MODULE DESCRIPTION - Mathematics II

وصف المادة الدراسية (الرياضيات II)

Module Information معلومات المادة الدراسية					
Module Title	**Mathematics II**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CIV12102**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Civil Engineering		**College**	Al-Mansour University Colloge	
Module Leader	Dr.Ammar Muayyad Saber		**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	11/10/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		**Semester**	1
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. The student acquires knowledge and special skills to analyze and solve mathematical equations using the relevant theories, hypotheses and laws. 2. To give a rigorous analytic approach to the definitions and properties of different functions 3. To study a number of important techniques which apply to finding integrals for specialized classes of functions 4. Extends the students' knowledge to find how to add together infinitely many numbers or many powers of variables.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Identify the Derivative and Integral of Natural Logarithm Function, exponential function and General Exponential Function a^x with applications. 2. Discuss the Definitions, Derivatives and Integrals of Hyperbolic Functions and the inverse of Trigonometric functions with applications. 3. Define the integration by parts as a techniques of integration with applications. 4. Simplify the Repeated Integrations by using Tabular Integration use identities to transform the integrals of powers of Sines and Cosines we have to find into integrals that are easier to work with. 5. Describe the Procedure for a Trigonometric Substitution with applications. 6. General Description of the Integration of Rational Functions by Partial Fractions. 7. Representing Sequences and explain the Monotonic Sequence Theorem 8. Describe the Convergence and Divergence of Sequences. 9. Define the Infinite Series and the nth-Term Test for a Divergent Series 10. Discuss the Power Series and Convergence with applications and Explain the Taylor and Maclaurin Series 11. Describe the Polar Coordinates.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Transcendental Functions – Natural Logarithm Function , exponential function and General Exponential Function a^x [8 hrs] Transcendental Functions –, Hyperbolic Functions and inverse of Trigonometric Functions [10 hrs] Techniques of integration - integration by parts, Tabular Integration, integrals of powers of Sines and Cosines [10 hrs] Techniques of integration - Trigonometric Substitution, Integration of Rational Functions [8 hrs] Infinite Sequences and Series – Sequences, Monotonic Sequence Theorem, Convergence and Divergence of Sequences [10 hrs] Infinite Sequences and Series – Infinite Series, nth-Term Test for a Divergent Series,

	Power Series and Convergence and Taylor and Maclaurin Series [10 hrs]. Polar Coordinates [4 hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by solving different types of mathematical problems that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.13
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 and 11	LO #1, #2 and #9, #10
	Assignments	3	18% (18)	2,8 and 12	LO #3, #4 and #6, #7
	Onsite Assign.	1	6% (6)	13	LO #5, #8 and #11
	Report	1	6% (6)	13	LO #5, #8 and #11
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Vector algebra, vector desc. of line, length angles and projections, vector dot and cross products
Week 2	Vector desc. of planes, intersection of planes and lines, planes: shortest distances
Week 3	Vector valued functions, revision, vector geometry
Week 4	Directional derivatives and gradient
Week 5	Engineering applications
Week 6	D-operator method and separation of variables
Week 7	Mid exam 1
Week 8	Double integration
Week 9	Change of order
Week 10	Double integration in polar coordinates
Week 11	Engineering applications
Week 12	Engineering applications
Week 13	Cartesian triple integration
Week 14	Applications
Week 15	Mid exam 2
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Thomas' Calculus: Early Transcendentals** 15th edition | Published by Pearson (February 8th 2022) - Copyright © 2023	No
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Websites	https://rodrigopacios.github.io/mrpacios/download/Thomas_Calculus.pdf	

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.