

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	<b>Mathematics</b>		Module Delivery
Module Type	Basic		<input checked="" type="checkbox"/> Theory
Module Code	<b>E112</b>		<input checked="" type="checkbox"/> Lecture
ECTS Credits	8		<input type="checkbox"/> Lab
SWL (hr/sem)	120		<input checked="" type="checkbox"/> Tutorial
			<input type="checkbox"/> Practical
			<input type="checkbox"/> Seminar
Module Level	1	Semester of Delivery	1,2
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Nabil najm	e-mail	
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor	Shahid Mohammed	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/09/2024	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

<b>Module Aims</b> أهداف المادة الدراسية	<ul style="list-style-type: none"><li>• Good understanding of General Mathematics.</li><li>• To give information about Integrations and derivations and how they are used in the physics field.</li><li>• Helping students to connect mathematics with physics.</li><li>• solving mathematical examples in their physics modules.</li><li>• better understanding of integration and derivations and their importance of them in physics.</li></ul>
<b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية	<p>After successful completion of the module, students should be able to:</p> <ul style="list-style-type: none"><li>• Work with functions represented in various ways: graphical, numerical, analytical, or verbal. They should understand the connections among these representations. The functions include linear, polynomial, absolute value, rational, exponential, logarithmic, trigonometric, inverse trigonometric, hyperbolic, inverse hyperbolic, and piecewise defined functions.</li><li>• Define and apply the concepts of limits and continuity to the mentioned functions and study them graphically and analytically.</li><li>• Understand the meaning of the derivative in terms of a rate of change and local linear approximation, and should be able to use derivatives to solve a variety of problems.</li><li>• Understand the meaning of the definite integral both as a limit of Riemann sums as the net accumulation of change and should be able to use integrals to solve a variety of problems.</li><li>• Understand the relationship between the derivative and the definite integral as expressed in both parts of the Fundamental Theorem of Calculus.</li><li>• Use various integration techniques to obtain anti-derivatives without an integral table or calculator.</li></ul>
<b>Indicative Contents</b> المحتويات الإرشادية	
<b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم	
<b>Strategies</b>	<ul style="list-style-type: none"><li>• Different forms of teaching will be used to come across with objectives of the course. PowerPoint presentations for the head titles, definitions, graphs, and many useful illustrations with a summary at the end of each chapter will be presented and discussed.</li><li>• The PowerPoint contains information about new topics and unsolved examples, and then the whiteboard will be used to solve them and to let students to see the solutions.</li></ul>

## Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ 15 اسبوعا

<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	142	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعيا	10
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	108	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعيا	7.2
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	250		

## Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
<b>Formative assessment</b>	<b>Quizzes</b>	2	10% (10)		
	<b>Assignments</b>	2	10% (10)		
	<b>Projects / Lab.</b>	1	10% (10)		
	<b>Report</b>	1	10% (10)		
<b>Summative assessment</b>	<b>Midterm Exam</b>	2hr	10% (10)		
	<b>Final Exam</b>	2hr	50% (50)	16	All
<b>Total assessment</b>			100% (100 Marks)		

## Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
<b>Week 1</b>	<b>Algebraic Preliminaries</b> Numbers, Sets, Inequalities & Absolute value.
<b>Week 2</b>	<b>Functions</b> Domain, Range, graphs, Symmetry, Asymptotes.
<b>Week 3</b>	<b>Limits</b> Definition of Limit, Theorems, Continuity, One-Sided Limits, Limits at Infinity, L Hopital's rule.
<b>Week 4</b>	<b>Derivatives</b> Definition, Power and Sum Rules, Product and Quotient Rules, Chain rule, High-Order derivatives, Implicit differentiation.
<b>Week 5</b>	<b>Applications of Derivative</b> Maximum and minimum, mean value theorem, Increasing and Decreasing Functions, Concavity and Points of inflection, Second Derivative Test.
<b>Week 6</b>	<b>Definite Integration</b> Definition, Integral Theorems, Length of a Curve, Areas, Volume of Solids, Surface Area, Indefinite Integrals.
<b>Week 7</b>	<b>Transcendental Functions</b> Trigonometric Functions, Graphs, Derivatives of trigonometric functions, Inverse trigonometric functions, Graphs, Derivatives of Inverse trigonometric functions, Natural Logarithm Functions, Exponential Functions, Functions $a^u$ and $\log_a u$ .

<b>Week 8</b>	<b>Complex Number</b> Invented number systems, The Argand diagram. Addition, Subtraction, product, Quotient, Power and Roots. Demoivers theorem.
<b>Week 9</b>	<b>Hyperbolic Functions</b> Definition, Derivatives, Integrals, Inverse Hyperbolic Functions.
<b>Week 10</b>	<b>Plane Analytic Geometry</b> Circle, Parabola, Ellipse, Hyperbola
<b>Week 11</b>	<b>Volume of Revolution</b> Disk Method & Washer Method
<b>Week 12</b>	<b>Volume of Revolution</b> Volumes by Cylindrical Shells & solid with known cross sections
<b>Week 13</b>	<b>Methods of Integrations</b> Integration by substitution, Trigonometric Integrals & Quadratic Functions
<b>Week 14</b>	<b>Methods of Integrations</b> Integration by Parts, Integration by partial fractions, Integration of Rational Functions, improper integrals.
<b>Week 15</b>	<b>Matrices and Determinates</b> Definition, Properties of Matrices, Operations on Matrices, Determinants, Matrix Inverse, Solution of Linear Simultaneous Equations (Gramer's Rule ).
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

### Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
<b>Week 1</b>	
<b>Week 2</b>	
<b>Week 3</b>	
<b>Week 4</b>	
<b>Week 5</b>	
<b>Week 6</b>	
<b>Week 7</b>	

### Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	<ol style="list-style-type: none"> <li>1. Calculus with Analytical Geometry, Fourth Edition, By Robert Ellis and Denny Gulick, 1990.</li> <li>2. Calculus, Fifth Edition, By Stanley I. Cross may1992.</li> <li>3. Calculus, International Edition, By Thomas, 2005.</li> </ol>	Yes

<b>Recommended Texts</b>	1. Calculus, 11th Edition, By Thomas, 2013. 2. Understanding Basic Calculus, by S.K. Chung, 2007	Yes
<b>Websites</b>		

<b>Grading Scheme</b> مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
<b>Success Group</b> (50 - 100)	<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> (0 – 49)	<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>				