



MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Mathematics		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	CYS103		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	1	Semester of Delivery	
Administering Department	Dept. of Cybersecurity	College	College of Information Technology
Module Leader	Dr. Mohammed Al-Shibly	e-mail	dr.alshibly@uofallujah.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Mohammed Al-Shibly	e-mail	dr.alshibly@uofallujah.edu.iq
Peer Reviewer Name	Dr. Ahmad AlSabhany	e-mail	ahmad.alsabhany@uofallujah.edu.iq
Scientific Committee Approval Date	25-5-2026	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1. Understanding basic concepts: Students should develop a solid understanding of fundamental concepts in calculus, such as limits, continuity, derivatives, and integrals. 2. Calculating derivatives: Students should be able to calculate derivatives using various differentiation techniques, including the power rule, chain rule, product rule, quotient rule, and trigonometric derivatives. 3. Applying differentiation: Students should be able to apply differentiation to solve problems related to rates of change, optimization, curve sketching, related rates, and applied problems in various fields. 4. Understanding the Fundamental Theorem of Calculus: Students should comprehend the Fundamental Theorem of Calculus and be able to use it to evaluate definite integrals and find antiderivatives. 5. Solving differential equations: Students should gain an understanding of basic techniques for solving first-order differential equations and solving separable, linear, and homogeneous differential equations. 6. Multivariable calculus: Depending on the level of the course, students may be introduced to multivariable calculus and learn concepts such as partial derivatives, multiple integrals, and vector calculus.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. study the functions and the domain. 2. evaluation the range of functions and their drawing. 3. A study of the limits and Luptal's rule. 4. A continuity study. 5. Derivability. 6. A study of the derivation of the transcendental exponential, trigonometric and natural logarithm functions. 7. study the integration with many methods..
Indicative Contents المحتويات الإرشادية	Part A– Theoretical lectures4 Introduction of real numbers, functions and Their types, the Domain and Range of the functions with different techniques for polynomial function , fractional functions. Radical functions (odd and even roots) . [8 hrs] Limit of a Function and Limit Laws, The Precise Definition of a Limit, One-Sided Limits , Limits Involving Infinity, Asymptotes of Graphs [8 hrs]. The Derivative at a Point , The Derivative as a Function , Differentiation Rules , The Chain Rule ,Implicit derivative , Partial derivative , (Cauchy-Riemann equation), Laplace equation [15hrs]. Transcendental functions (the Natural Logarithm) and Logarithm differentiable Logarithmic functions and their Derivatives, Trigonometric functions and their Derivatives , Logarithm with base a , the exponential function , Exponential function of type ax, au and trigonometric function [13 hrs] The inverse trigonometric function, Hyperbolic function [6hrs].

	Matrix: sum, multiplication, inverse, power, transpose, trace, matrix equation [10 hrs]. Definite integral, Indefinite integral, the integral of Natural logarithms, The integration of exponential functions and Trigonometric functions integrations. [8hrs] Integration by part. Integral contain n-th root, Integration of Rational function by partial fractions [10hrs]. Part B –Additional and Advanced Exercises. [18 hrs] applications [12 hrs] Advanced Exercises and homework's. [40 hrs].
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in the delivery of this unit is to encourage students to participate in the exercises, while improving and expanding their critical thinking skills at the same time. This will be achieved through classes and interactive tutorials and by looking at the types of simple experiments that include some sampling activities that are of interest to the students. Mathematics, including calculus, requires practice to reinforce understanding and develop problem-solving skills. Work through a variety of problems, both from your textbook and supplementary resources. Start with simple problems and gradually increase the difficulty level.

Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	97	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	175		

Module Evaluation تقييم المادة الدراسية
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		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quiz	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Quiz	-		Continuous	All
	Assignments	-		13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	20% (10)	7	LO #1 - #7
	Final Exam	3hr	60% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction of real numbers, functions and Their types, sketch and the domain.
Week 2	The Range of the functions, the Limit.
Week 3	The limit of Infinity and properties of Limits, the Continuity, the derivative.
Week 4	Implicit differentiation, The Chain Rule.
Week 5	Partial derivative, theorem (Cauchy-Riemann equation), Laplace equation.
Week 6	Transcendental functions (the Natural Logarithm) and Logarithm differentiable.
Week 7	Logarithm with base a, the exponential function, Exponential function of type a^x , a^u and trigonometric function. (quiz).
Week 8	Mid-term Exam
Week 9	The inverse trigonometric function and Hyperbolic function.
Week 10	Matrix: sum, multiplication, inverse, power, transpose, trace, matrix (quiz).
Week 11	Definite integral, Indefinite integral, the integral of Natural logarithms.
Week 12	The integration of exponential functions and Trigonometric functions integrations.
Week 13	Integration by part.
Week 14	Integral contain n-th root, Integration of Rational function by partial fractions.
Week 15	Substitution by trigonometric function.
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. Calculus 11th Thomas 2. George B. Thomas, Jr. Massachusetts " INSTRUCTOR'S SOLUTIONS MANUAL SINGLE VARIABLE " 3. Strang, Gilbert. <i>Introduction to Linear Algebra</i>. 5th ed. 2016. Wellesley-Cambridge Press. ISBN: 9780980232776.	
Recommended Texts	1. ROBERT T. SMITH, ROLAND B. MINTON, " Calculus Fourth Edition" 2012. 2. Lipschutz, S., & Lipson, M. L. (2009). CHAUM'S. <i>Outline of Theory and Problems of Data Structures</i>, McGraw: Hill Book Company.	No
Websites	https://www.wolframalpha.com/	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.