MODULE DESCRIPTION FORM

Module Information					
Module Title	**Mathematics**			**Module Delivery**	
Module Type	**B**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CSIT1102**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Artificial Intelligence		**College**	Computer Science and Information Technology	
Module Leader	Elaf Ali Sfooq		**e-mail**	elaf.ali@uowa.edu.iq	
Module Leader's Acad. Title	Assist Lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor	Elaf Ali Sfooq		**e-mail**	elaf.ali@uowa.edu.iq	
Peer Reviewer Name	Assist lecturer Ali Mahmoud		**e-mail**	ali.mahmou@uowa.edu.iq	
Scientific Committee Approval Date	01/11/2025		**Version Number**	1.0	

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Department Head Approval

Dean of the College Approval

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	The aim of this module is to provide students with a solid foundation in core mathematical concepts and theories essential for further study in mathematics, science, and engineering. The course covers fundamental topics including algebra, calculus, geometry, discrete mathematics, probability, and statistics, equipping students with the analytical skills and problem-solving abilities required to apply mathematical principles effectively in academic and professional contexts.
Module Learning Outcomes	By the end of this module, students will be able to: 1. Understand and correctly use basic mathematical terminology and notation. 2. Apply formal mathematical definitions, theorems, and proofs to solve problems accurately. 3. Demonstrate a foundational understanding of propositional and predicate logic. 4. Explain the fundamental concepts of elementary set theory. 5. Understand and analyze mathematical relations and functions. 6. Understand the basic principles of graph theory and their applications.
Indicative Contents	• Calculus (Differentiation, Integration, and Applications) • Linear Algebra (Matrices, Vectors, Systems of Linear Equations) • Discrete Mathematics (Logic, Sets, Relations, Functions, Combinatorics) • Probability and Statistics (Descriptive Statistics, Probability Theory, Distributions) • Differential Equations (First-Order and Higher-Order Equations, Applications)

Learning and Teaching Strategies	
Strategies	1. **Lectures** • Deliver core mathematical concepts, theories, and principles in a structured and systematic manner. • Provide examples and step-by-step explanations to illustrate key ideas. 2. **Tutorials and Problem-Solving Sessions** • Enable students to practice and apply mathematical techniques learned in lectures. • Focus on exercises in algebra, calculus, discrete mathematics, probability, and statistics to reinforce understanding. 3. **Independent Learning and Self-Study** • Students are encouraged to review lecture notes, textbooks, and online resources to consolidate learning. • Assignments and practice exercises promote self-directed learning. 4. **Formative Assessments and Feedback** • Quizzes, assignments, and in-class exercises provide regular feedback on student progress.

	• Continuous assessment helps identify areas for improvement and supports mastery of mathematical concepts. 5. **Revision and Exam Preparation** • Structured revision sessions and guided problem-solving prepare students for midterm and final exams. • Emphasizes analytical reasoning, proof construction, and application of mathematical methods.

Student Workload (SWL)			
Structured SWL (h/sem)	48	**Structured SWL (h/w)**	3
Unstructured SWL (h/sem)	102	**Unstructured SWL (h/w)**	6.8
Total SWL (h/sem)	**150**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	5	15% (15)	2,3,5,10,11	LO #1, LO #3, LO #4
	Assignments	5	15% (15)	2,4,6,9,12	LO #2, LO #5, LO #6
	Projects / Lab.	-	-	-	Not Applicable (N/A)
	Report	1	10% (10)	13	LO #2, LO #6
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	(LO #1 – LO #4)
	Final Exam	3hr	50% (50)	16	All Learning Outcomes (LO #1 – LO #6)
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Functions: Function Definition, Domain and range of functions, Graphing of function
Week 2	Limits: Definition of limits, Theorems of limits, Type of limits
Week 3	The Definition and Interpretation of the Derivative
Week 4	Methods of proof and Mathematical induction
Week 5	Counting principles Permutations and combinations
Week 6	Pigeonhole principle Inclusion-exclusion principle
Week 7	Midterm
Week 8	Number Theory: ● Prime numbers and factorization ● Modular arithmetic ● GCD and LCM ● Applications in cryptography
Week 9	Probability and Statistics: ● Probability spaces ● Random variables and distributions ● Expectation and variance ● Applications in data analysis and algorithm analysis
Week 10	Linear Algebra for Computer Science: ● Vectors and matrices
Week 11	● Linear transformations
Week 12	● Eigenvalues and eigenvectors ● Applications in Machine Learning
Week 13	Special Topics: ● Cryptography
Week 14	● Computation theory and Complexity theory
Week 15	Recap for the final exam

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Calculus, Thomas ,1990,5th edition	Yes
Recommended Texts	Howard Anton, Irl Bivens, Stephen Davis, CALCULUS, 10th Edition, John Wiley & Sons, Inc., 2012.	No
Websites	https://ocw.mit.edu/ , https://tutorial.math.lamar.edu/	

Grading Scheme				
Group	**Grade**	Mark	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	Excellent	90 - 100	Outstanding Performance
	B - Very Good	Very Good	80 - 89	Above average with some errors
	C - Good	Good	70 - 79	Sound work with notable errors
	D - Satisfactory	Fair / Average	60 - 69	Fair but with major shortcomings
	E - Sufficient	Pass / Acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	Fail (Pending)	(45-49)	More work required but credit awarded
	F – Fail	Fail	(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.