MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

<table>
<tr><td colspan="3" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td>Mathematics I</td><td rowspan="5">Module Delivery

☒Theory
☐ Lecture
☐ Lab
☒Tutorial
☐Practical
☐Seminar</td></tr>
<tr><td>Module Type</td><td>Basic Learning Activity</td></tr>
<tr><td>Module Code</td><td>Math112</td></tr>
<tr><td>ECTS Credits</td><td>6</td></tr>
<tr><td>SWL (hr/sem)</td><td>150</td></tr>
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Module Level	UGI	**Semester of Delivery**	One
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Sarmad A. Jameel Altaie	**e-mail**	sarmad.a.altaie@uotechnology.edu.iq
Module Leader's Acad. Title	Senior Lecturer	**Module Leader's Qualification**	M.Sc.
Module Tutor	Sarmad A. Jameel Altaie	**e-mail**	sarmad.a.altaie@uotechnology.edu.iq
Peer Reviewer Name	Azhar Malik	**e-mail**	120020@uotechnology.edu.iq
Scientific Committee Approval Date	01/06/2023	**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. To develop problem solving skills of Pre-differential calculus. 2. To understand Derivative as a Function. 3. To get a good grip on the Rules of differentiation. 4. To have a full grasp of the differentiation methods. 5. To be able to deal with Interpretations of the derivative.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize several aspects about Real Numbers System. 2. Being able to deal with parts of the Cartesian Coordinates System. 3. List the various terms associated with Functions. 4. Identify different types of functions. 5. Evaluating Limit for various types of Functions. 6. Testing for the continuity of Functions. 7. Evaluate the derivative of a function using the Definition. 8. Discuss the Rules of differentiation. 9. Map several functions to their derivatives. 10. Describe different differentiation methods. 11. Analyze the Tangent Line Slope using derivative. 12. Discuss the Rate of Change in the real-world using derivative. 13. Explain the Position, Velocity, and Acceleration using derivative. 14. Identify when it is worthy using L'Hopital Rule for evaluating a limit of a function. 15. Use the derivative to find Taylor and Maclaurin Series expansion of a function.
Indicative Contents المحتويات الإرشادية	**Part A – Pre Differential Calculus.** This part will include a Review of Real Numbers System in terms of Intervals, Inequalities, Absolute Value. After that, the Cartesian Coordinates System Increment, Distance, Straight Line Equation, Circle Equation. Furthermore, the Functions characteristics domain, Range, odd, even, and then its Types {Polynomial, Algebraic, Transcendental Functions (Exponential, Logarithmic, Trigonometric, Inverse Trigonometric, Hyperbolic, Inverse Hyperbolic)}. Finally, the Limit and Continuity of Functions is explained (Theorems on Limit "Calculation Techniques", One-Sided and Two-Sided Limit, Limit at infinity, Theorems on Limit at infinity, Some special limits, Conditions of Continuity.) [12 hrs] Revision problem tutorial sessions [6 hrs] **Part B – Differential Calculus.** This part will discuss the first key part of the semester namely Differentiation starting from defining the derivative based on the limit, to Calculating the Derivatives from this Definition, doing to explaining the rules of differentiation (Constant, Powers of a function, Constant Multiple, Summation of Functions, Product of Two Functions, Quotient of Two Functions.) Furthermore, functions under focus and their Derivatives will be demonstrated, followed by differentiation methods namely Implicit, Logarithmic, and chain rule. [8 hrs] Revision problem tutorial sessions [4 hrs]

	Part C – Interpretations of the derivative.
	This part will take the knowledge provided in part B and employ it to a meaningful Interpretations of the derivative {Slope of the Tangent Line, Rate of Change, (Position, Velocity, and Acceleration), L'Hopital Rule, Taylor and Maclaurin Series.} [10 hrs] Revision problem tutorial sessions [5 hrs]

Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies	The primary approach for presenting this module will be encouraging students to participate in the activities, as well as enhancing and improving their critical thinking abilities. This will be accomplished through lectures, tutorials, debates, and assessing activities.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
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	5
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**	2	5% (5)	5 and 11	LO #1 - #4 and #5 - #10
	Assignments	2	5% (5)	6 and 13	LO #1 - #5 and #6 - #12
	Projects / Lab.	N/A	N/A	N/A	
	Report	N/A	N/A	N/A	
Summative assessment	**Midterm Exam**	2hr	20% (20)	8	LO #1 - #7
	Final Exam	3hr	70% (70)	16	All
Total assessment		100% (100 Marks)			

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Review of Real Numbers System (**Intervals, Inequalities, Absolute Value.**)**
Week 2	**Cartesian Coordinates System (**Increment, Distance, Straight Line Equation, Circle Equation.**)**
Week 3	**Functions (**Domain, Range, odd, even, Types {Polynomial, Algebraic}.**)**
Week 4	**Functions (**Types {Transcendental Functions (Exponential, Logarithmic, Trigonometric, Inverse Trigonometric, Hyperbolic, Inverse Hyperbolic)}.**)**
Week 5	**Limit and Continuity of Functions (**Theorems on Limit "Calculation Techniques", One-Sided and Two-Sided Limit.**)**
Week 6	**Limit and Continuity of Functions (**Limit at infinity, Theorems on Limit at infinity, Some special limits, Conditions of Continuity.**)**
Week 7	**Differentiation (**Derivative as a Function, Calculating Derivatives from the Definition.**)**
Week 8	**Differentiation (**Rules of differentiation {Constant, Powers of a function, Constant Multiple, Summation of Functions, Product of Two Functions, Quotient of Two Functions}.**)**
Week 9	**Differentiation (**Functions and their Derivatives, Implicit differentiation.**)**
Week 10	**Differentiation (**Logarithmic differentiation, chain rule.**)**
Week 11	**Interpretations of the derivative (**Slope of the Tangent Line.**)**
Week 12	**Interpretations of the derivative (**Rate of Change.**)**
Week 13	**Interpretations of the derivative (**Position, Velocity, and Acceleration.**)**
Week 14	**Interpretations of the derivative (**L'Hopital Rule.**)**
Week 15	**Interpretations of the derivative (**Taylor and Maclaurin Series.**)**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Tutorial)

المنهاج الاسبوعي للدرس التدريبي

	Material Covered
	Each weak a questions sheet will be solved and discussed related to the material covered in the theoretical lecture.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Joel R. Hass, Christopher E. Heil, Maurice D. Weir, "Thomas' Calculus: Early Transcendentals", Pearson Education, 14th Edition, (January 1, 2017), ISBN-13 : 978-0134439020.	Yes
Recommended Texts	Anthony Croft, Robert Davison, "Mathematics for Engineers: A Modern Interactive Approach", Prentice Hall, 3rd edition, (January 1, 2008), ISBN-13 : 978-0132051569.	No
Websites	https://www.khanacademy.org/math/differential-calculus	

Group	Grade	التقدير	Marks %	Definition
		Grading Scheme مخطط الدرجات		
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.