MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	**Mathematics I**	**Module Delivery**	
Module Type	Suport or related learning activity	⊠ Theory ☐ Lecture ☐ Lab ⊠ Tutorial ☐ Practical ☐ Seminar	
Module Code	**CET1103**		
ECTS Credits	**5**		
SWL (hr/sem)	**125**		
Module Level	1	**Semester of Delivery**	1
Administering Department	CET	**College**	EETC
Module Leader	Hala A. Hashim	**e-mail**	hala.solomon@gmail.com
Module Leader's Acad. Title	Assistant Lecturer	**Module Leader's Qualification**	M.Sc.
Module Tutor	Haneen Jawad Abood	**e-mail**	haneenjawadabood1994@gmail.com
Peer Reviewer Name	Assist prof. Alhamzah Taher	**e-mail**	alhamza_tm@mtu.edu.iq
Scientific Committee Approval Date	13/06/2023	**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 Aims أهداف المادة الدراسية	1. This course deals with differential and integral calculus. 2. To develop problem solving skills and understanding of preliminaries to differential calculus. 3. To understand differentiation, and differentiation methods. 4. To perform applications using the derivative. 5. To get a good grasp of Integrals, and Integration methods. 6. To understand the relationship between differentiation and integration.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize Line and Circle Equation and related evaluating formulas. 2. List the various terms associated with Functions and their Types. 3. Discuss the Limit and Continuity of a Function. 4. Describe the Definition of a derivative as a limit, Differentiation Rules, and various types of Function's Derivatives. 5. Identify when to use different Differentiation Methods. 6. Discuss the Curve Sketching process, and the L'Hospital's Rule. 7. Analyze Taylor and Maclaurin Series. 8. Identify the Indefinite Integrals. 9. Explain the Integration Methods u-substitution, By parts. 10. Explain the Integration Methods Involving Trigonometric Functions, Trigonometric substitution. 11. Explain the Integration Method Rational Functions by Partial Fractions. 12. Explain the Integration Methods Functions Involving Roots, and Functions Involving Quadratics. 13. Recognize the Definite Integral and its Application Area Under a Curve. 14. Discuss e the Definite Integral Applications Arc Length, Average Value of a Function. 15. Discuss the Definite Integral Applications Areas Between Two Curves.
Indicative Contents المحتويات الإرشادية	<u>Part A - Preliminaries to differential calculus.</u> This part includes the Line and Circle Equation and related evaluating formulas and parameters. Furthermore, main mathematical Functions characteristics Domain, Range, Odd, Even, and their Types. Finally, The Limit and Continuity of a Function Laws, the behavior At Infinity, followed by important Special Limits, then the Continuity Conditions. **[9 hrs]** + Revision problem classes in weekly tutorials **[3 hrs]** <u>Part B – Differential calculus.</u> This part will take in details the first key subject of the semester, the Differentiation process from the prospective of Definition as limit, Differentiation Rules, and Function-Derivative Table. Which will be followed by Differentiation Methods namely the Implicit, Logarithmic, and The Chain Rule. Furthermore, four Applications of differentiation will be discussed the Curve Sketching, L'Hospital's Rule, and Taylor and Maclaurin Series. **[12 hrs]** + Revision problem classes in weekly tutorials **[5 hrs]**

	<u>Part C – Integral calculus.</u> This part discusses the second key subject the Integration of functions. Followed by dissecting the main Integration Methods, u-substitution, By parts, Involving Trigonometric Functions, Trigonometric substitution, Rational Functions by Partial Fractions, Functions Involving Roots, and Functions Involving Quadratics. Furthermore, it will consider six definite Integral applications, namely The Area Under a Curve, Arc Length, Average Value of a Function, and Areas Between two Curves. **[22 hrs]** + Revision problem classes in weekly tutorials **[8 hrs]**

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	This module will primarily focus on encouraging students to participate in the activities, as well as refining and developing their critical thinking skills. This will be achieved through lectures, tutorials, discussions, and grading activities.

Student Workload (SWL)
الحمل الدراسي للطالب موزع على ١٥ اسبوع

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.13
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	10% (10)	5,10	LO #1 - 9
	Assignments	2	20% (10)	5,10	LO # 1 - 4, LO # 6-9
	Projects / Lab.	N/A			
	Report	1	10% (10)		LO # 1 - 14
Summative assessment	**Midterm Exam**	2 hr	10% (10)	5	LO # 1-11
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

	Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered	
Week 1	**Line and Circle Equation. Functions (**Domain, Range, Odd, Even, Types.**)**	
Week 2	**The Limit and Continuity of a Function (**Laws, At Infinity, Special Limits, Continuity Conditions.**)**	
Week 3	**Differentiation (**Definition as limit, Differentiation Rules, Function-Derivative Table.**)**	
Week 4	**Differentiation Methods (**Implicit, Logarithmic, The Chain Rule**.)**	
Week 5	**Midterm Exam**	
Week 6	**Applications of Differentiation (**Curve Sketching, L'Hospital's Rule.**), Applications of Differentiation (**Taylor and Maclaurin Series.**)**	
Week 7	**Introduction to Indefinite Integrals, Integration Methods (**u-substitution, By parts.**)**	
Week 8	**Integration Methods (**Involving Trigonometric Functions, Trigonometric substitution.**)**	
Week 9	**Integration Methods (**Integration of Rational Functions by Partial Fractions.**)**	
Week 10	**Midterm Exam**	
Week 11	**Integration Methods (**Functions Involving Roots**, Functions Involving Quadratics.**)**	
Week 12	**Midterm Exam**	
Week 13	**Definite Integral and Applications (**Definite Integral, Area Under a Curve.**)**	
Week 14	**Definite Integral and Applications (**Arc Length, Average Value of a Function.**)**	
Week 15	**Definite Integral and Applications (**Areas Between two Curves**)**	
Week 16	**Preparatory week before the final Exam**	

Delivery Plan (Weekly Tutorial) المنهاج الاسبوعي الاضافي
Material Covered
Each week, a question sheet related to the material presented in the theoretical lecture will be solved and debated.

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

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.