MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	Differential Mathematics	Module Delivery	
Module Type	Support	☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	UOMU024013		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	**Semester of Delivery**	1
Administering Department	MIET	**College**	CETE
Module Leader	Arzaq Salim Abd Ali	**e-mail**	arzaq.saleem.abd@uomus.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	**Module Leader's Qualification**	MSc.
Module Tutor	Arzaq Salim Abd Ali	**e-mail**	arzaq.saleem.abd@uomus.edu.iq
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date	19/11/2023	**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 and understanding of Differential calculus through a broad range of Differentiation techniques. 2. To understand limits and theory of derivative and apply it on various types of functions. 3. This is the basic subject for all engineering fields. 4. Demonstrate basic knowledge and understanding of a core of plane analytical geometry, algebra and applied mathematics. 5. Introduce student to Derivatives of trigonometric functions and their inverses.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recall basic concepts of calculus: functions, variables, limits, and continuity. 2. Use the limit laws to evaluate the limit of a function. 3. Discuss continuity at a point and continuity over an interval. 4. Understand transcendental functions and how a function and its inverse are related. 5. Define Plane analytical geometry and identify how conic sections are formed in addition to define both in words and in algebraic formulae, a circle and its center and radius, and an ellipse and its foci. 6. Learn how to convert rectangular coordinates to polar coordinates and vice versa, as well as plot points using polar coordinates. 7. Differentiate algebraic and transcendental functions 8. Midterm 9. Discuss Chain rules and applications of the derivatives. 10. Define determinants and understand their relation to matrices . Also explain the methodology for finding a determinant. 11. Learn how to solve Linear equations by Cramer's rule.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Limits and Continuity, Trigonometric functions, and their inverses. Hyperbolic and inverse hyperbolic functions, Exponential function and logarithmic function. Plane analytical geometry, parabola & ellipse, hyperbola. [25 hrs] 1. Polar coordinates, Theory and rules of derivatives, Implicit Differentiation and Chain rules, Derivatives of trigonometric functions and their inverses. Derivatives of Transcendental functions and their inverses. [33 hrs] 2. Properties of determinants, Solution of Linear equations by Cramer's rule. [10 hrs] 3. Revision problem classes [5 hrs]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The major approach used to offer this module will be to promote student engagement in the exercises while also enhancing and broadening their critical thinking abilities. Classes and interactive lessons will be used to achieve this.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation					
تقييم المـادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	6 and 10	LO #2, #7, #9, and #10
	Online assignments	2	10% (10)	4 and 12	LO #1 - #5 and #6 - #10
	Report	1	10% (10)	14	LO #1 - #8
	On Site assignments	2	10% (10)	2 and 5	LO #1 - #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	LO #1 - #10
Total assessment			100% (100 Marks)		

| Delivery Plan (Weekly Syllabus) |
| المنهاج الاسبوعي النظري |

	Material Covered
Week 1	Limits and Continuity
Week 2	Transcendental functions- trigonometric functions, and their inverses.
Week 3	Transcendental functions-Hyperbolic and inverse hyperbolic functions
Week 4	Transcendental functions-Exponential function and logarithmic function.
Week 5	Plane analytical geometry, parabola & ellipse, hyperbola.
Week 6	Polar coordinates.
Week 7	Mid-term Exam
Week 8	Theory and rules of derivatives.
Week 9	Implicit Differentiation and Chain rules.
Week 10	Derivatives of trigonometric functions , Derivatives of inverse trigonometric functions.
Week 11	Derivatives of the exponential and natural logarithms functions.
Week 12	Derivatives of Hyperbolic and inverse hyperbolic functions.
Week 13	Applications of the derivatives.
Week 14	Determinants and properties of determinants.
Week 15	Solution of Linear equations by Cramer's rule. + Preparatory week before the final Exam

| Learning and Teaching Resources |
| مصادر التعلم والتدريس |

	Text	Available in the Library?
Required Texts	Engineering Mathematics I (pdf)	No
Recommended Texts	Thomas ' Calculus (pdf) Fouteenth edition Based on the original work by GEORGE B. THOMAS, JR.	No
Websites	https://elearningatria.files.wordpress.com/2013/10/differential-calculus-1-23.pdf http://dl.konkur.in/post/Book/Paye/Thomas-Calculus-14th-Edition-%5Bkonkur.in%5D.pdf	

<table>
<tr><td colspan="5" align="center">**Grading Scheme**
مخطط الدرجات</td></tr>
<tr><td>**Group**</td><td>**Grade**</td><td>**التقدير**</td><td>**Marks (%)**</td><td>**Definition**</td></tr>
<tr><td rowspan="5">**Success Group (50 - 100)**</td><td>**A -** Excellent</td><td>امتياز</td><td>90 - 100</td><td>Outstanding Performance</td></tr>
<tr><td>**B -** Very Good</td><td>جيد جدا</td><td>80 - 89</td><td>Above average with some errors</td></tr>
<tr><td>**C -** Good</td><td>جيد</td><td>70 - 79</td><td>Sound work with notable errors</td></tr>
<tr><td>**D -** Satisfactory</td><td>متوسط</td><td>60 - 69</td><td>Fair but with major shortcomings</td></tr>
<tr><td>**E -** Sufficient</td><td>مقبول</td><td>50 - 59</td><td>Work meets minimum criteria</td></tr>
<tr><td rowspan="2">**Fail Group (0 – 49)**</td><td>**FX –** Fail</td><td>راسب (قيد المعالجة)</td><td>(45-49)</td><td>More work required but credit awarded</td></tr>
<tr><td>**F –** Fail</td><td>راسب</td><td>(0-44)</td><td>Considerable amount of work required</td></tr>
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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.