



Ministry of Higher Education and  
Scientific Research - Iraq  
University of Warith Alanbyaa  
Aircraft engineering



## MODULE DESCRIPTOR FORM

### نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
<b>Module Title</b>	Mathematics I رياضيات I	<b>Module Delivery</b>	
<b>Module Type</b>	CORE	Theory	
<b>Module Code</b>	MATH112		
<b>ECTS Credits</b>	6		
<b>SWL (hr/sem)</b>	150		
<b>Module Level</b>	1	<b>Semester of Delivery</b>	1
<b>Administering Department</b>	Aircraft	<b>College</b>	Engineering
<b>Module Leader</b>	Dr. Nihad Abduljaleel	<b>e-mail</b>	
<b>Module Leader's Acad. Title</b>	Dr.	<b>Module Leader's Qualification</b>	Ph.D.
<b>Module Tutor</b>		<b>e-mail</b>	
<b>Peer Reviewer Name</b>	Dr.	<b>e-mail</b>	
<b>Review Committee Approval</b>	03/04/2024	<b>Version Number</b>	1.0

Relation With Other Modules			
العلاقة مع المواد الدراسية الأخرى			
<b>Prerequisite module</b>	None	<b>Semester</b>	
<b>Co-requisites module</b>	None	<b>Semester</b>	

## Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b> أهداف المادة الدراسية</p>	<ol style="list-style-type: none"><li>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.</li><li>2. To provide a course that is suitable both for students aiming to pursue research and for students going into other careers.</li><li>3. To provide an integrated system of teaching which can be tailored to the needs of individual students.</li><li>4. To develop in students the capacity for learning and clear logical thinking.</li><li>5. To continue to attract and select students of outstanding quality.</li><li>6. To provide an intellectually stimulating environment in which students have the opportunity to develop their skills and enthusiasm to their full potential.</li></ol>
<p><b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية</p>	<p>Knowledge and Understanding: This Course will develop learners' ability to:</p> <ol style="list-style-type: none"><li>1. Understand and use mathematical concepts and relationships</li><li>2. Select and apply operational skills in algebra, geometry, trigonometry and statistics within mathematical contexts</li><li>3. Select and apply skills in numeracy</li><li>4. Use mathematical models</li><li>5. Use mathematical reasoning skills to interpret information, select a strategy to solve a problem, and communicate solutions.</li></ol> <p>Subject-specific skills: It is expected that learners will develop the following:</p> <ol style="list-style-type: none"><li>6. Broad, generic skills through this Course.</li><li>7. Skills for Learning, and drawn from the main skills areas listed below.</li><li>8. Skills for Life</li><li>9. and Skills for Work</li></ol> <p>These must be built into the Course where there are appropriate opportunities.</p>
<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><b>Vector and the geometry of space:</b> 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><b>Matrices:</b> Types of matrices. Elementary operations with matrices and vectors. Determinants. Linear equations. Row reduction method. Cramer's rule. Applications. [18 hrs]</p>

	<p><b>Limits and continuity:</b> Rates of Change and Limits, calculating limits using the limit law, infinite limits and vertical asymptotes, continuity, tangents and derivatives. [12 hrs]</p> <p><b>Differentiation:</b> 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><b>Applications of derivatives:</b> 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><b>General Applications.</b> [5 hrs]</p>
--	---

### Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

<b>Strategies</b>	<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>
-------------------	--

### Student Workload (SWL)

الحمل الدراسي للطالب

<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	63	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	4
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	87	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	5.8
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	150		

## Module Evaluation

تقييم المادة الدراسية

		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
Summative assessment	Midterm Exam	1.5 hr	10% (10)	7	LO # 1-5
	Final Exam	3hr	50% (50)	16	All
<b>Total assessment</b>			100% (100 Marks)		

## Delivery Plan (Weekly Syllabus)

المناهج السبوعي النظري

	Material Covered
Week 1	<b>Vector and the geometry of space:</b> 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	<b>Matrices:</b> 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	<b>Limits and continuity:</b> Rates of Change and Limits. Calculating Limits Using the Limit Law.
Week 7	Infinite Limits and Vertical Asymptotes. Continuity. Tangents and Derivatives.
Week 8	<b>Differentiation:</b> 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	<b>Applications of derivatives:</b> 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.

<b>Week 15</b>	<b>General Applications</b>
<b>Week 16</b>	<b>Preparatory week before the Final Exam</b>

<b>Delivery Plan (Weekly Lab. Syllabus)</b> المنهاج السبوعي للمختبر	
	<b>Material Covered</b>
<b>Week 1</b>	Exp. 1:
<b>Week 2</b>	Exp. 2:
<b>Week 3</b>	Exp. 3:
<b>Week 4</b>	Exp. 4:
<b>Week 5</b>	Exp. 5:
<b>Week 6</b>	Exp. 6:
<b>Week 7</b>	Exp. 7:

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

**APPENDIX:**

<b>GRADING SCHEME</b> مخطط الدرجات				
<b>Group</b>	<b>Grade</b>	<b>التقدير</b>	<b>Marks (%)</b>	<b>Definition</b>
<b>Success Group</b> <b>(50 - 100)</b>	<b>A - Excellent</b>	امتياز	90 - 100	Outstanding Performance
	<b>B - Very Good</b>	جيد جدا	80 - 89	Above average with some errors
	<b>C - Good</b>	جيد	70 - 79	Sound work with notable errors
	<b>D - Satisfactory</b>	متوسط	60 - 69	Fair but with major shortcomings
	<b>E - Sufficient</b>	مقبول	50 - 59	Work meets minimum criteria
<b>Fail Group</b> <b>(0 - 49)</b>	<b>FX – Fail</b>	مقبول بقرار	(45-49)	More work required but credit awarded
	<b>F – Fail</b>	راسب	(0-44)	Considerable amount of work required
<b>Note:</b>				
<p>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.</p>				