

	<p>Ministry of Higher Education and Scientific Research - Iraq</p> <p>University of Warith Al-Anbiyaa College of Engineering Aircraft Engineering Department</p>	
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MODULE DESCRIPTOR FORM

Module Information			
Module Title	Mathematics I	Module Delivery	
Module Type	CORE	Theory	
Module Code	ENG112		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	Semester of Delivery	1
Administering Department	Aircraft Engineering	College	Engineering
Module Leader	Aws Akram Mahmoud	e-mail	aws@uowa.edu.iq
Module Leader's Acad. Title	Assist. Prof	Module Leader's Qualification	Ph.D.
Module Tutor	None	e-mail	None
Peer Reviewer Name		e-mail	
Review Committee Approval	26/09/2024	Version Number	2024

Relation With Other Modules			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	
Module Aims, Learning Outcomes and Indicative Contents			

<p>Module Aims</p>	<ol style="list-style-type: none"> 1. To provide a course of high academic quality in Mathematics in a challenging and supportive learning environment that encourages students to reach their full potential, personally and academically. 2. To provide a course that is suitable both for students aiming to pursue research and for students going into other careers. 3. To provide an integrated system of teaching which can be tailored to the needs of individual students. 4. To develop in students the capacity for learning and clear logical thinking. 5. To continue to attract and select students of outstanding quality. 6. To provide an intellectually stimulating environment in which students have the opportunity to develop their skills and enthusiasm to their full potential.
<p>Module Learning Outcomes</p>	<p>Knowledge and Understanding: This Course will develop learners' ability to:</p> <ol style="list-style-type: none"> 1. Understand and use mathematical concepts and relationships 2. Select and apply operational skills in algebra, geometry, trigonometry and statistics within mathematical contexts 3. Select and apply skills in numeracy 4. Use mathematical models 5. Use mathematical reasoning skills to interpret information, select a strategy to solve a problem, and communicate solutions. <p>Subject-specific skills: It is expected that learners will develop the following:</p> <ol style="list-style-type: none"> 6. Broad, generic skills through this Course. 7. Skills for Learning, and drawn from the main skills areas listed below. 8. Skills for Life 9. and Skills for Work <p>These must be built into the Course where there are appropriate opportunities.</p>
<p>Indicative Contents</p>	<p>Indicative content includes the following.</p> <p>Vector and the geometry of space: Three-Dimensional Coordinate Systems, Vector Algebra Operations, unit Vectors, the Midpoint of a Line Segment, The Dot Product, The angle between Vectors, and The Cross Product. [12 hrs]</p> <p>Matrices: Types of matrices. Elementary operations with matrices and vectors. Determinants. Linear equations. Row reduction method. Cramer's rule. Applications. [18 hrs]</p> <p>Limits and continuity: Rates of Change and Limits, calculating limits using the limit law, infinite</p>

	<p>limits and vertical asymptotes, continuity, tangents and derivatives. [12 hrs]</p> <p>Differentiation: Inverse Functions and Their Derivatives. Natural Logarithms. The Exponential and Logarithm Functions. Trigonometric Functions. Inverse Trigonometric Functions. Hyperbolic Functions. Inverse Hyperbolic Functions. Calculating Derivatives from the Definition. Differentiation Rules for (functions). Derivatives of Trigonometric Functions. The Chain Rule. Implicit Differentiation. Derivatives of Higher Order. [22 hrs]</p> <p>Applications of derivatives: Extreme Values of Functions. Increasing and Decreasing Functions. Concavity and Curve Sketching. Applied Optimization Problems. L'Hôpital's Rule. The Mean Value Theorem. Motion along a Line: Displacement, Velocity, Speed, Acceleration. Related Rates Equations (application on Implicit Differentiation). Approximate calculation. [18 hrs]</p> <p>General Applications. [5 hrs]</p>
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Learning and Teaching Strategies

Strategies	<p>All lectures reflect the higher values, purposes and principles. They offer flexibility, provide more time for learning, focus on skills and applying to learn, and scope for personalization and choice.</p> <p>In this Course, and its component Units, there will be an emphasis on skills development and the application of those skills. Assessment approaches will be proportionate, fit for purpose and will promote best practices, enabling learners to achieve the highest standards they can.</p> <p>This course provides learners with opportunities to continue to acquire and develop the attributes and capabilities of the four capacities, as well as skills for learning, skills for life and skills for work.</p>
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Student Workload (SWL)

Structured SWL (h/sem)	63	Structured SWL (h/w)	4
Unstructured SWL (h/sem)	87	Unstructured SWL (h/w)¹	5.8
Total SWL (h/sem)	150		

Module Evaluation

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	20% (20)	3, 6, 9, 12	LO #1, 2, 3,4 and 9
	Assignments	2	10% (10)	5, 10	LO #6, 7
	Projects / Lab.	-	-	-	-
	Report	1	10% (10)	13	LO #8
	Midterm Exam	2 hrs.	10% (10)	7	LO # 1-5

Summative assessment	Final Exam	3 hrs.	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Vector and the geometry of space: Three-Dimensional Coordinate Systems. Vector Algebra Operations. Unit Vectors. Midpoint of a Line Segment.
Week 2	The Dot Product. The angle between Vectors. The Cross Product.
Week 3	Matrices: Types of matrices. Elementary operations with matrices and vectors.
Week 4	Determinants. Linear equations. Row reduction method. Cramer's rule.
Week 5	Applications.
Week 6	Limits and continuity: Rates of Change and Limits. Calculating Limits Using the Limit Law.
Week 7	Infinite Limits and Vertical Asymptotes. Continuity. Tangents and Derivatives.
Week 8	Differentiation: Inverse Functions and Their Derivatives. Natural Logarithms. The Exponential and Logarithm Functions.
Week 9	Trigonometric Functions. Inverse Trigonometric Functions. Hyperbolic Functions. Inverse Hyperbolic Functions.
Week 10	Calculating Derivatives from the Definition. Differentiation Rules for (functions).
Week 11	Derivatives of Trigonometric Functions. The Chain Rule. Implicit Differentiation. Derivatives of Higher Order.
Week 12	Applications of derivatives: Extreme Values of Functions. Increasing and Decreasing Functions. Concavity and Curve Sketching.
Week 13	Applied Optimization Problems. L'Hôpital's Rule. The Mean Value Theorem. Motion along a Line: Displacement, Velocity, Speed, Acceleration.
Week 14	Related Rates Equations (application on Implicit Differentiation). Approximate calculation.
Week 15	General Applications
Week 16	Preparatory week before the Final Exam

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
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Week 1	Exp. 1:
Week 2	Exp. 2:
Week 3	Exp. 3:
Week 4	Exp. 4:
Week 5	Exp. 5:
Week 6	Exp. 6:
Week 7	Exp. 7:

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	George B. Thomas, Jr., Maurice D. Weir and Joel Hass, Thomas' calculus, 12th edition, Addison Wesley, 2010.	Yes
Recommended Texts	H.S. Gangwar, Prabhakar Gupta. A textbook engineering mathematics-I. Second edition, 2010.	No
Websites		

APPENDIX:

GRADING SCHEME

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.