First stage

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Computer Programming 1	**Module Delivery**	
Module Type	Basic	☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	CREQ1214		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	**Semester of Delivery**	1
Administering Department	Mathematics and Computer Applications Science	**College**	College of Sciences
Module Leader	Mohammed Q. Ali	**e-mail**	mohammed.q.ali@nahrainuniv.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	**Module Leader's Qualification**	M.Sc.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	23/2/2024	**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

Module Aims أهداف المادة الدراسية	1. The computer languages classification 2. How using the MATLAB 3. Programming mathematical operations 4. Identify the vectors and matrices 5. Understanding how to write a program in MATLAB
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. You will be able to apply the knowledge in MATLAB 2. You will be able to use MATLAB arithmetic operations 3. You will be able to elementary math built-in in MATLAB 4. You will be able to Creating, Saving and executing a Script File 5. You will be able to define different types of arrays, arrays operations 6. You will be able to solve linear equations in MATLAB
Indicative Contents المحتويات الإرشادية	Understanding computer languages classification Understanding MATLAB environment Variable and its rules, arithmetic operation and its Order of Precedences Math Built-In Functions (elementary, trigonometric functions, Rounding functions … etc.) Define arrays (vectors and matrices) with their different types (zero, ones, identity and so on) and operations (sort, inverse, reshape and so on) Running a program in MATLAB

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is by explaining lectures in an interactive way by letting the students to participate in the presenting through questions and answers while at the same time refining and expanding their critical thinking skills. This will be achieved through classes and labs.

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.06

الحمل الدراسي غير المنتظم للطالب خلال الفصل		
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125	

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	4	10% (10)	3,6,10,13	All
	Assignments	4	10% (10)	4,7,9,12	All
	Report	1	10% (10)	Continuous	
	Lab	2	10% (10)	8,15	All
Summative assessment	**Midterm Exam**	2hr	10% (10)	7,14	All
	Final Exam	3hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Computer Languages
Week 2	Starting with MATLAB
Week 3	Variables, Arithmetic operations and Elementary Math Built-In Functions
Week 4	Script Files
Week 5	Creating A One-Dimensional Array (Defining Vector)
Week 6	Vector operations and its Built-in functions
Week 7	Mid-term Exam 1
Week 8	Creating Matrices (2D array)
Week 9	Matrix Addressing
Week 10	Matrix Operations
Week 11	Special matrices
Week 12	Matrix built-in functions
Week 13	Solve linear equations
Week 14	Mid-term Exam 2
Week 15	**Preparatory Week**
Week 16	**Final Exam**

<table>
<tr><td colspan="2">Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر</td></tr>
</table>

	Material Covered
Week 1	Lab 1: Working with MATLAB (The MATLAB Environment)
Week 2	Lab 2: Defining variables and programming mathematics equations
Week 3	Lab 3: Using Elementary Math Built-In Functions and result formats
Week 4	Lab 4: Working with Script file (create and execute)
Week 5	Lab 5: Defining Vectors (create methods and addressing)
Week 6	Lab 6: vector operation and its Built-In Functions
Week 7	Lab 7: cross and dot product applications
Week 8	Practical Exam 1
Week 9	Lab 8: Create a matrix
Week 10	Lab 9: Matrix addressing
Week 11	Lab 10: matrix operations
Week 12	Lab 11: Special matrices (Identity, zeros, ones and so on)
Week 13	Lab 12: Matrix built-in functions
Week 14	Lab 13: solve linear equations base on matrix
Week 15	Practical Exam 2
Teaching Staff	م.م. محمد قاسم علي/م.م. ايمان خالد/ م.م. نبراس ياسر/م.م. شيماء عبدالستار/ م.م. بتول امخيلف / م.م. لمياء خالد/م.م. فرح لطيف جوي

<table>
<tr><td colspan="3">Learning and Teaching Resources
مصادر التعلم والتدريس</td></tr>
</table>

	Text	Available in the Library?
Required Texts		
Recommended Texts	MATLAB: An Introduction with Applications (4th Edition) by Amos Gilat, Golat A. 2011	No
Websites	Documentation - MATLAB & Simulink (mathworks.com)	

<table>
<tr><td colspan="5">Grading Scheme
مخطط الدرجات</td></tr>
</table>

Group	Grade	التقدير	Marks (%)	Definition
Success Group	**A -** Excellent	امتياز	90 - 100	Outstanding Performance

(50 - 100)	**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	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: 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.

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	**Calculus (I)**	**Module Delivery**	
Module Type	Core		
Module Code	**MATH1101**	• ☐ Theory • ☒ Lecture • ☒ Lab • ☒ Tutorial • ☐ Practical • ☐ Seminar	
ECTS Credits	**8**		
SWL (hr/sem)	**200**		
Module Level		**Semester of Delivery**	1
Administering Department	Mathematics and Computer Applications	**College**	College of Sciences

Module Leader	Ibtisam Kamil Hanan	e-mail	ibtisam.kamil@nahrainuniv.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	me	e-mail	E-mail
Scientific Committee Approval Date	1/9/2023	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 Aims أهداف المادة الدراسية	The aim of this course is for student to gain proficiency in computations. In calculus, we use two main tools for analyzing and describing the behavior of functions: limits and derivatives. Students will use these tools to solve application problems in a variety of setting ranging from physics and chemistry to business and economics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. To determine the solution set of inequalities involving absolute value, 2. To determine domain, range and operation of some one variable functions and the graphs. 3. To determine limit and continuity of one variable functions. 4. To determine derivate of one variable functions. 5. To determine the solution of problems involving the derivate of one variable function. 6. To determine inverse function and its derivative. 7. To learn about application of derivatives.
Indicative Contents المحتويات الإرشادية	1. Real number, inequalities, absolute value, Cartesian coordinate system, function and its graph, operation on function, trigonometry function. 2. Definition, theorems of limit, trigonometry function limit, limit on infinity, infinite limit, continuity function, 3. Definition and rule of derivate, derivate of trigonometry function, chain rule, higher order derivate, implicit derivate, related rate, basic

	concept of differential, 4. Maximum and minimum, monotonicity and concavity, graphing one variable function, mean value theorem for derivate. 7. Natural logarithm function, inverse function and its derivate, natural exponential function, general exponential function, general logarithm function, hyperbolic function and its inverse.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The module will be presented to the students through a specified series of lectures, supported by problem solving practice carried out in interactive tutorials. These tutorials will be supported by practice and directed study outside the classroom. Formative assessment takes place throughout the module during tutorials and feedback is given during these tutorials.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	106	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7.0666666667
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	3, 8	LO #1, 2, and 3
	Assignments	2	10% (10)	6, 9	LO # 4 and 5
	Projects / Lab.	1	10% (10)	continuous	
	Report	1	10% (10)	12	LO # 5 and 6
Summative assessment	**Midterm Exam**	2	10% (10)	5,10	LO # 1-5
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	The Rate of Change of Function: Coordinates, Increments and Distance, Slope of the straight line, Equations of straight lines, Circle, Equation of circle.
Week 2	Inequalities, Intervals, Absolute value, Properties of Absolute values.
Week 3	Functions and graphs: Odd function, Even function, Domain, Range, Composition function, Shift Formula, Axes intercept points, Symmetry, Asymptotes.
Week 4	Limits and continuity :Theorems of limits, One sided and two-sided limits.
Week 5	Mid Term Exam + Limit at infinity, Oblique asymptote.
Week 6	Sandwich theorem, Continuous functions.
Week 7	The slope of the curve and derivatives: Formal differentiation, Rules of derivatives (with proofs)
Week 8	Implicit differentiation, Second and higher order derivatives, Chain rule, Extended Chain rule.
Week 9	Parametric equations, Derivatives of the Parametric Equations, L'Hopital's rule (First Form), L'Hopital's rule (Stronger Form).
Week 10	Mid Term Exam + Transcendental Functions: Properties and derivatives (with proofs) for Trigonometric functions.
Week 11	Properties and derivatives (with proofs) for Inverse of trigonometric functions.
Week 12	Properties and derivatives (with proofs) for Logarithmic, exponential functions and The exponent function a^x
Week 13	Properties and derivatives (with proofs) for (Hyperbolic functions and Inverse of Hyperbolic Functions)
Week 14	Applications of Derivatives: Curve sketching, Maxima and minima problems
Week 15	Related rate, Roll's and mean value theorems, Velocity and acceleration.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introducing Simple Mathematical Expressions
Week 2	Lab 2: Names for Common Constant in MATLAB
Week 3	Lab 3: Using variables in MATLAB
Week 4	Lab 4: Using Built-in Functions in MATLAB
Week 5	Lab 5: Plotting Functions

Week 6	Lab 6: Calculating Limit
Week 7	Lab 7: Computing Derivative
Week 8	Lab 8: L'Hopital's Rule
Week 9	Lab 9: Transcendental Functions ,Convert angle from radians to degree
Week 10	Lab 10: Inverse of trigonometric functions.
Week 11	Lab 11: Exponentials and Logarithms
Week 12	Lab 12: Hyperbolic Functions and their inverse
Week 13	Lab 13: Velocity and acceleration
Week 14	Lab 14: Concavity and Inflection Points
Week 15	Lab 15: Finding Minima and Maxima

اساتذة المختبر

م.د. ابتسام كامل حنان   2- م. رنين زيد حمود   3- م.م. حنين عبد الكريم أمين   4- م.م. عباس ابراهيم خليف-1

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Calculus and Analytic Geometry by Thomas	Yes
Recommended Texts	Calculus Labs for MATLAB	No
Websites	www.mathhandbook.com	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
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Ministry of Higher Education and
Scientific Research - Iraq
Al-Nahrain University
College of Sciences
Department of Mathematics and Computer
Applications

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information		
معلومات المادة الدراسية		
Module Title	**Calculus (II)**	**Module Delivery**
Module Type	Core	
Module Code	**MATH1203**	• ☐ Theory • ☒ Lecture • ☒ Lab • ☒ Tutorial • ☐ Practical • ☐ Seminar
ECTS Credits	**7**	
SWL (hr/sem)	**175**	
Module Level		**Semester of Delivery**	2
Administering Department	Mathematics and Computer Applications	**College**	College of Sciences
Module Leader	Ibtisam Kamil Hanan	**e-mail**	ibtisam.kamil@nahrainuniv.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	me	**e-mail**	E-mail
Scientific Committee Approval Date	01/09/2023	**Version Number**	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MATH1101	**Semester**	1

Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The aim of this course is to introduce the concept of integration, study various techniques of integration, test improper integrals for convergence and illustrate some applications of integration. Student will gain proficiency to use integration to solve real world problems such as area and volumes problems.

Module Learning Outcomes
 	
مخرجات التعلم للمادة الدراسية
	After completing the course, students have the ability
	
	   o To determine proper integral of one variable functions.
	   o To determine integral involving the fundamental theorem of Calculus and method of substitution.
	   o To determine the solution of problems involving the integral of one variable function.
	   o To compute integral involving transcendental functions.
	   o To compute integral with advanced integration techniques.
	   o To demonstrate ability to think critically by recognizing patterns and determining and using appropriate techniques for solving a variety of integration problems.
	   o To solve indeterminate forms and improper integral problems.
	   o To calculate the length of a plane curve and solving area and volume application problems.
	   o To sketch the graph of a polar equation and the area problems in the polar coordinate system.
	   o To demonstrate an intuitive and computational understanding for integral applications by solving a variety of problems from physics, engineering and mathematics.

Indicative Contents المحتويات الإرشادية	1. Proper integral, Fundamental Theorem of Calculus, basic rules of integration. 2. Methods of integrations, method of substitution, partial integration method, trigonometry integral and integral of rational function with partial fraction. 3. Improper integrals, test for convergence and divergence of improper integrals. 4. Application of Definite Integrals, Mean value theorem of integration,

	Area, solid revolution volume and Arc length. 5. polar coordinates**.**

	Learning and Teaching Strategies استراتيجيات التعلم والتعليم
Strategies	The module will be presented to the students through a specified series of lectures, supported by problem solving practice carried out in interactive tutorials. These tutorials will be supported by practice and directed study outside the classroom. Formative assessment takes place throughout the module during tutorials and feedback is given during these tutorials.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	81	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	3, 8	LO #1, 2, and 4
	Assignments	2	10% (10)	6, 9	LO # 3 and 6
	Projects / Lab.	1	10% (10)	continuous	
	Report	1	10% (10)	12	LO # 5, 7 and 8
Summative assessment	**Midterm Exam**	2	10% (10)	5,10	LO # 1-7
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week	Indefinite integrals, Definite integrals, The fundamental theorems of

1	integrals, Basic Integration Formulas.
Week 2	Integration by substitution
Week 3	Integration of certain powers of trigonometric and hyperbolic functions
Week 4	Integrals involving trigonometric substitutions, Integrals involving hyperbolic substation .
Week 5	Mid-Term Exam + Integrals involving quadratic substation
Week 6	Integration by parts
Week 7	Integration of Rational Functions
Week 8	Integration of Irrational Functions, Integration of Rational Functions of Trigonometric
Week 9	Improper integrals: Definition of improper integral and examples
Week 10	Mid-Term Exam + Test for convergence and divergence of improper integrals (P-test, Domination test, Limit comparison test)
Week 11	Application of Definite Integrals: Mean value theorem of integration , Area under the curve
Week 12	Area between two curves, Volume of solid of revolution (Disk (washer) and shell) methods
Week 13	Arc length, Area of surface of revolution
Week 14	Area in polar coordinates
Week 15	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Integration in MATLAB
Week 2	Lab 2: Definite Integrals
Week 3	Lab 3: Indefinite integrals
Week 4	Lab 4: Sine and Cosine Integral functions
Week 5	Lab 5: Hyperbolic Sine and Cosine Integral functions
Week 6	Lab 6: Integration by parts in MATLAB
Week 7	Lab 7: Integrating inverse trigonometric Functions
Week 8	Lab 8: Partial Fraction Expansion in MATLAB
Week 9	Lab 9: Solving an improper Integral
Week 10	Lab 10: Area in MATLB
Week 11	Lab 11: Area between two curves in MATLAB
Week 12	Lab 12: Compute Volumes of Revolution
Week 13	Lab 13: Arc length
Week 14	Lab 14: Using Polar Coordinates in MATLAB

اساتذة المختبر

م.د. ابتسام كامل حنان   2- م. رنين زيد حمود   3- م.م. حنين عبد الكريم أمين   4- م.م. عباس

1-ابراهيم خليف

5 – م.م. شيماء عبد الستار   6 – م. م. فرح لطيف

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Calculus and Analytic Geometry by Thomas	Yes
Recommended Texts	Calculus Labs for MATLAB	No
Websites	www.mathhandbook.com	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
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MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	**Foundation of Mathematics (I)**	Module Delivery
Module Type	**Core**	☐ Theory ☒ Lecture
Module Code	MATH1102	

ECTS Credits	**7**			☐ **Lab**
SWL (hr/sem)	**175**			☒ **Tutorial** ☐ **Practical** ☐ **Seminar**

Module Level		1	**Semester of Delivery**		1
Administering Department		MATH	**College**	Science	
Module Leader	Ayat Abdulaali Neamah		**e-mail**	ayatneamah@nahrainuniv.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Asst. Lec. Nibras Yasir		**e-mail**	nibras.yasir@ nahrainuniv.edu.iq	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date		01/06/2023	**Version Number**		

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 Aims أهداف المادة الدراسية	1. To understand the concepts of sets, logic and functions and enable the student to study the theorems that are related to them. 2. To understand the need for proofs and develop the skills to enable the student to construct for themselves formal proofs. 3. To develop the manipulative skills and mathematical intuition necessary for the study of mathematics at university.
Module Learning	

Outcomes مخرجات التعلم للمادة الدراسية	1. Understand and use logical notation and arguments. 2. Construct simple mathematical proofs. 3. To express correctly statements and proofs of simple mathematical theorems. 4. To explain the properties of sets and their operations. 5. Understand theorems related with algebra of sets and their proofs. 6. Recognize the domain and the range of a function, draw the graph of a function 7. Recognize the inverse of a function and the inverse image of a function 8. Understand the cardinal number and its applications. 9. Recognize the countable sets.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Chapter One – Mathematical Logic Mathematical statements, Compound statements, Negation, Connective, Conjunction, Disjunction, Conditional and biconditional statements, Logical equivalence, Tautology, Contradiction, Algebra of statements, Idempotent laws, Associatively, De Morgan's laws, Arguments, Valid arguments, Invalid arguments. Chapter Two – Set Theory Set, Subset, Belongs, Equal sets, Union, Intersection, Complement, Disjoint, Partition, Empty set, Universal set, Power set, Algebra of sets, Idempotent law, Commutative law, Distributive law, De Morgan's law, Cartesian product of sets. Chapter Three– Mappings Basic concepts and definition, Domain, Codomain, Range, Graph of mapping, 1-1 mappings, Onto mappings, Bijective mapping, Equality of mappings, types of mapping, Identity mapping, Constant mapping, Restriction of mapping, Extension of mapping, Absolute value function, Composition mapping and inverse mapping, Direct images and inverse images under mapping. [21 hrs] Chapter Four– Cardinality, Cardinal Numbers, Arithmetic on Cardinal Numbers Finite and infinite sets, Countable and uncountable sets.

<table>
<tr><td colspan="2" style="background:#fce">Learning and Teaching Strategies
استراتيجيات التعلم والتعليم</td></tr>
<tr><td>Strategies</td><td>The main strategy that will be used in this module is to encourage the students to participation in the module activities. This strategy will be by giving the students quizzes, assignments, projects and midterm exams throughout the semester.</td></tr>
</table>

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	97	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.4666667
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	3, 9	LO #1, 2, 4 and 5
	Assignments	2	10% (10)	5,11	LO # 1,2, 3, 6 and 7
	Projects	1	10% (10)	Continuous	
	Report	1	10% (10)	14	LO # 4, 5 and 8
Summative assessment	**Midterm Exam**	2	10% (10)	6,12	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

	Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري
	Material Covered
Week 1	Mathematical statements, Compound statements, Negation, Connective,
Week 2	Conjunction, Disjunction, Conditional and biconditional statements,
Week 3	Logical equivalence, Tautology, Contradiction
Week 4	Algebra of statements, Idempotent laws, Associatively, De Morgan's laws
Week 5	Arguments, Valid arguments, Invalid arguments
Week 6	Mid-term Exam+ Set, Subset, Belongs, Equal sets, Union, Intersection, Complement
Week 7	Disjoint, Partition, Empty set, Universal set, Power set, Algebra of sets
Week 8	Idempotent law, Commutative law, Distributive law, De Morgan's law
Week 9	Cartesian product of sets, Basic concepts and definition, Domain, Codomain, Range
Week 10	Graph of mapping, 1-1 mappings, Onto mappings, Bijective mapping, Equality of mappings
Week 11	types of mapping, Identity mapping, Constant mapping, Restriction of mapping, Extension of mapping, Absolute value function
Week 12	Mid-term Exam + Composition mapping and inverse mapping
Week 13	Direct images and inverse images under mapping, cardinal number of a set
Week 14	Finite and infinite sets
Week 15	Countable and uncountable sets
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	أسس الرياضيات, هادي جابر مصطفى واخرون, الجزء الاول ١٩٨٣, جامعة البصرة-العراق.	Yes
Recommended Texts	Schaum's Outline of Set Theory and Related Topics	No
Websites	https://www.britannica.com/science/foundations-of-mathematics	

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	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: 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.

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية		
Module Title	**Foundation of Mathematics (II)**	**Module Delivery**
Module Type	**Core**	☐ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☒ Seminar
Module Code	**MATH1204**	
ECTS Credits	**8**	
SWL (hr/sem)	**200**	

Module Level	1	**Semester of Delivery**	2
Administering Department	MATH	**College**	Science
Module Leader	Ayat Abdulaali Neamah	**e-mail**	ayatneamah@nahrainuniv.edu.iq
Module Leader's Acad. Title		**Module Leader's Qualification**	Ph.D.
Module Tutor	Assist. LecNibras Yasir	**e-mail**	nibras.yasir@ nahrainuniv.edu.iq
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date	01/06/2023	**Version Number**	

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 Aims أهداف المادة الدراسية	4. To become familiar with different types of relations between two sets. 5. To understand the complete and well ordered sets. 6. Perform appropriate proofs of properties within a given number system.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	10. Understand and use relations on a set and arguments. 11. Construct the equivalence relations and find the equivalence classes. 12. Understand Partial order and total order relations. 13. Recognize the bounded sets and complete sets. 14. Understand the construction of the natural numbers and understand their properties 15. Understand the construction of the integer numbers, rational numbers and their properties 16. Use the mathematical induction in proofs within a given number system. 17. Understand the construction of the complex numbers and perform appropriate calculations within this number system. 18. Understand the binary operation and groups.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Chapter One –Relations Type of relations, Reflexive, Symmetric, Transitive, Anti-symmetric, Equivalence relations, Equivalent classes, Properties of equivalent classes, Partition. Chapter Two –Ordering Partial order and total order, Least and greatest elements , Bounded sets, Upper bound, Lower bound, Least upper bound, Greatest lower bound, Complete sets, Well-ordered set . Chapter Three –The set of Natural Numbers $\mathbb{N}$ Peano's Axioms, Arithmetic of the natural number, Addition, Subtraction, Multiplication, Properties, Associative law of addition and multiplication, Distribution law, Cancelation

law of addition and multiplication, Ordering on $\mathbb{N}$, Well ordering of $\mathbb{N}$.

Chapter Three –The set of Integer Numbers $\mathbb{Z}$
Construction of the set of integers, The addition and multiplication on integers, Properties, Associative law of addition and multiplication, Commutative law of addition and multiplication, Distribution law, Cancelation law of addition and multiplication, Ordering on $\mathbb{Z}$.

Chapter Four –The set of Integer Numbers $\mathbb{Q}$
Construction of the rational numbers, The addition and multiplication on rational and its properties, Ordering on $\mathbb{Q}$, Density of $\mathbb{Q}$.

Chapter Five–The set of Real Numbers $\mathbb{R}$
Completeness property of real numbers, Additional Properties of the Integer Number, Divisibility and primes, Greatest common divisor and least common multiple, The fundamental theorem of arithmetic.

Chapter Six– The Set of Complex Numbers $\mathbb{C}$
Addition and multiplication on complex numbers.

Chapter Seven– Basic Concepts in Group Theory
Binary Operation, Basic definitions, Groups, Commutative group, Subgroup, Order of group.

Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be used in this module is to encourage the students to participation in the module activities. This strategy will be by giving the students quizzes, assignment,

projects and midterm exams throughout the semester.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	122	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	8.1333333
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	Quizzes	2	10% (10)	3, 9	LO #1, 2, 4 and 5
	Assignments	2	10% (10)	5,11	LO # 1,2, 3, 6 and 7
	Projects	1	10% (10)	Continuous	
	Report	1	10% (10)	14	LO # 4, 5 and 8
Summative assessment	Midterm Exam	2	10% (10)	6,11	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Type of relations, Reflexive, Symmetric
Week 2	Transitive, Anti-symmetric,
Week 3	Equivalence relations, Equivalent classes
Week 4	Properties of equivalent classes, Partition
Week 5	Partial order and total order, Least and greatest elements
Week 6	Mid-term Exam+ Bounded sets, Upper bound, Lower bound
Week 7	Least upper bound, Greatest lower bound
Week 8	Complete sets, Well-ordered set
Week 9	The set of Natural Numbers $\mathbb{N}$

Week 10	The set of Natural Integer $\mathbb{Z}$	
Week 11	Mid-term Exam+ The set of Rational Numbers $\mathbb{Q}$	
Week 12	The set of Real Numbers $\mathbb{R}$	
Week 13	The Set of Complex Numbers $\mathbb{C}$	
Week 14	Binary Operation, Basic definitions, Groups	
Week 15	Commutative group, Subgroup, Order of group	
Week 16	**Preparatory week before the final Exam**	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	أسس الرياضيات, هادي جابر مصطفى واخرون, الجزء الثاني ١٩٨٣, جامعة البصرة-العراق.	Yes
Recommended Texts	Schaum's Outline of Set Theory and Related Topics	No
Websites	https://www.britannica.com/science/foundations-of-mathematics	

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
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	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: 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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="4" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td colspan="2" align="center"><strong style="color:red">General Chemistry</td><td>Module Delivery</td></tr>
<tr><td>Module Type</td><td colspan="2" align="center">Core</td><td rowspan="4">• ☒ Theory
• ☒ Lecture
• ☒ Lab
• ☐ Tutorial
• ☐ Practical
• ☐ Seminar</td></tr>
<tr><td>Module Code</td><td colspan="2" align="center">CHEM1103</td></tr>
<tr><td>ECTS Credits</td><td colspan="2"></td></tr>
<tr><td>SWL (hr/sem)</td><td colspan="2"></td></tr>
<tr><td>Module Level</td><td></td><td>Semester of Delivery</td><td>1</td></tr>
<tr><td>Administering Department</td><td>Type Dept. Code</td><td>College</td><td>Type College Code</td></tr>
<tr><td>Module Leader</td><td>Dr. Ahmed Al-Ani</td><td>e-mail</td><td>ahmed.sabeeh@nahrainuniv.edu.iq</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>Lecturer</td><td>Module Leader's Qualification</td><td>PhD</td></tr>
<tr><td>Module Tutor</td><td>Name (if available)</td><td>e-mail</td><td>E-mail</td></tr>
<tr><td>Peer Reviewer Name</td><td>Ahmed Al-Ani</td><td>e-mail</td><td>E-mail</td></tr>
<tr><td>Scientific Committee Approval Date</td><td>01/06/2023</td><td>Version Number</td><td>1.0</td></tr>
</table>

<table>
<tr><td colspan="3" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>None</td><td>Semester</td><td></td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td><td></td></tr>
</table>

<table>
<tr><td colspan="2" align="center">Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية</td></tr>
<tr><td>Module Aims
أهداف المادة الدراسية</td><td>The primary objective of this course is to acquire basic concepts, principles, and techniques of modern chemistry that would empower students with an analytical mind set and the abilities to solve diverse analytical problems in an efficient and quantitative way that conveys the importance of accuracy and precision of the analytical results. On successful completion of this course, students will be able:

1. To develop an understanding of the range and uses of analytical methods in chemistry.</td></tr>
</table>

	2. To establish an appreciation of the role of chemistry in quantitative analysis 3. To develop an understanding of the broad role of the chemist in measurement and problem solving for analytical tasks. 4. To provide an understanding of chemical methods employed for elemental and compound analysis. 5. To provide experience in some scientific methods employed in analytical chemistry. 6. To develop some understanding of the professional and safety responsibilities residing in working on chemical analysis.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	After attending this course in general Chemistry, the students have to be able to develop a basic knowledge of main principles of chemical methods as follows ✦ To understand qualitative and quantitative properties of solutions, understanding all kinds of analytical concentrations. ✦ To describe and explain chemical equilibriums of acid base reactions ✦ Understanding the periodic table and atomic structure ✦ Understanding ionic compounds, types of bonds and Metal and nonmetal ✦ Understanding the acid/base reactions and titration methods ✦ Effectively teach practical science through the context of general chemistry ✦ Design problem solving activities to challenge student understanding of analytical method ✦ Understanding the safe handling of chemicals and the principles apparatus and unit operation in general chemistry
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Areas of general chemistry 2. The current role of general chemistry 3. Improve the student's mind by how he or she can deal with chemicals and its uses Teach students about hazardous chemicals and how can avoid any risk in the lab

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises presented during the class, home works and quizzes. Furthermore, encourage the student participation in panel discussion.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	102	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	98	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
Summative assessment	Midterm Exam	2 hr	30% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1-2	Matter, measurements and significant figures
Week 3-5	Atomic weight, molecular weight and moles calculations
Week 6-8	Chemical reactions in solutions and concentrations
Week 9-11	Periodic table and atomic structure
Week 12-14	Ionic compounds and types of bonds
Week 15	Acid base reactions and titrations
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Safety rules and Laboratory equipments
Week 2	Lab 2: PH and indicators
Week 3	Lab 3: Acid base titration
Week 4	Lab 4: Preparation of sodium hydroxide
Week 5	Lab 5: Effect of concentration on reaction rate
Week 6	Lab 6: Preparation and reaction of barium peroxide
Week 7	Lab 7: Calculation the percentage of water in hydrated salt

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. Fundamental of analytical chemistry: Nine edition, Skoog	Yes
Recommended Texts	Fundamentals of chemistry: Fourth Edition, David E. Goldberg	Yes
Recommended Texts	Basic Inorganic Chemistry F. Albert Cotton, Geoffrey Wilkinson, Paul L. Gaus, , 3rd Edition, 1995	Yes
Websites	Different wabsites	

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	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: 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.

Ministry of Higher Education and
Scientific Research - Iraq
Al-Nahrain University
College of Science
Mathematics and Computer
Applications Department

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information		
معلومات المادة الدراسية		
Module Title	ELECTRICITY AND MAGNETISM I	**Module Delivery**
Module Type	**Basic**	☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	**CREQ1212**	
ECTS Credits	**5**	
SWL (hr./Sem)	**125**	

Module Level	1	Semester of Delivery	2
Administering Department	Mathematics and Computer Applications	**College**	**College of Science**
Module Leader	Dr. Ammar A. Alrawi	**e-mail**	ammar.alrawi@nahrainuniv.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	Dr. Ammar A. Alrawi	**e-mail**	ammar.alrawi@nahrainuniv.edu.iq
Peer Reviewer Name	Name	**e-mail**	
Scientific Committee Approval Date	8/11/2023	**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 Aims أهداف المادة الدراسية	1. Understand electric charge and electric field. 2. Knowing the materials. 3. Identify the electric field of charges and electric field lines. 4. Identifying the forces, moments and electric potential energy. 5. Learn about the electrostatic field. 6. Identification of a point charge inside a spherical surface. 7. Identify the resistance and capacitance.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Make the student able to: 1. Understand electric charge and electric field. 2. Knowing the composition of the material. 3. Know the types of matter. 4. Know the types of electric charge. 5. Learn about Coulomb's law. 6. Identify the electric field of charges and electric field lines. 7. Learn about the electrostatic field. 8. Learn about Ohm's Law. 9. Identify the resistance and capacitance.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. electric charge and electric field, electric charge and structure of matter, capacitance, use of capacitance, calculating the capacitance, current and resistance, moving charges and electric current, electric current, current density, resistance and resistivity, ohm's law: a microscopic view, energy and power in an electric circuit, the magnetic field, the magnetic field, the definition of b, discovering the electric

Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies	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 type of simple experiments involving some sampling activities that are interesting to the students and by oral, written exams and homework's.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/Sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/Sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.13

Total SWL (h/Sem) الحمل الدراسي الكلي للطالب خلال الفصل	125

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Electric charge: Electromagnetism, Electric Charge, Conductors and Insulators and Semiconductors, Coulomb's Law, Charge is Quantized, Charge is Conserved.
Week 2	Electric charge: Problem solving
Week 3	The Electric Field: Charge and Force, Lines of Force A Point Charge, Calculating the Field: An Electric Dipol
Week 4	The Electric Field: Problem solving
Week 5	Capacitance: The Use of Capacitance, Calculating the Capacitance, Capacitors in Series and in Parallel, Strong Energy in an Electric Field
Week 6	Capacitance: Problem solving
Week 7	Mid exam
Week 8	Current and Resistance: Moving Charges and Electric Current, Electric Current, Current Density
Week 9	Current and Resistance: Resistance and Resistivity, Ohm's Law: A Microscopic View, Resistor in Series and in Parallel, Strong Energy in an Electric Field, Energy and Power in an Electric Circuits
Week 10	Current and Resistance: Problem solving
Week 11	The Magnetic Field: The Magnetic Field, The Definition of Discovering the Electric
Week 12	Ampere's Law: Current and Magnetic Field, Calculating the Magnetic Field
Week 13	Faraday's Law of Induction: Two symmetries, Two Experiments, Faraday's Law of Induction, Lenz's Law
Week 14	Mid exam
Week 15	**Preparatory Week**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Ohms law
Week 2	Lab 2: Ohmic and Non Ohmic materials

Week 3	Lab 3: Series and parallel of capacitor and energy
Week 4	Lab 4: Electrical resonance phenomenon
Week 5	Lab 5: Voltage difference for the resistance and capacitance
Week 6	Lab 6: Voltage and resistance for the battery
Week 7	Lab 7: parallel and series for resistance and equivalent resistance

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Edward Purcell, Electricity and magnetism,3rd edition	No (Available as an e book)
Recommended Texts	University physics with modern physics, 13th edition	
Websites		

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 works with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
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Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: 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.

Ministry of Higher Education and
Scientific Research - Iraq
Al-Nahrain University
College of Science
Mathematics and
Computer Applications Department

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information		
معلومات المادة الدراسية		

Module Title	Mechanic physics	Module Delivery	
Module Type	**Basic**	☒ Theory	
Module Code	**CREQ1111**	☒ Lecture	
ECTS Credits	**5**	☒ Lab	
		☐ Tutorial	
SWL (hr./Sem)	**125**	☐ Practical	
		☐ Seminar	

Module Level	1	Semester of Delivery	1
Administering Department	Mathematics and Computer Applications	College	College of Science
Module Leader	Dr. Ammar A. Alrawi	e-mail	ammar.alrawi@nahrainuniv.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Ammar A. Alrawi	e-mail	ammar.alrawi@nahrainuniv.edu.iq
Peer Reviewer Name	Name	e-mail	
Scientific Committee Approval Date	8/11/2023	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 Aims أهداف المادة الدراسية	8. Introduce students to basic concepts related to static and mobile systems. 9. Introducing the student to the methods of classifying mechanical systems, the laws related to them, and the life applications that simulate their theories. 10. Introducing the student to the methods of mathematical solutions to

	problems related to kinetic systems
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	10. Providing the student with sufficient experience to deal with kinetic systems according to the mathematical theories and laws compatible with them. 11. Enhancing the student's mental ability to analyze kinetic systems according to those theories to find the required solutions to the problems that the student may face during study and after graduation.
Indicative Contents المحتويات الإرشادية	The instructional content includes the following: In our practical life we need to indicate the location of an object, whether it is stationary, non-stationary, or moving, and to determine the location of that object we use so-called "coordinates." There are several types of coordinates we can apply, such as rectangular coordinates and polar coordinates. And studying the usefulness of applying vectors in our lives [6 hours] Mechanics is one of the branches of physics that studies motion, and includes two main sections: kinematics, a science that describes the motion of objects without paying attention to the causes of motion. (Dynamics) is a science concerned with the causes of movement such as force and energy. We will first learn about the concepts of position, displacement, velocity and acceleration of objects to move in one dimension and in two dimensions with some nomenclature [10 hours] Physicist Isaac Newton based his theory of motion through three laws known as Newton's laws of motion, where he described the forces acting on the motion of bodies by these laws and the difference between mass and weight. [6 hours] While solving an exercise in kinesiology it is important to correctly analyze the forces acting on the body or system, and therefore the body. The forces acting on it will be illustrated, and this method is called a free body diagram. [hours] The concept of equilibrium, tensile equilibrium, rotational equilibrium, torque, vector torque, couple, center of mass, center of gravity. [10 hours] Work, Energy, Energy, Momentum, Energy Type [6 hours] Explain periodic motion, rotational motion, simple harmonic motion, relationship between uniform circular motion and simple harmonic motion, simple pendulum, simple harmonic motion, wave motion [10 hours]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Enabling students to solve problems related to the theoretical framework of the lecture material. 2. Enabling students to thinking about life problems related to the subject of the lecture. 3. Linking the lecture curriculum with practical applications, especially with our daily life.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا

Structured SWL (h/Sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/Sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.13
Total SWL (h/Sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Introduction to vectors:** Scalar Quantity, Vector quantity, resultant, graphical addition of vectors, Parallelogram method, subtraction of vectors, trigonometric functions, components of a vector, unit vector
Week 2	**Introduction to vectors:** Problem solving
Week 3	**Equilibrium under the action of concurrent forces:** Concurrent forces, an object in equilibrium, first condition in equilibrium, Problem solution method.
Week 4	**Equilibrium under the action of concurrent forces:** Problem solving
Week 5	**Equilibrium under the action of coplanar forces:** Torque or momentum, two conditions for equilibrium, center of gravity
Week 6	**Equilibrium under the action of coplanar forces:** Problem solving
Week 7	**Mid-term exam**
Week 8	**Uniformly accelerated motion:**

	Speed, velocity and acceleration. Uniformly accelerated motion on straight line, projectiles.
Week 9	**Uniformly accelerated motion:** Problem solving
Week 10	**Newton's Laws:** Mass, Force, External force. Newton first law, Newton second law, Newton third law. Law of universal gravitation. Weight. Types of forces.
Week 11	**Newton's Laws:** Problem solving
Week 12	**Work, Energy and Power:** Work, kinetic energy, gravitational potential energy, conservation of energy, Power, Kilowatt-hour
Week 13	**Work, Energy and Power:** Problem Solving
Week 14	**Impulse and Momentum:** Linear momentum, impulse causes change in momentum, conservation of linear momentum collisions and explosions. Elastic collision, coefficient of restitution.
Week 15	**A week of preparation before the final exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Instructions to students, Basic personal needs and other requirements. Writing experiment calculations, Introduction to graphical representation of experimental data, Errors, their determination and minimization, least square fitting and units.
Week 2	Forces and Equilibrium
Week 3	Spiral Spring and Hooks Law
Week 4	Simple Pendulum and determination of gravitational acceleration (g).
Week 5	Surface tension measurement
Week 6	calculate the refractive index of light using a moving microscope

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	University Physics, By Zemansky and Young	No (Available as an e-book)
Recommended Texts	Fundamental of Physics by Halliday, Resnick and Walker	No (Available as an e-book)
Websites		

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 works 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	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: 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.

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	**General Chemistry**	**Module Delivery**	
Module Type	**Core**	• ☒ **Theory**	
Module Code	CHEM1103	• ☒ **Lecture**	
ECTS Credits		• ☒ **Lab**	
SWL (hr/sem)		• ☐ **Tutorial**	
		• ☐ **Practical**	
		• ☐ **Seminar**	
Module Level		**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Dr. Ahmed Al-Ani	**e-mail**	ahmed.sabeeh@nahrainuniv.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	PhD
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Ahmed Al-Ani	**e-mail**	E-mail
Scientific	01/06/2023	**Version Number**	1.0

Committee Approval Date			

<div align="center">

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

</div>

Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

<div align="center">

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

</div>

Module Aims أهداف المادة الدراسية	The primary objective of this course is to acquire basic concepts, principles, and techniques of modern chemistry that would empower students with an analytical mind set and the abilities to solve diverse analytical problems in an efficient and quantitative way that conveys the importance of accuracy and precision of the analytical results. On successful completion of this course, students will be able: 1. To develop an understanding of the range and uses of analytical methods in chemistry. 2. To establish an appreciation of the role of chemistry in quantitative analysis 3. To develop an understanding of the broad role of the chemist in measurement and problem solving for analytical tasks. 4. To provide an understanding of chemical methods employed for elemental and compound analysis. 5. To provide experience in some scientific methods employed in analytical chemistry. 6. To develop some understanding of the professional and safety responsibilities residing in working on chemical analysis.

Module Learning Outcomes
 	
مخرجات التعلم للمادة الدراسية
	After attending this course in general Chemistry, the students have to be able to develop a basic knowledge of main principles of chemical methods as follows
	    ➕ To understand qualitative and quantitative properties of solutions, understanding all kinds of analytical concentrations.
	
	    ➕ To describe and explain chemical equilibriums of acid base reactions
	    ➕ Understanding the periodic table and atomic structure
	    ➕ Understanding ionic compounds, types of bonds and Metal and nonmetal
	    ➕ Understanding the acid/base reactions and titration methods
	    ➕ Effectively teach practical science through the context of general chemistry
	    ➕ Design problem solving activities to challenge student understanding of analytical method
	    ➕ Understanding the safe handling of chemicals and the principles apparatus and unit operation in general chemistry

Indicative Contents
 	
المحتويات الإرشادية
	Indicative content includes the following.
	    4. Areas of general chemistry
	    5. The current role of general chemistry
	    6. Improve the student's mind by how he or she can deal with chemicals and its uses
	Teach students about hazardous chemicals and how can avoid any risk in the lab

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises presented during the class, home works and quizzes. Furthermore, encourage the student participation in panel discussion.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	102	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	98	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
Summative assessment	Midterm Exam	2 hr	30% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1-2	Matter, measurements and significant figures
Week 3-5	Atomic weight, molecular weight and moles calculations

Week 6-8	Chemical reactions in solutions and concentrations
Week 9-11	Periodic table and atomic structure
Week 12-14	Ionic compounds and types of bonds
Week 15	Acid base reactions and titrations
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Safety rules and Laboratory equipments
Week 2	Lab 2: PH and indicators
Week 3	Lab 3: Acid base titration
Week 4	Lab 4: Preparation of sodium hydroxide
Week 5	Lab 5: Effect of concentration on reaction rate
Week 6	Lab 6: Preparation and reaction of barium peroxide
Week 7	Lab 7: Calculation the percentage of water in hydrated salt

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	2. Fundamental of analytical chemistry: Nine edition, Skoog	Yes
Recommended Texts	Fundamentals of chemistry: Fourth Edition, David E. Goldberg	Yes
Recommended Texts	Basic Inorganic Chemistry F. Albert Cotton, Geoffrey Wilkinson, Paul L. Gaus, , 3rd Edition, 1995	Yes
Websites	Different wabsites	

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	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	**Finite Mathematics**	**Module Delivery**	
Module Type	Core	• ☐ **Theory** • ☒ **Lecture** • ☐ **Lab** • ☒ **Tutorial** • ☐ **Practical** • ☐ **Seminar**	
Module Code	**MATH1205**		
ECTS Credits	**4**		
SWL (hr/sem)	**100**		
Module Level		**Semester of Delivery**	1
Administering Department	MATH	**College**	Type College Code
Module Leader	Dr.Fatimah Al-Taie	**e-mail**	fatimah.altaie@nahrainuniv.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	me	**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	
Module Aims أهداف المادة الدراسية	The aim of this course is for the students to be primarily concerned with applying mathematics problem-solving and reasoning to real-world phenomena, making finite mathematics a critical area of knowledge for students pursuing careers in business, social sciences, computer science, and other practical career disciplines.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Learning the basic concepts of mathematics, such as: o To be able to deal with Sigma Notation, and mathematical induction. o To be familiar with complex numbers and their properties. o To deal with matrices: definition and some applications, and solution of mathematical equations with first, and higher degrees. o To learn about polynomials and their properties with applications and definitions. o To have experience in applications of Linear functions.
Indicative Contents المحتويات الإرشادية	1. Mathematical induction: summation, induction. 2. Complex numbers: definitions, solutions, polar coordinates, Demoiver's Theorem, square roots of complex numbers. 3. Matrices: definitions, type of matrices, operations on matrices, determinants, the inverse of matrices, linear systems, solving linear systems. 4. Polynomials: definitions, properties, number of the roots, Cardan method, solution of nonlinear systems. 5. Applications: linear functions, definitions, slope, two methods of the graph of linear equations.

Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies	The subject will be given to the students on a whiteboard through a series of lectures with problem-solving practice carried out in interactive tutorials. These tutorials will be supported by practice and directed study outside the classroom. Formative assessment takes place during tutorials and feedback is given during these tutorials.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.46
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	2, 6	LO #1, 3
	Assignments	2	10% (10)	3, 8	LO # 2 and 3
	Projects / Lab.	-	10% (10)	continuous	
	Report	1	10% (10)	14	LO # 4, 5
Summative assessment	**Midterm Exam**	2	10% (10)	4,12	LO # 1,2 and 2-4
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Sigma Notation: Summation, changing index summation, properties of Sigma notation, summation formulas
Week 2	Mathematical Induction, principles, definition, method of solution
Week 3	Complex Numbers: Definitions, Properties, Some areas of applications, Operations on complex numbers
Week 4	Mid-Term Exam + Complex conjugates, laws of Algebra, solving for parameters
Week 5	Polar representation for complex numbers, Demoiver's Theorem
Week 6	Matrices: definitions, types, properties, operations of matrices
Week 7	Determinants, different methods of computing determinants, properties, solving linear systems using determinants
Week 8	The inverse of matrices, definition, two methods of computing matrix inversion

Week 9	solving linear systems using the inverse of matrices, solving equations formulas
Week 10	Polynomials: definitions, properties, operations
Week 11	A quick method for computing the quotient of two polynomials, roots of a polynomial equation
Week 12	Mid-Term Exam + upper and lower bounds of the real roots of the polynomial equation,
Week 13	Relation between roots and coefficients of (2 by 2) polynomials, (3 by 3) polynomials, (4 by 4) polynomials, and (n by n) polynomials
Week 14	Applications of Linear functions: the slope, increasing and decreasing of functions
Week 15	Calculating the rate of change, two methods of graphing linear functions
Week 16	**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	
Week 8	
Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Applied method, د. كاظم,د. سليم الكتبي , د. رياض شاكر نعوم , د. محمد الصومعي Introduction to finite mathematics, د. مصطفى احمد , د. جلال نعوم , د.محمد سردار	Yes
Recommended Texts	Mathematics with application brief version	No
Websites	https://www.khanacademy.org/math , www.mathhandbook.com ,	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
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	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	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: 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.

	Ministry of Higher Education and Scientific Research - Iraq Al-Nahrain University College of Sciences Department of Mathematics and Computer Applications	

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information		
معلومات المادة الدراسية		
Module Title	**Calculus (I)**	**Module Delivery**
Module Type	Core	• ☐ Theory • ☒ Lecture • ☒ Lab • ☒ Tutorial • ☐ Practical • ☐ Seminar
Module Code	**MATH1101**	
ECTS Credits	**8**	

SWL (hr/sem)	200		
Module Level		Semester of Delivery	1
Administering Department	Mathematics and Computer Applications	College	College of Sciences
Module Leader	Ibtisam Kamil Hanan	e-mail	ibtisam.kamil@nahrainuniv.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	me	e-mail	E-mail
Scientific Committee Approval Date	1/9/2023	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 Aims أهداف المادة الدراسية	The aim of this course is for student to gain proficiency in computations. In calculus, we use two main tools for analyzing and describing the behavior of functions: limits and derivatives. Students will use these tools to solve application problems in a variety of setting ranging from physics and chemistry to business and economics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. To determine the solution set of inequalities involving absolute value, 2. To determine domain, range and operation of some one variable functions and the graphs. 3. To determine limit and continuity of one variable functions. 4. To determine derivate of one variable functions. 5. To determine the solution of problems involving the derivate of one variable function. 6. To determine inverse function and its derivative. 7. To learn about application of derivatives.

Indicative Contents **المحتويات الإرشادية**	1. Real number, inequalities, absolute value, Cartesian coordinate system, function and its graph, operation on function, trigonometry function. 2. Definition, theorems of limit, trigonometry function limit, limit on infinity, infinite limit, continuity function, 3. Definition and rule of derivate, derivate of trigonometry function, chain rule, higher order derivate, implicit derivate, related rate, basic concept of differential, 4. Maximum and minimum, monotonicity and concavity, graphing one variable function, mean value theorem for derivate. 7. Natural logarithm function, inverse function and its derivate, natural exponential function, general exponential function, general logarithm function, hyperbolic function and its inverse.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The module will be presented to the students through a specified series of lectures, supported by problem solving practice carried out in interactive tutorials. These tutorials will be supported by practice and directed study outside the classroom. Formative assessment takes place throughout the module during tutorials and feedback is given during these tutorials.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	106	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7.0666666667
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation
تقييم المادة الدراسية

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

assessment	Exam				
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	The Rate of Change of Function: Coordinates, Increments and Distance, Slope of the straight line, Equations of straight lines, Circle, Equation of circle.
Week 2	Inequalities, Intervals, Absolute value, Properties of Absolute values.
Week 3	Functions and graphs: Odd function, Even function, Domain, Range, Composition function, Shift Formula, Axes intercept points, Symmetry, Asymptotes.
Week 4	Limits and continuity :Theorems of limits, One sided and two-sided limits.
Week 5	Mid Term Exam + Limit at infinity, Oblique asymptote.
Week 6	Sandwich theorem, Continuous functions.
Week 7	The slope of the curve and derivatives: Formal differentiation, Rules of derivatives (with proofs)
Week 8	Implicit differentiation, Second and higher order derivatives, Chain rule, Extended Chain rule.
Week 9	Parametric equations, Derivatives of the Parametric Equations, L'Hopital's rule (First Form), L'Hopital's rule (Stronger Form).
Week 10	Mid Term Exam + Transcendental Functions: Properties and derivatives (with proofs) for Trigonometric functions.
Week 11	Properties and derivatives (with proofs) for Inverse of trigonometric functions.
Week 12	Properties and derivatives (with proofs) for Logarithmic, exponential functions and The exponent function a^x
Week 13	Properties and derivatives (with proofs) for (Hyperbolic functions and Inverse of Hyperbolic Functions)
Week 14	Applications of Derivatives: Curve sketching, Maxima and minima problems
Week 15	Related rate, Roll's and mean value theorems, Velocity and acceleration.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introducing Simple Mathematical Expressions
Week 2	Lab 2: Names for Common Constant in MATLAB
Week 3	Lab 3: Using variables in MATLAB
Week 4	Lab 4: Using Built-in Functions in MATLAB
Week 5	Lab 5: Plotting Functions
Week 6	Lab 6: Calculating Limit
Week 7	Lab 7: Computing Derivative
Week 8	Lab 8: L'Hopital's Rule
Week 9	Lab 9: Transcendental Functions ,Convert angle from radians to degree
Week 10	Lab 10: Inverse of trigonometric functions.
Week 11	Lab 11: Exponentials and Logarithms
Week 12	Lab 12: Hyperbolic Functions and their inverse
Week 13	Lab 13: Velocity and acceleration
Week 14	Lab 14: Concavity and Inflection Points
Week 15	Lab 15: Finding Minima and Maxima

اساتذة المختبر

م.د. ابتسام كامل حنان   2- م. رنين زيد حمود   3- م.م. حنين عبد الكريم أمين   4- م.م. عباس 1-ابراهيم خليف

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Calculus and Analytic Geometry by Thomas	Yes
Recommended Texts	Calculus Labs for MATLAB	No
Websites	www.mathhandbook.com	

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	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Ministry of Higher Education and
Scientific Research - Iraq
Al-Nahrain University
College of Sciences
Department of Mathematics and Computer
Applications

Note: 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.

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	**Calculus (II)**		**Module Delivery**
Module Type	Core		☐Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐Practical ☐ Seminar
Module Code	**MATH1203**		
ECTS Credits	**7**		
SWL (hr/sem)	**175**		
Module Level		**Semester of Delivery**	2
Administering Department	Mathematics and Computer Applications	**College**	College of Sciences
Module Leader	Ibtisam Kamil Hanan	**e-mail**	ibtisam.kamil@nahrainuniv.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	me	**e-mail**	E-mail
Scientific Committee	01/09/2023	**Version Number**	1.0

Approval Date			

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MATH1101	Semester	1
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The aim of this course is to introduce the concept of integration, study various techniques of integration, test improper integrals for convergence and illustrate some applications of integration. Student will gain proficiency to use integration to solve real world problems such as area and volumes problems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	After completing the course, students have the ability - To determine proper integral of one variable functions. - To determine integral involving the fundamental theorem of Calculus and method of substitution. - To determine the solution of problems involving the integral of one variable function. - To compute integral involving transcendental functions. - To compute integral with advanced integration techniques. - To demonstrate ability to think critically by recognizing patterns and determining and using appropriate techniques for solving a variety of integration problems. - To solve indeterminate forms and improper integral problems. - To calculate the length of a plane curve and solving area and volume application problems. - To sketch the graph of a polar equation and the area problems in the polar coordinate system. - To demonstrate an intuitive and computational understanding for integral applications by solving a variety of problems from physics, engineering and mathematics.

Indicative Contents **المحتويات الإرشادية**	6. Proper integral, Fundamental Theorem of Calculus, basic rules of integration. 7. Methods of integrations, method of substitution, partial integration method, trigonometry integral and integral of rational function with partial fraction. 8. Improper integrals, test for convergence and divergence of improper integrals. 9. Application of Definite Integrals, Mean value theorem of integration, Area, solid revolution volume and Arc length. 10. polar coordinates**.**

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم
Strategies	The module will be presented to the students through a specified series of lectures, supported by problem solving practice carried out in interactive tutorials. These tutorials will be supported by practice and directed study outside the classroom. Formative assessment takes place throughout the module during tutorials and feedback is given during these tutorials.

Student Workload (SWL)			
الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	81	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	3, 8	LO #1, 2, and 4
	Assignments	2	10% (10)	6, 9	LO # 3 and 6
	Projects / **Lab.**	1	10% (10)	continuous	
	Report	1	10% (10)	12	LO # 5, 7 and 8
Summative assessment	Midterm Exam	2	10% (10)	5,10	LO # 1-7
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Indefinite integrals, Definite integrals, The fundamental theorems of integrals, Basic Integration Formulas.
Week 2	Integration by substitution
Week 3	Integration of certain powers of trigonometric and hyperbolic functions
Week 4	Integrals involving trigonometric substitutions, Integrals involving hyperbolic substation .
Week 5	Mid-Term Exam + Integrals involving quadratic substation
Week 6	Integration by parts
Week 7	Integration of Rational Functions
Week 8	Integration of Irrational Functions, Integration of Rational Functions of Trigonometric
Week 9	Improper integrals: Definition of improper integral and examples
Week 10	Mid-Term Exam + Test for convergence and divergence of improper integrals (P-test, Domination test, Limit comparison test)
Week 11	Application of Definite Integrals: Mean value theorem of integration , Area under the curve
Week 12	Area between two curves, Volume of solid of revolution (Disk (washer) and shell) methods
Week 13	Arc length, Area of surface of revolution
Week 14	Area in polar coordinates
Week 15	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Integration in MATLAB
Week 2	Lab 2: Definite Integrals
Week 3	Lab 3: Indefinite integrals
Week 4	Lab 4: Sine and Cosine Integral functions
Week 5	Lab 5: Hyperbolic Sine and Cosine Integral functions
Week 6	Lab 6: Integration by parts in MATLAB
Week 7	Lab 7: Integrating inverse trigonometric Functions
Week 8	Lab 8: Partial Fraction Expansion in MATLAB
Week 9	Lab 9: Solving an improper Integral
Week 10	Lab 10: Area in MATLB
Week 11	Lab 11: Area between two curves in MATLAB
Week 12	Lab 12: Compute Volumes of Revolution

Week 13	Lab 13: Arc length
Week 14	Lab 14: Using Polar Coordinates in MATLAB

اساتذة المختبر

م.د. ابتسام كامل حنان   2- م. رنين زيد حمود   3- م.م. حنين عبد الكريم أمين   4- م.م. عباس

1-ابراهيم خليف

5 - م.م. شيماء عبد الستار   6 - م. م. فرح لطيف

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Calculus and Analytic Geometry by Thomas	Yes
Recommended Texts	Calculus Labs for MATLAB	No
Websites	www.mathhandbook.com	

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	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: 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.

	Ministry of Higher Education and Scientific Research - Iraq Al-Nahrain University College of Science Department of Mathematics and Computer Applications	

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
الدراسية المادة معلومات

Module Title	English Language	**Module Delivery**	
Module Type	S	Theory Lecture • Lab • Tutorial • Practical • Seminar	
Module Code	URENG – UREQ1101		
ECTS Credits	2		
SWL (hr/sem)	50		

Module Level	UGI	**Semester of Delivery**	One
Administering Department	Mathematics and Computer Applications	**College**	Science
Module Leader	Shayma Abdul-Sattar	**e-mail**	Shayma.abdulsatter@nahrainuniv.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	**Module Leader's Qualification**	MSc Mathematics
Module Tutor	-	**e-mail**	-
Peer Reviewer Name	Manaf Adnan	**e-mail**	Manaf.adnan@nahrainuniv.edu.iq
Review Committee Approval		**Version Number**	

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
الإرشادية والمحتويات التعلم ونتائج الدراسية المادة أهداف

Module Aims الدراسية المادة أهداف	The main objective of this course is to strengthen the English language for the first year's students by focusing on: • Encouraging students to use the English language in conversations in the classroom and focusing on the importance of their knowledge of vocabulary and enhancing their ability to understand and listen to curriculum-based conversations concerning meeting new friends, self-description, life styles, families, personality, habits, and preferences; and the related every day's English phrases and vocabulary including numbers, the alphabet, days of the week, and some social expressions. • Reinforcing the related English grammar like auxiliary verbs, question types including short answers, possessive adjectives, present simple tense, the adverb frequency, and pronouns. • Enhancing their reading and writing skills that help them communicate with new friends, making a questionnaire, or writing a holiday's postcard.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	A- Cognitive goals. A1- To encourage students to speak English. A 2- Enrich them with an adequate amount of vocabulary. A3- Understand syntax using grammar. A4- Know the difference between the tenses of the English language. B. The skills goals special to the course. B1 - Learn how to break up sentences and analyze them grammatically. B2 - improve listening, speaking and writing abilities.
Indicative Contents المحتويات الإرشادية	Students should be able to understand the basic concepts of English Language that deals with the subjects of Mathematics.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	• The New Headway Beginner student's book is mainly taught which is enriched with a digital revising material provided by the Oxford university press, in addition to English for the Students of Mathematics book that focuses on Mathematics' history and its subjects' classification and mathematics phrases that help them in their first year of study at the Mathematics Dept. • Discussions and questions will be performed to help students break the barrier of speaking the English language by using the suitable vocabulary and grammar. Besides listening to the conversations • Writing on a white board with a marker in the classroom for demonstration and an audio device might be used to help the students listening to the taught conversations and hear the words and their pronunciation loudly to be able to repeat them properly.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation
الدراسية المـادة تقييم

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	3	10% (10)	5, 10	LO #1, 2, and 3
	Assignments	2	10% (10)	2, 12	LO # 1, 2, 3, 6, and 7
	Seminars / Lab.	1	10% (10)	14	LO # 6, 7, and 8
	Report	1	10% (10)	13	LO # 4, 5 and 8
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	This is … How are you? Good morning
Week 2	What's this in English? Numbers 1-10 Plurals
Week 3	Countries He/she/they, his/her Where's he from?
Week 4	Fantastic/awful/beautiful Numbers11-30Jobs
Week 5	Am/are/is Negatives and questions Personal information Social expressions (1)
Week 6	First Mid written exam+ listening test + an Oral test (and /or) Groups competition
Week 7	Our/their Possessive 's
Week 8	The family Has/have The alphabet
Week 9	Sports/Food/Drinks Present simple – I/you/we/they
Week 10	a/an Languages and nationalities Numbers and prices
Week 11	The time Present simple – he/she Always/sometimes/never
Week 12	Words that go together Days of the week
Week 13	Question words Me/him/us/them This/that Adjectives Can I …?
Week 14	Second mid exam of the first semester
Week 15	**Preparatory Week (Study Material review for the final exam)**
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1:

Week 2	Lab 2:
Week 3	Lab 3:
Week 4	Lab 4:
Week 5	Lab 5:
Week 6	Lab 6:
Week 7	Lab 7:

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	New Headway Beginner Plus Student's Book + the workbook	No
Recommended Texts	English for the Students of Mathematics book (Extra material for the Department's purposes)	No
Websites	www.oup.com/elt	

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
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	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.

ملاحظة : هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي