

	Ministry of Higher Education and Scientific Research - Iraq Al-Naji University College of Engineering AI Engineering Department	
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Fundamentals of Engineering Mathematics		Module Delivery	
Module Type	Basic		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☒ Seminar	
Module Code	CEA1201			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	UGI	Semester of Delivery		2
Administering Department	AI Engineering	College	Engineering	
Module Leader	Dr. Maher Faik		e-mail	maherfaik3@alnaji-uni.edu.iq
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			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. Recognize and analyze various mathematical functions as well as being able to distinguish them from other mathematical relationships. 2. Grasp the core idea of limits and being able to investigate the continuity of mathematical functions. 3. Mastering differentiation and use it for solving optimization and rate of change problems. 4. Comprehensively understand the concept of integration and use it to calculate area under the curve and volume of solids as well as solve accumulation and motion problems. 5. Applying different integration techniques. 6. Link between differentiation and integration to comprehend the fundamental theorem of Calculus. Improve mathematical thinking, reasoning and problem-solving skills.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	LO1. Analyze and manipulate mathematical functions and learn how to find domain, range, intercepts and compose functions. LO2. Evaluate limits graphically, numerically, and algebraically. LO3. Assess the continuity of functions. LO4. Find the derivative of functions by using the definition of differentiation. LO5. Determine the derivative of different types of functions such as algebraic, trigonometric and transcendental functions. LO6. Apply differentiation rules such as power and quotient rules. LO7. Use derivative concepts to solve real-world problems and sketch functions. LO8. Apply Integration rules. LO9. Evaluate indefinite integrals for different types of functions. LO10. Compute the definite integrals. LO11. Solve the area under the curve and volume problems by integrations. LO12. Use different methods of integrations. Modelling experimental data using Calculus concepts and interpret the results.
Indicative Contents المحتويات الإرشادية	1. Functions [14 hrs.] 2. Limits & continuity [14 hrs.] 3. Differentiation and its applications [28 hrs.] Integrations, its methods and applications [49 hrs.]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The learning strategy of this module focuses on grasp the underlying ideas of calculus with much effort is concentrated on explain how calculus formulas are formed in order to promote clear understanding of this topic and avoid the memorization of these formulas. Classwork is the essential tool for practicing regularly and reinforce understanding. Quizzes should be incorporated to assess the level of understanding, progress of the students in Calculus, and to concurrently modify the teaching approach, if it is necessary. Students ought to be encouraged to interact actively during the lectures to receive instantaneous feedback from them.
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	Finally, there is a written task where the students are asked to write a text to interpret some visual experimental data to improve their mathematical thinking reasoning, and written communication skills.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	10% (10)	Continuous	All
	Home Work	1	10% (10)	Continuous	All
	CW	1	10% (10)	Continuous	All
	Report	1	10% (10)	Continuous	All
Summative assessment	Midterm Exam	2hr	10% (10)	7	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Preparation for Calculus (Graphs & Models; Linear Models & Rate of Change; Function & Their graphs)
Week 2	Limits & Their Properties (Finding Limits Graphically and numerically)
Week 3	Limits & Their Properties (Evaluating Limits Analytically)
Week 4	Differentiation

Week 5	Calculus of Logarithmic, Exponential, and Other Transcendental Functions
Week 6	Implicit Differentiation
Week 7	Applications of Differentiation-Part 1
Week 8	Applications of Differentiation-Part 2 + Mid Term Exam
Week 9	Integration-Part 1
Week 10	Integration-Part 2
Week 11	Applications of Integration-Part 1
Week 12	Applications of Integration-Part 2
Week 13	Integration Techniques- Part 1
Week 14	Integration Techniques- Part 2
Week 15	Improper Integrals
Week 16	

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	

Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	

Week 15	
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Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Calculus Early Transcendental Functions, Ron Larson & Bruce Edwards, 6th edition, 2014.	
Recommended Texts	calculus, Howard Anton-Irl Bivens & Stephen Davis, 10th edition, 2012. Bird's Comprehensive Engineering Mathematics, John Bird, 2nd edition, 2018.	
Websites		

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.				

