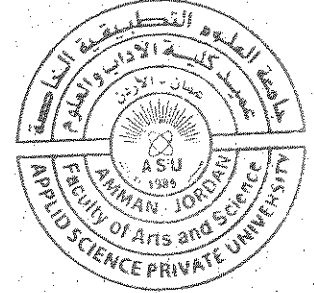
Total 100%

*** Textbook :**

James Stewart (2012) Calculus (Early Transcendentals), 7th Edition,
Metric international version, Canada.

*** References :**

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



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Subject Coordinator: Dr. Mona Khandakji

Signature:

د. منى خندقجي

Head of Curriculum Committee: Dr. Husam Miqdad

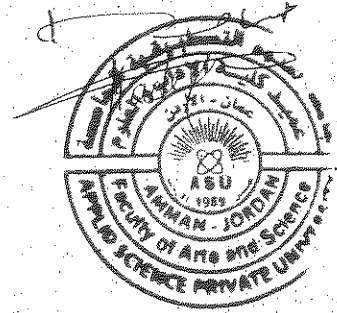
Signature:

Department Head: Dr. Husam Miqdad

Signature:

Dean Faculty: Dr. Hadeel Al Saed

Signature:



Copy to:

- Department Head.
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