MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Calculus |			**Module Delivery**	
Module Type	Basic			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CSIT1102				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	UGI		**Semester of Delivery**	1	
Administering Department	Cybersecurity		**College**	College of Computer Science & Information Technology	
Module Leader	Elaf Ali Safooq		**e-mail**	elaf.safooq@uowa.edu.iq	
Module Leader's Acad. Title	Assist Lecturer		**Module Leader's Qualification**	M.Sc. in Mathematics	
Module Tutor	M.Sc Elaf Ali Safooq		**e-mail**	elaf.safooq@uowa.edu.iq	
Peer Reviewer Name	Dr. Ali Kareem		**e-mail**	alialmujab@uowa.edu.iq	
Scientific Committee Approval Date	24/12/2025		**Version Number**	V1	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Non	**Semester**	...
Co-requisites module	Non	**Semester**	...

Department Head Approval **Dean of the College Approval**

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. **Emphasize the importance of mathematics as a scientific foundation for the study of information security and cyber systems.** 2. **Prepare students for advanced cybersecurity courses such as cryptography, algorithms, and network security.** 3. **Enhance students' analytical and logical thinking skills for solving mathematical problems related to information technology.** 4. **Build a solid mathematical foundation for analyzing algorithms and understanding the behavior of functions related to time and memory performance.**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Develop analytical and logical thinking skills for effective problem-solving. • Organize mathematical solutions and present them in a systematic and scientific manner. • Link mathematical concepts with practical applications in the fields of information technology and cybersecurity.
Indicative Contents المحتويات الإرشادية	• Fundamentals of mathematics and their relation to cybersecurity • Introduction to mathematical functions • Derivatives and their applications • Concept of differential equations • Number systems • Boolean algebra

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The course adopts a range of **student-centered teaching strategies** that support both **theoretical and practical understanding**, including the following: 1. **Interactive lectures**, which actively engage students in understanding the course content through questions, discussions, and feedback. 2. **Problem-based learning**, implemented by presenting mathematical problems progressively from basic to advanced levels. 3. **Applied learning**, achieved by applying mathematical concepts to real-world problems.

	4. **Integration of theory and practice**, by clarifying the relationship between mathematical principles and their practical applications. An example of this approach is linking fundamental concepts with subsequent courses such as **cryptography and algorithms**.

Student Workload (SWL)			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	5	10% (10)	3, 6,9,12	All
	Assignments	5	10% (10)	2,5,7,10	All
	Onsite Assignments	2	10% (10)	4,11	1,2
	Reports	2	10% (10)	4,11	2,3
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction of cybersecurity and the relationship with calculus
Week 2	Introduction for Number theory (binary, octal, decimal, hexadecimal)
Week 3	Arithmetic operations of number theory(addition, subtraction, multiplication ,division)
Week 4	Boolean algebra(definition of Booleans, relationship with digital systems, gates)
Week 5	Boolean algebra (complementary, types of gates with truth tables)
Week 6	Derivative – Concept & Definition and Rules of Differentiation
Week 7	Application od Derivatives

Week 8	Integral- rules of integral
Week 9	Mid exam
Week 10	Differential equations and applications
Week 11	Basic Number Theory (Number theory is one of the most important fields of mathematics for cryptography, hashing, encryption, and digital security like cryptography, hashing, digital signature)
Week 12	Modular Arithmetic (Addition, subtraction, multiplication)
Week 13	Primes &Greatest Common Divisor (GCD)
Week 14	Intro to Cryptographic Mathematics
Week 15	Fundamentals of Probability Basics
Week 16	Final exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Calculus: Early Transcendentals,Cengage Learning),Stewart Anton, Bivens, Davis. *Calculus*, Wiley CRYPTOGRAPHY AND NETWORK SECURITY by WILLIAM STALLINGS	No
Recommended Texts	Thomas, G. B. *Calculus*, Pearson Education CRYPTOGRAPHY AND NETWORK SECURITY by William Stallings	No
Websites	https://www.khanacademy.org/math/calculus-1	

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.