

University of Baghdad
جامعة بغداد



*First Cycle – Bachelor's Degree (B.Sc.) –
Mathematics Science*

بكالوريوس - علوم رياضيات



Semester 1

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Finite Mathematics		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Math105		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Name	e-mail	E-mail
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	20/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Objectives أهداف المادة الدراسية</p>	<p>This module aims to study the basic mathematical concepts (numbers, geometric shapes, functions, groups...), and how these concepts form the hierarchy of more complex concepts, especially the basic structures of the language of mathematics (theorems, definitions, proofs, and algorithms...) with Focus on the mathematical philosophical aspects. The course also aims to study mathematical logic and the philosophy of mathematical proof.</p>
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. Give the Definition of matrix. 2. A knowledge of Operation on Matrices and, Some type of Matrices. 3. A knowledge of determinants and their properties, Inverse of matrix. 4. Study Invertible matrices and adjoint matrices. 5. Study the Elementary transformations and Eigenvalues and Eigenvectors. 6. Give the Standard Eigenvalue Problem, applications on matrices. 7. Study the Kronecker Product and Eigenvalues, Approximating Eigenvalues Diagonalization and Jordan Form. 8. Give the Fundamental concept, Representing graph with matrices. 9. 2. A knowledge of connected graphs, graph isomorphism, planar graphs and trees. 10. Give the Binomial Expansion, The Additive and Multiplication Principles, Permutations, Combinations, Random Samples and Tree Diagrams.
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A - Matrices and Determinants</u> Definition of matrix, Operation on Matrices, Some type of Matrices. determinants and their properties. [30 hrs]</p> <p>Inverse of matrix, Invertible matrices, adjoint matrices. [25 hrs]</p> <p>Elementary transformations, Eigenvalues and Eigenvectors.. [15 hrs]</p> <p>Standard Eigenvalue Problem, applications on matrices.. [20 hrs]</p> <p><u>Part B - Graph Theory</u></p> <p>Fundamental concept, Representing graph with matrices, connected graphs, graph isomorphism, planar graphs, trees.. [30 hrs]</p> <p>Part C - Combinatorial Analysis Binomial Expansion, The Additive and Multiplication Principles, Permutations, Combinations, Random Samples, Tree Diagrams. [30 hrs]</p>

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<p>The main strategy of this module Specification provides a concise summary of the main features of the program and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each semester that contributes to the program.</p>
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب ٥١ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	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	Definition of matrix
Week 2	Operation on Matrices, Some type of Matrices.
Week 3	determinants and their properties, Inverse of matrix.
Week 4	Invertible matrices, adjoint matrices
Week 5	Elementary transformations, Eigenvalues and Eigenvectors.
Week 6	Standard Eigenvalue Problem, applications on matrices.
Week 7	Mid-term Exam
Week 8	Kronecker Product and Eigenvalues, Approximating Eigenvalues
Week 9	Diagonalization, Jordan Form.
Week 10	Fundamental concept, Representing graph with matrices.
Week 11	connected graphs, graph isomorphism
Week 12	planar graphs, trees.
Week 13	Binomial Expansion, The Additive and Multiplication Principles.
Week 14	Permutations, Combinations.
Week 15	Random Samples, Tree Diagrams.
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	<p style="text-align: right;">المصادر العربية</p> <p>1. بيرنارد كولمان " مقدمة في الجبر الخطي وتطبيقاته " ترجمة عادل غسان وباسل عطا الهاشمي، جامعة بغداد، 1990.</p> <p>2. خالد احمد السامرائي وسعد إبراهيم مهدي " مقدمة في الجبر الخطي " الجزئين الاول والثاني، جامعة بغداد، ١٩٩١.</p> <p>3. رمضان محمد جهيمة " جبر المصفوفات للمرحلة الجامعية " دار الكتب الوطنية، ينغازي / 2005</p> <p>4. رياض شاكر نعيم وآخرون " طرق رياضية " جامعة البصرة، الطبعة الاولى ٥٨٩١</p> <p>5. عادل زنبيل البياتي " المصفوفات " الجامعة المستنصرية، ٨٧٩١</p> <p>6. مجدي الطويل " المصفوفات النظرية والتطبيق " جامعة القاهرة، مصر، 1996</p> <p>7. محمود حسن المشهداني، وأمير حنا هرمز " الاحصاء " جامعة بغداد، 1985</p>	

	<p>8. مصطفى احمد وآخرون " مقدمة في الرياضيات المنتهية " الجامعة التكنولوجية ، ١٩٩١</p> <p>9. 10 . يحيى عبد سعيد ونزار حمدون شكر " مقدمة في الجبر الخطي " جامعة الموصل ، 1991 ، المصادر الاجنبية</p> <p>1. Bernard Kolman" Introductory Linear Algebra with Applications"</p> <p>2. Lange. S." Linear Algebra"</p> <p>3. Mostow. G. D. and Sampson. J. H." Linear Algebra" London, 1969.</p> <p>4. Stoll .R. R. and Wong .E. T." Linear Algebra" London, 1968.</p> <p>5, Strang . G. " Linear Algebra and Its Applications" New York, 1980</p>	
Recommended Texts		
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 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
<p>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, w as 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>				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Calculus I		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Math101		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Name	e-mail	E-mail
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	20/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Objectives أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> 1. The student's knowledge of the real functions and how to draw them, shifting (right, Left Up , Down) and Scaling Graphs 2. The student's knowledge of the definition of limits and their rules 3. The student's knowledge of the definition of the derivative at a Point, Differentiation Rules, Second- and Higher-Order Derivatives, and Derivatives of Trigonometric Functions and Implicit Differentiation. 4. 4. The student's knowledge of how to integrate and methods of integration
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. A knowledge of Functions and Their Graphs. 2. Combining Functions Shifting and Scaling Graphs. 3. A knowledge how to Composite of functions. 4. A review the trigonometric functions. 5. To begin with a definition of limit and show how can calculate the values of limits. 6. To give several limit rules, to calculate limits of functions that are arithmetic combinations of functions having known limits. 7. For further extend the concept of limit to infinite limits. 8. To understand continuity. 9. A knowledge that a function is said to have the Intermediate Value Property if whenever it takes on two values, it also takes on all the values in between. 10. Define the slope and tangent to a curve at a point, and the derivative of a function at a point. 11. To show how to differentiate the six basic trigonometric functions. 12. To show how to test the critical points of a function to identify whether local extreme values are present. 13. Apply the second derivative to gives us information about how the graph of a differentiable function 14. Applied Optimization Problems. Indeterminate Forms and L'Hopital's Rule.
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p>Part A - Real Functions Functions and Their Graphs, Combining Functions Shifting and Scaling Graphs, Composite of functions, Trigonometric Functions [24 hrs]</p> <p>Limit of a Function, The Limit Laws, Precise definitions of One-Sided Limits. Limits Involving Infinity, Infinite Limits. [26 hrs]</p> <p>Continuity: Continuity at a Point, Intermediate Value Property. [20 hrs]</p> <p>Part B - Differentiation</p> <p>Differentiation Rules, Second- and Higher-Order Derivatives. [15 hrs] Derivatives of Trigonometric Functions and Implicit Differentiation. [20 hrs]</p>

	<p>The Chain Rule and Parametric Equations. Related Rates. Linearization and Differentials. [20 hrs]</p> <p>Monotonic Functions and the First Derivative Test. Concavity and Curve Sketching. Applied Optimization Problems. Indeterminate Forms and L'Hopital's Rule. [25 hrs]</p>
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<p>The main strategy of this module Specification provides a concise summary of the main features of the program and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each semester that contributes to the program.</p>
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Student Workload (SWL)

الحمل الدراسي للطالب محسوباً ٥١ اسبوعاً

Structured SWL (h/sem)	63	Structured SWL (h/w)	4
الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعياً	
Unstructured SWL (h/sem)	87	Unstructured SWL (h/w)	6
الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعياً	
Total SWL (h/sem)			150
الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #3 and #9, #10
	Assignments	2	10% (10)	2 and 12	LO #6, #7 and #8, #11
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #14
Summative assessment	Midterm Exam	2hr	10% (10)	7	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	Real Functions: Functions and Their Graphs,
Week 2	Combining Functions Shifting and Scaling Graphs, Composite of functions.
Week 3	Trigonometric Functions, Limit of a Function.
Week 4	The Limit Laws, Precise definitions of One-Sided Limits.
Week 5	Limits Involving Infinity, Infinite Limits.
Week 6	Continuity: Continuity at a Point, Intermediate Value Property.
Week 7	Mid-term Exam
Week 8	DIFFERENTIATION: the Derivative at a Point, One-Sided Derivatives
Week 9	Differentiation Rules, Second- and Higher-Order Derivatives.
Week 10	Derivatives of Trigonometric Functions and Implicit Differentiation.
Week 11	The Chain Rule and Parametric Equations.
Week 12	Related Rates. Linearization and Differentials.
Week 13	Extreme Values of Functions. The Mean Value Theorem.
Week 14	Monotonic Functions and the First Derivative Test. Concavity and Curve Sketching.
Week 15	Applied Optimization Problems. Indeterminate Forms and L'Hopital's Rule.
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Thomas. G. B. , " Calculus and Analytic Geomtry", 12th , 2012.	Yes
Recommended Texts	<p>المصادر العربية</p> <p>1. برسل " حسابان التفاضل والتكامل مع الهندسة التحليلية " ترجمة على عزيز وآخرون جامعة الموصل</p> <p>2. الجزئين الاول والثاني الطبعة الثانية 1983</p> <p>3. صبري رديف العاني وآخرون ، "حسابان التفاضل والتكامل " 1981 ، بغداد.</p> <p>4. صبري رديف العاني وآخرون ، "حسابان التفاضل والتكامل المتقدم " 1981 ، بغداد.</p> <p>5. 4. عادل غسان نعوم، "مقدمة في التحليل الرياضي"، جامعة بغداد – العراق 1986</p> <p>6. على عزيز عليو عبد الرزاق، على الحسون وعادل زنبيل حسين، "الرياضيات العالية"، وزارة التعليم العالي</p>	No

	<p>7. والبحث العلمي ، 1980</p> <p>8. علي عزيز عليو عبد الرزاق علي الحسون وعادل زنبل حسين، "مبادئ الرياضيات التفاضل والتكامل"، وزارة التعليم العالي والبحث العلمي ، 1986</p> <p>9.10. فالح عمران الدوسري " التفاضل والتكامل " الجزئين الاول والثاني 2007 ،</p> <p>11.8. نوري فرحان المياحي " مقدمة في التحليل الرياضي " ، مطبعة القادسية، الطبعة الاولى 2015</p> <p>المصادر الاجنبية</p> <ol style="list-style-type: none"> 1. Anton. H, Bivens .I & Davis. S. , "Calculus " ,7th ,2002. 2. Craw. I. "Advanced Calculus and analysis MA 1002",2000. 3. Dovermann. K.H., "Applied Calculus" math215,1999 4. Durfee. W.HB. , "Calculus and Analytic Geomtry",1971. 5. Thomas. G. B. & Finney. R. L , "Calculus and Analytic Geomtry",6th ,1984. 6. Thomas. G. B. , " Calculus and Analytic Geomtry",12th ,2012. 	
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 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 (فيد 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, w as 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	The Foundation of Mathematics I		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Math103		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Name	e-mail	E-mail
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	20/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Objectives</p> <p>أهداف المادة الدراسية</p>	<p>The aims of this module is to study basic mathematical concepts, mathematical phrases and sentences, the method of mathematical proof, sets and their operations, relations and functions to prepare the student to deal with mathematical operations in the future in a correct mathematical logical manner. The course also aims to study mathematical logic and the philosophy of mathematical proof.</p>
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<p>After successful completion of this course students will be able to:</p> <ol style="list-style-type: none"> 1. Choose the appropriate method of proof 2. Logical thinking when mathematical proof and proof in the way of contradiction 3. The student's knowledge of the mathematical definition of finite and infinite sets 4. Knowledge of operations on sets 5. Extensive study of sets and their properties 6. The ability to use mathematical proof methods (direct proof and indirect proof) 7. Learn truth tables and operations on them 8. Learn mathematical operations on the Cartesian multiplication of sets 9. Learn the reflexive, symmetric and transitive relationships 10. Find the inverse of the relations 11. Formation of a solid mathematical foundation for the student to rely on in the subsequent academic stages 12. Developing the student's ability to choose the appropriate method for mathematical proof. 13. Giving the student experience in dealing with functions Developing students' logical thinking, which will be used in the future as ready-made skills in algebra, topology, and mathematical analysis 14. Know how to deal with functions (applications) and employ them in numerical analysis and differentiation Advanced 15. Learn the function, types of function, bijective, and composition of functions
<p>Indicative Contents</p> <p>المحتويات الإرشادية</p>	<ol style="list-style-type: none"> 1. The set and the operation on it, power set 2. Mathematical proof, direct and indirect proof. 3. Logic, truth table, argument, Quantifiers. 4. The relations: Definition of relation, types of relations, inverse relation. 5. The functions Definition of function, types of functions, bijective functions, composition of functions, invers of the function

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy of this module Specification provides a concise summary of the main features of the program and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each semester that contributes to the program.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب ٥١ اسبوعا

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	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #14
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #11, #12
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #13
Summative assessment	Midterm Exam	2hr	10% (10)	7	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	Concept of Set, The principles of mathematical logic
Week 2	Propositions and Truth Tables, Quantifiers.

Week 3	Arguments, Mathematical Proof.
Week 4	Axiomatic Development of Set Theory, Sets algebra.
Week 5	Cartesian Product, Relations and their Properties
Week 6	Type of Relations, Equivalence Classes, Ordered Sets.
Week 7	Mid-term Exam
Week 8	Definitions and General Properties, Type of Functions
Week 9	Composition of Functions, Extension and Restriction of Function
Week 10	The Image and Inverse Image of a Function, Invertible Functions
Week 11	The Axiom of Choice and Its Equivalents.
Week 12	Equivalent Sets, Finite and Infinite Sets.
Week 13	Countable sets, Similar Sets,
Week 14	Cardinal Numbers, Ordinal
Week 15	Paradoxes in Set Theory.
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1. D. S. Malik, John M. Mordeson, M. K. Sen ,fundamentals of mathematics (2009) . 2. Ali Nesin , fundamentals of mathematics (2004) .	

	د. هادي جابر مصطفى ، د. رياض شاكر نعوم، د. نادر جورج مصطفى "اسس الرياضيات" ج ١	
Recommended Texts	<ol style="list-style-type: none"> 1. Birkhoff .G and Mac Lane . Saunders." A Survey of Modern Algebra ", New York,2010. 2. Wildel., R. " Introduction to the Foundation of Mathematic ", New York, 1965. 3. Seymour Lipschutz, " Finite Mathematics " Schaum's Outline Series,1966. 4. Seymour Lipschutz, " Set Theory band Related Topics " Schaum's Outline Series,1964. 	
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
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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
<p>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, w as 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>				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Mathematical Physics I	Module Delivery	
Module Type	S	<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	Phys151		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level			
Administering Department	mathematic	College	College of Science for Women
Module Leader	NOHA HASSAN HARB, Mervat Kadhem Tameem	e-mail	Noha.harb1104@sc.uobaghdad.edu.iq ; Mervat.kadhem@csu.uobaghdad.edu.iq
Module Leader's Acad. Title	Lecture	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	14/11/2023	Version Number	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Level 1	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	<p>The course covers several chapters:1- Fundamental quantities in mechanics ,static and Dynamic mechanics.</p> <p>2- Motion in two and three dimensions: position and displacement Average acceleration.</p> <p>3- The laws of motion: Newton’s first and second laws ,also Periodic Motion: Hook law</p>
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none">1. Describe the Fundamental quantities in mechanics2 - an overview of the theories of Fundamental quantities applications in classical and quantitative mechanics3- Study vectors, their properties and type and their applications.4- Study types of motion as well as Newton’s laws, and their applications.
Indicative Contents المحتويات الإرشادية	<ol style="list-style-type: none">1-Encouraging students to research and follow up the scientific news of foreign journals and discuss them collectively2-Research on modern scientific applications and linking them to the subject of teaching nodal analysis3- Taking a topic or a physical problem that has scientific controversy and presenting it by linking it to the course curriculum

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<ol style="list-style-type: none">1- Holding daily, monthly and quarterly exams2- Holding practical exams in laboratories3- Students participating in writing reports and giving seminars
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	Oral assessment by involving students in discussions Quizzes
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

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
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
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Week 1	Binary Operations
Week 2	Introduction, Construction of Natural Numbers ,
Week 3	Pianos Axioms for Natural Numbers, Arithmetic of the Natural Numbers
Week 4	Ordered on the set of Natural Numbers
Week 5	Mathematical Induction
Week 6	Introduction , Construction of Integers ,Arithmetic of the Integers
Week 7	Mid -terms Exam
Week 8	Order on the set of integers
Week 9	Introduction , Construction of Rational Numbers , Arithmetic of the Rational Numbers
Week 10	Order on the set of Rational Numbers ,Properties of Rational Numbers
Week 11	Introduction , Construction of Real Numbers , Arithmetic of the Real Numbers
Week 12	Order on the set on Real Numbers ,The Completeness ,Properties of Real Numberse
Week 13	Introduction, Construction of Complex Numbers, Arithmetic of the Complex Numbers
Week 14	Order on the set of Complex Numbers ,Geometric Representation of Complex Numbers
Week 15	Polar Representation of Complex Numbers , Roots of Complex
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Measurement tools
Week 2	Lab 2: Simple pendulum
Week 3	Lab 3: Hooke's law (part ₂)
Week 4	Lab 4: Find the coefficient of static friction on a horizontal surface
Week 5	Lab 5: Find the coefficient of static friction for an inclined surface weighted test tube
Week 6	Lab 6: Determine the density of a liquid using a weighted test tube
Week 7	Lab 7: Find the moment of inertia of a rotating wheel
Week 8	Lab ^Λ : Determination of the surface tension of a liquid using a Searle balance
Week 9	Lab 9 Measure the spin radius of a cylinder on an inclined surface
Week 10	Lab 10 Finding the ground acceleration using a fluid oscillation method using a weighted test tube
Week 11	Lab 11 Calculation of viscosity coefficient
Week 12	Lab 12 Compound pendulum
Week 13	Lab 13 Graph Method
Week 14	Lab 14 : Hooke's law (part ^١)
Week 15	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	<p>١- كتاب الميكانيك لطلبة الهندسة والعلوم لد.نبيل اللحام ومنير دبابنه</p> <p>٢- Physics Mathematical, Jamis H.M.2017</p> <p>3- Fundamental of physics; David Halliday, Robert Resnick, Jearl Walker.</p>	NO
Recommended Texts	<p>The most important books and sources in physical mathematics</p> <p>There is a section in the Central Library and sciences for girls, rather</p>	No
Websites	<p>Discreet websites.</p> <p>Library locations in some international universities</p>	

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.

Semester 2

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Calculus II		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Math102		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Name	e-mail	E-mail
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	20/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الاخرى			
Prerequisite module	Math101	Semester	1
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Objectives</p> <p>أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> 1. The student's knowledge of how to integrate and methods of integration. 2. The student's knowledge of Transcendental Functions. 3. Apply the Methods of Integration.
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. Define the Indefinite Integral integration. 2. Applications of Indefinite Integral. 3. Define the Definite Integral. 4. Give The Fundamental Theorem of Calculus. 5. Definite Integral and Improper Integrals. 6. Give Some Application of the Definite Integral such as Area and Volumes. 7. Calculus of Trigonometric Functions and find the inverse Trigonometric Functions. 8. Define the natural Logarithmic function and The Natural Exponential Function. 9. Calculus of Hyperbolic Functions and the Inverse Hyperbolic Functions. 10. Give the Methods of Integration such as Integration by Parts, Integration by Partial Fractions, Trigonometric Integrals, Integration by Substitution, Integrals Involving the Square of a quadratic Functions, Integration of Rational Functions.
<p>Indicative Contents</p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A - The Integration</u></p> <p>The Integration: Indefinite Integral, Applications of Indefinite Integral, The Definite Integral. The Fundamental Theorem of Calculus, Definite Integral, Improper Integrals [20 hrs]</p> <p>Some Application of the Definite Integral, Area and Volumes. Trigonometric Functions: Calculus of Trigonometric Functions, The Inverse Trigonometric Functions. [25 hrs]</p> <p>Calculus of The Inverse Trigonometric Functions, The natural Logarithmic function, The Natural Exponential Function, General Exponential Function. [20 hrs]</p> <p>General Logarithmic Function, Hyperbolic Functions. Calculus of Hyperbolic Functions, The Inverse Hyperbolic Functions. [25 hrs]</p> <p>Calculus of The Inverse Hyperbolic Functions. [10 hrs]</p> <p><u>Part B - Methods of Integration</u></p> <p>Integration by Parts, Integration by Partial Fractions . Trigonometric Integrals Integration by Substitution. [25 hrs]</p> <p>Integrals Involving the Square of a quadratic Functions Integration of Rational Functions. [25 hrs]</p>

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy of this module Specification provides a concise summary of the main features of the program and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each semester that contributes to the program.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب ٥١ اسبوعا

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	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #3 and #8, #9
	Assignments	2	10% (10)	2 and 12	LO #5, #6 and #7, #8
	Projects / Lab. Report	1 1	10% (10) 10% (10)	Continuous 13	All LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	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	The Integration: Indefinite Integral, Applications of Indefinite Integral The Definite Integral. The Fundamental Theorem of Calculus
Week 2	Definite Integral, Improper Integrals
Week 3	Some Application of the Definite Integral, Area and Volumes.
Week 4	Trigonometric Functions: Calculus of Trigonometric Functions, The Inverse Trigonometric Functions
Week 5	Calculus of The Inverse Trigonometric Functions , The natural Logarithmic function,
Week 6	The Natural Exponential Function, General Exponential Function.
Week 7	Mid-term Exam
Week 8	General Logarithmic Function, Hyperbolic Functions.
Week 9	Calculus of Hyperbolic Functions, The Inverse Hyperbolic Functions.
Week 10	Calculus of The Inverse Hyperbolic Functions.
Week 11	Methods of Integration :Integration by Parts, Integration by Partial Fractions
Week 12	Trigonometric Integrals
Week 13	Integration by Substitution
Week 14	Integrals Involving the Square of a quadratic Functions
Week 15	Integration of Rational Functions.
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Thomas. G. B. , " Calculus and Analytic Geomtry", 12th , 2012.	Yes
Recommended Texts	المصادر العربية 1. برسل " حساب التفاضل والتكامل مع الهندسة التحليلية " ترجمة على عزيز وآخرون جامعة الموصل 2. الجزئين الاول والثاني الطبعة الثانية 1983 3. صبري رديف العاني وآخرون ، "حساب التفاضل والتكامل " 1981 ، بغداد. 4. صبري رديف العاني وآخرون ، "حساب التفاضل والتكامل المتقدم " 1981 ، بغداد. 27	

	<p>5. 4. عادل غسان نعوم، "مقدمة في التحليل الرياضي"، جامعة بغداد - العراق 1986</p> <p>6. على عزيز عليو عبد الرزاق على الحسون وعادل زنبيل حسين، "الرياضيات العالية"، وزارة التعليم العالي والبحث العلمي، 1980</p> <p>7. 8. على عزيز عليو عبد الرزاق على الحسون وعادل زنبيل حسين، "مبادئ الرياضيات التفاضل والتكامل"، وزارة التعليم العالي والبحث العلمي، 1986</p> <p>9. 10. 7. فالج عمران الدوسري "التفاضل والتكامل" الجزئين الاول والثاني ، 2007 ،</p> <p>11. 8. نوري فرحان المياحي " مقدمة في التحليل الرياضي " ، مطبعة القادسية، الطبعة الاولى 2015 المصادر الاجنبية</p> <p>1. Anton. H, Bivens .I & Davis. S. , "Calculus " ,7th ,2002.</p> <p>2. Craw. I. "Advanced Calculus and analysis MA 1002",2000.</p> <p>3. Dovermann. K.H., "Applied Calculus" math215,1999</p> <p>4. Durfee. W.HB. , "Calculus and Analytic Geomtry",1971.</p> <p>5. Thomas. G. B. & Finney. R. L , "Calculus and Analytic Geomtry",6th ,1984.</p> <p>6. Thomas. G. B. , " Calculus and Analytic Geomtry",12th ,2012.</p>
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 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
<p>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, w as 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>				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Linear Algebra		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Math106		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Name	e-mail	E-mail
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	20/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الاخرى			
Prerequisite module	Math105	Semester	1
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Objectives أهداف المادة الدراسية</p>	<p>This module is a comprehensive introduction to fundamental concepts in linear algebra, it starts with linear equations and matrices, followed by determinants and eigenvalues, and then moves on to inner products and the singular value decomposition. Finally, we give Bilinear and Quadratic Forms. Application sessions are included to show uses of linear algebra in the real world.</p>
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. Define Linear Combination and Linear Independence. 2. Define bases, dimension, Coordinates and Change of Bases. 3. Acknowledge of Convex and Affine Sets. 4. Definition of Linear Transformation and General Properties. 5. Acknowledge of The Space of Linear Transformations. 6. Knowing the Rank, Nullity and Inverse Transformations. 7. Use Matrix of Linear Transformations, Change of Bases and Normal Forms. 8. Define Eigenvalues and Eigenvectors and General Properties. 9. Use Eigen Space, Diagonalization of a Linear Transformation and Similar Matrices. 10. Use Cayley – Hamilton Theorem and Its Applications. 11. Acknowledge of Orthonormal Bases, Gram-Schmidt Process in Euclidean Spaces. 12. Define the Orthogonal Compliments and Orthogonal Transformations. 13. Apply Bilinear Functions, Quadratic Functions and Quadratic Forms.
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A - Vector Spaces</u> Definitions and Examples, Subspaces., Linear Combination, Linear Independence. [20 hrs]</p> <p>Bases and Dimension, Coordinates and Change of Bases, Convex and Affine Sets. [20hrs]</p> <p>Definitions of Linear Transformations and General Properties, The Space of Linear Transformations [20 hrs]</p> <p>Rank and Nullity, Inverse Transformations. [15 hrs]</p> <p>Matrix of Linear Transformations, Change of Bases and Normal Forms. [15 hrs]</p> <p><u>Part B - Eigenvalues and Eigenvectors</u></p>

	<p>Definitions of Eigenvalues and Eigenvectors and General Properties, Eigen Space and Diagonalization of a Linear Transformation, Similar Matrices, Cayley – Hamilton Theorem and Its Applications. [25 hrs]</p> <p>Euclidean Spaces: Orthonormal Bases, Gram-Schmidt Process, Orthogonal Compliments , Orthogonal Transformations. [20 hrs]</p> <p>Bilinear Functions, Quadratic Functions, Quadratic Forms. [15 hrs]</p>
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	<p>The main strategy of this module Specification provides a concise summary of the main features of the program and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each semester that contributes to the program.</p>

Student Workload (SWL) الحمل الدراسي للطالب محسوب ٥١ اسبوعا			
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	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #12
Summative assessment	Midterm Exam	2hr	10% (10)	7	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	Vector Spaces: Definitions and Examples, Subspaces.
Week 2	Linear Combination, Linear Independence.
Week 3	Bases and Dimension, Coordinates and Change of Bases.
Week 4	Convex and Affine Sets.
Week 5	Linear Transformations: Definitions and General Properties.
Week 6	The Space of Linear Transformations
Week 7	Mid-term Exam
Week 8	Rank and Nullity, Inverse Transformations.
Week 9	Matrix of Linear Transformations, Change of Bases and Normal Forms.
Week 10	Eigenvalues and Eigenvectors: Definitions and General Properties
Week 11	Eigen Space and Diagonalization of a Linear Transformation, Similar Matrices.
Week 12	Cayley – Hamilton Theorem and Its Applications.
Week 13	Euclidean Spaces: Orthonormal Bases, Gram-Schmidt Process.
Week 14	Orthogonal Compliments , Orthogonal Transformations.
Week 15	Bilinear Functions, Quadratic Functions, Quadratic Forms.
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	<p>المصادر العربية</p> <ol style="list-style-type: none"> 1. احمد بن على وفالح الدوسري " الجبر الخطي " الطبعة الثانية 2014 . جامعة أم القرى مكة المكرمة. 2. بيرنارد كولمان " مقدمة في الجبر الخطي وتطبيقاته " ترجمة عادل غسان وباسل عطا الهاشمي، جامعة بغداد، ٩٩١ . 3. جورج ضايف السبتي " الجبر الخطي " 1988 ، جامعة البصرة. 4. خالد احمد السامرائي وسعد إبراهيم مهدي " مقدمة في الجبر الخطي " الجزئين الاول والثاني، جامعة بغداد ، ٩٨٩١ 5. رمضان محمد جهيمة " جبر المصفوفات للمرحلة الجامعية " دار الكتب الوطنية ، ينغازي / 2005 6. رياض شاكر نعوم وآخرون " طرق رياضية " جامعة البصرة ، الطبعة الاولى 1985 7. سيمور ليبشتز " الجبر الخطي " ملخصات شوم ، ترجمة نخبة منا لاساتذة ، دار ماكجروهيل للنشر، 1974 8. عادل زنبيل البياتي " المصفوفات " الجامعة المستنصرية ، 1978 9. فيكتور كلّي ستيل " مبادئ الجبر الخطي " ترجمة نهدي صادق عباس وخالد احمد محمد على ، الجامعة المستنصرية 10. مجدي الطويل " المصفوفات النظرية والتطبيق " جامعة القاهرة ، مصر ، 1996 11. مصطفى احمد وآخرون " مقدمة في الرياضيات المنتهية " الجامعة التكنولوجية ، 1991 12. يحيى عبد سعيد ونزار حمدون شكر " مقدمة في الجبر الخطي " جامعة الموصل ، 199 <p>المصادر الاجنبية</p> <ol style="list-style-type: none"> 1. Bernard Kolman" Introductory Linear Algebra with Applications" 2. Lange. S." Linear Algebra" 3. Mostow. G. D. and Sampson. J. H." Linear Algebra" London, 1969. 4. Stoll .R. R. and Wong .E. T." Linear Algebra" London, 1968. 5, Strang . G. " Linear Algebra and Its Applications" New York, 1980 	
Recommended Texts		
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 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, w as 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	Mathematical Physics		Module Delivery
Module Type	Basic		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Phys152		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	1	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Name	e-mail	E-mail
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	20/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Objectives أهداف المادة الدراسية</p>	<p>This module aims to study the basic mathematical physics which refers to the development of mathematical methods for their application to problems in physics. The field is defined as "the application of mathematics to problems in physics and the development of mathematical methods suitable for such applications and for the formulation of physical theories". An alternative definition might also include that mathematics that are inspired by physics (also known as physical mathematics).</p>
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. Define the vector, definition of axes and their types, addition, subtraction, product and division of vectors. 2. Give Numerical triple product and directional triple product, Derivative of vectors, vectors regression, vectors divergence. 3. Define Newton 's Laws of Motion, Newton's three laws, work, energy, torque, momentum, power, conservation laws. 4. Basic principles of Harmonic Oscillators, differential equation of motion, Equation solution, Initial conditions of motion, some applied examples. 5. Definition of Simple Pendulum Movement, aim of this topic. differential equation describing motion, and solving the equation depending on the initial conditions of motion. 6. Description of the Cartesian, polar and cylindrical axes, what is meant by the movement of reference axes. Displacement and real and apparent speed, real and virtual acceleration in the concept of movement of reference axes. 7. Apply Central acceleration, Coriolus acceleration and acceleration of moving axes. 8. Give Central acceleration, Coriolis acceleration, Acceleration of moving axes, With applied examples. 9. Describe the Radiation decay mathematically through the differential equation and solve this equation. 10. Description of electrical circuits, how to express their terms mathematically, the mathematical representation of these circuits, and how to solve these equations
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A</u> Vector Analysis: Definition of vector, definition of axes and their types, addition, subtraction, product and division of vectors. Numerical triple product and directional triple product, Derivative of vectors, vectors regression, vectors divergence. vectors wrap, Integrals of vectors, some applications on vector analysis, problem solving and examples of vector operations. [20 hrs]</p>

	<p>Newton 's Laws of Motion, Newton's three laws, work, energy, torque, momentum, power, conservation laws. [8 hrs]</p> <p>Harmonic Oscillators: Basic principles, differential equation of motion, Equation solution, Initial conditions of motion, some applied examples. [10 hrs]</p> <p><u>Part B</u></p> <p>Simple Pendulum Movement: Definition, aim of this topic. Differential equation describing motion, and solving the equation depending on the initial conditions of motion [15 hrs]</p> <p>Dynamic of Coordination System: Description of the Cartesian, polar and cylindrical axes, what is meant by the movement of reference axes?, Displacement and real and apparent speed, real and virtual acceleration in the concept of movement of reference axes. Central acceleration, Coriolus acceleration and acceleration of moving axes, with application. Central acceleration , Coriolis acceleration , Acceleration of moving axes, With applied examples. [30 hrs]</p> <p>Radiation Decay: Radioactive decay and describe this decay mathematically through the differential equation and solve this equation. [8 hrs]</p> <p>Electrical Circuit Analysis: Description of electrical circuits, how to express their terms mathematically, the mathematical representation of these circuits, and how to solve these equations. [9 hrs]</p>
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	<p>The main strategy of this module Specification provides a concise summary of the main features of the program and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each semester that contributes to the program.</p>

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب ٥١ اسبوعا			
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	37	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
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)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	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	Vector Analysis: Definition of vector, definition of axes and their types, addition ,subtraction , product and division of vectors.
Week 2	Numerical triple product and directional triple product, Derivative of vectors, vectors regression, vectors divergence.
Week 3	vectors wrap, Integrals of vectors, some applications on vector analysis, problem solving and examples of vector operations.
Week 4	Newton 's Laws of Motion, Newton's three laws, work, energy, torque, momentum, power, conservation laws.
Week 5	Harmonic Oscillators: Basic principles, differential equation of motion,
Week 6	Equation solution, Initial conditions of motion, Some applied examples
Week 7	Mid-term Exam

Week 8	Simple Pendulum Movement: Definition, aim of this topic.
Week 9	differential equation describing motion, and solving the equation depending on the initial conditions of motion.
Week 10	Dynamic of Coordination System: Description of the Cartesian, polar and cylindrical axes, What is meant by the movement of reference axes.
Week 11	Displacement and real and apparent speed, real and virtual acceleration in the concept of movement of reference axes.
Week 12	Central acceleration, Coriolus acceleration and acceleration of moving axes, with application.
Week 13	Central acceleration , Coriolis acceleration , Acceleration of moving axes, With applied examples
Week 14	Radiation Decay: Radioactive decay and describe this decay mathematically through the differential equation and solve this equation.
Week 15	Electrical Circuit Analysis: Description of electrical circuits, how to express their terms mathematically, the mathematical representation of these circuits, and how to solve these equations
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	<p>المصادر الاجنبية المصادر العربية عبد الامير القزازو عبد السلام عبد الامير " الفيزياء لغير الفيزيائيين " المصادر الاجنبية</p> <ol style="list-style-type: none"> 1. Theory and problems of theoretical mechanics."Schaum's Outline Series", by Murray R. Spiegel , McGraw Hill Book Company. 2. Mathematical Methods for Physics , Sixth edition , George B. Arfken ,Hans J. Weber 3. Advanced Engineering mathematics , 7th Edition , PETER V. O'NEIL,The University of Alabama at Birmingham. 	
Recommended Texts		
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	39 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 (فيد 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, w as 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	The Foundation Of Mathematics II		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Math104		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Name	e-mail	E-mail
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	20/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الاخرى			
Prerequisite module	Math103	Semester	1
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Objectives</p> <p>أهداف المادة الدراسية</p>	<p>This course aims to study the basic mathematical concepts of the number system and study the properties of natural, integer, rational and real numbers, also a simple introduction to number theory.</p> <p>And how these concepts form a hierarchy of more complex concepts, with a focus on dealing with countable and uncountable sets and their equivalents, well-ordered sets, totally ordered sets and density of sets.</p>
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<p>After successful completion of this course students will be able to:</p> <ol style="list-style-type: none"> 1. Identify the countable and uncountable groups. 2. Identify the axioms of choice and their equivalents. 3. Studying the natural, correct, and relative numbers, and getting acquainted with the principles of the numbers theory 4. How to prove the group is countable or uncountable. 5. Dealing with the setup system through mathematical theorems.
<p>Indicative Contents</p> <p>المحتويات الإرشادية</p>	<p><u>Some Algebraic Systems</u> Binary Operations, Mathematical Systems, Groups, Rings, Fields.</p> <p><u>The Natural Numbers</u> Introduction, Construction of Natural Numbers, Axiom of Infinity, Peano's Axioms for Natural Numbers, Arithmetic of the Natural Numbers, Ordered on the Set of Natural Numbers, The set of counting number, Mathematical Induction.</p> <p><u>The integers numbers</u> Introduction, Construction of Integers, Arithmetic of the Integers, Order on the Set of Integers.</p> <p><u>The rational numbers</u> Introduction, Construction of Rational Numbers, Arithmetic of the Rational Numbers, Order on the Set on Rational Numbers, Properties of Rational Numbers .</p> <p><u>Sequences in ordered fields</u> Sequences, Convergence, Cauchy Sequences, Cut, Positive Sequence.</p> <p><u>The Real Numbers</u> Introduction, Construction of Real Numbers, Arithmetic of the Real Numbers, Order on the Set on Real Numbers, The Completeness, Properties of Real Numbers</p> <p><u>Introduction to Numbers Theory</u> Divisibility, Greatest Common Divisor, Prime Numbers and the Distribution of. Them the Fundamental Theorem of Arithmetic, Perfect numbers, Congruence.</p>

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<p>The main strategy of this module Specification provides a concise summary of the main features of the program and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each semester that contributes to the program.</p>
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Student Workload (SWL)

الحمل الدراسي للطالب محسوباً ٥١ اسبوعاً

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Binary Operations, Mathematical Systems
Week 2	Introduction, Construction of Natural Numbers, Axiom of Infinity
Week 3	pianos Axioms for Natural Numbers, Arithmetic of the Natural Numbers
Week 4	Ordered on the Set of Natural Numbers
Week 5	The set of counting number, Mathematical Induction.
Week 6	Introduction, Construction of Integers, Arithmetic of the Integers
Week 7	Mid-term Exam
Week 8	Order on the Set of Integers, Absolute Value.
Week 9	Introduction, Construction of Rational Numbers, Arithmetic of the Rational Numbers.
Week 10	Order on the Set on Rational Numbers, Properties of Rational Numbers .
Week 11	Introduction, Construction of Real Numbers, Arithmetic of the Real Numbers
Week 12	Order on the Set on Real Numbers, The Completeness, Properties of Real Numbers.
Week 13	Introduction, Construction of Complex Numbers, Arithmetic of the Complex Numbers
Week 14	Order on the Set on Complex Numbers, Geometric Representation of Complex Numbers
Week 15	Modulus of Complex Number, Polar Representation of Complex Numbers, Roots of Complex Numbers.
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. D. S. Malik, John M. Mordeson, M. K. Sen ,fundamentals of mathematics (2009) . 2. Ali Nesin , fundamentals of mathematics (2004) . د. هادي جابر مصطفى ، د. رياض شاكر نعوم، د. نادر جورج مصطفى "اسس الرياضيات" ج ١	
Recommended Texts	1. Birkhoff .G and Mac Lane . Saunders." A Survey of Modern Algebra ", New York,2010. 2. Wildel., R. " Introduction to the Foundation of Mathematic ", New York, 1965. 3. Seymour Lipschutz, " Finite Mathematics " Schaum's Outline Series,1966. 4. Seymour Lipschutz, " Set Theory band Related Topics " Schaum's Outline Series,1964.	
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 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, w as 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.

Semester 3

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Advanced Calculus		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Math211		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Name	e-mail	E-mail
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	20/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الاخرى			
Prerequisite module	Math102	Semester	2
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Objectives</p> <p>أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> 1. The student will provide with the skills of vector calculus operations which are needed for further study in mathematics; 2. The student will be able to give reasonable explanations by provide him with the necessary skills necessary. 3. The student will be able to solve problems in physics and in engineering by provide him with the critical thinking skills required.
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<p>The student will be able to</p> <ol style="list-style-type: none"> 1. Define the Sequences, Real Sequences, Convergence, Cauchy sequence, Monotone and Bounded sequences. 2. Define Infinite Convergence, Infinite Series, Geometric Series, Harmonic series. 3. Apply the Converging Test, Alternations Series, Absolute Convergence, Rearrangements of Series, Product Infinites Series, Power Series. 4. Calculus of Power Series Taylors and Maclorian series with applications. 5. Define Vectors Functions, Velocity, Acceleration and Arc Length, Curvature, The Laws of Planetary Motion. 6. Knowledge of Multiple Variables Functions, Limits and Continuity, Partial derivatives, Increments and Differentials of Functions of Several Variables. 7. Knowledge of Extreme of a Functions of two Variables, Exact Differentials, Line Integrals, Work. 8. Apply the Double integrals, Iterated integrals, Evaluation of Double integrals by Means of Iterated integrals. 9. Apply Other Applications of Double integrals, Green's theorem, Double integrals in Polar Coordinates. 10. Knowledge of Triple integrals, Application in Rectangular Coordinates, Integrals in cylindrical and spherical coordinates.
<p>Indicative Contents</p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A</u></p> <p>Sequences and Series: Sequences, Real Sequences, Convergence, Cauchy sequence, Monotone and Bounded sequences Infinite Convergence, Infinite Series, Geometric Series, Harmonic series, Converging Test, Alternations Series. [25 hrs]</p> <p>Absolute Convergence , Rearrangements of Series, Product Infinites Series, Power Series, Calculus of Power Series Taylors and Maclorian series with applications. [25 hrs]</p> <p>Vector Functions in Three Dimensional Spaces: Vectors Functions, Velocity. Acceleration and Arc Length, Curvature, The Laws of Planetary Motion. [25 hrs]</p>

	<p><u>Part B -</u></p> <p>Partial Differentiation: Multiple variables Functions, Limits and Continuity. Partial derivatives, Increments and Differentials of Functions of Several Variables.</p> <p>Chain Rule, The Derivative and the Gradient, Tangent and orthogonal planes on the surface, Extreme of a Functions of two Variables, Exact Differentials, Line Integrals, Work. [25 hrs]</p> <p>Double Integrals : Double integrals, Iterated integrals, Evaluation of Double integrals by Means of Iterated integrals. Other Applications of Double integrals, Green's theorem, Double integrals in Polar Coordinates.. [25 hrs]</p> <p>Triple integrals, Application in Rectangular Coordinates, Integrals in cylindrical and spherical coordinates. [25 hrs]</p>
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	<p>The main strategy of this module Specification provides a concise summary of the main features of the program and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each semester that contributes to the program.</p>

Student Workload (SWL) الحمل الدراسي للطالب محسوب ٥١ اسبوعا			
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	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #9, #10
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	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	Sequences and Series: Sequences, Real Sequences, Convergence, Cauchy sequence, Monotone and Bounded sequences
Week 2	Infinite Convergence, Infinite Series, Geometric Series, Harmonic series, Converging Test, Alternations Series.
Week 3	Absolute Convergence , Rearrangements of Series, Product Infinites Series,
Week 4	Power Series, Calculus of Power Series Taylors and Maclorian series with applications.
Week 5	Vector Functions in Three Dimensional Spaces: Vectors Functions, Velocity.
Week 6	Acceleration and Arc Length, Curvature, The Laws of Planetary Motion.
Week 7	Mid-term Exam
Week 8	Partial Differentiation: Multiple variables Functions, Limits and Continuity.
Week 9	Partial derivatives, Increments and Differentials of Functions of Several Variables.
Week 10	Chain Rule, The Derivative and the Gradient, Tangent and orthogonal planes on the surface
Week 11	Extreme of a Functions of two Variables, Exact Differentials, Line Integrals, Work.
Week 12	Double Integrals : Double integrals, Iterated integrals, Evaluation of Double integrals by Means of Iterated integrals.
Week 13	Other Applications of Double integrals, Green's theorem, Double integrals in Polar Coordinates.
Week 14	Triple integrals, Application in Rectangular Coordinates.
Week 15	Integrals in cylindrical and spherical coordinates.
Week 16	Preparatory week before the final Exam.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Thomas. G. B. , " Calculus and Analytic Geomtry",12th ,2012.	
Recommended Texts	<p>المصادر العربية</p> <p>1. برسل " حساب التفاضل والتكامل مع الهندسة التحليلية" ترجمة علي عزيز وآخرون جامعة الموصل</p> <p>2. الجزئين الاول والثاني الطبعة الثانية 1983</p> <p>3. صبري رديف العاني وآخرون ، "حساب التفاضل والتكامل" 1981 ، بغداد.</p> <p>4. صبري رديف العاني وآخرون ، "حساب التفاضل والتكامل المتقدم" 1981 ، بغداد.</p> <p>5. 4. عادل غسان نعوم، "مقدمة في التحليل الرياضي"، جامعة بغداد – العراق 1986</p> <p>6. علي عزيز عليو عبد الرزاق علي الحسوان وعادل زنبل حسين، "الرياضيات العالية"، وزارة التعليم العالي والبحث العلمي ، 1980</p> <p>7. علي عزيز عليو عبد الرزاق علي الحسوان وعادل زنبل حسين، "مبادئ الرياضيات التفاضل والتكامل"، وزارة التعليم العالي والبحث العلمي ، 1986</p> <p>9. 7. 10. فالج عمران الدوسري " التفاضل والتكامل " الجزئين الاول والثاني ، 2007</p> <p>11. 8. نوري فرحان المياحي " مقدمة في التحليل الرياضي " ، مطبعة القادسية، الطبعة الاولى 2015</p> <p>المصادر الاجنبية</p> <p>1. Anton. H, Bivens .I & Davis. S. , "Calculus ",7th ,2002.</p> <p>2. Craw. I. "Advanced Calculus and analysis MA 1002",2000.</p> <p>3. Dovermann. K.H., "Applied Calculus" math215,1999</p> <p>4. Durfee. W.HB. , "Calculus and Analytic Geomtry",1971.</p> <p>5. Thomas. G. B. & Finney. R. L , "Calculus and Analytic Geomtry",6th ,1984.</p> <p>6. Thomas. G. B. , " Calculus and Analytic Geomtry",12th ,2012.</p>	
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 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, w as 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	Group Theory		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Math217		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Name	e-mail	E-mail
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	20/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الاخرى			
Prerequisite module	Math104	Semester	2
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	Educate the students on the main concepts in the group Theory, illustrating that with some examples. Moreover, this course introduced all theoretical properties of the group and investigated some kinds of groups.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. Knowledge and understanding binary operations, definition of group. 2. Knowledge of group of integers modulo n. 3. know of Symmetric groups, direct product of groups. 4. Definition of subgroup. Center of group. 5. Determine of Subgroups generated by a set, Cyclic groups. 6. Study the Coset sets, Lagrange's theorem. 7. Definition of normal subgroup, simple groups. 8. Studying the Quotient group, derived subgroup. 9. Knowledge and understanding Homomorphism, kernel of homomorphism. 10. Learn the Properties of homomorphism, canonical function, Cayley theorem, the fundamental theorems. 11. Studying the Chains, solvable groups, Conjugacy , p-groups. 12. Knowledge of Sylow theorems, Some applications of Sylow theorems, finite nilpotent groups.
Indicative Contents المحتويات الإرشادية	<ul style="list-style-type: none"> • Asking sudden and overlapping questions to explain the subject. • Giving homework to students. • Monthly and quarterly tests.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<p>Education: Providing lectures and printed sources of modern, varied and rich, including examples. Also, harnessing the blackboard to educate students, explain the steps of the solution and extract the results.</p> <p>Teaching: Solve some examples and have the students propose the solution with the following steps</p> <p>Learning: ask questions and inquiries and engage students in the debate.</p>
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Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب ٥١ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	150		

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

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	The groups and Its properties: Binary operations, definition of group, group of integers modulo n.
Week 2	Symmetric groups, direct product of groups.
Week 3	Subgroups: Definition of subgroup. Center of group
Week 4	Subgroups generated by a set, Cyclic groups.
Week 5	Normal Subgroups: Coset sets, Lagrange's theorem
Week 6	Definition of normal subgroup, simple groups
Week 7	Mid-term Exam
Week 8	Quotient group, derived subgroup. ⁵⁵

Week 9	Isomorphic of Groups: Homomorphism, kernel of homomorphism,
Week 10	Properties of homomorphism, canonical function,
Week 11	Cayley theorem, the fundamental theorems.
Week 12	Types of Groups: The Chains, solvable groups.
Week 13	Conjugacy , p-groups,
Week 14	Sylow theorems.
Week 15	Some applications of Sylow theorems, finite nilpotent groups.
Week 16	Preparatory week before the Final Exam.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Burton, D.M. Abstract and Linear Algebra,1972.	yes
Recommended Texts	<ol style="list-style-type: none"> 1. John B. Fraleigh, A first course in abstract algebra, 1982. 2. Joseph J. Rotman, Advanced Modern Algebra, 2003. 3. Thomas W Judson, Abstract Algebra Theory and Applications, 2009. 4. Joseph A. Gallian, Contemporary Abstract Algebra, Seven Edition, 2010. 5. J.S. Milne, Group Theory, Version 4, 2021. 	
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 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, w as 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	Methods of Solutions of Ordinary Differential Equations		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Math 213		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Name	e-mail	E-mail
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	20/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Math102	Semester	2
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1-To understand the concept of differential equation 2- To classify the differential equation 3- How to construct the differential equation 4-How to find the particular solution 5-To know the series solution method and Laplace transform method
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Definition and basic concepts 2- Classification of differential equation 3- Separable variables ,Homogenous, linear ,exact ,Bernoulli ,and Riccati equation 4- Studying $n \geq 2$ order differential equation 5- Euler equation 6- Solving by reduction of order 7- Solving by operator 8- Finding the particular solution 9- Applying Laplace to find the solution
Indicative Contents المحتويات الإرشادية	1- Recognize differential equation 2- List the kinds of 1 st differential equation 3- List the kinds of 2 st differential equation 4- To define linearly dependent and independent solution

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in this module is to encourage student in exercises, reports and discussions. Refining and expanding their skills. This will be completed through classes tutorials by considering examples and applications.

Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب ل ٥١ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	150		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #3 and #7, #9
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #3, #7and #8
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #4
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Definition, order, degree, ordinary, partial, solution with examples .
Week 2	Construction of differential equation by elementary arbitrary constant.
Week 3	Envelope
Week 4	Methods of solution ,separable variables ,Homogenous equation ,equation with liner coefficient ,exact differential equation, integrating factor, linear differential equation Bernoulli equation, Riccati equation ,Initial value problems ,Existence and uniqueness theorem, equation of 1 st order and higher degrees.
Week 5	differential equation of order $n \geq 2$
Week 6	Homogenous and non Homogenous differential equation with constant and variable coefficient .

Week 7	Mid-term Exam
Week 8	Solving differential equation with constants by (operator)
Week 9	Finding particular solution by undetermined coefficients
Week 10	Euler equation
Week 11	Solution by reducing the order
Week 12	Initial and boundary value problems
Week 13	Power series solution
Week 14	Frobenius method
Week 15	Laplace transformation method
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	المصادر العربية ١. باسل يعقوب يوسف لوفاء، " طرق في الرياضيات التطبيقية " جامعة البصرة-العراق ، ٩٨٩١	
	٢. خالد احمد السامرائي ويحيى عبد سعيد، " طرق حل المعادلات التفاضلية " وزارة التعليم العالي والبحث العلمي العراقي، ٨٩١ . ٣. خليل إسماعيل طه، "المعادلات التفاضلية الاعتيادية ونظرية الاستقرار"، الجامعة التكنولوجية- العراق ٩٩١ .	
	٤. رياض شاكر نعوم وإبراهيم رياض غربال، "طرق حل المعادلات التفاضلية العادية وتطبيقاتها"، جامعة البصرة العراق ٢٨٩١	
	٥. سليم إسماعيل الغرابي وصباح هادي الجاسم، " المعادلات التفاضلية " جامعة بغداد - العراق، ٨٨٩١	
	٦. معروف محمد حديدو رشيد عيد الرزاق ، " المعادلات التفاضلية وتطبيقاتها "، التعليم العالي العراقي- ٧. فرانك ايرز، " المعادلات التفاضلية)ملخصات شوم " (،ترجمة نخبة من الاساتذة ، دار ماكجروهيل .للنشر، ٢٧٩١	
	٨. موارد سبيجل، " الرياضيات المتقدمة"، للمهندسين والعلمين) ملخصات شوم (،ترجمة سعد كامل .احمد مسعود، جامعة عين شمس مصر ، ٨٩١ . ٩. فيليبوف . أ.ف ، "مسائل في المعادلات التفاضلية" ، ترجمة احمد صادق القرمانى ، دار مير للطباعة والنشر -موسكو ، ٣٧٩١	
	١٠. فريد بروير وجونام نوهيل، " المعادلات التفاضلية الاعتيادية "،ترجمة خالد احمد محمد على وصباح ، فاضل عبد ،الجامعة المستنصرية - العراق ، ٩٩١ .	
	المصادر الاجنبية 1. Arrowsmith. D. K. & Place. C. M., " Ordinary Differential Equations " 1982, London.. 2. Brauer F. & Nohel J. A. , " Ordinary Differential Equations: A First course" ,2nd , 973 , London , Amsterda 3. Finney .R.L. and Ostberg.D.R., Elementary Differential	

	Equations With Linear Algebra , London, 1976. 4. Rabenstein . A. L., " Introduction to Ordinary Differential Equations",1972,New York. 5. Rainville.E.D. and Bedient.Ph.E., Elementary Differential Equations. 5nd, New York, 1974. 6. Stein. R. , “ Introduction To Ordinary Differential Equations “ 2nd , New York London, ٢٧٩١	
Recommended Texts		
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 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, w as 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	Programming Languages		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Comp 261		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	2	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Name	e-mail	E-mail
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	20/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الاخرى			
Prerequisite module	Comp 182	Semester	2
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Objectives</p> <p>أهداف المادة الدراسية</p>	<p>The module is about learning programming in the programming language. They should get a basic understanding of structured and object-oriented programming. They should be able to write and run their own programs. An important concept is dividing the task the student is solving into modules and programming each module independently.</p>
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<p>By the end of the course, students will be able to:</p> <ol style="list-style-type: none"> 1. The student knows the What is Programming Language. 2. Define the Programming Language. 3. Acknowledge Types of Programming. 4. The student can use specific rules and structure used to write code in a programming language. 5. The student can know the type of values that can be stored in a program, such as numbers, strings, and Booleans. 6. The student can know the Named memory locations that can store values. 7. The student can know Symbols used to perform operations on values, such as addition, subtraction, and comparison. 8. The student can know Statements used to control the flow of a program, such as if-else statements, loops, and function calls. 9. The student can know Collections of pre-written code that can be used to perform common tasks and speed up development. 10. The student can know he programming style or philosophy used in the language, such as procedural, object-oriented, or functional.
<p>Indicative Contents</p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p>What is programming, Types of Programming, Levels of Programming Languages (Low-Level programming Languages, High-Level Programming Languages). [30 hrs]</p> <p>The Objectives of Programming Languages, The Specificity of the Programming Language. [20 hrs]</p> <p>The Definition of Programming, The Development of Programming Languages. [20 hrs]</p> <p>Characteristics of Programming Languages and The Difference Between Them (Information and Storage, Orders and Organizing Their Progress, Dealing with Data). [30 hrs]</p>

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 types of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب ٥١ اسبوعا

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	37	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
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)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment		100% (100 Marks)			

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوع النظري

	Material Covered
Week 1	Programming Language Vocabulary
Week 2	Types of Programming
Week 3	Languages (Low-Level programming Languages)
Week 4	What is programming
Week 5	Languages (Levels Of Programming High-Level Programming Languages)
Week 6	The Objectives Of Programming Languages
Week 7	Mid-term Exam
Week 8	The Specificity Of The Programming Language
Week 9	The Definition Of Programming
Week 10	The Development Of Programming Languages
Week 11	Characteristics Of Programming Languages And The difference Between Them
Week 12	Characteristics Of Programming Languages, Information And Storage.
Week 13	Characteristics Of Programming Languages, Orders Their Progress
Week 14	Characteristics Of Programming Languages, Organizing Their Progress
Week 15	Characteristics Of Programming Languages, Dealing With Data
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوع للمخت

	Material Covered
Week 1	Lab 1: Types of Programming
Week 2	Lab 2: The Specificity Of The Programming Language
Week 3	Lab 3: Characteristics Of Programming Languages, Information And Storage.
Week 4	Lab 4: Characteristics Of Programming Languages, Orders Their Progress
Week 5	Lab 5: Characteristics Of Programming Languages, Organizing Their Progress
Week 6	Lab 6: Characteristics Of Programming Languages, Dealing With Data

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Mustafa Obaid, "Programming Languages," Istanbul, 2022.	
Recommended Texts		
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 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, w as 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	The Probability		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Math 215		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Name	e-mail	E-mail
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	20/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الاخرى			
Prerequisite module	Math102	Semester	2
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Objectives أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> 1. To learn the students the meaning of the probability 2. Dealing with countable methods 3. Discuss the random variables and how find the mean and variance and moment generating function 4. Conditional distributions 5. Independency 6. Explain the some special discrete probability distributions. 7. Explain the Some special continuous probability distributions.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. Recognize between the expectation and conditional expectation. 2. List the various term of some special discrete probability distributions. 3. Summarize what is meant of joint distribution, independency. 4. Discuss the reaction of Bayes theorem in the probability theory. 5. Discuss the multiplicative theorem 6. Discuss the mode, median, quantiles , 7. Define and discuss the Laplace transform. 8. Define the random experiment. 9. Identify the basic of conditional probability 10. Discuss the reaction of combinational in probability theory 11. Describe the correlation and regression. 12. Summarize what are the properties of probability distributions 13. Explain the various term of probability distributions 14. List the various term of some special continuous probability distributions 15. Describe the sample space and sigma -filed
<p>Indicative Contents المحتويات الإرشادية</p>	<ol style="list-style-type: none"> 1. Introduction to Probability, Probability Distributions. (15 h/w) 2. Mathematical Expectation. (15 h/w) 3. Some Special Discrete Probability Distributions. (15 h/w) 4. Some Special Continuous Probability Distributions. (15 h/w)

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<ol style="list-style-type: none"> Using video lectures and direct discussion in the classroom. Divide the class into competitive groups to solve different tasks which assigned to them.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب ل ٥١ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
Summative assessment	Report	1	10% (10)	13	LO #5, #8 and #10
	Midterm Exam	2hr	10% (10)	7	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	Random experiments, sample space, Ω - field
Week 2	probability space, combinatorial probability, geometrical probability
Week 3	conditional probability, multiplicative theorem, Bayes theorem, independence
Week 4	Random Variables, the distribution function, the probability density function
Week 5	The Mode, The Median, Quantiles
Week 6	Joint Distributions, Conditional Distributions, Independence
Week 7	Mid-term Exam
Week 8	Expected Value, The Variance, The variance, moments
Week 9	generating functions, probabilistic inequalities, Laplace transform, joint expectation
Week 10	conditional expectation, the correlation, the regression
Week 11	Uniform Distribution, The Binomial Distribution, Bernoulli Distribution, Negative Binomial Distribution, Geometric (Pascal)
Week 12	Hypergeometric Distribution, Poisson Distribution, Truncated Poisson Distribution, Beta-Binomial Distribution, Logarithmic Distribution.
Week 13	Uniform Distribution, Uniform Distribution, Lognormal Distribution, Inverse Gassian Distribution
Week 14	Cauchy Distribution, Laplace Distribution, Logistic Distribution, Pareto Distribution, Power Function Distribution, Gamma Distribution, Exponential Distribution
Week 15	Truncated Exponential Distribution, Chi-Square Distribution, Maxwell Distribution, Weibull Distribution, Rayleigh Distribution, Extreme Value Distribution, Beta Distribution
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	<p>مصادر العربية</p> <p>١. أمير حنا هرمز " الاحصاء الرياضي " جامعة الموصل ، ٩٩١ .</p> <p>٢. باسل يونس ذنون " الاحتمالية والمتغيرات العشوائية " جامعة الموصل ، ١٩٩١ .</p> <p>٣. زكريا زكي وسليم إسماعيل الغرابي " مبادئ الاحتمالية والاحصاء الرياضي " الجامعة المستنصرية ٧٧٩١</p> <p>٤. سيمور لبيشتر " الاحتمالات " ترجمة سامح داود ، ٤٧٩١</p> <p>٥. صباح داود سليم " مقدمة في الاحصاء الرياضي " جامعة البصرة ، ٩٨٩١</p> <p>٦. عبد الحميد محمد ربيع " نظرية الاحتمالية والتوزيعات الاحتمالية " الجزئين الاول والثاني ، جامعة الازهر - مصر الطبعة الاولى ٤٠٠٢</p> <p>٧. محمد إبراهيم عقيل ، عبد الرحمن محمد أبو عمه " نظرية الاحتمال وتطبيقاتها " جامعة الملك سعود - السعودية ، ٠٠٠٢</p> <p>الاجنبية</p> <ol style="list-style-type: none"> 1. Ash, R. B." Probability and Measure Theory" New York, 2000 2. Athreya. K.B.& Lahiri. S.N. " Measure Theory and Probability Theory " Springer, 2006 3. Banuelos. R, "Lecture Notes Measure Theory and Probability " 2003. 4. Billingsley "Probability and Measure" 1979 5. Charles M. G. & Lauriesnell. J. " Introduction To Probability" 6. Chung, K. L. " A Course In Probability Theory " 7. Chung. K.L. " Elementary Probability Theory With Stochastic Processes " 8. Cloughlin M.P. " A Compendium Of Common Probability Distribution " 9. Degroot, M. H. " Probability And Statistics " 10. Dudley. R.M. " Real Analysis and Probability " Cambridge, 2004 11. Edwin Hewitt Karl Stromberg, " Real And Abstract Analysis" , 1978 12. Grimmett. G.R.& Stirzaker. D.R " Probability and Random Processes " Oxford, 2001 13. Hogg. R.V. & Craig A.T" Introduction To Mathematical Statistics " 14. Kallenberg. O. "Foundations of Modern Probability" Springer, New York,1997. 15. Mood. A.M. et.al. " Introduction To The Theory Of Statistics " 16. Lukacs. F, " Stochastic Converge". 1975 17. Stirzaker. D. " Elementary Probability " 18. Walrand. J. " Lecture Note on Probability theory and Random Processes",2004 19. Williams, D. " Probability With Martingale " 	
Recommended Texts		
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 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, w as 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.

Semester 4

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Mathematical modeling		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Math 212		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Name	e-mail	E-mail
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	20/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الاخرى			
Prerequisite module	Math102	Semester	2
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Objectives</p> <p>أهداف المادة الدراسية</p>	<p>The main objective will be to learn how to take a phenomena arising in physics, chemistry, biology, even the social sciences, then study it (intelligently) using mathematics. This can be a very tricky endeavor: it necessitates both a sound understanding of the field w the problem originated, and a capacity for sometimes quite sophisticated mathematical analysis. It also typically requires using numerical analysis, that is, using a computer to solve problems that are not tractable by hand.</p>
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<p>By the end of the course, students will be able to:</p> <ol style="list-style-type: none"> 1. Knowledge of Models and Their types. 2. Give Mathematical Models, Mathematical Modeling. 3. Can Scaling and Time Scale, Approximation and Reasonableness of answers. 4. Give Modeling change, Dynamical Systems. 5. Give Modeling with Difference Equations. 6. Use the Modeling Process, Proportionality and Geometric Similarity. 7. Give Model Fitting 8. Give Experimental Modeling and Simulation. 9. Give Modeling, Graphs of functions as models . 10. Give Modeling with differential equations. 11. Give Some case studies: Population Modeling (population of the world modeling). 12. Give Modeling of radioactivity and Carbon dating technique. 13. Give Econometrics Modeling. 14. Give Modeling of eco-systems.
<p>Indicative Contents</p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A- Mathematical Modeling</u></p> <p>Mathematical Modeling: Models and Their types, Mathematical Models, Mathematical Modeling, Scaling and Time Scale, Approximation and Reasonableness of answers. [30 hrs]</p> <p>Modeling change, Dynamical Systems, Modeling with Difference Equations, the Modeling Process, Proportionality and Geometric Similarity.. [30 hrs]</p> <p>Model Fitting, Experimental Modeling and Simulation, Modeling ,Graphs of functions as models, Modeling with differential equations. [30 hrs]</p>

	<p><u>Part B- Some case studies</u></p> <p>Population Modeling (population of the world modeling), Modeling of radioactivity and Carbon dating technique, [30 hrs]</p> <p>Econometrics Modeling, Modeling of eco-systems, Preparatory week before the final Exam. [30 hrs]</p>
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	<p>The main strategy of this module Specification provides a concise summary of the main features of the program and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each semester that contributes to the program.</p>

Student Workload (SWL) الحمل الدراسي للطالب محسوب ٥١ اسبوعا			
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	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			700% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Mathematical Modeling: Models and Their types
Week 2	Mathematical Models, Mathematical Modeling.
Week 3	Scaling and Time Scale, Approximation and Reasonableness of answers.
Week 4	Modeling change, Dynamical Systems.
Week 5	Modeling with Difference Equations.
Week 6	The Modeling Process, Proportionality and Geometric Similarity.
Week 7	Mid-term Exam
Week 8	Model Fitting
Week 9	Experimental Modeling and Simulation.
Week 10	Modeling ,Graphs of functions as models
Week 11	Modeling with differential equations
Week 12	Some case studies :Population Modeling (population of the world modeling)
Week 13	Modeling of radioactivity and Carbon dating technique,
Week 14	Econometrics Modeling,
Week 15	Modeling of eco-systems.
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	المصادر العربية	
	<p>1. باسل يونس ذنون "مدخل إلى النمذجة الرياضية باستخدام Matlab الجزء الاول:الاساسيات والنمذجة المتقطعة، الطبعة الاولى ، جامعة الموصل ، 2012</p> <p>2. الجزء الثاني: النمذجة المستمرة والنظم الحركية، 2. "baltaM باسل يونس ذنون "مدخل إلى النمذجة الرياضية باستخدام الطبعة الاولى ، جامعة الموصل ، 2012</p> <p>3. ولترجي . ماير " مفاهيم النمذجة الرياضية " ترجمة حبيب محسن الدوري ، جامعة بغداد ، 1987.</p> <p>المصادر الاجنبية</p> <p>1. ohn J. Mahony, Neville D. Fowkes,An Introduction to Mathematical ,Modelling,Wiley, Aug 16, 1994</p> <p>2. Edward A. Bender,., An Introduction to Mathematical Modeling, Wiley, 1978</p>	

	3. Mark M. Meerschaert," Mathematical Modeling",2013	
Recommended Texts		
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
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	C - Good	جيد	70 - 79	Sound work with notable errors
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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
<p>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, w as 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>				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Mathematical Statistics		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Math 216		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Name	e-mail	E-mail
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	20/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الاخرى			
Prerequisite module	Math215	Semester	3
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Objectives أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> 1. This course is aimed to learn the students the types of statically discrete and continuous distributions 2. Two random variables 3. Learning the sampling 4. Introducing the estimation and its two types (point and interval) 5. Statistical tables
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. Recognize between point estimation and interval estimation 2. List the various term of distributions 3. Summarize what is meant by sampling from normal population 4. Discuss the methods of moment generating functions 5. Discuss the sampling distributions 6. Discuss the confidence interval 7. Define and discuss the order statistics. 8. Define the central limit theorem 9. Discuss the Normal distribution and the relation between the Normal distribution and some other distributions. 10. Discuss the reaction of Rao- black well theorem in the estimation and what is the differences between it and Lehmann theorem. 11. Describe the confidence interval for mean and confidence interval for variance and what the differences between them 12. Discuss the properties of the estimator. 13. Explain the various methods of estimation 14. List the various term of transformations 15. Describe the statistical tables
<p>Indicative Contents المحتويات الإرشادية</p>	<ol style="list-style-type: none"> 1. Distributions of Functions of Random Variables, Statistical Tables .(15h/w) 2. Sampling from Normal Population.(15h/w) 3. Point Estimation.(15h/w) 4. Interval Estimation.(15h/w)

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<ol style="list-style-type: none"> 1. Using video lectures and direct discussion in the classroom. 2. Divide the class into competitive groups to solve different tasks which assigned to them.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب ل ٥١ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
Summative assessment	Report	1	10% (10)	13	LO #5, #8 and #10
	Midterm Exam	2hr	10% (10)	7	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	Method of Moment Generated Function, Method of Distribution Function
Week 2	Distribution of Sum and Difference of two Continuous Random Variables,
Week 3	Distribution of Product and Quotient of two Continuous Random Variables,
Week 4	Transformations of Variables of the Discrete Type,
Week 5	Transformations of Variables of the Continuous Type.
Week 6	Definitions and General Properties, The Chi-Square Distribution, The t Distribution
Week 7	Mid-term Exam
Week 8	The F Distribution, Sampling Distributions, Order Statistics, Limiting Distributions
Week 9	Laws of Large Numbers, The Central Limit Theorem, Relation Between normal and Binomial Distribution,
Week 10	Relation Between normal and Poisson Distribution Functions of order statistic
Week 11	Methods of estimation(methods of moments, methods of maximum likelihood), properties of estimators (unbiasedness, consistency, sufficiency, jointly sufficient, completeness)
Week 12	minimum variance unbiased estimator (exponential family ,lower bound for variance, the Rao-Cramer inequality, efficiency, Rao-Black well theorem, Lehmann- Scheffe theorem).
Week 13	Random Intervals, Confidence Intervals for Mean, Confidence Intervals for Variance
Week 14	Confidence Intervals for Differences Means, Confidence Intervals for Ratio Between Two Variances
Week 15	Statistical Tables
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	<p>مصادر العربية</p> <p>1. 1990 ، الموصل جامعة " الرياضي الاحصاء " هرمز حنا أمير</p> <p>2. باسل يونس ذنون " الاحتمالية والمتغيرات العشوائية " جامعة الموصل ، ١٩٩١</p> <p>3. زكريا زكي وسليم إسماعيل الغرابي " مبادئ الاحتمالية والاحصاء الرياضي " الجامعة المستنصرية ٧٧٩١</p> <p>4. سيمور ليبشتز " الاحتمالات " ترجمة سامح داود ، ٤٧٩١</p> <p>5. صباح داود سليم " مقدمة في الاحصاء الرياضي " جامعة البصرة ، ٩٨٩١</p> <p>6. عبد الحميد محمد ربيع " نظرية الاحتمالية والتوزيعات الاحتمالية " الجزئين الاول والثاني ، جامعة الازهر - مصر الطبعة الاولى ٤٠٠٢</p> <p style="text-align: center;">82</p>	

	<p>٧. محمد إبراهيم عقيل ، عبد الرحمن محمد أبو عمة " نظرية الاحتمال وتطبيقاتها " جامعة الملك سعود - السعودية ، ٢٠٠٢ .</p> <p>الاجنبية</p> <ol style="list-style-type: none"> 1. Ash, R. B." Probability and Measure Theory" New York, 2000 2. Athreya. K.B.& Lahiri. S.N. " Measure Theory and Probability Theory " Springer, 2006 3. Banuelos. R, "Lecture Notes Measure Theory and Probability " 2003. 4. Billingsley "Probability and Measure" 1979 5. Charles M. G. & Lauriesnell. J. " Introduction To Probability" 6. Chung, K. L. " A Course In Probability Theory " 7. Chung. K.L. " Elementary Probability Theory With Stochastic Processes " 8. Cloughlin M.P. " A Compendium Of Common Probability Distribution " 9. Degroot, M. H. " Probability And Statistics " 10. Dudley. R.M. " Real Analysis and Probability " Cambridge, 2004 11. Edwin Hewitt Karl Stromberg, " Real And Abstract Analysis" , 1978 12. Grimmett. G.R.& Stirzaker. D.R " Probability and Random Processes " Oxford, 2001 13. Hogg. R.V. & Craig A.T" Introduction To Mathematical Statistics " 14. Kallenberg. O. "Foundations of Modern Probability" Springer, New York,1997. 15. Mood. A.M. et.al. " Introduction To The Theory Of Statistics " 16. Lukacs. F, " Stochastic Converge". 1975 17. Stirzaker. D. " Elementary Probability " 18. Walrand. J. " Lecture Note on Probability theory and Random Processes",2004 19. Williams, D. " Probability With Martingale " 	
Recommended Texts		
Websites		

Grading Scheme				
مخطط الدرجات				
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, w as 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	Matrix-Laboratory(MATLAB)		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input checked="" type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Comp 262		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	2	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Name	e-mail	E-mail
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	20/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الاخرى			
Prerequisite module	Comp 261	Semester	3
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	The primary objective of this module is to introduce students to the fundamental concepts and techniques of programming in Matlab and creating basic level simulations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<p>After studying this course, the student is supposed to be able to:</p> <ol style="list-style-type: none"> 1. Introduction to Matlab. Basic commands. 2. Basic commands. 3. Editing figure properties by using visual tools. 4. Plotting. Vectors and matrices. 5. Customizing plots programmatically and by the help of visual tools. 6. Creating scripts and functions. 7. Executing functions at once and step-by-step. 8. Implementing an algorithm given in form of a flow chart. 9. Displaying different values in Command Window and in message boxes. 10. Three dimensional plots. 11. Creating a graphical user interface.
Indicative Contents المحتويات الإرشادية	<p>Indicative content includes the following.</p> <p><u>Part A</u> Definition of MATLAB, MATLAB application. [20 hrs]</p> <p>The MATLAB Desktop Layout (Command Window, Workspace, Command History) Operations On Variables. [10 hrs]</p> <p>Some Mathematical Functions, Exponential and Logarithmic Functions, Trigonometric Functions, Hyperbolic Functions. [10 hrs]</p> <p>Defined The MATLAB Program, Variables, Vectors (Vector Definition, Operations on Vectors, Vector Product). [10 hrs]</p> <p><u>Part B</u></p> <p>Matrices (Matrix Definition, Special Matrices, Operations on a Single Matrix, Operations on Matrices, Solving a System of Linear Equations).. [20 hrs]</p> <p>2D Plots(Introduction to 2D Plots, Setting 2D Plot Properties), 3D Plots(Multiple 2D Plots in a Window, Combining 2D Plots, Statistical Plots, Plotting Discrete Signals). [20 hrs]</p> <p>Knowledge of Plot curves, Color, Line Style, Marker, Programming In MATLAB (Introduction to Programming, Control Flow, Control Flow, The Function. [10 hrs]</p>

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 types of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب ٥١ اسبوعا

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	37	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
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)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	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	Definition of MATLAB
Week 2	MATLAB application
Week 3	The MATLAB Desktop Layout (Command Window, Workspace, Command History)
Week 4	Operations On Variables
Week 5	Some Mathematical Functions, Exponential and Logarithmic Functions, Trigonometric Functions, Hyperbolic Functions.
Week 6	Defined The MATLAB Program
Week 7	Mid-term Exam
Week 8	Variables
Week 9	Vectors (Vector Definition, Operations on Vectors, Vector Product)
Week 10	Matrices(Matrix Definition, Special Matrices, Operations on a Single Matrix, Operations on Matrices, Solving a System of Linear Equations).
Week 11	2D Plots(Introduction to 2D Plots, Setting 2D Plot Properties).
Week 12	3D Plots(Multiple 2D Plots in a Window, Combining 2D Plots, Statistical Plots, Plotting Discrete Signals)
Week 13	Color, Line Style, Marker
Week 14	Knowledge of Plot curves
Week 15	Programming In MATLAB(Introduction to Programming, Control Flow, Control Flow, The Function,
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمخت

	Material Covered
Week 1	Lab 1: MATLAB application
Week 2	Lab 2: The MATLAB Desktop Layout
Week 3	Lab 3: Some Mathematical Functions
Week 4	Lab 4: 2D Plots
Week 5	Lab 5: 3D Plots
Week 6	Lab 6: Plot curves
Week 7	Lab 7: Programming In MATLAB

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	المصادر العربية خالد عبد الحميد الهندي " مقدمة في البرمجة بالماتلاب " جامعة ام القرى مكة المكرمة ، 2007 المصادر الاجنبية Khaled Abdul Hamid Al Hindi "An introduction to Programming in MATLAB," Umm Al-Qura University, Makkah Al-Mukarramah, 2007.	
Recommended Texts		
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 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, w as 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	Methods for Solution of Partial Differential Equations		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Math214		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	Semester of Delivery	4
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Name	e-mail	E-mail
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	20/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الاخرى			
Prerequisite module	Math213	Semester	3
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Objectives</p> <p>أهداف المادة الدراسية</p>	<p>The student learns :</p> <p>To classify and solve PDE by using different methods of solutions. And, To understand the importance of applications of PDE in many branches of physics.</p>
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. Knowledge of Multivariate functions, linear partial differential equations. 2. Knowledge of canonical forms of partial differential equations and solution of partial differential equations. 3. Finding partial differential equation from exact solution. 4. Study General form of first order partial differential equations, Lagrange's Equation. 5. Study Integral surface equation, non linear partial differential equations. 6. Define partial differential equations of forms $\nabla(\phi, \psi) = 0$, $\nabla(\phi, \psi, \chi) = 0$ and $\nabla(\phi, \chi) = \nabla(\psi, \chi)$. 7. Define Clairaut's extension partial differential equations, some transformation. 8. Study Partial differential Operator, linear partial differential equations with homogeneous terms and constant coefficients. 9. Study linear partial differential equations with non homogeneous terms and constant coefficients , Cauchy's Linear Partial Differential Equations. 10. Determine linear partial differential equations from second order with variable coefficients, method of separation of variables. 11. Determine Even and odd functions, Fourier series, half range Fourier series, Fourier integrations. 12. Study of Half Fourier integrals, solution Partial Differential Equations by Fourier series. 13. Applications to Partial Differential Equations by given The heat equation, the wave equation, Laplace equation. 14. Knowledge of Integral transforms, Laplace transforms, applications of Laplace transform. 15. Knowledge of Fourier transforms, Fourier transforms for half the range, applications of Fourier transform.
<p>Indicative Contents</p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p>Part A</p> <p>Fundamental Concepts : Multivariate functions, linear partial differential equations, canonical forms of partial differential equations solution of partial differential equations, find partial differential equation from exact solution. General form of first order partial differential equations, Lagrange's Equation...</p> <p>[30 hrs]</p>

	<p>General form of first order partial differential equations, Lagrange's Equation. Integral surface equation, non linear partial differential equations. partial differential equations of forms $\nabla(\phi, \psi) = 0$, $\nabla(\phi, \psi, \chi) = 0$ and $\nabla(\phi, \psi) = \nabla(\psi, \chi)$. Clairaut's extension partial differential equations, some transformation. [30 hrs]</p> <p>Partial differential Operator, linear partial differential equations with homogeneous terms and constant coefficients. linear partial differential equations with non homogeneous terms and constant coefficients, Cauchy's Linear Partial Differential Equations [30 hrs]</p> <p>linear partial differential equations from second order with variable coefficients, method of separation of variables. [30 hrs]</p> <p>Part B</p> <p>Even and odd functions, Fourier series, half range Fourier series, Fourier integrations. Half Fourier integrals, solution Partial Differential Equations by Fourier series. The heat equation, the wave equation, Laplace equation [30 hrs]</p> <p>Integral transforms, Laplace transforms, applications of Laplace transform, Fourier transforms, Fourier transforms for half the range, applications of Fourier transform. [30 hrs]</p>
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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 types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوباً ٥١ اسبوعاً			
Structured SWL (h/sem)	63	Structured SWL (h/w)	4
الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعياً	
Unstructured SWL (h/sem)	87	Unstructured SWL (h/w)	6
الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعياً	
Total SWL (h/sem)	150		
الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #9, #10
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #10, #11
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #12
Summative assessment	Midterm Exam	2hr	10% (10)	7	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	Fundamental Concepts : Multivariate functions, linear partial differential equations, canonical forms of partial differential equations
Week 2	solution of partial differential equations, find partial differential equation from exact solution.
Week 3	First Order Partial Differential Equations: General form of first order partial differential equations, Lagrange's Equation.
Week 4	Integral surface equation, non linear partial differential equations.
Week 5	partial differential equations of forms $\Delta(u, v) = 0$, $\Delta(u, v, w) = 0$ and $\Delta(u, v) = \Delta(u, w)$.
Week 6	Clairaut's extension partial differential equations, some transformation.
Week 7	Mid-term Exam
Week 8	Linear Partial Differential Equations: Partial differential Operator, linear partial differential equations with homogeneous terms and constant coefficients.
Week 9	linear partial differential equations with non homogeneous terms and constant coefficients , Cauchy's Linear Partial Differential Equations.
Week 10	linear partial differential equations from second order with variable coefficients, method of separation of variables.
Week 11	Fourier Series: Even and odd functions, Fourier series, half range Fourier series, Fourier integrations.
Week 12	Half Fourier integrals, solution Partial Differential Equations by Fourier series.
Week 13	Applications to Partial Differential Equations: The heat equation, the wave equation, Laplace equation.
Week 14	Integral Transforms: Integral transforms, Laplace transforms, applications of Laplace transform,.
Week 15	Fourier transforms ,Fourier transforms for half the range, applications of Fourier transform.
Week 16	Preparatory week before the final Exam.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Sneddon I.N ,Elements of Partial Differential Equations	
Recommended Texts	1. Brauer F. and Nohel J. A. , " Ordinary Differential Equations : A First course " second on Edition " 1973 London , Amsterdam 2. Carrier. G. E. and Pearson. C. E. , "Partial Differential Equations" Theory and Technique,1976. 3. Garabedian. P. R. , "Partial Differential Equations" New York 1964. 4. Raben stein " Introduction to Ordinary Differential Equations " 2nd Edition ,New York London 1972. 5. Rainville. E. D. and Bedient. P. H. " Elementary Differential Equations " 5th Edition , New York London 1974 6. Ross L- Finneg , Donald R. Ostberg " Elementary Differential Equations with Linear Algebra " 1976 7. S. J. Farlow , "Partial Differential Equations For Scientists and Engineers , 1989. 8. Wylie. C.R. , " Advanced Engineering Mathematics " 3rd Edition , Tokyo, Japan 1966 9. William E. Boyce and Richard C.Di Prima ,Elementary Differential Equations and Boundary Value Problems(2001)	
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 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, w as 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	Ring Theory		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Math218		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Name	e-mail	E-mail
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	20/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الاخرى			
Prerequisite module	Math217	Semester	3
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	Educate the students in the concept Ring Theory and introduced all theoretical properties of Rings and investigating some kinds of rings.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<p>Knowledge and understanding</p> <ol style="list-style-type: none"> 1. Determine ways to solve different problems on the ring theory. 2. Know and understand how these methods work. 3. Knowledge of nilpotent elements, Boolean ring, Divisors of zero, integral domain. 4. Know of Characteristic of ring, subring, center of ring. 5. Learn how to reach the simpler proof in the results in the ring theory. 6. Define the ideal and studying the, simple rings, Annihilator ideal, ideals generated by a set. 7. Studying the Principal ideal, direct sum of ideals, quotient ring. 8. Knowing the Prime and maximal ideal and the relations between them. 9. Define the Homomorphism, kernel of homomorphism, Properties of homomorphism. 10. Studying the Canonical function and prove the fundamental theorems. 11. Define the field. Subfield, field of quotient, Prime field, Imbedded. 12. Studying the polynomial ring, the division algorithm theorem and remainder theorem with some applications. 13. Knowing the extensions of fields, Kronecker's theorem with applications.
Indicative Contents المحتويات الإرشادية	<ul style="list-style-type: none"> • Asking sudden and overlapping questions to explain the subject. • Giving homework to students. • Monthly and quarterly tests.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<p>Education: Providing lectures and printed sources of modern, varied and rich, including examples. Also, harnessing the blackboard to educate students, explain the steps of the solution and extract the results.</p> <p>Teaching: Solve some examples and have the students propose the solution with the following steps</p> <p>Learning: ask questions and inquiries and engage students in the debate.</p>
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Student Workload (SWL)			
الحمل الدراسي للطالب محسوب ٥١ اسبوعا			
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	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 11	LO #2, #3 and #9, #10
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #11
	Projects / Lab. Report	1	10% (10)	Continuous	All
		1		13	LO #10, #11 and #12
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered

Week 1	The Rings and Its properties :Definition of ring, idempotent elements.
Week 2	nilpotent elements, Boolean ring.
Week 3	Divisors of zero, integral domain.
Week 4	Characteristic of ring, subring, center of ring.
Week 5	Ideals :Definition of ideal , simple rings.
Week 6	Annihilator ideal, ideals generated by a set.
Week 7	Mid-term Exam
Week 8	Principal ideal, direct sum of ideals, quotient ring.
Week 9	Prime and maximal ideal and the relations between them .
Week 10	Isomorphic of Rings: Homomorphism, kernel of homomorphism, Properties of homomorphism.
Week 11	Canonical function, the fundamental theorems.
Week 12	Fields: Definition of field. Subfield, field of quotient.
Week 13	Prime field, Imbedded.
Week 14	Polynomials ring: The polynomial ring, the division algorithm theorem and remainder theorem with some applications.
Week 15	extensions of fields, Kronecker's theorem with applications.
Week 16	Preparatory week before the Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Burton, D.M. Abstract and Linear Algebra,1972.	yes
Recommended Texts	<ol style="list-style-type: none"> 1. John B. Fraleigh, A first course in abstract algebra, 1982. 2. Joseph J. Rotman, Advanced Modern Algebra, 2003. 3. Thomas W Judson, Abstract Algebra Theory and Applications, 2009. 4. Joseph A. Gallian, Contemporary Abstract Algebra, Seven Edition, 2010. 5. J.S. Milne, Group Theory, Version 4, 2021. 	
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 98	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, w as 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.

Semester 5