	Ministry of Higher Education and Scientific Research - Iraq **Al-Naji University** **College of Engineering** **Department of Cybersecurity Engineering**	

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	CALCULUS I		**Module Delivery**	
Module Type	SUPLEMENT		☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	NU1101			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	UG I		**Semester of Delivery**	1
Administering Department	CSE		**College**	College of Engineering
Module Leader	Mohammed Talal Saleem		**e-mail**	Mohammed.talal@alnaji-uni.edu.iq
Module Leader's Acad. Title	Assist. Prof.		**Module Leader's Qualification**	Ph.D.
Module Tutor	None		**e-mail**	
Peer Reviewer Name	Prof. Dr. Abdulkareem A. Kadhim		**e-mail**	Ak_kadhim@nahrainuniv.edu.iq
Review Committee Approval	01/06/2023		**Version Number**	1.0

Relation With Other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	None

Co-requisites module	None	**Semester**	None

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1- To understand the concept of rate of change 2- To Develop the derivative idea from rate of change 3- To perform derivative to different functions 4- To deal with integration basics
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1-Explain the change rate 2-Define the connection between change rate and the derivative. 3-Recognize the derivative concept and how to evaluate it. 4-Discuss the different approached and rules of derivation. 5-Describe the idea of integration and compare it with derivative. 6-List various application of integration. 7-Demonstrate transcendental functions
Indicative Contents المحتويات الإرشادية	**A- derivative** In this part we start with the change rate then move to the next level by introducing the integration as a form of change rate. **B-integration** The next part from week 9 to week 13, the integration is introduced, how to evaluate it, area under curve as a value of integration and some other applications. **C- Transcendental functions** Some Transcendental function are introduced. The derivative of some of them introduced also in last part of this course.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	Weekly lectures with tutorial session ensure better understanding Quizzes and exams to ensure student learning

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	61	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	89	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	**6**
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	3, 8	1,2,3,7
	Assignments	2	10% (10)	10	1-4 , 5
	Projects / Lab.	-	-	-	-
	Report	1	10% (10)	13	4-7
Summative assessment	Midterm Exam	2 hr	10% (10)	7,14	1-6
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	**The Rate of Change of Function I:** Coordinates for the plane, Increments and distance, The slope of a straight line, Equation of a straight line.
Week 2	**The Rate of Change of Function II:** Functions and graphs, Slopes of quadratic and cubic curves, the slope of the curves y=f(x), Derivatives, Velocity and other rates of change.
Week 3	**The Rate of Change of Function III:** Properties of limits, Infinity as a limit, Continuous functions,
Week 4	**Derivatives I:** Formal differentiation, Polynomial functions and their derivatives, Products, power, and quotients.
Week 5	**Derivatives II**: Implicit differentiation and fractional powers, Tangent line approximation, The chain rule and parametric equations, A brief review of trigonometry, Angles between curves.
Week 6	**Derivatives III:** Derivatives of trigonometric functions, Newton's method for approximating solutions of equations, Inverse functions and the Picard method.
Week 7	**Applications of Derivatives I:** Curves sketching, The sign of the first derivatives, Concavity and points, Asymptotes and symmetry, Maxima and minima theorems.
Week 8	**Applications of Derivatives II:** Related rates, Rolle's theorem, the mean value theorem, Indeterminate forms and l'Hopital rules, Extending the Mean Value Theorem to Taylor's formula.
Week 9	**Integration I:** Indefinite integrals, Applications, Determining constants of integration, Integrals of trigonometric functions.
Week 10	**Integration II:** Definite integrals, Area under a curve, Calculating areas as limits, The fundamental theorems of integral calculus.
Week 11	**Integration III:** Integration by substitution Differentials, Rules for approximating definite integrals.
Week 12	**Applications of Definite Integrals I:** Area between two curves, Distance, Calculating volumes by slicing.
Week 13	**Applications of Definite Integrals II:** Length of plane curve, Area of a surface of revolution, Average value of a function.
Week 14	**Transcendental Functions I:** The inverse of trigonometric functions, Derivatives of the inverse trigonometric functions, The natural logarithm and its derivatives.
Week 15	**Transcendental Functions II:** Properties of natural logarithm, The exponential function e^x, The function a^x and a^u, The function $y=\log_q u$.
Week 16	**Final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Thomas and Finney, Calculus and Analytic Geometry, Pearson Education Inc,11th Ed, 2008	Yes
Recommended Texts	Non	--
Websites	https://mdl.coie-nahrain.edu.iq	

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.