

**Ministry of Higher Education and Scientific
Research Scientific Supervision and Scientific
Evaluation Apparatus Directorate of Quality
Assurance and Academic Accreditation
Department**



**ACADEMIC PROGRAM AND DESCRIPTION GUIDE
UNDERGRADUATE STUDIES
BOLOGNA SYSTEM**

2025-2024



Academic Program Description Form

University Name: Al-Nahrain University

Faculty/Institute: College of Sciences

Scientific Department: Department of Mathematics and Computer Applications

Academic or Professional Program Name: Bachelors

Final Certificate Name: Bachelor in Mathematics and Computer Applications

Academic System: Semester / Bologna System

Description Preparation Date: 2024 - 2025

File Completion Date: 18 / 11 / 2024

Signature:

Head of Department Name:

Prof. Dr. Fadhel Subhi Fadhel

Date: 18 / 11 / 2024



Signature:

Scientific Associate Name:

Assist. Prof. Dr. Manaf Adnan Saleh

Date: 25 / 11 / 2024

The file is checked by: Orooba Nadhim Harbi

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Lect. Dr. Orooba Nadhim Harbi

Date: 25 / 11 / 2024

Signature:



Approval of the Dean

Prof. Dr. Asmaa Hadi Mohammed

Introduction:

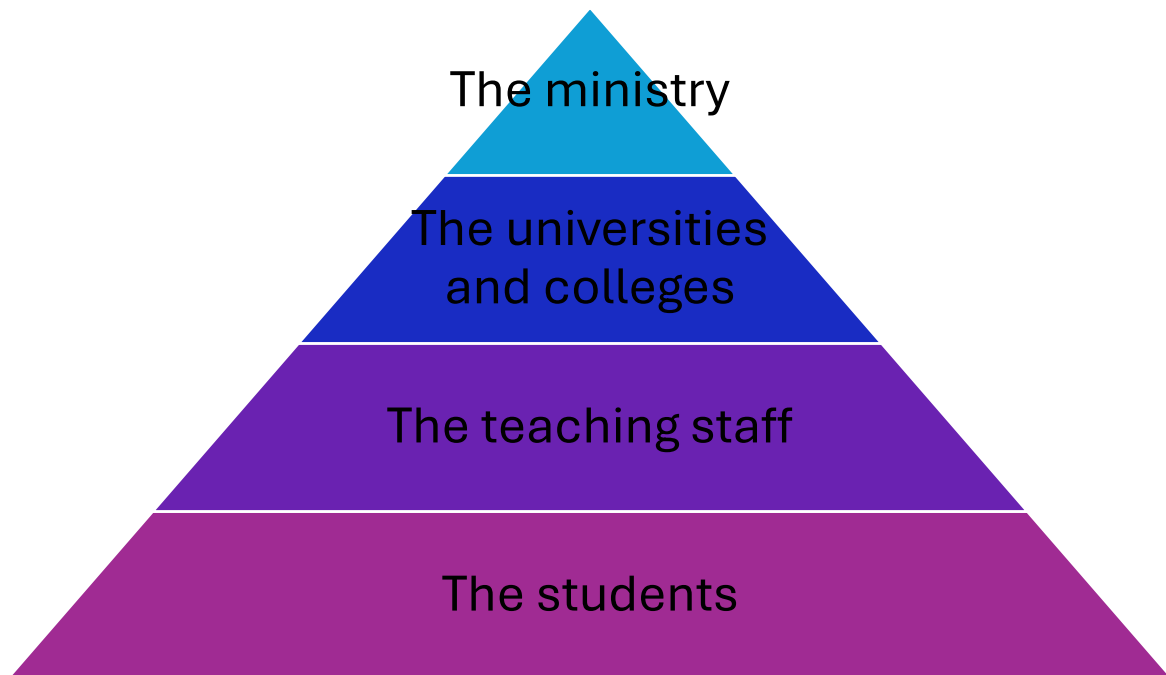
Based on the first edition of the Digital Bologna System (BIS) Guide, the Digital Bologna System is an integrated application system that combines the Student Information System (SIS) with the Bologna Process Application System. It represents the first and fundamental step in digitizing educational institutions and transforming them into smart universities. Its function is to handle all students' personal information, Bologna Process academic variables, university information, semester information, educational resources, academic reports, examination committees, and other academic activities. The system, with all its sections and functions, was analyzed and built in accordance with the laws and regulations in force in the Iraqi Ministry of Higher Education and Scientific Research, and based on the Bologna Process Guide, launched by the Ministry's Department of Studies, Planning, and Follow-up. It also operates according to the principle of the powers and permissions granted to educational and administrative bodies working within the educational institution.

The system administrator (ministry staff or teaching and administrative staff of the educational institution) can manage all system activities by providing the system with information about its users and distributing powers among them according to the tasks assigned to them, in addition to providing it with information about the educational institution such as the names of colleges, academic departments, study stages, etc. and other academic information, in addition to managing the reports provided by the system professionally in order to reach smart universities where decisions are made quickly, flexibly, and based on accurate data.

The advantages of using the system include:

1. A repository for storing all student personal and academic information.
2. A smart digital system for implementing the requirements and activities of the Bologna Process in accordance with the standards of the Iraqi Ministry of Higher Education and Scientific Research.
3. A repository for storing all personal and academic information of the institution's teaching staff.
4. The system is equipped with an integrated file manager, through which we can link all official documents and administrative orders to the student's digital record, as well as those of the institution's teaching staff.
5. An advanced system for evaluating the educational institution's professors and their courses, in order to measure the quality of education and its outcomes at these institutions.
6. Organizing and managing the electronic master sheet, which contains the student's grades and marks obtained during the academic level, with the above-mentioned master sheet available for each system (annual, semester, and course).
7. Forming central and sub-examination committees within the educational institution and distributing powers among them, in order to enter, organize, and manage student exam grades in the colleges and departments affiliated with that educational institution.
- 8- The ability to send various administrative notifications and alerts to both the teaching staff and the students, or one of them, with the ability to allocate these notifications to some and not to all.

It is also worth noting that those who use the Bologna Process information system are arranged hierarchically as follows:



Concepts and Terminology:

Academic Program Description: The academic program description provides a concise summary of the program's vision, mission, and objectives, including a precise description of the intended learning outcomes based on specific learning strategies.

Course Description: Provides a concise summary of the course's key features and the learning outcomes expected of students, demonstrating whether they have maximized the available learning opportunities. It is derived from the program description.

Program Vision: An ambitious picture of the future of the academic program, ensuring it is advanced, inspiring, motivating, realistic, and applicable.

Program Mission: Briefly defines the goals and activities required to achieve them, and identifies the program's development paths and directions.

Program Objectives: Statements that describe what the academic program intends to achieve within a specific time period and are measurable and observable.

Curriculum Structure: All courses/subjects included in the academic program according to the approved learning system (semester, annual, Bologna Process), whether required by a ministry, university, college, or scientific department, along with the number of credits.

Learning outcomes: A consistent set of knowledge, skills, and values acquired by a student after successfully completing an academic program. Learning outcomes for each course must be defined in a manner that achieves the program's objectives.

Teaching and learning strategies: These are the strategies used by faculty members to develop student teaching and learning. They are plans followed to achieve learning objectives. This describes all class and extracurricular activities to achieve the program's learning outcomes.

		Republic of Iraq - Ministry of Higher Education and Scientific Research						جمهورية العراق - وزارة التعليم العالي والبحث العلمي																							
		Al-Nahrain University						جامعة النهرين																							
		Bachelor's degree in Mathematics and Computer Applications (First cycle)						بكالوريوس في علوم الرياضيات وتطبيقات الحاسوب (الدورة الأولى)																							
		Four years (Eight semesters) 240 ECTS credits - 1 ECTS = 25 hr						أربع سنوات (ثمانية فصول دراسية) 240 وحدة ائتمانية - كل وحدة ائتمانية = 25 ساعة																							
Program Curriculum 2024-2025						المنهاج الدراسي للعام 2024-2025																									
Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code												
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semnn (hr/w)																			
							1	MATH1101	Calculus I	حساب التفاضل والتكامل 1	English	4									1		1		4	94	106	200	8.00	C	
							2	MATH1102	Foundation of Mathematics I	أسس الرياضيات 1	English	4									0		1		3	78	97	175	7.00	C	
							3	CREQ1111	Mechanical Physics	الفيزياء الميكانيكية	English	2									2		0		4	64	61	125	5.00	S	
							4	CREQ1103	Introduction to Chemistry	مدخل في الكيمياء	English	2									2		0		4	64	61	125	5.00	S	
							5	URENG1	New Headway Plus	اللغة الانكليزية	English	2									0		0		3	33	17	50	2.00	B	
							6	URCOM	Computer	حاسوب	English	2									2		0		3	63	12	75	3.00	B	
						Total	16	0	7	0	2	0	21	396	354	750	30.00														
UGI	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code												
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semnn (hr/w)																			
							1	MATH1203	Calculus II	حساب التفاضل والتكامل 2	English	4									1		1		4	94	81	175	7.00	C	
							2	MATH1204	Foundation of Mathematics II	أسس الرياضيات 2	English	4									0		1		3	78	97	175	7.00	C	
							3	MATH1205	Finite Mathematics	الرياضيات المنتهية	English	4									0		1		3	78	22	100	4.00	C	
							4	CREQ1212	Electricity and Magnetism	الكهرباء والمغناطيسية	English	2									2		0		4	64	61	125	5.00	S	
							5	CREQ1114	Computer Programming I	برمجة الحاسب الى 1	English	2									2				4	64	61	125	5.00	S	
							6	URDEM	Democracy and Human Rights	الديمقراطية وحقوق الإنسان	Arabic	2									0				3	33	17	50	2.00	B	
						Total	18	0	5	0	3	0	21	411	339	750	30.00														
Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code												
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semnn (hr/w)																			
							1	URARA	Arabic Language	اللغة العربية	Arabic	2													3	33	17	50	2.00	B	
							2	MATH2106	Advanced Calculus I	التفاضل والتكامل المتقدم 1	English	4									1	0	1		4	94	106	200	8.00	C	MATH1101+MATH1203
							3	MATH2107	Linear Algebra I	الجبر الخطي 1	English	4									1		1		4	94	81	175	7.00	C	
							4	MATH2108	Probability Theory	نظرية الاحتمالات	English	3											1		3	63	87	150	6.00	C	
							5	CRCOMP2	Computer Programming II	برمجة الحاسوب 2	English	2									2				4	64	61	125	5.00	S	
							6	URBRC	Baath Regime Crimes in Iraq	جرائم نظام البعث في العراق	Arabic	2									0		0		3	33	17	50	2.00	B	
						Total	17	0	4	0	3	0	21	381	369	750	30.00														
UGI	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code												
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semnn (hr/w)																			
							1	MATH2209	Advanced Calculus II	التفاضل والتكامل المتقدم 2	English	4									1		1		4	94	81	175	7.00	C	
							2	MATH2210	Linear Algebra II	الجبر الخطي 2	English	4									1		1		4	94	81	175	7.00	C	
							3	URARA2	Arabic Language II	اللغة العربية 2	Arabic	2													3	33	17	50	2.00	B	
							4	URENG2	English Language	لغة اللغة الانكليزية	English	2													3	33	17	50	2.00	B	
							5	MATH2212	Ordinary Differential Equations	المعادلات التفاضلية الاعيادية	English	4													3	63	62	125	5.00	C	
							6	URCOM2	Computer 2	الحاسوب 2	English	2									2				4	64	11	75	3.00	B	
7	MATH2211	Operations Research	بحوث العمليات	English	3		1		1		4	79	21	100	4.00	C															
						Total	18	0	4	0	2	0	21	381	269	650	30.00														
Note: The student should complete 4 weeks of Summer Internships to fulfill the requirements of the Bachelor's degree																															
Structured SWL (hr/w) type	CL	Class Lecture				Module type	B	Basic learning activities				SWL:		Student Workload																	
	Lab	Laboratory					C	Core learning activity				SSWL:		Structured SWL																	
	Pr	Practical Training					B	Support or related learning activity				USSWL:		Unstructured SWL																	
	Tut	Tutorial					E	Elective learning activity																							
	Lect	Online lecture																													
	Semnn	Seminar																													
Note: Columns O, Q and R are prograamed, protected and should not be edited																															

First Stage

Course Description Form

Module Information			
معلومات المادة الدراسية			
Module Title	Advanced Calculus (I)		Module Delivery
Module Type	Core		☐ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	MATH2106		
ECTS Credits	8		
SWL (hr/sem)	200		
Module Level		Semester of Delivery	1
Administering Department	Mathematics and Computer Applications	College	College of Sciences
Module Leader	Ibtisam Kamil Hanan	e-mail	ibtisam.kamil@nahrainuniv.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	me	e-mail	E-mail
Scientific Committee Approval Date	1/9/2024	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The aim of this course is for student to gain proficiency in computations. In calculus, we use two main tools for analyzing and describing the behavior of functions: limits and derivatives. Students will use these tools to solve

	application problems in a variety of setting ranging from physics and chemistry to business and economics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. To determine the solution set of inequalities involving absolute value, 2. To determine domain, range and operation of some one variable functions and the graphs. 3. To determine limit and continuity of one variable functions. 4. To determine derivate of one variable functions. 5. To determine the solution of problems involving the derivate of one variable function. 6. To determine inverse function and its derivative. 7. To learn about application of derivatives.
Indicative Contents المحتويات الإرشادية	1. Real number, inequalities, absolute value, Cartesian coordinate system, function and its graph, operation on function, trigonometry function. 2. Definition, theorems of limit, trigonometry function limit, limit on infinity, infinite limit, continuity function, 3. Definition and rule of derivate, derivate of trigonometry function, chain rule, higher order derivate, implicit derivate, related rate, basic concept of differential, 4. Maximum and minimum, monotonicity and concavity, graphing one variable function, mean value theorem for derivate. 7. Natural logarithm function, inverse function and its derivate, natural exponential function, general exponential function, general logarithm function, hyperbolic function and its inverse.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب

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

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

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

Week 14	Applications of Derivatives: Curve sketching, Maxima and minima problems
Week 15	Related rate, Roll's and mean value theorems, Velocity and acceleration.
Week 16	Preparatory week before the final Exam

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

اساتذة المختبر

1- ا.م.د. ابتسام كامل حنان 2- م.م. حنين عبد الكريم أمين 3- م.م.رقية سعدي هاشم 4- م.م.فرح لطيف جوي

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

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors

	C – Good	جيد	70 - 79	Sound work with notable errors
	D – Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Course Description Form

Module Information معلومات المادة الدراسية			
Module Title	Advanced Calculus (II)		Module Delivery
Module Type	Core		☐ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	MATH2109		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level		Semester of Delivery	
Administering Department	Mathematics and Computer Applications	College	College of Sciences
Module Leader	Ibtisam Kamil Hanan	e-mail	ibtisam.kamil@nahrainuniv.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	me	e-mail	E-mail
Scientific Committee Approval Date	01/09/2024	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The aim of this course is to introduce the concept of integration, study various techniques of integration, test improper integrals for convergence and illustrate some applications of integration. Student will gain proficiency to use integration to solve real world problems such as area and volumes problems.
Module Learning Outcomes	After completing the course, students have the ability To determine proper integral of one variable functions.

مخرجات التعلم للمادة الدراسية	To determine integral involving the fundamental theorem of Calculus and method of substitution. To determine the solution of problems involving the integral of one variable function. To compute integral involving transcendental functions. To compute integral with advanced integration techniques. To demonstrate ability to think critically by recognizing patterns and determining and using appropriate techniques for solving a variety of integration problems. To solve indeterminate forms and improper integral problems. To calculate the length of a plane curve and solving area and volume application problems. To sketch the graph of a polar equation and the area problems in the polar coordinate system. To demonstrate an intuitive and computational understanding for integral applications by solving a variety of problems from physics, engineering and mathematics.
Indicative Contents المحتويات الإرشادية	Proper integral, Fundamental Theorem of Calculus, basic rules of integration. Methods of integrations, method of substitution, partial integration method, trigonometry integral and integral of rational function with partial fraction. Improper integrals, test for convergence and divergence of improper integrals. Application of Definite Integrals, Mean value theorem of integration, Area, solid revolution volume and Arc length. polar coordinates.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module will be presented to the students through a specified series of lectures, supported by problem solving practice carried out in interactive tutorials. These tutorials will be supported by practice and directed study outside the classroom. Formative assessment takes place throughout the module during tutorials and feedback is given during these tutorials.

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

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

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

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

اساتذة المختبر

- 1- م.د. ابتسام كامل حنان 2- م.م. حنين عبد الكريم أمين 3- م.م. عباس ابراهيم خليف
4 - م.م. ايمان خالد خلف

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

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

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Course Description Form

Module Information معلومات المادة الدراسية			
Module Title	Computer	Module Delivery	
Module Type	Basic	☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	URCOM		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	1	Semester of Delivery	1
Administering Department	Mathematics and Computer Applications Science	College	College of Sciences
Module Leader	Mohammed Q. Ali	e-mail	mohammed.q.ali@nahrainuniv.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	me	e-mail	E-mail
Scientific Committee Approval Date	19/12/2024	Version Number	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The History of the Personal Computer Understanding Digital Components Processing, Storage, and Connectivity Input and Output peripherals Understanding Number systems The Applications Software and OS Communication and Computer networks

	The Internet and World Wide Web Cloud computing
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	You will be able to describe the history of personal computer hardware and software development. You will be able to describe the devices that make up a computer system. You will be able to describe how computers process and store data and how devices connect to a computer system You will understand the differences between input and output devices You will be able to explain the types and functions of operating systems Describe the different types of application software You will be able to use Microsoft Office applications (Word, Excel and PowerPoint) You will be able to convert numbers in binary and other number system with binary arithmetic operations You will be able to explain the basics of networking, including the components needed to create a network, and describe the different ways a network can connect to the Internet. Describe the Cloud computing
Indicative Contents المحتويات الإرشادية	Understanding Digital Components, Understanding Your Computer, Input Devices, Output Devices. Processing, Storage, and Connectivity, Processing and Memory on the Motherboard, Storing Data and Information, Connecting Peripherals to the Computer. Application Software, Productivity and Business Software, Multimedia and Educational Software. Understanding System Software, Operating System Fundamentals, What the Operating System Does Starting Your Computer. Understanding Networks, the Internet and Cloud computing.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.8
Total SWL (h/sem)	75		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	10% (10)	Continuous	All
	Assignments	2	10% (10)	7,8	All
	Report	1	10% (10)	Continuous	
	Lab	2	10%(10)	8,14	All
Summative assessment	Midterm Exam	2hr	10% (10)	7,15	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introducing computer system
Week 2	Evolutions of Computer (computer generations)
Week 3	Basic Computer System Organization
Week 4	Essential Computer Hardware (Processor and Memory)
Week 5	Essential Computer Hardware (Secondary storage)
Week 6	Essential Computer Hardware (Input/Output Units)
Week 7	Mid-term Exam 1
Week 8	Computer Number Systems
Week 9	Computer Arithmetic (Operations in Binary)
Week 10	Computer Software and Operating System
Week 11	Data Communication and Computer Networks
Week 12	The Internet and WWW (Web Browsers)
Week 13	The Internet and WWW (Communications and Emails)
Week 14	Cloud computing and Services
Week 15	Mid-term Exam 2

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Computer Hardware and Understanding Operating Systems
Week 2	Lab 2: Working with Windows (Windows Features, Decorating Windows and Basic windows)
Week 3	Lab 3: Working with Windows (Folders and Files)
Week 4	Lab 4: Working with Windows (Window Settings)
Week 5	Lab 5: Starting Microsoft Word (Application environment, entering Your Text, fonts styles)
Week 6	Lab 6: Starting Microsoft Word (Documents features, create a table and insert an equation)
Week 7	Lab 7: Starting Microsoft Word (Document decorate as output)
Week 8	Practical Exam 1
Week 9	Lab 8: Data analysis with Microsoft excel (create data model and formatting tools)
Week 10	Lab 9: Data analysis with Microsoft excel (using formula and basic functions)
Week 11	Lab 10: Data analysis with Microsoft excel (filtering data)
Week 12	Lab 11: Presentation authoring with Microsoft PowerPoint (Creating a New Presentation)
Week 13	Lab 12: Presentation authoring with Microsoft PowerPoint (Enhancing Presentation - Visuals and Media)
Week 14	Practical Exam 2
Teaching Staff	

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts		
Recommended Texts	Cambridge IGCSE Information and Communication Technology (3 rd . Edition) by David Watson, Graham Brown 2021 Fundamentals Of Computers (1st Edition) by E. Balagurusamy 2009 Microsoft Office 2019 Step by Step (1st Edition) by Joan Lambert, Curtis Frye 2019	No
Websites		

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound works with notable errors

	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	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.

Course Description Form

Module Information			
معلومات المادة الدراسية			
Module Title	Computer Programming 1	Module Delivery	
Module Type	Core	☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	CRCOMPRO1		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	Semester of Delivery	2
Administering Department	Mathematics and Computer Applications Science	College	College of Sciences
Module Leader	Mohammed Q. Ali	e-mail	mohammed.q.ali@nahrainuniv.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	me	e-mail	E-mail
Scientific Committee Approval Date	19/12/2024	Version Number	

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Understanding the computer languages and their features Learn how to analysis a problem using algorithms The ability using flowcharts and pseudocode for expressing the problem and converting it to program in C++

	Equip students with a solid understanding of the basic syntax and structure of C++ programs. Enable students to declare, initialize, and work with various data types, and understand the importance of type conversion and type safety in C++. Develop students' ability to implement conditional logic using if, else, and switch statements, allowing them to control the flow of their programs. Foster an understanding of the importance of logical operations and conditions in solving real-world problems. How to use for, while, and do-while loops to repeat operations efficiently, introducing control structures like break and continue for managing loop execution. Provide a strong understanding of how to define, call, and pass arguments to functions, enabling students to write modular, reusable, and maintainable code. the differences between passing by value and by reference and how to handle return values. Introduce arrays and their role in handling collections of data, as well as how to manipulate strings operations like concatenation, comparison, and length manipulation. Encourage students to develop problem-solving skills by applying their knowledge of C++ concepts to solve practical problems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Students should be able to: Write an algorithm, flowchart and pseudocode in order to convert to program in C++ Write and Execute Simple C++ Programs. Understand and Use Variables and Data Types. Implement Conditional Logic and Decision-Making. Use Loops for Iteration. Define and Call Functions and user defined functions Work with Arrays and Strings
Indicative Contents المحتويات الإرشادية	Algorithm, flowchart and pseudocode Overview of C++ (Setting C++ Environment and Structure of a C++ Program) Variables, Data Types, and Constants Operators in C++ (Arithmetic, relational and logic Operators) Control Flow: Conditional Statements and Loops Functions and user defined function Arrays and String in C++

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem)		Structured SWL (h/w)	
الحمل الدراسي المنتظم للطالب خلال الفصل	63	الحمل الدراسي المنتظم للطالب أسبوعيا	4.2

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	4.13
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	10% (10)	3,6,10,13	All
	Assignments	4	10% (10)	4,7,11,14	All
	Project	1	10% (10)	Continuous	
	Lab	2	10% (10)	8,15	All
Summative assessment	Midterm Exam	2hr	10% (10)	8,15	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Computer Languages
Week 2	Planning of Computer Program (Algorithms and Flowcharts)
Week 3	Planning of Computer Program (Pseudocodes)
Week 4	Operators in C++
Week 5	Conditional Statements
Week 6	Conditional Loops
Week 7	Loop Control Statements
Week 8	Mid-term exam
Week 9	Functions: Basics and Parameters (definition, declaration, and calling)
Week 10	Recursive Functions
Week 11	Arrays: Basics and Manipulation (Declaring, initializing, and accessing array elements)
Week 12	Arrays: Multi-dimensional arrays
Week 13	Introduction to C-strings (null-terminated arrays of characters)
Week 14	Basic string operations: concatenation, comparison, length, etc.
Week 15	Mid-term Exam 2

Delivery Plan (Weekly Lab. Syllabus)

المناهج الأسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to C++ Programming (Writing, compiling, and running your first "Hello, World!" program)
Week 2	Lab 2: Introduction to Variables and Data Types (Identifiers, Introduction to variables and constants)
Week 3	Lab 3: Arithmetic and Relational operators
Week 4	Lab 4: Logical operators, Assignment operators, increment, and decrement operators
Week 5	Lab 5: if, else if, else statements, Nested if conditions and switch statement
Week 6	Lab 6: for loop, while loop and do-while loop
Week 7	Lab 7: break and continue statements
Week 8	Practical Exam 1
Week 9	Lab 8: Write a user defined function
Week 10	Lab 9: Recursive Functions examples
Week 11	Lab 10: one dimension array declaration with examples
Week 12	Lab 11: two-dimension array declaration with examples
Week 13	Lab 12: Using the <code>string</code> class (Standard Library)
Week 14	Lab 13: Other string functions in C++ with examples
Week 15	Practical Exam 2
Teaching Staff	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		
Recommended Texts	A Complete Guide to Programming in C++ by Ulla Kirch-Prinz, Peter Prinz 2001 Schaum's Outline of Programming with C++ (2 nd . Edition) by John Rast Hubbard 2000 Introduction to Algorithms, Second Edition (2 nd . Edition) by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein 2001	No
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, 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.				

Course Description Form

Module Information				
معلومات المادة الدراسية				
Module Title	ELECTRICITY AND MAGNETISM I		Module Delivery	
Module Type	Basic		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	CREQ1212			
ECTS Credits	5			
SWL (hr./Sem)	125			
Module Level	1	Semester of Delivery		2
Administering Department	Mathematics and Computer Applications	College	College of Science	
Module Leader	Dr. Ammar A. Alrawi		e-mail	ammar.alrawi@nahrainuniv.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.	
Module Tutor	Dr. Ammar A. Alrawi		e-mail	ammar.alrawi@nahrainuniv.edu.iq
Peer Reviewer Name	me	e-mail		
Scientific Committee Approval Date	8/11/2024	Version Number	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Understand electric charge and electric field. Knowing the materials. Identify the electric field of charges and electric field lines. Identifying the forces, moments and electric potential energy. Learn about the electrostatic field.

	Identification of a point charge inside a spherical surface. Identify the resistance and capacitance.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Make the student able to: Understand electric charge and electric field. Knowing the composition of the material. Know the types of matter. Know the types of electric charge. Learn about Coulomb's law. Identify the electric field of charges and electric field lines. Learn about the electrostatic field. Learn about Ohm's Law. Identify the resistance and capacitance.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. electric charge and electric field, electric charge and structure of matter, capacitance, use of capacitance, calculating the capacitance, current and resistance, moving charges and electric current, electric current, current density, resistance and resistivity, ohm's law: a microscopic view, energy and power in an electric circuit, the magnetic field, the magnetic field, the definition of b, discovering the electric

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students and by oral, written exams and homework's.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا

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

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المناهج الاسبوعي النظري

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

Delivery Plan (Weekly Lab. Syllabus)

المناهج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Ohms law
Week 2	Lab 2: Ohmic and Non Ohmic materials
Week 3	Lab 3: Series and parallel of capacitor and energy
Week 4	Lab 4: Electrical resonance phenomenon
Week 5	Lab 5: Voltage difference for the resistance and capacitance
Week 6	Lab 6: Voltage and resistance for the battery
Week 7	Lab 7: parallel and series for resistance and equivalent resistance

Learning and Teaching Resources

مصادر التعلم والتدريس

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

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound works with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	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.

Course Description Form

Module Information				
الدراسية المادة معلومات				
Module Title	English Language	Module Delivery		
Module Type	S	Theory Lecture Lab Tutorial Practical Seminar		
Module Code	URENG – UREQ1101			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level	UGI	Semester of Delivery		One
Administering Department	Mathematics and Computer Applications	College	Science	
Module Leader	Shayma Abdul-Sattar	e-mail	Shayma.abdulsatter@nahrainuniv.edu.iq	
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification		MSc Mathematics
Module Tutor	-	e-mail	-	
Peer Reviewer Name	Manaf Adnan	e-mail	Manaf.adnan@nahrainuniv.edu.iq	
Review Committee Approval	1/11/2024	Version Number		

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

Module Aims, Learning Outcomes and Indicative Contents	
الإرشادية والمحتويات التعلم ونتائج الدراسة المادة أهداف	
Module Aims أهداف المادة الدراسية	The main objective of this course is to strengthen the English language for the first year's students by focusing on: Encouraging students to use the English language in conversations in the classroom and focusing on the importance of their knowledge of vocabulary and enhancing their ability to understand and listen to curriculum-based conversations concerning meeting new friends, self-description, life styles, families, personality, habits, and preferences; and the related every day's English phrases and vocabulary including numbers, the alphabet, days of the week, and some social expressions. Reinforcing the related English grammar like auxiliary verbs, question types including short answers, possessive adjectives, present simple tense, the adverb frequency, and pronouns.

	Enhancing their reading and writing skills that help them communicate with new friends, making a questionnaire, or writing a holiday's postcard.
Module Learning Outcomes الدراسية للمادة التعلم مخرجات	A- Cognitive goals. A1- To encourage students to speak English. A 2- Enrich them with an adequate amount of vocabulary. A3- Understand syntax using grammar. A4- Know the difference between the tenses of the English language. B. The skills goals special to the course. B1 - Learn how to break up sentences and analyze them grammatically. B2 - improve listening, speaking and writing abilities.
Indicative Contents المحتويات الإرشادية	Students should be able to understand the basic concepts of English Language that deals with the subjects of Mathematics.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The New Headway Beginner student's book is mainly taught which is enriched with a digital revising material provided by the Oxford university press, in addition to English for the Students of Mathematics book that focuses on Mathematics' history and its subjects' classification and mathematics phrases that help them in their first year of study at the Mathematics Dept. Discussions and questions will be performed to help students break the barrier of speaking the English language by using the suitable vocabulary and grammar. Besides listening to the conversations Writing on a white board with a marker in the classroom for demonstration and an audio device might be used to help the students listening to the taught conversations and hear the words and their pronunciation loudly to be able to repeat them properly.

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

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

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

Learning and Teaching Resources

مصادر التعلم والتدريس

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

APPENDIX:

GRADING SCHEME

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	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	بقرار مقبول	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Course Description Form

Module Information معلومات المادة الدراسية			
Module Title	Finite Mathematics		Module Delivery
Module Type	Core		☐ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	MATH1205		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level		Semester of Delivery	1
Administering Department	MATH	College	Type College Code
Module Leader	Ranen Zaid Ahmood	e-mail	ranen.z.ahmood@nahrainuniv.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	me	e-mail	E-mail
Scientific Committee Approval Date	01/10/2024	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims اهداف المادة الدراسية	The aim of this course is for the students to be primarily concerned with applying mathematics problem-solving and reasoning to real-world phenomena, making finite mathematics a critical area of knowledge for students pursuing careers in business, social sciences, computer science, and other practical career disciplines.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Learning the basic concepts of mathematics, such as: To be able to deal with Sigma Notation, and mathematical induction. To be familiar with complex numbers and their properties. To deal with matrices: definition and some applications, and solution of mathematical equations with first, and higher degrees. To learn about polynomials and their properties with applications and definitions. To have experience in applications of Linear functions.
Indicative Contents المحتويات الإرشادية	Mathematical induction: summation, induction. Complex numbers: definitions, solutions, polar coordinates, Demoiver's Theorem, square roots of complex numbers. Matrices: definitions, type of matrices, operations on matrices, determinants, the inverse of matrices, linear systems, solving linear systems. Polynomials: definitions, properties, number of the roots, Cardan method, solution of nonlinear systems. Applications: linear functions, definitions, slope, two methods of the graph of linear equations.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب

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

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	2, 6	LO #1, 3
	Assignments	2	10% (10)	3, 8	LO # 2 and 3
	Projects / Lab.	-	10% (10)	continuous	
	Report	1	10% (10)	14	LO # 4, 5

Summative assessment	Midterm Exam	2	10% (10)	4,12	LO # 1,2 and 2-4
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Sigma Notation: Summation, changing index summation, properties of Sigma notation, summation formulas
Week 2	Mathematical Induction, principles, definition, method of solution
Week 3	Complex Numbers: Definitions, Properties, Some areas of applications, Operations on complex numbers
Week 4	Mid-Term Exam + Complex conjugates, laws of Algebra, solving for parameters
Week 5	Polar representation for complex numbers, Demoiver's Theorem
Week 6	Matrices: definitions, types, properties, operations of matrices
Week 7	Determinants, different methods of computing determinants, properties, solving linear systems using determinants
Week 8	The inverse of matrices, definition, two methods of computing matrix inversion
Week 9	solving linear systems using the inverse of matrices, solving equations formulas
Week 10	Polynomials: definitions, properties, operations
Week 11	A quick method for computing the quotient of two polynomials, roots of a polynomial equation
Week 12	Mid-Term Exam + upper and lower bounds of the real roots of the polynomial equation,
Week 13	Relation between roots and coefficients of (2 by 2) polynomials, (3 by 3) polynomials, (4 by 4) polynomials, and (n by n) polynomials
Week 14	Applications of Linear functions: the slope, increasing and decreasing of functions
Week 15	Calculating the rate of change, two methods of graphing linear functions
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس
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	Text	Available in the Library?
Required Texts	Applied method, د. رياض شاکر نعوم , د. سليم الكتيبي, د. كاظم محمد الصومعي Introduction to finite mathematics, د. مصطفى احمد , د. جلال نعوم , د. محمد سردار	Yes
Recommended Texts	Mathematics with application brief version	No
Websites	https://www.khanacademy.org/math , www.mathhandbook.com , www.google.com ,	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D – Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Course Description Form

Module Information معلومات المادة الدراسية			
Module Title	Foundation of Mathematics (I)	Module Delivery	
Module Type	Core	☐ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	MATH1102		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	1	Semester of Delivery	1
Administering Department	MATH	College	Science
Module Leader	Ayat Abdulaali Neamah	e-mail	ayatneamah@nahrainuniv.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	01/10/2024	Version Number	

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

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

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

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies

The main strategy that will be used in this module is to encourage the students to participation in the module activities. This strategy will be by giving the students quizzes, assignments, projects and midterm exams throughout the semester.

Student Workload (SWL)

الحمل الدراسي للطلاب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	97	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	6.466666 7
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	175		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المناهج الاسبوعي النظري

	Material Covered
Week 1	Mathematical statements, Compound statements, Negation, Connective,
Week 2	Conjunction, Disjunction, Conditional and biconditional statements,
Week 3	Logical equivalence, Tautology, Contradiction

Week 4	Algebra of statements, Idempotent laws, Associatively, De Morgan's laws
Week 5	Arguments, Valid arguments, Invalid arguments
Week 6	Mid-term Exam+ Set, Subset, Belongs, Equal sets, Union, Intersection, Complement
Week 7	Disjoint, Partition, Empty set, Universal set, Power set, Algebra of sets
Week 8	Idempotent law, Commutative law, Distributive law, De Morgan's law
Week 9	Cartesian product of sets, Basic concepts and definition, Domain, Codomain, Range
Week 10	Graph of mapping, 1-1 mappings, Onto mappings, Bijective mapping, Equality of mappings
Week 11	types of mapping, Identity mapping, Constant mapping, Restriction of mapping, Extension of mapping, Absolute value function
Week 12	Mid-term Exam + Composition mapping and inverse mapping
Week 13	Direct images and inverse images under mapping, cardinal number of a set
Week 14	Finite and infinite sets
Week 15	Countable and uncountable sets
Week 16	Preparatory week before the final Exam

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

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
	A - Excellent	امتياز	90 - 100	Outstanding Performance

Success Group (50 - 100)	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D – Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Course Description Form

Module Information معلومات المادة الدراسية			
Module Title	Foundation of Mathematics (II)	Module Delivery	
Module Type	Core	☐ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☒ Seminar	
Module Code	MATH1204		
ECTS Credits	8		
SWL (hr/sem)	200		
Module Level	1	Semester of Delivery	2
Administering Department	MATH	College	Science
Module Leader	Ayat Abdulaali Neamah	e-mail	ayatneamah@nahrainuniv.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	5/10/2024	Version Number	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	To become familiar with different types of relations between two sets. To understand the complete and well ordered sets. Perform appropriate proofs of properties within a given number system.
Module Learning Outcomes	Understand and use relations on a set and arguments. Construct the equivalence relations and find the equivalence classes. Understand Partial order and total order relations.

مخرجات التعلم للمادة الدراسية	Recognize the bounded sets and complete sets. Understand the construction of the natural numbers and understand their properties Understand the construction of the integer numbers, rational numbers and their properties Use the mathematical induction in proofs within a given number system. Understand the construction of the complex numbers and perform appropriate calculations within this number system. Understand the binary operation and groups.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Chapter One –Relations</u> Type of relations, Reflexive, Symmetric, Transitive, Anti-symmetric, Equivalence relations, Equivalent classes, Properties of equivalent classes, Partition. <u>Chapter Two –Ordering</u> Partial order and total order, Least and greatest elements , Bounded sets, Upper bound, Lower bound, Least upper bound, Greatest lower bound, Complete sets, Well-ordered set . <u>Chapter Three –The set of Natural Numbers $\mathbb{N}$</u> Peano’s Axioms, Arithmetic of the natural number, Addition, Subtraction, Multiplication, Properties, Associative law of addition and multiplication, Distribution law, Cancellation law of addition and multiplication, Ordering on $\mathbb{N}$, Well ordering of $\mathbb{N}$. <u>Chapter Three –The set of Integer Numbers $\mathbb{Z}$</u> Construction of the set of integers, The addition and multiplication on integers, Properties, Associative law of addition and multiplication, Commutative law of addition and multiplication, Distribution law, Cancellation law of addition and multiplication, Ordering on $\mathbb{Z}$. <u>Chapter Four –The set of Integer Numbers $\mathbb{Q}$</u> Construction of the rational numbers, The addition and multiplication on rational and its properties, Ordering on $\mathbb{Q}$, Density of $\mathbb{Q}$. <u>Chapter Five–The set of Real Numbers $\mathbb{R}$</u> Completeness property of real numbers, Additional Properties of the Integer Numbers, Divisibility and primes, Greatest common divisor and least common multiple, The fundamental theorem of arithmetic. <u>Chapter Six– The Set of Complex Numbers $\mathbb{C}$</u> Addition and multiplication on complex numbers.

	Chapter Seven– Basic Concepts in Group Theory Binary Operation, Basic definitions, Groups, Commutative group, Subgroup, Order of group.
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be used in this module is to encourage the students to participation in the module activities. This strategy will be by giving the students quizzes, assignments, projects and midterm exams throughout the semester.

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

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

Delivery Plan (Weekly Syllabus) المناهج الاسبوعي النظري	
	Material Covered
Week 1	Type of relations, Reflexive, Symmetric
Week 2	Transitive, Anti-symmetric,
Week 3	Equivalence relations, Equivalent classes
Week 4	Properties of equivalent classes, Partition
Week 5	Partial order and total order, Least and greatest elements

Week 6	Mid-term Exam+ Bounded sets, Upper bound, Lower bound
Week 7	Least upper bound, Greatest lower bound
Week 8	Complete sets, Well-ordered set
Week 9	The set of Natural Numbers $\mathbb{N}$
Week 10	The set of Natural Integer $\mathbb{Z}$
Week 11	Mid-term Exam+ The set of Rational Numbers $\mathbb{Q}$
Week 12	The set of Real Numbers $\mathbb{R}$
Week 13	The Set of Complex Numbers $\mathbb{C}$
Week 14	Binary Operation, Basic definitions, Groups
Week 15	Commutative group, Subgroup, Order of group
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

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

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	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.

Course Description Form

Module Information معلومات المادة الدراسية			
Module Title	General Chemistry		Module Delivery
Module Type	S		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	CRGENCHE		
ECTS Credits			
SWL (hr/sem)			
Module Level	1	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Dr. Ahmed Al-Ani	e-mail	ahmed.sabeeh@nahrainuniv.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	PhD
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Ahmed Al-Ani	e-mail	E-mail
Scientific Committee Approval Date	10/9/2024	Version Number	1.0

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

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

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

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطلاب

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

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7

Summative assessment	Midterm Exam	2 hr	30% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

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

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

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

Grading Scheme

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

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Course Description Form

Module Information			
معلومات المادة الدراسية			
Module Title	Mechanics		Module Delivery
Module Type	Basic		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	CREQ1111		
ECTS Credits	5		
SWL (hr./Sem)	125		
Module Level	1	Semester of Delivery	
Administering Department	Mathematics and Computer Applications	College	College of Science
Module Leader	Dr. Ammar A. Alrawi	e-mail	ammar.alrawi@nahrainuniv.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Ammar A. Alrawi	e-mail	ammar.alrawi@nahrainuniv.edu.iq
Peer Reviewer Name	me	e-mail	
Scientific Committee Approval Date	8/11/2024	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Introduce students to basic concepts related to static and mobile systems. Introducing the student to the methods of classifying mechanical systems, the laws related to them, and the life applications that simulate their theories. Introducing the student to the methods of mathematical solutions to problems related to kinetic systems
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Providing the student with sufficient experience to deal with kinetic systems according to the mathematical theories and laws compatible with them. Enhancing the student's mental ability to analyze kinetic systems according to those theories to find the required solutions to the problems that the

	student may face during study and after graduation.
Indicative Contents المحتويات الإرشادية	The instructional content includes the following: In our practical life we need to indicate the location of an object, whether it is stationary, non-stationary, or moving, and to determine the location of that object we use so-called "coordinates." There are several types of coordinates we can apply, such as rectangular coordinates and polar coordinates. And studying the usefulness of applying vectors in our lives [6 hours] Mechanics is one of the branches of physics that studies motion, and includes two main sections: kinematics, a science that describes the motion of objects without paying attention to the causes of motion. (Dynamics) is a science concerned with the causes of movement such as force and energy. We will first learn about the concepts of position, displacement, velocity and acceleration of objects to move in one dimension and in two dimensions with some nomenclature [10 hours] Physicist Isaac Newton based his theory of motion through three laws known as Newton's laws of motion, where he described the forces acting on the motion of bodies by these laws and the difference between mass and weight. [6 hours] While solving an exercise in kinesiology it is important to correctly analyze the forces acting on the body or system, and therefore the body. The forces acting on it will be illustrated, and this method is called a free body diagram. [4 hours] The concept of equilibrium, tensile equilibrium, rotational equilibrium, torque, vector torque, couple, center of mass, center of gravity. [10 hours] Work, Energy, Energy, Momentum, Energy Type [6 hours] Explain periodic motion, rotational motion, simple harmonic motion, relationship between uniform circular motion and simple harmonic motion, simple pendulum, simple harmonic motion, wave motion [10 hours]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Enabling students to solve problems related to the theoretical framework of the lecture material. Enabling students to thinking about life problems related to the subject of the lecture. Linking the lecture curriculum with practical applications, especially with our daily life.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا

Structured SWL (h/Sem)	63	Structured SWL (h/w)	4
		الحمل الدراسي المنتظم للطالب أسبوعيا	

الحمل الدراسي المنتظم للطلاب خلال الفصل			
Unstructured SWL (h/Sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	4.13
Total SWL (h/Sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to vectors: Scalar Quantity, Vector quantity, resultant, graphical addition of vectors, Parallelogram method, subtraction of vectors, trigonometric functions, components of a vector, unit vectors
Week 2	Introduction to vectors: Problem solving
Week 3	Equilibrium under the action of concurrent forces: Concurrent forces, an object in equilibrium, first condition in equilibrium, Problem solution method.
Week 4	Equilibrium under the action of concurrent forces: Problem solving
Week 5	Equilibrium under the action of coplanar forces: Torque or momentum, two conditions for equilibrium, center of gravity
Week 6	Equilibrium under the action of coplanar forces: Problem solving
Week 7	Mid-term exam
Week 8	Uniformly accelerated motion: Speed, velocity and acceleration. Uniformly accelerated motion on straight line, projectiles.
Week 9	Uniformly accelerated motion: Problem solving
Week 10	Newton's Laws: Mass, Force, External force. Newton first law, Newton second law, Newton third law. Law of universal gravitation. Weight. Types of forces.

Week 11	Newton's Laws: Problem solving
Week 12	Work, Energy and Power: Work, kinetic energy, gravitational potential energy, conservation of energy, Power, Kilowatt-hour
Week 13	Work, Energy and Power: Problem Solving
Week 14	Impulse and Momentum: Linear momentum, impulse causes change in momentum, conservation of linear momentum, collisions and explosions. Elastic collision, coefficient of restitution.
Week 15	A week of preparation before the final exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

Learning and Teaching Resources

مصادر التعلم والتدريس

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

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 – 100	Outstanding Performance
	B - Very Good	جيد جدا	80 – 89	Above average with some errors
	C – Good	جيد	70 – 79	Sound works with notable errors

	D – Satisfactory	متوسط	60 – 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.



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



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information المادة معلومات

Module Title	Human Rights And Democracy	Module Delivery	
Module Type	Theory Lecture	Theory Lecture	
Module Code		Lab	
ECTS Credits		Tutorial	
SWL (hr/sem)		Practical	
		Seminar	
Module Level	First stage	Semester of Delivery	Second Semester
Administering Department	Math and Computer Application	College	College of sciences
Module Leader	Dr. Ahmed Neama Jouda	e-mail	: ahmedjuda68@gmail.com
Module Leader's Acad. Title		Module Leader's Qualification	University Doctor Assistant
Module Tutor	-	e-mail	-
Peer Reviewer Name		e-mail	
Review Committee Approval	10/12/2024	Version Number	

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى

Prerequisite module		Semester	
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Co-requisites module	Semester
Module Aims, Learning Outcomes and Indicative Contents الإرشادية والمحتويات التعلم ونتائج الدراسة المادة أهداف	
Module Aims الدراسية المادة أهداف	The aim of human rights and democracy lectures is to simplify the principles of human right and to assure democracy disciplines applying by equally and properly distribution among people in the society.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Cognitive objectives: A1- Introducing the student to the principles of human rights. A2- Briefly introduce the student to the nature of human rights and freedoms and the nature of democracy and its types. A3- Comprehensive knowledge of human rights and basic freedoms in light of the existing reality and types of political systems and states. A4- Introducing the bullying stereotype and the Iraqi historical performance in Iraqi governments in the ancient and modern era. The skills objectives of the course: B1 - Introducing the student to human rights and freedoms and how to deal with international and regional treaties and their internal legislation. B2 - Deriving knowledge related to human rights and how they are reflected and their true civilizational role in the lives of peoples. B3 - Knowing how different governments and ideologies deal with human rights and democracy in practice in countries of the world.
Indicative Contents المحتويات الإرشادية	
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This is done through a booklet that was prepared by me using external sources such as books, newspapers, and the information network, through in-person lectures, and supporting this with illustrative means in Word or PDF format. It is carried out through weekly lectures and through observations made by the teacher and measuring the extent of students' knowledge.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الفصل خلال للطالب المنتظم الدراسي الحمل		Structured SWL (h/w) أسبوعي ا للطالب المنتظم الدراسي الحمل	
Unstructured SWL (h/sem) خلال للطالب		Unstructured SWL (h/w) أسبوعي ا للطالب المنتظم غير الدراسي الحمل	
Total SWL (h/sem) الفصل خلال للطالب الكلي الدراسي الحمل			

Module Evaluation الدراسية المادة تقييم					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2 times	10 marks		
	Assignments	once	20 marks		
	Seminars / Lab.				
	Report	once	10 marks		
Summative assessment	Midterm Exam	once	10 marks		
	Final Exam	once	50 marks		
Total assessment			100 marks		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Concepts about human rights and fundamental freedoms.
Week 2	Categories and Features of Human Rights.
Week 3	Characteristics and advantages of human rights in Islam.
Week 4	The difference between human rights and public freedoms.
Week 5	Freedom, its concept and types.
Week 6	Human rights In ancient civilizations (Mesopotamia civilization) .

Week 7	Human rights in ancient civilizations (Chinese, Hindu, Pharaonic and Greek Egypt) .
Week 8	Human rights in the heavenly religions (Christianity and Islam).
Week 9	Human rights in the Middle Ages.
Week 10	Human rights in the modern era and the international organizations responsible for implementing them.
Week 11	The concept of democracy and it's characteristics.
Week 12	Types of democracy.
Week 13	Pictures of democratic systems.
Week 14	Democratic political rights.
Week 15	Preparatory Week (Study Material review for the final exam).
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1:
Week 2	Lab 2:
Week 3	Lab 3:
Week 4	Lab 4:
Week 5	Lab 5:
Week 6	Lab 6:
Week 7	Lab 7:

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1.Universal Declaration of Human Rights (Drafting Committee of the Universal Declaration of Human Rights). 2. Human Rights (Thomas Paine). 3.Human rights in Islam (Ali Abdul Wahid) .	Not available

Recommended Texts	Human rights in the Arab world (Hussein Jameel) .	Not available
Websites		

APPENDIX:

مخطط الدرجات RADING SCHEME				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound 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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				
NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				



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

Second Stage

Course Description Form

Module Information			
معلومات المادة الدراسية			
Module Title	ADVANCED CALCULUS I	Module Delivery	
Module Type	Core	☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	MATH 211		
ECTS Credits	8		
SWL (hr/sem)	200		
Module Level		Semester of Delivery	
Administering Department		Department of Mathematics and Computer Applications	College
			College of Science
Module Leader	Nabaa Hussain Fakhry	e-mail	Nabaa.hussein@nahrainuniv.edu.iq
Module Leader's Acad. Title	Assistant Teacher	Module Leader's Qualification	Ph
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name		e-mail	E-mail
Review Committee Approval	20/10/2024	Version Number	

Relation With Other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	
Module Aims, Learning Outcomes and Indicative Contents			
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية			
Module Aims أهداف المادة الدراسية	To introduce the students to the sequences and infinite series and studying the sequences, infinite series and the test for convergence of series, absolute convergence and conditional convergence. Study and solutions of power series with its convergence, Taylor's series, Maclurian series expansion of different functions and applications. Studying dimensional coordinate systems, distance in space, Vectors and unit vectors.		

	Studying vector and distance in space: scalar (Dot), product (Cross). Lines and plane in space. Studying quadratic surfaces: paraboloid, ellipsoid and hyperboloid.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	That students gain proficiency in computations, in advance calculus. That students to be able knowledge and understanding oh how laws are linked. That Students enhance their logical thinking and problem structuring abilities. That students can obtain knowledge and understanding the advanced differentiation and integrations. The Support students in identify the most important applications in mathematics.
Indicative Contents المحتويات الإرشادية	1. The student will be able to use new advanced methods and theorems in advance calculus. 2. studying types of series, including tests, as well as binomial series and Taylor applications. 3. The various vectors and the unit vector will be discussed in detail and studied extensively.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module will be presented to the students through a specified series of lectures, supported by problem solving practice carried out in interactivities tutorials. These tutorials will be supported by practice and directed study outside the classroom. Completing homework is part of the learning experience. Students should review topics from prior courses as needed.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation

تقييم المادة الدراسية					
		Time/N umber	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	2 hr	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 of numbers, limit of sequences, bounded monotonic sequence.
Week 2	Infinite series: definition of infinite series and examples, the n^{th} term test for divergence, geometric series.
Week 3	Test for convergence of series with Harmonic series.
Week 4	Absolute convergences: Ratio tests and Root tests.
Week 5	Alternating series and conditional convergence.
Week 6	Power series for functions, convergence of power series.
Week 7	Taylor's and Maclaurin series expansion of functions.
Week 8	The binomial series and applications of Taylor series: integral and limit.
Week 9	The dimensional coordinate systems, distance in space.
Week 10	Vectors, unit vectors.
Week 11	Dot product, vector projections.
Week 12	Cross product, parallel vectors.
Week 13	Lines and plane in space.
Week 14	Quadratic surfaces: cylinder, ellipsoid, hyperbolic paraboloid.
Week 15	Preparatory Week
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: introducing of limit of sequences and bounded monotonic sequence.
Week 2	Lab 2: Using infinite series and geometric series in MATLAB.

Week 3	Lab 3: Using Harmonic series in MATLAB.
Week 4	Lab 4: computing Power series for functions.
Week 5	Lab 5: Taylor's and Maclaurin series expansion of functions.
Week 6	Lab 6: Calculating Vectors and unit vectors.
Week 7	Lab 7: Using Dot product and Cross product in MATLAB.

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

APPENDIX:

GRADING SCHEME				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 – 100	Outstanding Performance
	B - Very Good	جيد جدا	80 – 89	Above average with some errors
	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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

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Course Description Form

Module Information			
معلومات المادة الدراسية			
Module Title	اللغة العربية		Module Delivery
Module Type	Secondary		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☒ Seminar
Module Code	URARA		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	Preliminary studies	Semester of Delivery	
Administering Department	Physics Science	College	College of science
Module Leader	Rana Majed Hamed	e-mail	Rana.Majid@nahrainuniv.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	M.D.
Module Tutor	None	e-mail	E-mail
Peer Reviewer Name	Fatimah Sahib Kadhim	e-mail	fatimah.altai@nahrainuniv.edu.iq
Scientific Committee Approval Date	20/11/2024	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	لا يوجد	Semester	
Co-requisites module	لا يوجد	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The main objective of this semester is to strengthen the Queen of First Graders and :develop their linguistic abilities and focus on 1.Acquiring knowledge skills about linguistic concepts 2.Keep the tongue from falling into the word's pronunciation error 3.Developing the student's expressive abilities 4.Teaching students to analyze the speech system 5.Teach students to distinguish between the origins of the word or increase and what .it does in increasing meaning

	6.Teaching students on methods and rules of control and drafting of vocabulary 7.Enabling the student to use the language vocabulary in the proper location 8.Provide trainings to strengthen the student's queen and develop his ability in language practice and influential rhetoric, taking advantage of experiences and .training 9.Enabling students to read and analyze literary texts, understand them and be able to .save them Teaching students to read properly the words of the Holy Quran, learn its meaning .and develop students' ability to keep and pronounce
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The University of Nahrin works by teaching Arabic to strengthen the student's linguistic queen. By adjusting and perfecting the rules of Arabic, introducing students to speech systems and the possibility of contributing to the teaching and refinement of writing and damaged times, and being able to know the divisions of actions. This develops students' ability to understand the subject. and have the ability to detect language errors. Teaching the right reading and understanding of educational grammatical systems and developing the skill in addressing the problems faced by students in teaching Arabic .and directing it correctly
Indicative Contents المحتويات الإرشادية	Students should be able to understand the basic principles of Arabi by studying the sections of speech (name, verb and letter) and describing the definition .of each of them and what their connotation is Innovative knowledge, experience and detailed knowledge of its types with representation The study was made by her sisters, her sisters, the statement of her meaning, her work, what changes occurred in the sentence when she entered it, how to write the number, numbering marks, tied and open tags, and other topics of interest to the .student in learning the principles of Arabic

Learning and Teaching Strategies			
استراتيجيات التعلم والتعليم			
Strategies	1. POWERPOINT DISPLAY 2. Writing Reports 3. Quarterly Tests 4. Discussing and Solving Questions .5 Homework		
Student Workload (SWL)			
الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/sem)	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.1

الحمل الدراسي غير المنتظم للطالب خلال الفصل			
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Seminar	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	20% (20)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Grammar - Speech Section (Name, verb, letter), beginner, types, news and types
Week 2	It was her sisters, her sisters.
Week 3	Muthanna and his attachment, the collection of the peaceful masculine and his attachment, the collection of the peaceful feminine and his attachment, the five names
Week 4	Building the past act, building the act.
Week 5	The tense act of building and godmother
Week 6	Assigned names (effect - absolute effect - effect - effect - effect - effect)
Week 7	Hair - Nazik Angels
Week 8	Poetry - Mohammed Mahdi Al Jawahiri
Week 9	Dictatorship - Writing the Shame (Connecting and Cutting)
Week 10	Intermediate and Extreme Shaking
Week 11	Writing Antidote and Adversity
Week 12	Writing short and long diversion
Week 13	Punctuation -The rule of a thousand paradoxes
Week 14	Writing Number
Week 15	The Holy Quran

Learning and Teaching Resources مصادر التعلم والتدريس
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	Text	Available in the Library?
Required Texts	Expression, creation, written drawing and written dictation/a. d. Abdulrahman Matlak al-Jabouri	لا
Recommended Texts	Clarify the trajectory of the millennium of the son of Malik/Ibn Hisham. Qatar al-Nada and Bel al-Echo of Hisham's son. The hummus of the Sooty, as adequate as Abbas Hassan, is a shrewd custom in the art of drainage, polite in drainage.	لا
Websites	Adequate Grammar / Abbas Hassan.	

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.				

Course Description Form

Module Information			
معلومات المادة الدراسية			
Module Title	Computer programming 2	Module Delivery	
Module Type	Basic	☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	CRCOMPRO2		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	Semester of Delivery	1
Administering Department	Mathematics and Computer Applications Science	College	College of Sciences
Module Leader	Mohammed Q. Ali	e-mail	mohammed.q.ali@nahrainuniv.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	me	e-mail	E-mail
Scientific Committee Approval Date	15/9/2024	Version Number	

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Cover fundamental programming concepts such as variables, data types, operators, expressions, and basic syntax specific to MATLAB. Introduce students to MATLAB's capabilities in handling and manipulating data, including arrays (vectors and matrices), indexing, and slicing. Teach students how to use conditional statements (if, else if, else) and iterative structures (for loops, while loops) in MATLAB to control the flow of their programs.

	Familiarize students with writing and using functions and scripts in MATLAB, emphasizing good coding practices and code organization. Provide students with skills in performing numerical computations and basic mathematical operations using MATLAB's built-in functions and operations. Develop students' ability to apply MATLAB programming skills to solve simple computational problems and implement algorithms. Equip students with skills in debugging MATLAB programs to identify and resolve errors
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Understand MATLAB syntax and basic programming concepts (variables, operators, expressions). Work with different data types (numeric, character, logical, etc.) in MATLAB. Understand basic data structures such as arrays (vectors and matrices). Perform arithmetic and logical operations using MATLAB. Use conditional statements (if, else if, else) and loops (for, while) to control program flow. Create and call user-defined functions in MATLAB. Differentiate between scripts and functions. Perform basic numerical computations using MATLAB (e.g., solving equations, numerical integration). Debug simple MATLAB programs to identify and fix errors and utilize MATLAB Help and documentation to find information and resources.
Indicative Contents المحتويات الإرشادية	Overview of MATLAB environment (Basic operations and calculations in MATLAB, introduction to variables and data types and working with matrices and vectors) Control Flow and Loops in MATLAB Scripts and Basic Programming Concepts Functions in MATLAB (user defined functions) Introduction to symbolic computations (solving equations and calculus)

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	75	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	5.0
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	50	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	3.33
Total SWL (h/sem)	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	10% (10)	3,6,10,13	All
	Assignments	4	10% (10)	4,7,11,14	All
	Project	1	10% (10)	Continuous	
	Lab	2	10% (10)	8,15	All
Summative assessment	Midterm Exam	2hr	10% (10)	8,15	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Declaration variables, vectors and matrices
Week 2	Programming Using Script Files
Week 3	Input & Output Commands
Week 4	Relational And Logical Operators
Week 5	Conditional Statements
Week 6	Conditional Loops
Week 7	Conditional Loops ... cont.
Week 8	Mid-term exam
Week 9	User-Defined Functions
Week 10	Anonymous Functions and Subfunctions
Week 11	Symbolic Math Programming
Week 12	Substituting A Numerical Value and Simplification an Equation
Week 13	Solving Algebraic Equations
Week 14	Calculus (Differentiation and Integration)
Week 15	Mid-term Exam 2

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Define variables, vector and matrix
Week 2	Lab 2: Create m-file and its properties
Week 3	Lab 3: I/O commands ("input", "disp" and "fprintf") statements and its properties
Week 4	Lab 4: Relational Operators and Logical ("and", "or" ... statements)
Week 5	Lab 5: {if – elseif – else – end} and {switch} statements
Week 6	Lab 6: {for loop} and {while loop} statements
Week 7	Lab 7: {break} and {continue} statements
Week 8	Practical Exam 1
Week 9	Lab 8: Write User-Defined Functions
Week 10	Lab 9: define Anonymous Functions and subfunctions
Week 11	Lab 10: Symbolic Variables and Expressions with "sym" and "syms" statements
Week 12	Lab 11: substitution and simplification Functions
Week 13	Lab 12: Solving Equations with {solve} statement
Week 14	Lab 13 and Calculus programming using {diff, and int} statements
Week 15	Practical Exam 2
Teaching Staff	م.م. محمد قاسم علي / م.م. حنين عبدالكريم / م.م. عباس ابراهيم / م.م. فرح لطيف / م.م. ايمان خالد / م.م. نراس ياسر / م.م. عدراء عبدالسلام

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts		
Recommended Texts	MATLAB: An Introduction with Applications (6 th . Edition) by Amos Gilat. 2017	No
Websites	Documentation - MATLAB & Simulink (mathworks.com)	

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria

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

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Course Description Form

Module Information			
معلومات المادة الدراسية			
Module Title	Computer II	Module Delivery	
Module Type	Basic	☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code			
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	Second	Semester of Delivery	Second
Administering Department	Mathematics and Computer Applications Science	College	College of Sciences
Module Leader	Mohammed Q. Ali	e-mail	mohammed.q.ali@nahrainuniv.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	me	e-mail	E-mail
Scientific Committee Approval Date	25/12/2024	Version Number	

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Network security Computer Troubleshooting E-commerce Artificial Intelligent (AI) Applications and Tools in AI. AI in Modern Smartphones

	AI and Society Ethics In AI The AI Future
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	You will be able to understand network and its types You will be able to Identify and understand the important of network security Understanding the E-commerce Application and how use them You will be able to solve common HW and SW problems in computer You will be able to explain the Fundamentals of AI You will be able to describe AI Applications and Real-World Problem Solving. You will be able to use the AI application in smartphones You will be able to Understand and Discuss the Ethics and Social Implications of AI You will be able to understand what is the AI future. You will be able to understand and use methos of digital image processing in MATLAB as practical application
Indicative Contents المحتويات الإرشادية	Introduction to Networking and Network Security Introduction to E-commerce (Types of E-commerce, E-commerce marketplaces and websites and online payment systems) Hardware Troubleshooting, Software Troubleshooting and System Maintenance and Preventative Care. Introduction to Artificial Intelligence (History and Evolution, Types of AI and Applications of AI) AI Ethics and Social Implications AI in Real-World Applications AI Tools Digital Image Processing

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.8

Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	75
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Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	10% (10)	Continuous	All
	Assignments	3	10% (10)	Continuous	All
	Report	1	10% (10)	Continuous	
	Lab	2	10%(10)	8,14	All
Summative assessment	Midterm Exam	2hr	10% (10)	7,15	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Security and Networking
Week 2	E-Commerce
Week 3	Computer troubleshooting
Week 4	Computer troubleshooting (cont..)
Week 5	Introduction to AI (definition and evolution of AI)
Week 6	Introduction to AI (Key characteristics and Benefits of AI)
Week 7	Mid-term Exam 1
Week 8	The Role of AI in Modern Smartphones (AI mobile technologies and virtual assistants)
Week 9	The Role of AI in Modern Smartphones (Adaptive learning and real time translation services)
Week 10	Applications and AI tools (overview of AI applications)
Week 11	Applications and AI tools (Transportation, marketing, advertising, robotics and automation technologies)
Week 12	AI and Society
Week 13	Ethics In AI
Week 14	The future of AI
Week 15	Mid-term Exam 2

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to Image Processing (Working with Image Types in MATLAB)
Week 2	Lab 2: Image Representation (read, display, save and information of an image)
Week 3	Lab 3: Display Array Data as Image
Week 4	Lab 4: Display Array Data as Image (Cont.)
Week 5	Lab 5: Spatial Transformations (crop, resize and rotate)
Week 6	Lab 6: Image Types and Type Conversions
Week 7	Lab 7: Image Types and Type Conversions (Cont.)
Week 8	Practical Exam 1
Week 9	Lab 8: Thresholding and Histogram tools
Week 10	Lab 9: Image Arithmetic
Week 11	Lab 10: Image Arithmetic (Cont.)
Week 12	Lab 11: Analyzing and Enhancing image
Week 13	Lab 12: Image registration
Week 14	Practical Exam 2
Teaching Staff	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		
Recommended Texts	Introduction to Artificial Intelligence (AI) by Ahmed Banafa 2024 Cambridge IGCSE Information and Communication Technology (3rd. Ed.) by David Watson, Graham Brown 2021 Technology In Action Complete (16th. Ed.) by Alan Evans, Mary Anne Poatsy, Kendall Martin 2020 Fundamentals of Digital Image Processing: A Practical Approach with Examples in MATLAB by Chris Solomon 2011	No
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, 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.

Course Description Form

Module Information			
معلومات المادة الدراسية			
Module Title	Linear Algebra I	Module Delivery	
Module Type	Core	☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	Math 212		
ECTS Credits	8		
SWL (hr/sem)	200		
Module Level	2		
Administering Department	MATH	College	Science
Module Leader	Dr.Zainab Riyadh Shaker	e-mail	zaianb.riyadh22@nahrainuniv.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	01/09/2024	Version Number	

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The course provides students with an understanding of a number of topics and concepts in linear algebra. The course also introduce techniques of proof which are useful to other courses. The course aims to encourage students to develop interest in the subject and pursue other courses that require these skills.
Module Learning Outcomes	By the end of this course, successful students should be able to: • Have a sound and broad understanding of how to solve systems of linear equations and matrix manipulation including computation of its inverse (when possible) and evaluate determinants

مخرجات التعلم للمادة الدراسية	• Have a broad understanding of the concepts of vector and matrix algebra, including linear dependence/independence, basis and dimension of a subspace, rank and nullity • Have an understanding of the principles and applications of eigenvectors and eigenvalues, Linear Transformations and present a rigorous analysis of problems • Be able to choose the correct method/strategy to solve problems using appropriate mathematical routines and strategies
Indicative Contents المحتويات الإرشادية	• Systems of linear equations; Row reduction and Matrix Equation • Linear Transformations; Transformation Matrix; • Matrix Operations; Inverse Matrix • Vector Spaces; Null Space • Vector Algebra, Basis, dimension and rank • Eigenvectors and Eigenvalues • Linear Transformation • Orthogonality and Gram-Schmidt Process

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

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Linear Equations and Matrices
Week 2	Systems of Linear Equations
Week 3	Matrices
Week 4	Matrix Multiplication
Week 5	Algebraic Properties of Matrix Operations
Week 6	Special Types of matrices
Week 7	Solving Linear Systems
Week 8	Echelon Form of a Matrix
Week 9	Elementary Matrices; Finding A^{-1}

Week 10	Determinants
Week 11	Properties of Determinants
Week 12	Cofactor Expansion
Week 13	Inverse of a Matrix
Week 14	Other Applications of Determinants
Week 15	Vector space and its properties
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Introduction to Linear Algebra and Application by Bernard Kolman	Yes
Recommended Texts	Introduction to Linear Algebra by Franz hohn	No
Websites	Any website that specializes in the study of linear algebra	

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.

Course Description Form

Module Information			
معلومات المادة الدراسية			
Module Title	Probability Theory		Module Delivery
Module Type	Core		☐ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	MATH 2108		
ECTS Credits			
SWL (hr/sem)	100		
Module Level		Semester of Delivery	1
Administering Department	Mathematics and Computer Applications	College	College of Sciences
Module Leader	Raneen Zaid	e-mail	Ranen.z.ahmood@nahrainuniv.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name		e-mail	E-mail
Scientific Committee Approval Date	23/10/2024	Version Number	

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Describe discrete data graphically and compute of location and dispersions (mean and variance) Compute probabilities by modeling sample spaces and applying rules of permutations and combinations, additive and multiplicative laws and conditional probability Introducing basic statistical methodology of data analysis including; graphs, descriptive statistics Interpret probabilities and use probabilities of outcomes to calculate probabilities of events in discrete sample spaces- exclusive and independent events

	The purpose of the random variable, some discrete and continuous distributions
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Having successfully completed this module you will be able to: - A good understanding of elementary probability theory and its application - A good understanding of the basic concepts of statistical inference - A good understanding of the concept of a statistical distribution - A good understanding of the standard univariate distributions and their properties - A good understanding of exploratory data analysis. - A good understanding of the laws of probability and the use of Bayes theorem - A good understanding of the Central Limit Theorem and its application - Ability to write a short-report describing a simple statistical data set.
Indicative Contents المحتويات الإرشادية	Exploratory data analysis: measures of location and spread; symmetry and skewness. Presentation and interpretation of data and report writing. Probability: Sample space, events, outcome, and axioms of probability. Addition and multiplication rules. The law of total probability, conditional probability, independence, Bayes Theorem. Practical applications. Random variables: Discrete and continuous random variables. Probability mass function, probability density function and cumulative distribution function. Expectation, variance and moments.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The module will be presented to the students through a specified series of lectures, supported by practice and directed study outside the classroom. Formative assessment takes place throughout the module during lectures and feedback is given during these lectures.
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً
Total SWL (h/sem) 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)	3, 8	LO #1, 2, and 3
	Assignments	2	10% (10)	6, 9	LO # 4 and 5
	Report	1	10% (10)	12	LO # 5 and 6
Summative assessment	Midterm Exam	2	20% (20)	5,10	LO # 1-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction and overview of statistics
Week 2	Organization and presentation of statistical data
Week 3	Measures of central tendency (mean, median, mode, ...) of the simple data and the frequency distribution
Week 4	Measures of dispersion (the range – the variance and the standard deviation
Week 5	Coefficient of variation of the simple data and the frequency distribution
Week 6	Sample space and events
Week 7	Counting techniques (fundamental basics, addition rule – multiplication rule- permutation and combinations)
Week 8	Definition of the probability and its applications
Week 9	Conditional probability
Week 10	Midterm exam.
Week 11	Independence of events and bayes theorem and its applications
Week 12	6definition of the random variable
Week 13	The probability distribution
Week 14	Some special probability distributions
Week 15	The normal distribution.
Week 16	Preparatory week before the final exam.

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	-Modern Mathematical Statistics with Applications, Jay L. Devore, Kenneth N. Berk, Springer, 2012. - MATHEMATICAL S T A T I S T I C S WITH APPLICATIONS, Dennis D. Wackerly, William Mendenhall III, Richard L. Scheaffer, Thomson Brooks, 2008.	No
Websites	www.mathhandbook.com	

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D – Satisfactory	متوسط	60 - 69	Fair but with major shortcomings

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

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Course Description Form

Module Information			
معلومات المادة الدراسية			
Module Title	Operations Research	Module Delivery	
Module Type	Core	Theory Lecture Lab Tutorial Practical Seminar	
Module Code	MATH2211		
ECTS Credits	5		
SWL (hr/sem)	75		
Module Level	UGx11 UGI	Semester of Delivery	One
Administering Department	Mathematics and Computer Applications	College	Science
Module Leader	Rewayda Razaq Mohsin	e-mail	rewayda.r.mohsin@nahrainuniv.edu.iq
Module Leader's Acad. Title	Assistant Prof.	Module Leader's Qualification	PhD. Mathematics
Module Tutor	-	e-mail	-
Peer Reviewer Name	Fadhel subhi Fadhel	e-mail	Fadhel.subhi@nahrainuniv.edu.iq
Review Committee Approval	5\2\2025	Version Number	

Relation With Other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	
Module Aims, Learning Outcomes and Indicative Contents			
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية			
Module Aims أهداف المادة الدراسية	Operations research is the application of scientific methods to reach optimal solutions to problems. It also helps to make better decisions. Furthermore, the term operational analysis is used in the British Army as an essential part of capability development and management. Operations research subject includes studying the topics of transportation models, assignment models, business network analysis, theory. The goal is to help the third stage study real-life problems and find mathematical solutions to them. 1- Develop a strategy to develop an understanding of real life problems. 2- Develop a strategy to write a model for clear and appropriate problems to solve them mathematically. 3- Encouraging students to use different methods to deal with new problems previously unknown to them through effective training of using mathematical solutions methods. 4- Exploring and evaluating research techniques, finding sources, and identifying sources to extract information. 5-Promote independent learning by encouraging students to return to the initial learning skills to stimulate memory or to see how new skills can build and develop the skills mentioned above		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. The student learns the skill of building a mathematical model. 2. The student learns the skill of solving the proposed model. 3. The student learns many ways to solve. 4. The student learns how to distinguish problems. 5. learning programming by Matlab		

Indicative Contents المحتويات الإرشادية	Students should be able to understand the basic concepts of operations research that deals with the real life problems.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	- Teaching in the class and discussing the material with the students and ask questions. - Writing on a white board with a marker in the classroom for demonstration the subject. - Sudden daily and continuous weekly tests and participation in solving exercises. - Exercises and activities in the classroom and electronically. - Guide students to some sources that contain examples and exercises to benefit from them. Develop the student's ability to work on the duties and deliver them on time. - teaching them programming by using Matlab code - Trying to apply the concepts by solving different types of exercises. - Develop the student's ability to solve questions and discussion.

Student Workload (SWL) الحمل الدراسي للطلاب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	45	Structured SWL (h/w) أسبوعيا الحمل الدراسي المنتظم للطلاب	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	30	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	75		

Module Evaluation					
تقييم المادة الدراسية					
As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	10% (10)	5, 10	LO #1, 2, and 3
	Assignments	2	10% (10)	2, 12	LO # 1, 2, 3, 6, and 7
	Seminars / Lab.	1	10% (10)	14	LO # 6, 7, and 8
	Report	1	10% (10)	13	LO # 4, 5 and 8
Summative assessment	Midterm Exam	3hr	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	
Week	Material Covered
Week 1	Operations Research Models
Week 2	Mathematical Formulation of Linear Programming (LP)
Week 3	Graphical LP Solution
Week 4	Simplex Method
Week 5	Basic Solution, Big-M and Two-Phase simplex Method
Week 6	Duality Theory
Week 7	Transportation Problem
Week 8	Network Analysis

Week 9	CPM-PERT Methods for projects models
Week 10	Test for Optimality
Week 11	Assignment Problem
Week 12	Travel Salesman Problem
Week 13	Evolutionary Algorithms
Week 14	Genetic algorithm Representation Genetic Operators Stopping Criteria
Week 15	Matlab Implementation
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

Week	Material Covered
Week 1	Lab 1: drawing the constraints
Week 2	Lab 2: drawing the feasible region
Week 3	Lab 3: solve the LP by Graphical method
Week 4	Lab 4: find the intersection points of the constraints
Week 5	Lab 5: find the optimal solution
Week 6	Lab 6: solve the LP model by simplex method
Week 7	Lab 7: solve the LP by the genetic algorithm code

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?

Required Texts	Reeves, Colin, and Jonathan E. Rowe. <i>Genetic algorithms: principles and perspectives: a guide to GA theory</i> . Vol. 20. Springer Science & Business Media, 2002.	No
Recommended Texts	Engineering Optimization: Theory and Practice, Fourth Edition Singiresu S. Rao. 2009 by John Wiley & Sons, Inc.	No
Websites	www.oup.com/elt	

APPENDIX:

GRADING SCHEME				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				
NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4				

will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Course Description Form

Module Information			
معلومات المادة الدراسية			
Module Title	ADVANCED CALCULUS II	Module Delivery	
Module Type	Core	☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	MATH 211		
ECTS Credits	8		
SWL (hr/sem)	200		
Module Level		Semester of Delivery	
		1	
Administering Department		Department of Mathematics and Computer Applications	College
			College of Science
Module Leader	Nabaa Hussain Fakhry		e-mail
			Nabaa.hussein@nahrainuniv.edu.iq
Module Leader's Acad. Title		Assistant Teacher	Module Leader's Qualification
			Ph
Module Tutor	Name (if available)		e-mail
			E-mail
Peer Reviewer Name			e-mail
			E-mail
Review Committee Approval		20/10/2024	Version Number

Relation With Other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	
Module Aims, Learning Outcomes and Indicative Contents			
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية			
Module Aims			
أهداف المادة الدراسية	To introduce the students to the partial derivatives for functions of two or more variables. Limit and continuity, chain rules. Study and solutions of the directional derivatives and tangent plans, maxima, minima and saddle points, Lagrange multiplier.		

	Studying double integral and iterated integrals over rectangles, double integral over general regions, area by double integration, triple integrals in rectangular coordinates, Substitutions in double integrals and line integral. Studying Vector fields, Greens theorem, Surface and area and Surface integrals. Studying and understanding the Stokes theorem and The diverge theorem.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	That students gain proficiency in computations, in advance calculus. That students to be able knowledge and understanding oh how laws are linked. That Students enhance their logical thinking and problem structuring abilities. That students can obtain knowledge and understanding the advanced differentiation and integrations. The Support students in identify the most important applications in mathematics.
Indicative Contents المحتويات الإرشادية	1. The student will be able to use new advanced methods and theorems in advance calculus. 2. studying the vector fields in details. 3. The various types of integrations and its applications will be discussed and studying intensively.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module will be presented to the students through a specified series of lectures, supported by problem solving practice carried out in interactives tutorials. These tutorials will be supported by practice and directed study outside the classroom. Completing homework is part of the learning experience. Students should review topics from prior courses as needed.

Student Workload (SWL) الحمل الدراسي للطلاب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	109	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	91	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	200		

Module Evaluation					
تقييم المادة الدراسية					
		Time/N umber	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	2 hr	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	Function of two or more variables, Limit and continuity.
Week 2	Partial derivatives, chain rules.
Week 3	Directional derivatives and tangent planes.
Week 4	Maxima, minima and saddle points.
Week 5	Lagrange multiplier.
Week 6	Double integral and iterated integrals over rectangles.
Week 7	Double integral over general regions.
Week 8	Area by double integration, triple integrals in rectangular coordinates.
Week 9	Substitutions in double integrals, line integral.
Week 10	Vector fields, Greens theorem.
Week 11	Surface and area.
Week 12	Surface integrals.
Week 13	Stokes theorem.
Week 14	The diverge theorem.
Week 15	Preparatory Week
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introducing of Limit and continuity.
Week 2	Lab 2: Computing derivatives.
Week 3	Lab 3: Finding Maxima and minima.
Week 4	Lab 4: Using Lagrange multiplier in MATLAB.
Week 5	Lab 5: Computing Integral and double integral.
Week 6	Lab 6: Calculating area by double integration and line integral.
Week 7	Lab 7: Using Greens theorem in MATLAB.

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

APPENDIX:

GRADING SCHEME				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				

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Course Description Form

Module Information معلومات المادة الدراسية			
Module Title	Solution of Ordinary Differential Equation (ODE)		Module Delivery
Module Type	Core		☐ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	MATH216		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level		Semester of Delivery	1
Administering Department	Math. & Comp. Appl.	College	Type College Code
Module Leader	Asst. Prof. Dr. Fatimah Al-Taie	e-mail	fatimah.altaie@nahrainuniv.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name		e-mail	E-mail
Scientific Committee Approval Date	15/2/2025	Version Number	

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

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

Module Aims أهداف المادة الدراسية	The aim of this course is for the students to be primarily concerned with learning the basic concepts of mathematics, application in reality, solution of ordinary differential equations with first-, and higher-order and their applications. In addition, different classes of ODEs are considered.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Learning the basic concepts of differential equations, such as: To be able to deal with ordinary differential equations (ODE) and their applications. To be familiar with first order ODE and learning how to solve such equations. To deal with higher order ODE and their solutions. To learn the difference between homogeneous and non-homogeneous differential equations. To have experience in applications of Laplace transform.
Indicative Contents المحتويات الإرشادية	Differential Equations: definition, properties, classifications. First-order DE: Types, methods of solution: separable, homogeneous, exact, non-exact, linear, Bernoulli differential equation. Higer-order DE: Definition, homogeneous linear DE., methods of solution. Non-homogeneous DE: definitions, properties, <ethods of solution. Laplace Transform: Definitions, properties, applications.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The learning and teaching strategy is presented by: Providing the students with a sufficient amount of mathematical terms and definitions by attending lectures and presenting on the whiteboard to connect the students with the lecturer to solve as many real-life applications as possible. The pdf lectures, homework, quizzes, reports, seminar, and exercises are shared on Google Classroom. The subject will be given to the students through a series of lectures with problem-solving practice carried out in interactive tutorials. These tutorials will be supported by practice and directed study outside the classroom. Formative assessment takes place during tutorials and feedback is given during these tutorials.
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Student Workload (SWL)

الحمل الدراسي للطالب

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

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100
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Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	2, 6	LO #1, 3
	Assignments	2	10% (10)	3, 8	LO # 2 and 3
	Projects / Lab.	-	10% (10)	continuous	
	Report	1	10% (10)	14	LO # 4, 5
Summative assessment	Midterm Exam	2	10% (10)	4,12	LO # 1,2 and 2-4
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to DE's: Definition and classification of Differential Equations (DE's)
Week 2	First-order DE's: Separable DE.
Week 3	Homogeneous first-order DE.
Week 4	Exact differential equations
Week 5	Non-exact differential equations.
Week 6	Linear differential equation and Bernoulli equation.
Week 7	Higher-order DE's: The general form of higher-order DE's
Week 8	Homogeneous DE's
Week 9	Definition and methods on solving homogeneous DE's
Week 10	Nonhomogeneous DE's
Week 11	Definition, properties, and methods of solving non-homogeneous DE's
Week 12	Mid-Term Exam
Week 13	Reducing second-order DE to first-order DE
Week 14	Laplace Transform
Week 15	Definition / properties of Laplace transform and then using Laplace transformation in solving DE's
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	
Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	[1] C. Henry Edwards and David E. Penney, Differential Equations and Linear Algebra, ser. Pearson International Edition, third edition. Pearson Education, United States of America, 2010. [2] William E. Boyce, and Richard C. DiPrima, Elementary Differential Equations and Boundary Value Problems, John Wiley and Sons, Inc. Seventh edition, United State of America. 2001.	No
Recommended Texts	Earl D. Rainville and Phillip E. Bedient, Elementary Differential Equations, Collier Macmillan Publishers, fifth Edition, New York, 1974.	Yes
Websites	https://www.khanacademy.org/math/differential-equations , www.google.com ,	

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition

Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Linear Algebra II		Module Delivery
Module Type	Core	☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☒ Seminar	
Module Code	Math 213		
ECTS Credits	8		
SWL (hr/sem)	200		
Module Level	2	Semester of Delivery	2
Administering Department	MATH	College	Science
Module Leader	Dr. Zainab Riyadh Shaker	e-mail	zaianb.riyadh22@nahrainuniv.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	01/02/2025	Version Number	

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The course provides students with an understanding of a number of topics and concepts in linear algebra. The course also introduce techniques of proof which are useful to other courses. The course aims to encourage students to develop interest in the subject and pursue other courses that require these skills.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Study of vector spaces and their solutions. 2. Solving linear systems by RREF and GJRR methods. 3. Inner product space and its applications. 4. Gram Schmidt method and their applications.
Indicative Contents المحتويات الإرشادية	• Real Vector Spaces • Linear Independence • Vector Spaces; Null Space • Isomorphism's • Rank of a Matrix • Gram-Schmidt Process • Eigenvalues and Eigenvectors and Similarity

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

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Real Vector Spaces
Week 2	Subspaces
Week 3	Span
Week 4	Linear Independence
Week 5	Basis and Dimension
Week 6	Homogeneous Systems
Week 7	Relationship between Nonhomogeneous Linear Systems and Homogeneous Systems
Week 8	Coordinates and Isomorphism's
Week 9	Isomorphism's
Week 10	Rank of a Matrix
Week 11	Inner Product Spaces
Week 12	Length and Direction in R^2 and R^3
Week 13	Gram-Schmidt Process

Week 14	Linear Transformations and Matrices
Week 15	Eigenvalues and Eigenvectors and Similarity
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Introduction to Linear Algebra and Application by Bernard Kolman	Yes
Recommended Texts	Introduction to Linear Algebra by Franz hohn	No
Websites	Any website that specializes in the study of linear algebra	

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.