Course Syllabus
Faculty of -Arts & Science
Academic Department - Basic science and humanities

Academic Year 2021 / 2022 Semester: Second

Course Title :	Calculus 1
Course No. :	1501110
Prerequisite :	none
Concurrent :	none
Department :	Basic science and humanities
Coordinator :	Dr. Mona Khandakji
Mode of Instruction	**On-Compas** - 3 hours in-class (Synonym) learning

*** Instructor:**

Lecturer	Office Phone	Room No.	Office Hours	E-mail
Dr.Mona Khandakji,	216	1405	Sun-Tue-Thur:11-12 Mon-Wed:8:30-9:30,11-12 Wed: 8:30-9:30	m_khandakji@asu.edu.jo
Dr.Mayada.Abu Humus,	225	1442	Sun-Tue-Thur:11-12 Mon- Wed:9:30-11	abuhomos@asu.edu.jo

Course Description

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

Intended Learning Outcomes

Upon the completion of the course, this module should lead to the following learning outcomes:

A. Knowledge and Understanding (Student should):

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. Cognitive and Intellectual Skills (Student should):

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 should):

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. Transferable Skills (Student should):

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.

Program Learning Outcomes (PLOs):

1. ----------
2. ----------
3. ----------

Course Learning Outcomes Alignment Matrix				
	CLO. 1	CLO. 2	CLO. 3	CLO. 4
PLO.1:	-	-	-	-
PLO 2:	-	-	-	-
PLO.3:	-	-	-	-
PLO.4:	-	-	-	-
PLO. 5	-	-	-	-

Course Contents and Schedule

Week	Day and Date	Topics to be covered	Method of instruction	CLOs	PLOs
1	Mon. 7/3/2022	**1. Functions and models** 1.1: Four ways to represent a function Ex: **2,4,7–10, 31-55,72–78**	In-class lecture	C3,D1 ,D2	-
	Wed. 9/3/2022		In-class lecture		
2	Mon. 14/3/2022	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**	In-class lecture	C3,A4 ,D1, D2	-
	Wed. 16/3/2022		In-class lecture		
3	Mon. 21/3/2022	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**	In-class lecture	C3,A4 ,D1, D2	-
	Wed. 23/3/2022		In-class lecture		
4	Mon. 28/3/2022	**2. Limits and derivatives** 2.2 The limit of a function Ex:	In-class lecture	A1,A2	-

	Wed. 30/3/2022	**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**	In-class lecture	, C1	
5	Mon. 4/4/2022	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**	In-class lecture	A1,A3	-
	Wed. 6/4/2022		In-class lecture		
6	Mon. 11/4/2022	**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**	In-class lecture	A3,C2 D1, D2	-
	Wed.13/4/2022		In-class lecture		
7	Mon. 18/4/2022	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**	In-class lecture	A3,C2 ,D1, D2	-
	Wed. 20/4/2022		In-class lecture		
8	Mon. 25/4/2022	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**	In-class lecture	A3,C2, D1	
	Wed. 27/4/2022		In-class lecture		
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10	Mon. 9/5/2022	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**	In-class lecture	A3,C2, D1,D2	-
	Wed. 11/5 /2022		In-class lecture		
11	Mon. 16/5/2022	**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**	In-class lecture	B1,A5, D1,D2	-
	Wed. 18/5/2022		In-class lecture		

		4.3: How derivatives affect the shape of a graph Ex:**5–7, 9, 11, 13, 15-17, 19, 25, 31, 37-53**			
12	Mon. 23/5/2022	**4. Applications of** 4.4: Indefinite forms and L'Hopital's rule Ex: **1–66, 74, 89, 90**	In-class lecture	A1,C1	
	Wed. 25/5/2022 **(Holiday)**		In-class lecture		
13	Mon. 30/5/2022	4.5: Summary of curve sketching Ex: **5, 9, 13, 17, 19, 24, 25, 29, 30, 37, 43, 45, 54, 66-69**	In-class lecture	C3,A4, D1	-
	Wed. 1/6/2022		In-class lecture		
14	Mon. 6/6/2022	**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**	In-class lecture	A3,C2, B1,D1, D2	-
	Wed. 8/6/2022		In-class lecture		
15	Mon. 13/6/2022	5.4: Indefinite integrals and the net change theorem Ex: **2,5–18,21–46,49,50** 5.5: The substitution rule Ex: **7–48, 53–74, 74, 78, 79, 85, 86**	In-class lecture	A3,C2, B1,D1, D2	-
	Wed. 15/6/2022		In-class lecture		
16.	**Final Exam**				

Grading Plan and Assessment Tools

Assessment Tools	Weights	Due date
Mid-term	30%	To be announced
Assignments	-	-
Quizzes	20%	To be announced
Inter active lectures	-	-
Group Work	-	-
Presentation	-	-
Reports	-	-
Project	-	-
Case-Study	-	-
Final Exam	**50%**	**To be announced**

Supplementary Reading

Textbook:

1- 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..

جامعة كل العرب

Subject Coordinator	- Dr. Mona Khandakji -	**Signature:**	----------
Head of Curriculum Committee	--- Dr.Husam Miqdad -	**Signature:**	----------
Department Head	-- Dr.Husam Miqdad	**Signature:**	----------
Faculty Dean	-- Dr. Hadeel Al Saed	**Signature:**	----------

Copy to:

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- Head of Curriculum Committee.
- Course File.