

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Mathematics III		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	MATH 210		
ECTS Credits	5.00		
SWL (hr/sem)	63		
Module Level	3	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Dr. Raid A. Daud	e-mail	<a href="mailto:raid.a.daud@nahrain.edu.iq">raid.a.daud@nahrain.edu.iq</a>
Module Leader's Acad. Title	Assist. Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	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

<p><b>Module Objectives</b> أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> <li>1. The lecture aims to improve students' mathematical literacy and communication skills. They should be able to read and interpret mathematical notation, formulas, and graphs</li> <li>2. The math lecture aims to develop students' critical thinking and problem-solving skills through mathematical exercises and applications. Students should be able to analyze engineering problems</li> <li>3. Familiarize with vectors and matrices: Vectors and matrices play a crucial role in civil engineering, particularly in structural analysis and linear systems..</li> <li>4. Students should be able to apply calculus techniques to solve engineering problems, such as finding rates of change, determining areas and volumes, and analyzing the behavior of variables.</li> </ol>
<p><b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> <li>1. CLO-1: Understanding numerical methods and computational tools such as matrix method and series.</li> <li>2. CLO-2: Students should be able to analyze and model civil engineering systems such as engineering applications.</li> <li>3. CLO-3: Students should be able to present mathematical derivations, analyses, and results in a clear and concise manner to engineering audiences.</li> <li>4. CLO-4: Students should understand the limitations and assumptions associated with mathematical models used in civil engineering. By applying initial conditions and boundary conditions</li> <li>5. CLO-5: Students should be able to understand and apply mathematical principles, such as calculus linear algebra, and probability theory, to solve engineering problems related to civil engineering.</li> </ol>
<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p>Analytic Geometry: Analytic geometry combines algebra and geometry to study geometric shapes and their properties using coordinates. Students learn about lines, curves, conic sections, and transformations in the coordinate plane. This knowledge is crucial for visualizing and analyzing engineering structures.</p> <p>Matrices are an essential mathematical tool used in various fields, including civil engineering. In the context of civil engineering, matrices are particularly useful for representing and manipulating data related to structural analysis</p> <p>Vectors: Vectors are fundamental in civil engineering for representing forces, displacements, and other physical quantities. Students learn about vector operations, including addition, subtraction, scalar multiplication, dot product, and cross product.</p> <p>Functions of two or more variables are mathematical functions that depend on multiple independent variables. Instead of being limited to a single input, these functions take multiple inputs and produce an output. They are commonly encountered in various areas of mathematics, science, and engineering.</p> <p>"Multiple integration" refers to the process of performing integration over multiple variables or dimensions. It is an extension of single-variable integration and involves integrating functions with respect to multiple independent variables.</p>

## Learning and Teaching Strategies

### استراتيجيات التعلم والتعليم

<b>Strategies</b>	Type something like: 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 considering types of simple experiments involving some sampling activities that are interesting to the students.
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## Student Workload (SWL)

### الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	63	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعيا	4
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	<b>125</b>		

## Module Evaluation

### تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
<b>Formative assessment</b>	<b>Quizzes</b>	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	<b>Assignments</b>	2	5% (5)	2 and 12	LO #3, #4 and #6, #7
	<b>Projects / Lab.</b>	1	0	Continuous	All
	<b>Report</b>	1	5% (5)	13	LO #5, #8 and #10
<b>Summative assessment</b>	<b>Midterm Exam</b>	2hr	20% (20)	7	LO #1 - #7
	<b>Final Exam</b>	3hr	50% (50)	16	All
<b>Total assessment</b>			100% (100 Marks)		

### Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction Matrix algebraic
Week 2	Matrix determinate
Week 3	Solve linear equations using matrix
Week 4	Eigenvalues & Eigenvector and its application
Week 5	Introduction Vector and vector algebraic
Week 6	Cross product and dot product
Week 7	Vector Applications
Week 8	2nd order PDE
Week 9	Functions of two or more variables
Week 10	Chain rule and partial derivatives
Week 11	Multiple integration: double integration
Week 12	Multiple integration: triple integration
Week 13	Multiple integration: applications
Week 14	Polar Coordinate
Week 15	Preparatory week before the final Exam

### Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

### Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	Thomas' Calculus, 12th Edition" by George B. Thomas Jr., Maurice D. Weir,	Yes
<b>Recommended Texts</b>	Engineering Mathematics" by K.A. Stroud and Dexter J. Booth:	No
<b>Websites</b>		

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
<b>Success Group (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 (0 – 49)</b>	<b>FX – Fail</b>	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	<b>F – Fail</b>	راسب	(0-44)	Considerable amount of work required
<p><b>Note:</b> 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.</p>				