



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information

معلومات المادة الدراسية

Module Title	INTEGRAL MATHEMATICS	Module Delivery	
Module Type	BASIC	✓ Theory Lecture Lab	
Module Code	UOMU0205023	✓ Tutorial Practical ✓ Seminar	
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	Semester of Delivery	1
Administering Department	DEPARTMENT OF ELECTRICAL ENGINEERING TECHNIQUES	College	Al-Mustaqbal
Module Leader	Ahmed Mahdi	e-mail	ahmed-hamza@atu.edu.iq
Module Leader's Acad. Title	Assist. lec.	Module Leader's Qualification	M.Sc.
Module Tutor	None	e-mail	None
Peer Reviewer Name	None	e-mail	None
Review Committee Approval	21/06/2023	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	To teach the students: 1- Indefinite integral and the Fundamental Theorem of calculus 2- Methods of integration: by parts, trigonometric substitutions, completing the square, partial fractions 3- Definite integral 4- Application of integrations: Area of a region under a graph of a continuous function, arc length, volume of a solid of revolution, surface area 5-Determinants and Matrices.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Learning about the Indefinite integral. 2. Learning the Functions of several variables. 3. Learning the Methods of integration 4. Learning the Definite integral. 5. Application of integrations 6. Determinants and Matrices.

Indicative Contents المحتويات الإرشادية	<p>Indicative content includes the following:</p> <ul style="list-style-type: none"> ❖ <u>Indefinite integral</u> – For most students the assumptions I’ve made above about their exposure to Indefinite integral is the extent of their exposure. Problems tend to arise however because most instructors seem to assume that either students will see beyond this exposure in some later class or have already seen beyond this in some earlier class. Students are then suddenly expected to know more than basic Indefinite integral_but often haven’t actually seen it anywhere and have to quickly pick it up on their own in order to survive in the class. [12 hrs] ❖ <u>Methods of integration</u> – In this section we introduce the concept of a Methods of integration and give several examples of solving them. We also revisit the gradient that we first saw a few chapters ago. Line Integrals – Part I – In this section we will start off with a quick review of parameterizing curves. This is a skill that will be required in a great many of the line integrals we evaluate and so needs to be understood. We will then formally define the first kind of line integral we will be looking at : line integrals with respect to arc length. Line Integrals – Part II – In this section we will continue looking at line integrals and define the second kind of line integral we’ll be looking at : line integrals with respect to x, y, and/or z. We also introduce an alternate form of notation for this kind of line integral that will be useful on occasion. Line Integrals of Vector Fields – In this section we will define the third type of line integrals we’ll be looking at : line integrals of vector fields. We will also see that this particular kind of line integral is related to special cases of the line integrals with respect to x, y and z. [20 hrs] ❖ <u>Definite integral and its applications</u>- In this chapter will be looking at definite integrals, i.e. integrating functions of two variables in which the independent variables are from two dimensional regions, and triple integrals, i.e. integrating functions of three variables in which the independent variables are from three dimensional regions. [12 hrs] ❖ Determinants and Matrices [12hrs]. ❖ Revision problem classes [6 hrs]
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in the delivery of this unit is to encourage students to participate in exercises, while improving and expanding their mathematical reasoning skills.
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	32	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	2.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

	Time/Number	Weight (Marks)	Week Due	Relevant Learning
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					Outcome
Formative assessment	Quizzes	5	10% (10)	4,6,8,10,11	LO #1, 2, and 4
	Assignments	12	10% (10)	Continuous	All
	Projects / Lab. Report	0	0		
		0	0		
Summative assessment	Midterm Exam	2 hr	20% (20)	8	LO # 1-6
	Final Exam	3 hr	60% (60)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Definite integral
Week 2	Integral calculus, Standard integration .
Week 3	Method of integration.
Week 4,5	Methods of integration: by parts, trigonometric substitutions, completing the square.
Week 6	Integration using algebraic substitutions, trigonometric substitutions, hyperbolic substitutions, and partial fractions.
Week 7	Definite integral
Week 8,9	Application of integrations: Area of a region under a graph of a continuous function, arc length, volume of a solid of revolution, surface area
Week 10,11	Integration using Tables and Computer Algebra Systems CAS, Numerical Integration (Trapezoidal Approximation, Midpoint Approximation, Simpson's Approximation, and Error Bounds)
Week 12	Theory of matrices and determinants. Properties of matrix operations
Week 13,14	matrix transpose, matrix inverse, Applications to linear equations, Cramer's Rule.
Week 14	Eigen values and eigenvectors.
Week15	Final exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Advance Engineering Mathematics, Alan Jeffrey, 2002	Yes
Recommended Texts	Calculus II & Calculus III, Paul Dawkins, 2007	No
Websites	https://tutorial.math.lamar.edu/Classes/CalcIII/CalcIII.aspx https://tutorial.math.lamar.edu/Classes/CalcII/CalcII.aspx	

APPENDIX:**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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.