Course Description Template for the Academic Year According to the Bologna System 2024-2025

Department of Operations Research and Intelligent Technologies/College of Computer Science and Mathematics

Note: The course system will be discontinued after two years and replaced by the Bologna System.

Semester One

MODULE DESCRIPTION FORM

Module Information					
Module Title	**Operations Research (1)**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**OR101**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	OR408		**College**	UoM	
Module Leader	Oday Abdulrahman Jarjies		**e-mail**	odayjarjies@uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Ghazwan Alsoufi		**e-mail**	ghazwan.alsoufi@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/02/2025		**Version Number**	1.0	

Relation with other Modules			
Prerequisite module	Operations Research (1)	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1. To develop problem solving skills and an understanding of operations research through applying formulas to solve some examples.

أهداف المادة الدراسية	2. Use mathematical and engineering methods to study optimization problems in Business and Management, Economics, Computer Science, Civil Engineering, Industrial Engineering, etc. 3. This course introduces frameworks and ideas about various types of optimization problems in the business world. 4. In particular, we focus on how to formulate real business problems into mathematical models that can be solved by computers.
Module Learning Outcomes	1. Fundamentals of operations research and development 2. Scientific methods in operations research 3. Operations research and its relationship to decision-making 4. Linear programming of the general form 5. Building linear programming models 6. The canonical and standard form of linear programming 7. Simplex method 8. Special cases in linear programming 9. Graphical Method 10. Big M method 11. Two Phaes Method

	12. Corresponding(dual) model 13. The relationship between the normal and the corresponding model 14. The corresponding(dual) optimal solution 15. The corresponding(dual) simplex method
Indicative Contents	Indicative content includes the following. <u>Part A- Components of Linear Programming [10 hrs]</u> The basic components of the LP are as follows: • Decision Variables • Constraints • Data • Objective Functions <u>Part B- Characteristics of Linear Programming</u> [15 hrs] • The following are the five characteristics of the linear programming problem: • Constraints – The limitations should be expressed in the mathematical form, regarding the resource. • Objective Function – In a problem, the objective function should be specified in a quantitative way. • Linearity – The relationship between two or more variables in the function must be linear. It means that the degree of the variable is one. • Finiteness – There should be finite and infinite input and output numbers. In case, if the function has infinite factors, the optimal solution is not feasible. • Non-negativity – The variable value should be positive or zero. It should not be a negative value. • Decision Variables – The decision variable will decide the output. It gives the ultimate solution of the problem. For any problem, the first step is to identify the decision variables.

	Part C-Methods to Solve Linear Programming Problems [25 hrs] • The linear programming problem can be solved using different methods, such as the graphical method, simplex method, or by using tools such as WINQSB, LINGO, QMP, open solver etc. Here, we will discuss the two most important techniques called the simplex method ,graphical method, Big M method, Two Phaes Method in detail. Part D- Special Cases in Graphical Method: Linear Programming [10 hrs] • The linear programming problems (LPP) discussed in the previous section possessed unique solutions. This was because the optimal value occurred at one of the extreme points (corner points). But situations may arise, when the optimal solution obtained is not unique. Part E- Corresponding(dual) model [15 hrs] • The relationship between the normal and the corresponding model • The corresponding(dual) optimal solution • The corresponding(dual) simplex method

Learning and Teaching Strategies	
Strategies	basic form of programmed instruction—called linear programming—analyzes a subject into its component parts and arranges the parts in sequential learning order. At each step in their reading, students are required to make a response and are told immediately whether or not the response is correct.

Student Workload (SWL)			
Structured SWL (h/sem)	78	**Structured SWL (h/w)**	5
Unstructured SWL (h/sem)	72	**Unstructured SWL (h/w)**	5
Total SWL (h/sem)	**150**		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	20% (10)	4 and 10	LO #1- #4 and #9-#12
	Assignments	1	10% (10)	5	LO #1- #4
	Report	1	10% (10)	13	LO #1- #12
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #8
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Fundamentals of operations research and development
Week 2	Scientific methods in operations research
Week 3	Operations research and its relationship to decision-making
Week 4	Linear programming of the general form and The canonical and standard form of linear programming
Week 5	Building linear programming models
Week 6	Graphical Method
Week 7	Simplex method
Week 8	Numerical examples
Week 9	Special cases in linear programming

Week 10	Big M method
Week 11	Two Phaes Method
Week 12	Numerical examples
Week 13	Corresponding(dual) model
Week 14	The relationship between the primal and the dual model
Week 15	The corresponding(dual) optimal solution and The corresponding(dual) simplex method
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	حمدي طه	Yes
Recommended Texts	1-مقدمة في نماذج البرمجة الخطية بين النظرية والتطبيق , سعد النعيمي. 2-بحوث العمليات , احمد حاتم عبدالله	No
Websites	https://www.tutorialsduniya.com/notes/linear-programming-applications-notes/	

Grading Scheme

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 – 100	Outstanding Performance
	B - Very Good	جيد جدا	80 – 89	Above average with some errors
	C – Good	جيد	70 – 79	Sound 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	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
(0 – 49)	**F –** Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Calculus (1)**			**Module Delivery**	
Module Type	Core			☒ **Theory** ☒ **Lecture** ☒ **Tutorial** ☐**Lab** ☐ **Practical** ☐ **Seminar**	
Module Code	**OR102**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		**UGI**	**Semester of Delivery**		1
Administering Department		OR	**College**	CSM	
Module Leader	Edrees M. Nori Mahmood		**e-mail**	edreesnori@uomosul.edu.iq	
Module Leader's Acad. Title		Assistant Professor	**Module Leader's Qualification**		Ph.D.

Module Tutor	Ahmed Naziyah Abdullah	**e-mail**	Ahmed.alkhateeb@uomosul.edu.iq
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date	26/01/2025	**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	Calculus (2)	**Semester**	2

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1. To develop basic mathematical skills necessary for all branches of mathematics. 2. To develop the ability to think in mathematical analysis to solve problems. 3. Introduce the student to the relationship between limits, continuity and derivatives. 4. To learn the rules of differentiation and its applications. 5. To develop the ability to draw curves by making use of all the information that has been studied. 6. To learn the basic rules of integration and its applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understanding different types of algebraic functions and how to identify them. Also, learn the different identities of algebraic functions. 2. Understanding limits and their relationship to continuity. 3. Understanding the concept of continuity and its relationship to differentiation. 4. The ability to understand differentiation and its rules. 5. Understand the consequences of Rolle's theorem and the Mean Value theorem for differentiable functions.

	6. The ability to understand integration and its rules. 7. Employing all the concepts studied in drawing curves and solving mathematical problems.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Sets, set representation, real numbers, intervals and their types. [5 hrs] Cartesian coordinate system and some basic concepts in analytic geometry. [5 hrs] Algebraic functions, domain, range, algebraic operations on functions. [10 hrs] Limits. [5 hrs] continuity. [5 hrs] derivatives. [15 hrs] L'Hôpital's first and second rule. [5 hrs] Rolle's theorem, mean value theorem. [5 hrs] Applications of derivatives. [5 hrs] Integration. [10 hrs] Applications of definite integration. [5 hrs]

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

الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Sets, set representation, Real numbers, intervals and their types.
Week 2	Linear and nonlinear inequalities.
Week 3	Cartesian coordinate system and some basic concepts in analytic geometry.
Week 4	Function, types of functions, domain and range of function, graph of function.
Week 5	Algebraic operations on functions, composition of functions, inverse of functions.
Week 6	limits: definition of limit, theorems in limits, computing limits, limits on one side, infinite limits, limits at infinity.
Week 7	The concept of continuity, theorems in continuity, continuity at a point, continuity on an interval.
Week 8	Derivatives: definition, derivative rules, higher order derivatives.
Week 9	Chain rule
Week 10	Implicit functions and their derivatives.
Week 11	L'Hôpital's first and second rule.
Week 12	Rolle's theorem, mean value theorem.
Week 13	Applications of derivatives: increasing functions, decreasing functions, maximum and minimum values of a function.
Week 14	Integration, integration rules, definite integral, the Fundamental Theorem of Calculus.
Week 15	Applications of definite integral in finding the area.
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	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	مبادئ الرياضيات التفاضل والتكامل للدكتور علي عزيز علي واخرون، 1980 التفاضل والتكامل د. رمضان محمد جهيمة و د. أحمد عبد العالي، 2002 الجزء الأول.	yes
Recommended Texts	Thomas Calculus Schaum's calculus series Calculus of one and several Variaables,11th Edition	yes
Websites	https://www.khanacademy.org/math/calculus-1 https://tutorial.math.lamar.edu/classes/calci/calci.aspx	

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	**Programming (1)**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**OR103**				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level		**UGI**	**Semester of Delivery**		**1**
Administering Department		**OR**	**College**	**CSM**	

Module Leader	كرم عادل عبد	**e-mail**	karamadel@uomosul.edu.iq
Module Leader's Acad. Title	lecture	**Module Leader's Qualification**	ماجستير
Module Tutor	كرم عادل عبد	**e-mail**	karamadel@uomosul.edu.iq
Peer Reviewer Name	احمد نزيه	**e-mail**	
Scientific Committee Approval Date	2025/1/24	**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Programming (1)	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1. To enhance problem-solving skills and general programming understanding through the application of the MATLAB language. 2. This course focuses on the fundamental concepts of programming using the MATLAB language. 3. It serves as the foundational subject for all types of programming. 4. To comprehend programming challenges and develop solutions utilizing the MATLAB language.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	In MATLAB, an array can produce multiple outputs based on its usage and the operations applied to it. Below are some common outputs of arrays in MATLAB: "Here are some common outputs of conditional statements such as if and while in MATLAB: 1. **Logical values**: In if and while statements, the result can be either true or false, which determines whether the code inside the conditional statement will be executed or not. 2. **Multiple actions**: If the conditional statement contains more than one condition, different actions may be executed depending on the satisfaction of

	the multiple conditions. 3. **Text output**: disp or fprintf can be used to print messages that clarify the result of the condition or the status within the conditional statements. 4. **Repetition of actions**: Using while, a certain process can be repeated as long as the condition remains true, with the output potentially changing depending on the iteration. 5. **Stopping operations**: The break statement can be used inside a while loop to stop the loop when a certain condition is met, causing an early exit from the loop. 6. **Re-executing operations**: Sometimes, continue is used to skip the current iteration and proceed to the next iteration within a while or for loop. 7. **Returning values to variables**: Conditional statements can return values to variables based on the outcome of the condition, such as returning a specific value if a certain condition is met. 8. **Transition points**: If the conditional statements include else or elseif, multiple paths may be executed depending on the satisfaction of the conditions. 9. **Complex mathematical operations**: Within if statements, complex calculations or mathematical functions may be executed based on specific conditions. 10. **Exiting using return**: In if statements within functions, return can be used to exit the function if the condition is met. 11. **Multiple outputs within functions**: When using conditional statements within a function, the outputs may be multiple values or notifications depending on the logic of the condition."
Indicative Contents المحتويات الإرشادية	"The instructional content for MATLAB can be divided into several categories, including: 1. **Basics**: This content includes an introduction to the MATLAB graphical interface (MATLAB Desktop) and the tools used in program development, as well as an overview of the basic commands in the language. 2. **Programming Concepts**: The guidance should include important programming concepts, such as conditionals, loops, arrays, and data handling. 3. **Graphing**: The guidance should explain how to plot data using MATLAB, such as line plots, pie charts, and 3D plots. 4. **Statistics and Data Analysis**: The guidance could include an explanation of how to use MATLAB for data analysis and performing statistical operations, such as solving differential equations, factor analysis, and classification.

	5. **Machine Learning**: The guidance may also cover how to use MATLAB to develop machine learning models, such as classification, clustering, and factor analysis models. 6. **Matrices and Vectors**: Defining and creating matrices and how to work with them in MATLAB. 7. **Charts and Plots**: Methods for plotting different types of charts, such as line charts and polar plots. 8. **Matrices and Vectors**: Defining and creating matrices and how to work with them in MATLAB. In general, the guidance should include examples and practical exercises that allow users to apply the concepts and tools explained in real-world scenarios. [90 h]"

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy to be adopted in delivering this unit is to encourage students to use the MATLAB language and then engage in exercises, while at the same time improving and expanding their critical thinking skills. This will be accomplished through interactive classes and tutorials and by looking at types of simple experiments that include some sampling activities of interest to students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	107	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7

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 التقييم التكويني	**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 التقييم التلخيصي	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	A general introduction to MATLAB.
Week 2	Basics of writing in MATLAB.
Week 3	Variables and constants in MATLAB.
Week 4	Operator precedence in MATLAB.
Week 5	Algorithms in MATLAB.

Week 6	Flowcharts in MATLAB.
Week 7	Programming statements in MATLAB.
Week 8	The conditional **if** statement has three forms.
Week 9	The **for**-loop statement.
Week 10	The **while** loop statement.
Week 11	The **break** statement.
Week 12	The **continue** statement.
Week 13	A general introduction to arrays.
Week 14	Integrating programming statements with arrays.
Week 15	General exercises and review.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: General introduction to arrays
Week 2	Lab 2: Entering and addressing arrays
Week 3	Lab 3: types of arrays
Week 4	Lab 4: operations on arrays
Week 5	Lab 5: Solve various examples of matrices
Week 6	Lab 6: Solve various examples of matrices using the conditional "if" and "for" statements
Week 7	Lab 7: Functions ready with (special) matrices

Week 8	Lab 8: Generating Matrices
Week 9	Lab 9: Rotate and reshape the matrix
Week 10	Lab 10: Expanding Matrices
Week 11	Lab 11: Partial matrices
Week 12	Lab 12: Changing matrix elements
Week 13	Lab 13: Drawing in MATLAB in two dimensions
Week 14	Lab 14: Drawing in MATLAB in three dimensions
Week 15	Lab 15: General review

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts النصوص المطلوبة	1- محمد رفيق علي ," تطبيقات الماتلاب الهندسية ", جامعة البلقاء التطبيقية, 2010 .	Yes
Recommended Texts	The MathWorks, Inc., MATLAB®13 Help, 2020	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition

Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance أداء مذهل
	B - Very Good	جيد جدا	80 - 89	Above average with some errors فوق المتوسط مع بعض الأخطاء
	C - Good	جيد	70 - 79	Sound work with notable errors العمل السليم مع أخطاء ملحوظة
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings عادل ولكن مع نواقص كبيرة
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria العمل يلبي الحد الأدنى من المعايير
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded مطلوب المزيد من العمل ولكن الائتمان الممنوح
	F – Fail	راسب	(0-44)	Considerable amount of work required قدر كبير من العمل المطلوب

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	**الجبر الخطي**	**Module Delivery**

Module Type	**Basic**			☒ Theory ☒ Lecture ☐Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	**OR104**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	**UGI**	**Semester of Delivery**	**1**		
Administering Department	**OR**	**College**	**CSM**		
Module Leader	**هدى عصام احمد**	**e-mail**	**Dr.hudaea@uomosul.edu.iq**		
Module Leader's Acad. Title	**Professor**	**Module Leader's Qualification**	**Ph.D.**		
Module Tutor	**حذيفة حازم طه**	**e-mail**			
Peer Reviewer Name		**e-mail**			
Scientific Committee Approval Date	**1/02/2025**	**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 Indicativz Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1- Providing the student with sufficient information that qualifies him to distinguish realistic situations that can be solved by matrix algebra. 2- Accustoming the student to formulating realistic problems as models in linear algebra.

	3- Solving a system of linear equations using linear algebra. 4-To develop students' skills in understanding matrices and arithmetic operations on matrices. 5- Study linear algebra in detail.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Matrices and arithmetic operations 2-Finding the inverse of matrices (using elementary transformations - Gaussian elimination) 3- Learn to find the determinant of matrices with small and very large capacities (definition method - modern method - discriminant factor method - elementary transformation method). 4- Solving the non-homogeneous linear system using matrices in the case m=n (Cramer's method - definition method - Gauss's elimination method to find the inverse and solve the system) 5-Solving a non-homogeneous linear system using matrices if the number of equations is less than the number of unknowns 6- Solve the non-homogeneous linear system using matrices if the number of equations is greater than the number of unknowns 7- How to find the rank of square and non-square matrices 8-Using the diacritic formula and how to find the rank of square and non-square matrices

	-9 Euclidean nth space (Euclidean length - Euclidean distance - Euclidean multiplication - Dicatric multiplication)
Indicative Contents المحتويات الإرشادية	Instructional content includes the following. Part A – Matrices Basic concepts and definition of matrices and their types - Arithmetic operations on matrices (addition, subtraction, multiplication) and the properties of those operations - The effect of the matrix and its applications in arithmetic operations - Complex numbers and arithmetic operations on them with their properties - Complex numbers and arithmetic operations on them with their properties - Complex numbers and arithmetic operations on them With its properties- Finding determinants of large capacity matrices - Properties of determinants - Inverses of matrices (using elementary transformations - Gaussian elimination) - Properties of inverses of matrices - Methods of solving systems of non-homogeneous linear equations using the method of Gauss, Gauss-Gordon and Kramer, when the determinant of the matrix is not equal to zero - Equivalent matrices and types of solution to equations Linearity - finding the order of matrices using equivalence - the modal or suppressive formula - defining the nth Euclidean space and some of its theorems - defining the linear structure, the Euclidean length, and the Euclidean distance between two vectors in the nth Euclidean space - finding the characteristic roots and characteristic vectors [75 hours]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Encourage students to participate in exercises, while improving and expanding critical thinking skills at the same time. This will be accomplished through interactive classes and tutorials and by looking at types of simple experiments that include some sampling activities of interest to students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment التقييم التكويني	**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 التقييم التلخيصي	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Basic concepts and definition of matrices and their types, arithmetic operations on matrices (addition, subtraction, multiplication) and properties of those operations, the effect of the matrix and its applications in arithmetic operations.
Week 2	Complex numbers and arithmetic operations on them with their properties - Complex numbers and arithmetic operations on them with their properties - Complex numbers and arithmetic operations on them with their properties

Week 3	Finding determinants of small capacity matrices
Week 4	Finding the determinants of large capacity matrices - (definition - modern method - discriminant factor method - elementary transformations method).
Week 5	Properties of determinants
Week 6	- Inverse of matrices (using elementary transformations - Gaussian elimination)
Week 7	Properties of inverse matrices-
Week 8	Solving a non-homogeneous linear system using matrices in the case m=n (Cramer's method - definition method - Chaos' elimination method to find the inverse and solve the system)
Week 9	Chaos' elimination method to find the inverse and solve the system
Week 10	Solving a non-homogeneous linear system using matrices if the number of equations is less than the number of unknowns
Week 11	Solving a non-homogeneous linear system using matrices if the number of equations is greater than the number of unknowns
Week 12	- How to find the rank of square and non-square matrices

Week 13	The diacritic formula - The diacritic formula and how to find the rank of square and non-square matrices
Week 14	Nth Euclidean space (Euclidean length - Euclidean distance - Euclidean multiplication - Dicatric multiplication)
Week 15	Definition of linear structure - finding characteristic roots and characteristic vectors
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	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts النصوص المطلوبة	**الجبرالخطي تأليف (د.عبدالمجيد حمزة, د.لميعة باقرالجواد)** **الخطي الخبر وتطبيقاته تأليف د. معروف الرحمن**	Yes
Recommended Texts	الجبر الخطي تاليف د. جورج ضايق السبتي(١٩٨٨)	No
Websites	https://youtu.be/ettlYWO0zlg?si=fluQnZKfax7RWWaJ	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance أداء مذهل
	B - Very Good	جيد جدا	80 - 89	Above average with some errors فوق المتوسط مع بعض الأخطاء
	C - Good	جيد	70 - 79	Sound work with notable errors العمل السليم مع أخطاء ملحوظة
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings عادل ولكن مع نواقص كبيرة
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria العمل يلبي الحد الأدنى من المعايير
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded مطلوب المزيد من العمل ولكن الائتمان الممنوح
	F – Fail	راسب	(0-44)	Considerable amount of work required قدر كبير من العمل المطلوب

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	**English Language**			**Module Delivery**	
Module Type	**Support**			☐ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOM1021**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level		**UGI**	**Semester of Delivery**		**1**
Administering Department		**OR**	**College**	**CSM**	
Module Leader	**Zainab Qusay Ahmed Taqi**		**e-mail**	**Zainab.q@uomosul.edu.iq**	
Module Leader's Acad. Title		**Asst. lecturer**	**Module Leader's Qualification**		**master**
Module Tutor	**None**		**e-mail**	**None**	
Peer Reviewer Name		**None**	**e-mail**	**None**	
Scientific Committee Approval Date		**23/01/2025**	**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 Objectives أهداف المادة الدراسية	1. To be able to speak English fluently and accurately. 2. To think in English and then speak. 3. To be able to compose freely and independently in speech and writing. 4. To be able to read books with understanding.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. To address grammar issues that students encounter in their daily speech, writing, reading, and listening. 2. Recognize the structure of the sentence. 3. To address the issue of grammatical errors that affect effective communication 4. To improve your reading skills through the practice of vocabulary enrichment, reading comprehension exercises, speed reading strategies, written responses, discussions, and reflections 5. Develop writing skills.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction: about new headway pre-intermediate plus [1 hrs] Tenses: past-present-future, wh- questions. Vocabulary- using a bilingual dictionary, reading (communication). Everyday English (social expressions) [9 hrs]

	Grammar: Review about tenses, Present tenses, have and have got. Vocabulary: about (daily life), listening and match between verb and nouns. Practices about simple present and present continuous, Reading: about living in the USA. Social expressions about every day English. [8 hrs] Past tenses, simple past and past continuous, practice, Reading and listening, regular and irregular verbs. Vocabulary: about N.- V.- Adj. endings. Everyday English (time expressions). [6hrs] Grammar: the quantities, also about Something/someone/somewhere, practices. Reading: about markets, practices. [6 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	- The main strategy that will be adopted in developing the four skills: - The skill of speaking. - The skill of reading. - The skill of writing. - The skill of listening. - Also, enables the students the use grammar correctly.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	32	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	18	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
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% (15)	4,9 and 11	LO #1, #2 and #5
	Assignments	2	10% (15)	2,10 and 13	LO #3, #4 and #6
	Report	1	10% (10)	13	LO #1, #4
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO #1 - #5
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction: new headway pre-intermediate plus
Week 2	Grammar: Tenses, wh- questions, practices.
Week 3	Vocabulary- how to use a bilingual dictionary, reading about (communication)
Week 4	Everyday English (social expressions), listening, practices.
Week 5	Grammar: Present tenses, have and have got, practices.
Week 6	Vocabulary about (daily life), listening, and match between vocabularies, and practices.
Week 7	Mid-term Exam.
Week 8	simple present and present continuous, practices, reading about living in the USA.
Week 9	Social expressions about everyday English, practices.
Week 10	Grammar: simple past and past continuous tenses, and practices.
Week 11	Reading and listening, regular and irregular verbs, practices.
Week 12	Vocabulary: about N.- V.- Adj. endings, practices, Everyday English (time expressions), practices.
Week 13	Grammar: quantity (some, many, any, much, few,….), practice.
Week 14	Grammar: about Something/someone/somewhere, practices.
Week 15	Reading: about markets, practices.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	None
Week 2	None
Week 3	None
Week 4	None
Week 5	None
Week 6	None
Week 7	None

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Headway pre-intermediate plus student's book. (John and Liz Soars)	Yes
Recommended Texts	Headway pre-intermediate plus work's book	Yes
Websites	https://7esl.com/	

Grading Scheme

مخطط الدرجات

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

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

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

Semester Two

MODULE DESCRIPTION FORM

Module Information			
Module Title	**Operations Research (2)**	**Module Delivery**	
Module Type	**Core**		☒ **Theory**
Module Code	**OR107**		☒ **Lecture**
ECTS Credits	**6**		☐ **Lab**
SWL (hr/sem)	**150**		☒ **Tutorial**
			☐ **Practical**
Module Level	**UGI**	**Semester of Delivery**	**2**
Administering Department	**OR**	**College**	**CSM**
Module Leader	**Oday Abdulrahman Jarjies**	**e-mail**	**odayjarjies@uomosul.edu.iq**
Module Leader's Acad. Title	**Lecturer**	**Module Leader's Qualification**	**Ph.D.**
Module Tutor	**Ghazwan Alsoufi**	**e-mail**	**ghazwan.alsoufi@uomosul.edu.iq**

Peer Reviewer Name	**Name**	**e-mail**	**E-mail**
Scientific Committee Approval Date	**1/02/2025**	**Version Number**	**1.0**

Relation with other Modules			
Prerequisite module	Operations Research (1)	**Semester**	1
Co-requisites module	برمجة صحيحة وحركية	**Semester**	3

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	5. To develop problem solving skills and an understanding of operations research through applying formulas to solve some examples. 6. Use mathematical and engineering methods to study optimization problems in Business and Management, Economics, Computer Science, Civil Engineering, Industrial Engineering, etc. 7. This course introduces frameworks and ideas about various types of optimization problems in the business world. 8. In particular, we focus on how to formulate real business problems into mathematical models that can be solved by computers.
Module Learning Outcomes	1. Dual Model 2. Definition of the Dual Problem 3. Solution of the Dual Problem 4. Relationship Between Primal and Dual Objective Values 5. Dual Simplex Method 6. Economic interpretation of the corresponding model 7. Interpreting the Simplex Tableau : Sensitivity Analysis 8. Post optimal or Sensitivity Analysis

	9. Changes Affecting Optimality 10. Changes Affecting Feasibility 11. Changes Affecting Optimality and Feasibility 12. Parametric Linear Programming 13. Mathematical Foundations 14. Standard LP Model in Matrix Form 15. Revised (Primal) Simplex Method 16. Steps of the Primal Revised Simplex Method
Indicative Contents	Indicative content includes the following. <u>Part A- Dual Problem [10 hrs]</u> • Definition of the Dual Problem • Constraints • Data • Objective Functions <u>Part B- Solution of the Dual Problem [15 hrs]</u> • Relationship Between Primal and Dual Objective Values • Dual Simplex Method • Economic interpretation of the corresponding model <u>Part C-Sensitivity Analysis [25 hrs]</u> • Post optimal or Sensitivity Analysis • Changes Affecting Optimality • Changes Affecting Feasibility • Changes Affecting Optimality and Feasibility <u>Part D- Parametric Linear Programming [10 hrs]</u> • Changes in C • Changes in B • Changes in Pj • Simultaneous Changes in C and b • Mathematical Foundations • Standard LP Model in Matrix Form

	• Basic Solution and Bases • The Simplex Tableau in Matrix Form Part E- Revised (Primal) Simplex Method [10 hrs] • Product Form of the Inverse • Steps of the Primal Revised Simplex Method Part F- tools [5 hrs] • The linear programming problem can be solved using different methods, such as the Dual Simplex Method, Sensitivity Analysis, or by using tools such as WINQSB, LINGO, QMP, open solver etc.

Learning and Teaching Strategies	
Strategies	• The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)			
Structured SWL (h/sem)	78	**Structured SWL (h/w)**	5
Unstructured SWL (h/sem)	72	**Unstructured SWL (h/w)**	5
Total SWL (h/sem)	**150**		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	20% (10)	4 and 10	LO #1- #4 and #9-#12
	Assignments	1	10% (10)	5	LO #1- #4
	Report	1	10% (10)	13	LO #1- #12
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #8
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Dual Model and Definition of the Dual Problem
Week 2	Solution of the Dual Problem
Week 3	Relationship Between Primal and Dual Objective Values
Week 4	Dual Simplex Method
Week 5	Economic interpretation of the corresponding model
Week 6	Interpreting the Simplex Tableau : Sensitivity Analysis
Week 7	Numerical examples
Week 8	Parametric Linear Programming
Week 9	Numerical examples
Week 10	Mathematical Foundations and Standard LP Model in Matrix Form

Week 11	Numerical examples
Week 12	Revised (Primal) Simplex Method
Week 13	Numerical examples
Week 14	Product Form of the Inverse
Week 15	Steps of the Primal Revised Simplex Method
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	حمدي طه	Yes
Recommended Texts	1-مقدمة في نماذج البرمجة الخطية بين النظرية والتطبيق , سعد النعيمي. 2-بحوث العمليات , احمد حاتم عبدالله	No
Websites	https://www.tutorialsduniya.com/notes/linear-programming-applications-notes/	

Grading Scheme

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Calculus (2)**			**2 Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Tutorial** ☐ **Lab** ☐ **Practical** ☐ **Seminar**	
Module Code	**OR108**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	**UGI**		**Semester of Delivery**	**2**	
Administering Department	**OR**		**College**	**CSM**	
Module Leader	**Edrees M. Nori Mahmood**		**e-mail**	**edreesnori@uomosul.edu.iq**	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	**Ph.D.**	
Module Tutor	**Ahmed Naziyah Abdullah**		**e-mail**	**Ahmed.alkhateeb@uomosul.edu.iq**	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	26/01/2025		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Calculus (1)	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	7. To develop basic mathematical skills necessary for all branches of mathematics. 8. To develop the ability to think in mathematical analysis to solve problems. 9. learn the techniques of differentiation of functions such as trigonometric, inverse trigonometric, exponential, logarithmic, and hyperbolic functions. 10. Studying integration methods and identify the most appropriate method. 11. understanding the concept of functions in multiple variables. 12. To learn to find the partial derivatives of functions in two variables. 13. To learn to find extrema of functions in two variables 14. To learn calculate double integrals.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	8. Understand the properties of transcendental functions and how to identify them. 9. The ability to find derivatives and integrals of transcendental functions. 10. Training the students on integration methods and evaluating the most appropriate method to find it. 11. Understanding multivariate functions. 12. The ability to find partial derivatives. 13. The ability to identify and find extreme values of functions in two variables. 14. The ability to understand and evaluate double integrals. 15. Employing the concept of double integrals in solving mathematical problems.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Trigonometric functions. [5 hrs]

	Inverse trigonometric functions. [5 hrs] Exponential functions. [5 hrs] Logarithmic functions. [5 hrs] Hyperbolic functions. [5 hrs] Methods of Integration. [15 hrs] Functions of Several Variables. [5 hrs] Partial derivatives. [10 hrs] Extreme values of functions in two variables [5 hrs] Double integrals. [5 hrs] Applications of double integration. [5 hrs] Polar coordinates. [5 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem)	72	**Unstructured SWL (h/w)**	5

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

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Trigonometric functions, derivatives and integrations.
Week 2	Inverse trigonometric functions, derivatives, integrals resulting in inverse trigonometric functions

Week 3	Exponential functions, domain, range, and its properties, derivatives and integrations.
Week 4	Logarithmic functions, domain, range, and its properties, derivatives of logarithmic functions
Week 5	Hyperbolic functions, derivatives and integrations.
Week 6	Methods of Integration: Integration by parts, integrals of powers of trigonometric functions, trigonometric substitutions.
Week 7	Methods of Integration: integration by substitution, other substitutions.
Week 8	Methods of Integration: integration by partial fractions, integrals of quadratic formulas.
Week 9	Functions of Several Variables: Functions of two Variables, domain and range.
Week 10	Partial derivatives of functions of two variables.
Week 11	second-order partial derivatives of functions of two variables.
Week 12	Extreme values of functions in two variables.
Week 13	Double integrals
Week 14	Applications of double integration (finding area, volume, mass, centers of mass, and …).
Week 15	Polar coordinates, relationship between polar and cartesian coordinates.
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	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	مبادئ الرياضيات التفاضل والتكامل للدكتور علي عزيز علي واخرون. التفاضل والتكامل د. رمضان محمد جهيمة و د. أحمد عبد العالي، 2002 الجزء الأول + الجزء الثاني	yes
Recommended Texts	Thomas Calculus Schaum's calculus series Calculus of one and several Variaables,11th Edition	yes
Websites	https://www.khanacademy.org/math/calculus-1 https://tutorial.math.lamar.edu/classes/calci/calci.aspx https://www.khanacademy.org/math/calculus-2 https://tutorial.math.lamar.edu/classes/calcII/calcII.aspx https://tutorial.math.lamar.edu/classes/calciii/multivrblefcns.aspx	

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	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
(0 – 49)	**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	Principle of Statistics			**Module Delivery**	
Module Type	Basic			☒ **Theory** ☒ **Lecture** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**OR110**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level		**UGI**	**Semester of Delivery**		**2**
Administering Department		**OR**	**College**	**CSM**	
Module Leader	**د. زينب توفيق حامد**		**e-mail**	**zainab.tawfeek@uomosul.edu.iq**	

Module Leader's Acad. Title	**lecturer**	**Module Leader's Qualification**	**Ph.D.**
Module Tutor	**د. هدى عصام**	**e-mail**	
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date	**1/02/2025**	**Version Number**	**1.0**

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None Requirements module smoother	**Semester**	
Co-requisites module	None Complementary requirements unit	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1 -Introducing the student to the subject of statistics and its relationship to other subjects 2 -Introducing the student to the basic concepts of statistics 3 -Introducing the student to measures of central tendency, their characteristics and disadvantages 4 -Introducing the student to measures of dispersion, their characteristics and disadvantages 5 -Introducing the student to simple and multiple correlation between variables 6 -Teaching the student to create statistical tables and calculate the above concepts for them, and graphs
Module Learning Outcomes	1- Teaching the student to deal with data and put it in statistical tables 2-The student will be able to find statistical measures such as the rate, variance, geometric mean, harmonic, and squared data for classified and non-classified

مخرجات التعلم للمادة الدراسية	.data 3-The student will be able to find the median and the mode 4-The student will be able to represent data using graphical forms such as histograms, histograms, and circles 5-The student will be able to read his results by calculating the arithmetic mean, variance, etc. 6- The student's knowledge of the variables and the type of relationship between them, direct or inverse.
Indicative Contents المحتويات الإرشادية	Instructional content includes the following: Chapter one. the introduction. The emergence and development of statistics. Definition of statistics and its application areas. The statistical method in scientific research and the research design method [4 hours] Chapter II. Collect, classify and tabulate data. Data collection method (comprehensive recording, samples). Data collection methods (direct collection, questionnaire) [4 hours] Classification and tabulation of data. Sampling [3 hours] Chapter III. Frequency distributions and data presentation methods. Random variables (discrete and continuous) Quality and quantity). Tabular presentation of data (frequency distribution/relative [frequency distribution) [10 hours Paired frequency distribution/clustered frequency distributions. Geometric display (bar/rectangular/circle/line) (histogram, histogram, polygon) (clustered histograms) Shapes of frequency distributions (symmetric and asymmetric) [6 hours] the fourth chapter. Measures of central tendency. Addition and multiplication symbols. The concept of averages and the purpose of calculating them. Average calculation. Geometric mean. The compromise middle. The square mean and the relationship between them. The mediator and the mode. (Disadvantages and advantages of the

	milieus, medium, and mode). Choosing the appropriate measure of central tendency [6 hours] Chapter V . Measures of dispersion. The concept of dispersion and the purpose of calculating it. Calculate variance. Calculate the standard deviation (for ungrouped and tabulated data). Common variance. Coefficient of variation [6 hours] Relative dispersion coefficients , Simple and multiple linear correlation [6 hours]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy to be adopted in delivering this unit is to encourage students to engage in exercises, while at the same time improving and expanding their critical thinking skills. This will be achieved through interactive classes and tutorials

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
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 التقييم التكويني	**Quizzes**	2	20% (20)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	4 and 12	LO #3, #4 and #6, #7
	Projects / Lab.		10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment التقييم التلخيصي	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Chapter one. the introduction. The emergence and development of statistics. Definition of statistics and its application areas**

Week 2	**The statistical method in scientific research and the research design method**
Week 3	**Chapter II. Collect, classify and tabulate data. Data collection methods (comprehensive registration/sampling). Data collection methods (direct collection/questionnaire). Data classification and tabulation. Selection of samples**
Week 4	**Chapter III. Frequency distributions and data presentation methods. Random variables (discrete and continuous). (Quality, quantity). Tabular display of data (frequency distribution/relative frequency distribution)**
Week 5	**Paired frequency distribution / distributions (clustered frequency). Geometric display (bar graph / rectangle graph / graph circle / line)(histogram. frequency polygon)**
Week 6	**Clustered frequency curves. Forms of frequency distributions (symmetric and asymmetric)**
Week 7	**Chapter Four. Measures of central tendency. Addition and multiplication symbols. The concept of averages and the purpose of calculating them. Arithmetic mean . How to calculate unclassified and classified variables. Defects . Advantages**
Week 8	**The advantages are the geometric mean. Harmonic mean. The square mean. Methods for calculating these averages. Disadvantages and advantages. The relationship between these averages and their relationship with the arithmetic mean**
Week 9	**Mediator . Loom. Calculation method. Defects. Advantages. The relationship with the arithmetic mean. Choosing an appropriate measure of central tendency**
Week 10	**Chapter V. Measures of dispersion. The concept of dispersion. The goal of calculating it**
Week 11	**variance. standard deviation. calculation method . Defects. Advantages. Covariance**
Week 12	**Relative dispersion coefficients. Coefficient of variation. Standard score**
Week 13	**Calculating the variance of classified data. Calculate the standard deviation of tabulated data**
Week 14	**Relative dispersion coefficients**
Week 15	**Simple and multiple linear correlation.**
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	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts النصوص المطلوبة	الإحصاء/د. محمود حسن المشهداني/امير حنا هرمز /جامعه بغداد 2- المدخل إلى الإحصاء/د. خاشع الراوي/ جامعه الموصل 3- Allan G. Bluman/2012 /Elementary	yes
Recommended Texts	1- مبادئ الإحصاء. احمد عبد السميع،دار اليازوري العلمية للنشر، 2008 2- مبادئ الإحصاء. الدكتور طه حسين الزبيدي، دار غيداء للنشر، 2012	No
Websites	https://books-library.net/c-Statistics-download	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performanceأداء مذهل
	B - Very Good	جيد جدا	80 - 89	Above average with some errors فوق المتوسط مع بعض الأخطاء
	C - Good	جيد	70 - 79	Sound work with notable errors العمل السليم مع أخطاء ملحوظة
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings عادل ولكن مع نواقص كبيرة
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria العمل يلبي الحد الأدنى من المعايير
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded مطلوب المزيد من العمل ولكن الائتمان الممنوح
	F – Fail	راسب	(0-44)	Considerable amount of work required قدر كبير من العمل المطلوب

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

Module Information

Module Title	**Arabic Language**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOM 1011**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level		UGI	**Semester of Delivery**		2
Administering Department		OR	**College**	CSM	
Module Leader	م.م. مروة عدنان إسماعيل		**e-mail**	Marwa-Adnan@uomosul.edu.iq	
Module Leader's Acad. Title		Assistant Lecturer	**Module Leader's Qualification**		MSc.
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date		1/02/2025	**Version Number**		1.0

Relation with other Modules

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives	1- Learn about language and its relationship to society 2- The student learns about the functions of language, its characteristics and advantages 3- Learns the difference between bilingualism and linguistic duality 4- The student knows linguistic phenomena in terms of syntax and intonation 5- The student knows the phenomenon of contrast, verbal homonym and synonymy 6- The student knows the phenomenon of alleviation and derivation 7- The student knows the phenomenon of Arabization, coining and generation in Arabic 8- Say and do not say: common mistakes among speakers and writers 9- Know the linguistic triangle of the linguistic term 10- Learn about the sentence that has a place in syntax and that does not have a place in syntax 11- Learn about the history of Arabic dictionaries and the difference between the .source and the reference
Module Learning Outcomes	1- The student learns about the history of the Arabic language and its relationship with other sciences, especially from a societal perspective. 2- The student learns the difference between linguistic duality and bilingualism. 3- Learn how to use linguistic duality and bilingualism in daily life. 4- The student knows the phenomena of the Arabic language. 5- The student learns how the grammatical movement affects the meaning of the word. 6- The student knows the characteristics of Arabic. 7- The student knows the common linguistic errors among speakers. 8- The student knows the Arabic sentence and how to differentiate between sentences that have a place in grammar and those that do not have a place in grammar. 9- The student learns about the history of the Arabic dictionary. 10- Learn about the types of ancient and modern Arabic dictionaries. 11- Know the difference between the source and the reference.

	12- The prose piece helps the student on how to apply linguistic issues to Arabic texts. 13- Learning linguistic skills: developing linguistic taste and improving the style of learners
Indicative Contents	1- Language and its relationship to society [2 hours] 2- Knowledge of language and its functions, 2 hours 3- Recognizing linguistic duality and bilingualism, 2 hours 4- The student's knowledge of the characteristics and advantages of the Arabic language, 2 hours 5- The student's knowledge of the phenomenon of syntax, 2 hours 6- The student's knowledge of the phenomenon of intonation and intonation, 2 hours 7- The student's knowledge of the phenomenon of verbal ambiguity and contrast, 2 hours 8- Recognizing the phenomenon of alleviation and derivation, 2 hours 9- Learning the phenomenon of Arabization, 2 hours 10- Recognizing sculpture in Arabic and its methods, 2 hours 11- Say and do not say: common mistakes among speakers and writers, 2 hours 12- A prose piece, a linguistic and semantic study, 2 hours 13- Recognizing sentences that have a place in syntax and those that do not have a place in syntax, 2 hours Learn about the history of the Arabic dictionary and its types, 2 hours -14

Learning and Teaching Strategies	
Strategies	The main strategy that will be adopted in delivering this unit is to encourage students to participate in speaking and writing Arabic correctly, while at the same time

	improving and expanding their critical thinking skills. This will be achieved through interactive classes and tutorials and by considering the types of simple experiments that include some sampling activities that interest students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
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**	1	10% (10)	5, 10 and 12	LO #1, #2 and #10, #11
	Assignments	2	10% (20)	2,5 and 12	LO #3, #4 and #6, #7
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO #1 - #7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Language and its relationship to society
Week 2	Bilingualism and bilingualism
Week 3	Characteristics and advantages of Arabic
Week 4	Phenomena of the Arabic language
Week 5	The phenomenon of intonation
Week 6	The phenomenon of verbal homonym
Week 7	Review and exam
Week 8	The phenomenon of derivation and synonymy
Week 9	The phenomenon of alleviation, Arabization and coining
Week 10	An applied study of a prose piece
Week 11	Linguistic issues Say and do not say
Week 12	The linguistic triangle
Week 13	An analytical image of poetic verses
Week 14	The Arabic sentence
Week 15	**The dictionary in Arabic**
Week 16	**End of semester exam**

Learning and Teaching Resources

مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Bin Dharel, Adnan, "Language and Style: A Study," Second Edition, 2006	No
Recommended Texts	Bahri, Saeed Hassan, "The Basis of Arabic Linguistics," 2000	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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية		
Module Title	**Computer course 1**	**Module Delivery**
Module Type	**Core**	☒ **Theory** ☒ **Lecture**
Module Code	**UOM1031**	

ECTS Credits	**3**			☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
SWL (hr/sem)	**100**				
Module Level		**1**	**Semester of Delivery**		2
Administering Department		**OR**	**College**		**CMS**
Module Leader	**هند طلعت ياسين**		**e-mail**		hindtalaat48@uomosul.edu.iq
Module Leader's Acad. Title		Assistant lecturer	**Module Leader's Qualification**		**M.D.**
Module Tutor	Name (if available)		**e-mail**		E-mail
Peer Reviewer Name		Name	**e-mail**		E-mail
Scientific Committee Approval Date		**6/1/2025**	**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 Objectives أهداف المادة الدراسية	1. Understand the basic concepts of computers, including hardware and software. 2. Identify and effectively use computer components and peripherals. 3. Develop skills in operating systems and graphical user interfaces (GUI). 4. Master creating and formatting documents using word processing software. 5. Learn to create and analyze data using spreadsheet applications. 6. Enhance skills in designing professional presentations. 7. Gain knowledge of internet basics and effective web browsing. 8. Strengthen email communication skills for personal and collaborative use. 9. Familiarize with cloud computing services and their applications. 10. Improve productivity and efficiency through modern technical tools.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Comprehensive understanding of computer concepts and components. 2. Ability to connect and configure input/output devices with the CPU. 3. Proficiency in using operating systems and graphical interfaces. 4. Capability to create and format professional documents. 5. Skill in managing and analyzing data using spreadsheets. 6. Competence in creating interactive and visually appealing presentations. 7. Effective use of the internet for research and networking. 8. Efficient management of email accounts and document sharing. 9. Hands-on experience with cloud-based tools like Google Workspace and Office 365. 10. Enhanced technical proficiency for increased productivity.
Indicative Contents المحتويات الإرشادية	1. **Introduction to Computers**: Definition of computers and their components (hardware and software), and connecting peripherals to the CPU. 2. **Computer Components**: Basic components of a computer like the CPU and types of memory. 3. **Operating Systems and User Interface**: Working with common operating systems and using graphical user interfaces (GUI). 4. **Word Processing**: Creating and formatting documents using software like Microsoft Word. 5. **Spreadsheets**: Using software like Excel to analyze data and create pivot tables. 6. **Presentations**: Designing presentations using PowerPoint with added effects and transitions. 7. **Internet and Web Browsers**: Using the internet, web browsers, and search engines. 8. **Email**: Sending and receiving emails, and collaborating on documents.

	9. **Cloud Computing**: Using cloud applications such as Google Workspace and Office 365.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	تتمثل الإستراتيجية الرئيسية التي سيتم اعتمادها في تقديم هذه الوحدة في تشجيع مشاركة الطلاب في التمارين، وفي الوقت نفسه تحسين وتوسيع مهارات التفكير النقدي لديهم. وسيتم تحقيق ذلك من خلال الفصول الدراسية والبرامج التعليمية التفاعلية باستخدام استراتيجيات وأساليب التدريس المناسبة والوسائل التعليمية لتنمية مهارات التفكير.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	• **Introduction to Computer:** Concepts of Hardware and Software with their components; Concept of Computing, Data and Information; Connecting input/output devices, and peripherals to CPU.
Week 2	• **Computer Components:** Computer Portions, Hardware Parts, I/O Units, Memory Types.
Week 3	• **Computer Components (Cont.):** Basic CPU Components, Computer Ports, Personal Computer, Personal Computer (Features and Types)
Week 4	• **Operating System and Graphical User Interface GUI:** Operating System; Basics of Common Operating Systems; The User Interface, Using Mouse Techniques.
Week 5	• **Operating System and Graphical User Interface GUI(Cont**.): Use of Common Icons, Status Bar, Using Menu and Menu-selection, Concept of Folders and Directories, Opening and closing of different Windows; Creating Short cuts.
Week 6	• **Word Processing:** Word Processing Basics; Basic Features of Word Processors, Opening and Closing of documents, Text creation and Manipulation; Formatting Text and Paragraphs, Using Templates for Document Creation.
Week 7	• **Word Processing (Cont.)**: Creating and Managing Tables, Utilizing Styles and Themes, Spell Check and Grammar Tools, Using Headers and Footers.
Week 8	• **Mid-exam** • **Spread Sheet:** Introduction to Spreadsheet Software, Creating and Formatting Worksheets. Sorting and Filtering Data, Using Formulas and Functions.
Week 9	• **Spread Sheet (Cont.):** Using Formulas and Functions, Using Pivot Tables for Data Analysis, Data Validation and Error Checking, Data Visualization: Creating Charts and Graphs.

Week 10	• **Presentation Software**: Introduction to Presentation Software, Overview of Popular Presentation Tools, creating a New Presentation, Using Templates and Themes, Inserting and Formatting Text and Images, Transition and Animation Effects.
Week 11	• **Presentation Software (Cont.):** Using Speaker Notes and Timers,, Advanced Features: Hyperlinks and Action Buttons, Troubleshooting Common Presentation Issues, Future Trends in Presentation Technology.
Week 12	• **Introduction to Internet and Web Browsers:** Computer networks Basic; LAN, WAN; Concept of Internet and its Applications; connecting to internet.
Week 13	• **Introduction to Internet and Web Browsers (Cont.):** World Wide Web; Web Browsing software's, Search Engines; Understanding URL; Domain name; IP Address.
Week 14	• **Communications and Emails:** Basics of electronic mail; getting an email account; Sending and receiving emails; Accessing sent emails; Using Emails; Document collaboration.
Week 15	• **Introduction to Cloud Computing and Services:** Definition of Cloud Computing and its concept, Cloud-Based Office Suites (Office 365 and Google Workspace), Google Docs, Google Sheets, Google Drive, Google Meet.
Week 16	• Comprehensive review of all topics.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Lab 1	تطبيقات على برنامج Word
Lab 2	تطبيقات على برنامج Excel
Lab 3	تطبيقات على برنامج Power point
Lab 4	تطبيقات على البريد الاليكتروني

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**كتاب: "أساسيات الحاسوب" المؤلف:** الخضر علي الخضر بحاث	Yes

	كتاب: "تطبيقات الاكسل" المؤلف :الخضر علي الخضر بحاث	
Recommended Texts	كتاب اوفيس (Word2016- Excel 2016- Access2016- PowerPoint 2016 (2016 المؤلف:وفاء أحمد ناجي	Yes
Websites	https://www.youtube.com/watch?v=Olm22l7gae4&list=PLZZdF7TtQ_kpNyAsll5YvINc-i_RhPnbX https://www.youtube.com/watch?v=SxmL1U3oc-A&list=PLZZdF7TtQ_kpNyAsll5YvINc-i_RhPnbX&index=2 https://www.youtube.com/watch?v=2Yvxp9N6w6I&list=PL0jjySeobjbKKKsDTxxqAowWcYp1QkcbN	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	أداء مذهل
	B - Very Good	جيد جدا	80 - 89	فوق المتوسط مع بعض الأخطاء
	C - Good	جيد	70 - 79	عمل سليم مع وجود أخطاء ملحوظة
	D - Satisfactory	متوسط	60 - 69	عادلة ولكن مع اخطاء كبيرة
	E - Sufficient	مقبول	50 - 59	العمل يلبي الحد الأدنى من المعايير
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	مطلوب المزيد من العمل ولكن لكي يحقق الحد الادنى
	F – Fail	راسب	(0-44)	فشل في الاداء مطلوب كمية كبيرة من العمل

ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن 0.5 إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة 54.5 إلى 55، في حين سيتم تقريب علامة 54.4 إلى 54. لدى الجامعة سياسة عدم التغاضي عن "فشل التمريرة القريبة" وبالتالي فإن التعديل الوحيد للعلامات الممنوحة بواسطة العلامة (العلامات) الأصلية سيكون التقريب التلقائي الموضح أعلاه.

Semester Three

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Integer & Dynamic Programming**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**OR201**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	**2**	**Semester of Delivery**	3		
Administering Department	**OR**	**College**	CSM		
Module Leader	Dr.Mohammed Ahmed Alkailany	**e-mail**	**alkailanym@uomosul.edu.iq**		
Module Leader's Acad. Title	**Lecture**	**Module Leader's Qualification**	Ph.D.		
Module Tutor	Name (if available)	**e-mail**	E-mail		
Peer Reviewer Name	Lamyaa Jasim Mohammed	**e-mail**	lomuaajasem@uomosul.edu.iq		
Scientific Committee Approval Date	2/02/2025	**Version Number**	1.0		

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Operation Research	**Semester**	2
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This course aims to introduce students to how to solve integer and dynamic programming models, through different methods of solving and how to deal with time in dynamic models .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 learning outcomes, ideally equal to the number of weeks of study. 1- The student writes some terms 2- The student describes the model 3- To distinguish between the models 4- To explain the mathematical formula to the student 5- The student summarizes the steps for solving the mathematical formula 6- The student presents a problem from reality 7- That the student compare the methods of solution 8- To rearrange the solution method 9- To plan how to use the appropriate method in the solution 10- The student applies the model to a realistic situation 11- The student reveals the error in the form. 12- The student should schedule the results

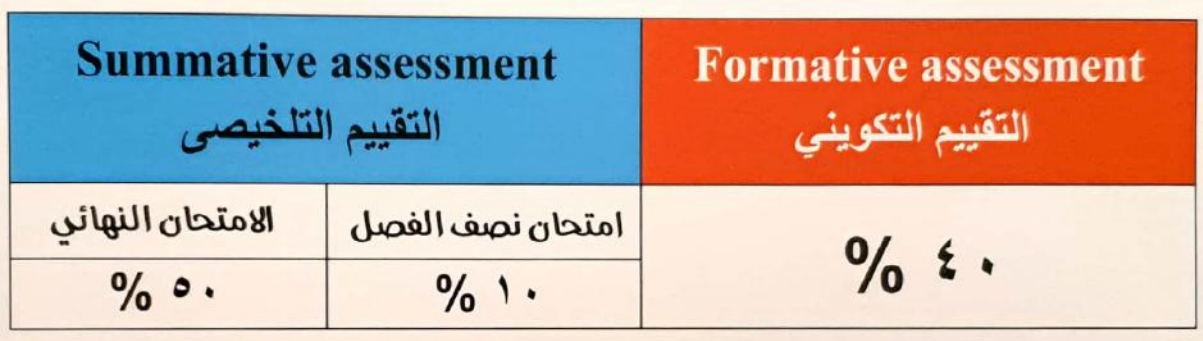
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Chapter (1): Illustrative Applications of Integer Programming [40 hours] Dichotomies Solution Methods of Integer Programming Branch – and – Bound Algorithm Cutting – Plane Algorithms The Fractional (Pure Integer) Algorithm The Mixed Algorithm Zero – One Polynomial Programming Chapter (2) Dynamic (Multistage) Programming [35 hours] Elements of the DP Model : The Capital Budgeting Example DP Model Backward Recursive Equation More on the Definition of the state Examples of DP Models and Computations Problem of Dimensionality in Dynamic Programming Solution of Linear Programs by Dynamic Programming Backward Recursive Equation

Learning and Teaching Strategies استراتيجيات التعلم والتعليم

Strategies	1- Determine the scientific concepts and principles that will be learned and put forward in the form of a question or problem. 2- Preparing the educational materials needed to implement the lesson. 3- Formulating the problem in the form of sub-questions so as to develop the skill of imposing assumptions among the learners 4- Determine the discovery activities or experiments that the learners will carry out. 5- Evaluate learners and help them apply what they have learned in situations

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment التقييم التكويني	**Quizzes**	3	15% (15)	5 and 10	LO #1, #2 and #10, #11
	Assignments	3	15% (15)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.				
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment التقييم التلخيصي	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		



Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Illustrative Applications of Integer Programming**
Week 2	Dichotomies
Week 3	Solution Methods of Integer Programming
Week 4	Branch – and – Bound Algorithm
Week 5	Cutting – Plane Algorithms
Week 6	The Fractional (Pure Integer) Algorithm
Week 7	The Mixed Algorithm
Week 8	Zero – One Polynomial Programming
Week 9	**Chapter (2) Dynamic (Multistage) Programming** Elements of the DP Model : The Capital Budgeting Example
Week 10	DP Model
Week 11	Backward Recursive Equation
Week 12	More on the Definition of the state
Week 13	Examples of DP Models and Computations
Week 14	Problem of Dimensionality in Dynamic Programming
Week 15	Solution of Linear Programs by Dynamic Programming
Week 16	Backward Recursive Equation
Delivery Plan (Weekly Lab. Syllabus)	

المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts النصوص المطلوبة	Operation Research (2011) Gupta	Yes
Recommended Texts	Hamdy A. Taha , "Operations Research" *University* of *Arkansas, Fayetteville*	No
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performanceأداء مذهل
	B - Very Good	جيد جدا	80 - 89	Above average with some errors فوق المتوسط مع بعض الأخطاء
	C - Good	جيد	70 - 79	Sound work with notable errors العمل السليم مع أخطاء ملحوظة
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings عادل ولكن مع نواقص كبيرة
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria

				العمل يلبي الحد الأدنى من المعايير
Fail Group **(0 – 49)**	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded مطلوب المزيد من العمل ولكن الائتمان الممنوح
	F – Fail	راسب	(0-44)	Considerable amount of work required قدر كبير من العمل المطلوب

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	**Probability Theory (1)**	**Module Delivery**	
Module Type	**Core**	☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**OR202**		
ECTS Credits	**6**		
SWL (hr/sem)	**150**		
Module Level	**UGII**	**Semester of Delivery**	**3**

Administering Department		**OR**	**College**	**CSM**	
Module Leader	**Saifuldeen Dh. Saeed Alrefaee**		**e-mail**	**Saifldeen.alrefaee@uomosul.edu.iq**	
Module Leader's Acad. Title		**lecturer**	**Module Leader's Qualification**		**M.Sc.**
Module Tutor	**Salih Muayad Shakir**		**e-mail**	**Salih.mooaed@uomosul.edu.iq**	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		1/02/2025	**Version Number**	1.0	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	Probability Theory (2)	**Semester**	4

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1- Grasp the set theory fundamentals: Learn subsets, complements, unions, intersections, and set partitioning. Explore theorems and proofs for deeper understanding. 2- Developing the student's abilities on counting methods to reach sets theory as well as the binomial expansion law. 3- Acquire probability theory knowledge: Introduce concepts like sample space, events, and connections to random experiments. Explore Classical and Axiomatic approaches and utilize tools for understanding the events. 4- Realization of conditional probability and axioms: Learn theoretical foundations, practical calculations, and their application in problem-solving. 5- Explore Bayes' theory and applications: Introduce valuable tools for advanced probability work and real-world utilization.

	6- Provide a solid foundation for advanced work on probability and its applications, and is essential to understanding many applied fields. Overall, the objectives of this module include building a strong foundation in set theory, developing proficiency in combinatorics and probability, and introducing advanced topics like conditional probability and Bayes' theory.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Understand the basic concepts of probability and its relationship with set theory. 2- Apply fundamental theorems in probability theory to solve problems. 3- Identifying the counting methods in determining the sample space of the set's theory as well as the expansion theory 4- Understand the concept of random experiments and their role in probability theory. 5- Define sample space and events and their relevance to probability calculations. 6- Differentiate between different kinds of probability, such as classical, empirical, and subjective. 7- Calculate probabilities based on defined events within a sample space. 8- Understand and apply the axioms of probability to solve problems. 9- Analyze and determine the independent and non-independent events in probability calculations. 10- Identify conditional probability and build models and laws for any experiment. 11- Apply Bayes' theorem to calculate probabilities in situations involving conditional events. 12- Building a basic base for the student to move to the future stages of subjects in which probability theory is a basis.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: <u>Part A - Set Theory and Counting Methods</u> Basic set theory - Definition of subsets, complements, difference, union, intersection, and the partition of the set - Some fundamental theorems (with proofs) - Sequences and limits - Definition of the union and intersection for an arbitrary number of sets, De Morgan's theory and lemma with proof Convergent sequences of sets and Definition and examples [15 hrs.] Techniques of Counting and Tree Diagram - Fundamental principle of counting - Arrangements Method, Permutation Method, and Combinations Method - Multinomial expansion with theorem [15 hrs.]

	Binomial Theorems and Theorems combination - Probability and Random Experiment - Definitions of random experiments, sample space, and events [15 hrs.] Part B - Probability Theory and Conditional Probability kinds of Probability and the First Law of Probability (Classical approach) - Probability defined on events - Some theories in the Axiomatic Approach of Probability – Some examples on dice, coins, and playing cards - theories, and proofs of independent events [15 hrs.] Definitions of Conditional Probability and its axioms - Conditional Probability and how to calculate it- Definitions and remarks - Bayes' law, Bayes' theory and its applications [15 hrs.]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in introducing this unit is to encourage students to participate in the exercises while improving and expanding their critical thinking skills at the same time by getting acquainted with the theory of probability, in the first part and developing the student's mind. This will be achieved through classes and interactive educational programs to learn about sets theory and counting methods for it, and through learning about the random experiment and sample space in forming sets, as well as using basic probabilistic laws in application in its various forms, which will be the basis for the student for his future stages.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem)	72	**Unstructured SWL (h/w)**	5

الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	20% (20)	5 and 11	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	4 and 12	LO #3, #4 and #6, #7
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	8	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	Introduction of the Probability and Basic set theory.
Week 2	Basic Set theory, definitions of set theory.

Week 3	Some Fundamental Theorems, Fundamental laws of set theory with theorems.
Week 4	Sequence and limits, with theorems.
Week 5	Field, σ-Field, and Power of the set + Quiz.
Week 6	Techniques of Counting, Tree Diagrams, and Arrangement
Week 7	Techniques of Counting, Permutations.
Week 8	Mid-term Exam + Techniques of Counting, Combinations with theorems.
Week 9	Combinations and Binomial theorem and Multinomial Expansion.
Week 10	Probability Introduction, Random Experiment, Events Kinds, Sample Space, and Probability a law.
Week 11	Axiomatic Approach of Probability + Quiz.
Week 12	Probabilistic models according to the basic laws of set theory with theorems.
Week 13	Independent events, Conditional Probability.
Week 14	Conditional Probability, Bayes' law, and Bayes' Theorem
Week 15	Applications of Bayes' Theorem.
Week 16	**Preparatory week before the Final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	There are no laboratories
Week 2	There are no laboratories
Week 3	There are no laboratories
Week 4	There are no laboratories
Week 5	There are no laboratories
Week 6	There are no laboratories

Week 7	There are no laboratories

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1- 1-Introduction to probability theory, Dr. Dhafir H. Rasheed,1999,2-nd edition, Baghdad University 2- 2-probability, Dr.kubais S. A Fahady Dr. Pirlanty J. Shamoon, Ministry of Higher Education and Scientific Research University of Mosul	Yes
Recommended Texts	3- A first course in probability, Sheldon Ross, 2010, Eighth edition. 4- Probability, scheme series	No
Websites	https://www.coursera.org/learn/probability-theory-foundation-for-data-science? https://www.khanacademy.org/math/statistics-probability	

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	**numerical Analysis (1)**			**Module Delivery**	
Module Type	**Basic**			☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**OR203**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	**UGII**		**Semester of Delivery**	**3**	
Administering Department	**OR**		**College**	**CSM**	
Module Leader	**Name: د. زينب توفيق حامد**		**e-mail**	**E-mail zainab.tawfeek @uomosul.edu.iq**	
Module Leader's Acad. Title	**lectuer**		**Module Leader's Qualification**	**Master's**	
Module Tutor	**م. اسماء عبدالمنعم عبدالله**		**e-mail**	**E-mail asmaa.abd@uomosul.edu.iq**	
Peer Reviewer Name			**e-mail**	**E-mail**	
Scientific Committee Approval Date	**1/02/2025**		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	numerical Analysis (2)	**Semester**	4

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1- To enable the student to understand the subject of numerical analysis and its uses 2- To clarify the types of numerical errors 3- 3- To facilitate the solution of linear differential equations in different ways 4- 4- To facilitate the solution of non-linear equations using numerical methods. 5- 5- To compare the analytical solution with the numerical solution of differential equations 6- 6- To learn how to apply programming to numerical methods
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	هام: اكتب 6 مخرجات تعليمية على الأقل ، ومن الأفضل أن تكون مساوية لعدد أسابيع الدراسة. 1. Identify the types of errors and how to derive them. 2. Use simple methods in numerical solution, such as drawing. 3. Use the sign change method to solve the differential equation. 4. Use simple Newton-Raphson methods in the solution. 5. Use the Newton-Raphson method to solve nonlinear equations. 6. Find the value of the root using the Newton-Raphson method. 7. Find the reciprocal of a number using Newton Raphson's method.
Indicative Contents	يتضمن المحتوى الإرشادي ما يلي.

المحتويات الإرشادية	Part A - Sources of errors Data errors, mathematical model errors, rotation and truncation errors. [5 hours] Approximations, approximations of decimal numbers, rounding of integers. [5 hours] Types of errors, mathematical operations on errors [5 hours] Definition of numerical analysis, the main steps of all numerical analysis methods, solving linear and nonlinear equations by numerical analysis methods. [5 hours] Learn about writing algorithms and flowcharts for numerical methods [5 hours] Part B - Using practical methods or formulas to find the solution to a specific mathematical problem Numerical iterative methods for solving nonlinear equations, explaining each method with algorithm, flowchart, and numerical solution. [50 hours]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy to be adopted in delivering this unit is to encourage students to engage in exercises, while at the same time improving and expanding their critical

	thinking skills. This will be accomplished through interactive classes and educational programs and by considering the types of computer programs that benefit the student.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment التقييم التكويني	**Quizzes**	3	15% (15)	4,8 and 10	LO #1, #2 and #5, #6
	Assignments	1	5% (5)	6	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #2, #4and #6
Summative assessment	**Midterm Exam**	2hr	10% (10)	8	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All

التقييم التلخيصي					
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to numerical analysis, sources of errors, circular cutting error, turning and cutting error
Week 2	Rounding decimal numbers using rotation, rounding integers, types of errors
Week 3	Absolute error, relative error, mathematical operations on errors, comprehensive and diverse examples of the above.
Week 4	Solving nonlinear equations using iterative methods, methods for finding the initial point of any nonlinear equation, drawing method
Week 5	change the sign method (algorithm - flow chart - practical example - practical program in Mathlab language)

Week 6	Numerical iterative methods for solving nonlinear equations - bisection method (method algorithm - flow chart - applied example - practical program)
Week 7	Mid-term Exam
Week 8	Iteration and repetition method (solid point method) ((Method algorithm - Flow chart - Practical example - Practical program in Mathlab language) Electronic lecture
Week 9	False position method (method algorithm - flow chart - applied example - practical program in Mathlab language)
Week 10	- Newton Raphson's method for solving a nonlinear equation (algorithm - flow chart - practical example - practical program in Mathlab language)
Week 11	Disadvantages of Newton-Raphson method - Finding the square root using Newton Raphson (practical examples, practical program in Mathlab language)
Week 12	The general law for finding the reciprocal of a number using Newton Raphson (practical examples, practical program in Mathlab language)

Week 13	Finding the nth root using Newton Raphson (practical examples, practical program in Mathlab language)
Week 14	Hornes method for solving nonlinear polynomial equations
Week 15	**Solutions to the problems for the numerical methods above**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Mathlab programs and a review of functions and circuits
Week 2	Programming the method of changing the signal, and the bisection method
Week 3	Solid point method programming
Week 4	Programming the false position method
Week 5	Newton-Raphson method programming

Week 6	Programming the reciprocal method using the Newton-Raphson method
Week 7	Programming a method to find the nth root of any positive real number using Newton-Raphson's method

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts النصوص المطلوبة	حسن مجيد حسون الدلفي و محمود عطا الله مشكور"التحليل الهندسي والعددي التطبيقي".	Yes
Recommended Texts	Fast algorithms for solving a system of linear equations Math and logic	No
Websites	https://www.bacldung.com/cs/category/core-concepts/math-logic)	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performanceأداء مذهل
	B - Very Good	جيد جدا	80 - 89	Above average with some errors فوق المتوسط مع بعض الأخطاء

	C - Good	جيد	70 - 79	Sound work with notable errors العمل السليم مع أخطاء ملحوظة
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings عادل ولكن مع نواقص كبيرة
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria العمل يلبي الحد الأدنى من المعايير
Fail Group **(0 – 49)**	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded مطلوب المزيد من العمل ولكن الائتمان الممنوح
	F – Fail	راسب	(0-44)	Considerable amount of work required قدر كبير من العمل المطلوب

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	**المسائل التتابعية**	**Module Delivery**
Module Type	**Core**	☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial**
Module Code	**OR204**	
ECTS Credits	**5**	

SWL (hr/sem)	**125**	☐ **Practical** ☐ **Seminar**	
Module Level	**4**	**Semester of Delivery**	3
Administering Department	OR	**College**	CSM
Module Leader	**Niam Abdulmunim Abdulmajeed Al-Thanoon**	**e-mail**	**niam.munim@uomosul.edu.iq**
Module Leader's Acad. Title	**Assistant Professor**	**Module Leader's Qualification**	**Ph.D.**
Module Tutor	**د. زهراء عبد العزيز**	**e-mail**	zahraaalnuaimi2019@uomosul.edu.iq
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date	**1/02/2025**	**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 Objectives أهداف المادة الدراسية	1) Identify sequential problems and their concepts, the scheduling problem and its types, scheduling criteria, and the most important scheduling problems for single-machine problems and parallel machines, the multi-processor task, open workshops, the flow workshop, business workshops, and scheduling resource-constrained projects, in addition to the important optimization and scheduling algorithms used in operations research.

	2) Use scheduling to schedule operations to provide a general estimate of the production process over time. 3) Control the planning method when scheduling forward or backward starting from a specific date. 4) Improving resource utilization by scheduling production operations according to resource capacity To provide the required materials. 5) Obtain sufficient training in formulating sequential problems, various scheduling, and algorithms to solve these problems. 6) Presenting many real-life problems that can be formulated, such as sequential and tabulation problems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	هام: اكتب 6 مخرجات تعليمية على الأقل ، ومن الأفضل أن تكون مساوية لعدد أسابيع الدراسة. 1. Students can learn about scheduling and sequencing problems. 2. Students are able to deal with sequencing problems. 3. Students can deal with scheduling problems. 4. Identify the optimization and scheduling algorithms used for machine and workshop scheduling problems. 5. Recognize the importance of scheduling problems and algorithms in solving practical problems in industry and production. 6. Modeling scheduling and sequencing problems. 7. Enabling the student to write and understand algorithms, solve problems, interpret results, and be able to make the optimal decision in using scheduling algorithms and applying them in real life. 8. Keeping pace with developments in the field of specialization. 9. The use of different types of algorithms that solve scheduling problems and how to develop and improve them.
Indicative Contents المحتويات الإرشادية	يتضمن المحتوى الإرشادي ما يلي. Part A - Basic concepts, types of scheduling, scheduling criteria, The resource-constrained project scheduling problem. Part B - Machine Scheduling problems, Single Processor Scheduling Algorithms, Multiprocessor (Parallel) Scheduling Algorithms

	Part C - Shop Scheduling, Flow Shop Scheduling, Johansen Algorithm for n/2/F//F_{max} Problem, Open Shop Scheduling, Multiprocessor Job Scheduling

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	الإستراتيجية الرئيسية التي سيتم تبنيها في تقديم هذه الوحدة هي تشجيع الطلاب على المشاركة في التمارين ، مع تحسين مهارات التفكير النقدي وتوسيعها في نفس الوقت. سيتم تحقيق ذلك من خلال الفصول والبرامج التعليمية التفاعلية ومن خلال النظر في أنواع التجارب البسيطة التي تتضمن بعض أنشطة أخذ العينات التي تهم الطلاب.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment التقييم التكويني	Quizzes	6	30% (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.			Continuous	All
	Report			13	LO #5, #8 and #10
Summative assessment التقييم التلخيصي	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Sequencing problems, sequence, scheduling, Directed Acyclic Graph Model, homogeneous and heterogeneous processors, types of scheduling, scheduling criteria
Week 2	The resource-constrained project scheduling problem with examples
Week 3	Machine scheduling, basic concepts, machine scheduling problems
Week 4	Single machine (processor) scheduling algorithms ,First Come First Server Scheduling Algorithm Short Job First Scheduling algorithm
Week 5	Priority Scheduling Algorithm , Round Robin Scheduling Algorithm
Week 6	Earliest Due Date Scheduling Algorithm , Moore's Algorithm
Week 7	Parallel Machine Scheduling
Week 8	Multi-machine (multiprocessor) scheduling algorithms, Independent Jobs scheduling algorithms Longest Processing Time Scheduling Algorithm
Week 9	Shortest Processing Time Scheduling Algorithm
Week 10	Multiprocessor Scheduling Algorithms With Out Communication Cost

	Highest Level First With Estimated Time) Scheduling Algorithm
Week 11	Smallest Co – Level First With Estimated Time Scheduling Algorithm CP/ MISF (Critical Path/ Most Immediate Successors First) Scheduling Algorithm
Week 12	Shop Scheduling Flow Shop Scheduling
Week 13	Johansen's algorithm for the n/2/F//F_{max} problem
Week 14	Open Shop Scheduling
Week 15	Multi-Processor task Scheduling
Week 16	A week of preparation before the final exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts النصوص المطلوبة	.Lectures prepared by the lecturer (1 2) Kenneth R. Baker and Dan Trietsch,2018, Principles of Sequencing and Scheduling, Second Edition, John Wiley & Sons, Inc.	Yes No

	3) P.K. Gupta & D.S.Hira,2008,Operations Research, S.Chand & Company Ltd. New Delhi.	Yes
Recommended Texts	1) S. French , 1981,Sequencing and Scheduling: An Introduction to the Mathematics of the Job-Shop. 2) P.Bruker,2006,Complex Scheduling, Springer, Germany. 3) P.Bruker,2007, Scheduling Algorithms, Springer, Germany.	No
Websites	https://www.youtube.com/watch?v=pGRZ8laY-2U https://www.youtube.com/watch?v=o418t7kcOb8	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performanceأداء مذهل
	B - Very Good	جيد جدا	80 - 89	Above average with some errors فوق المتوسط مع بعض الأخطاء
	C - Good	جيد	70 - 79	Sound work with notable errors العمل السليم مع أخطاء ملحوظة
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings عادل ولكن مع نواقص كبيرة
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria العمل يلبي الحد الأدنى من المعايير
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded مطلوب المزيد من العمل ولكن الائتمان الممنوح
	F – Fail	راسب	(0-44)	Considerable amount of work required قدر كبير من العمل المطلوب

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	**Differential equations**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**OR205**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	**UGII**		**Semester of Delivery**	**3**	
Administering Department	OR		**College**	**CSM**	
Module Leader	**Manal Salim Hamdi**		**e-mail**	**E-mail manalsalim@uomosul.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	**1/02/2025**		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Calculus (2)	**Semester**	2
Co-requisites module	Supplementary requirements unit	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Enabling the student to recognize the types of differential equations. 2. To have an excellent tool to feel the close relationship between pure mathematics and the physical or engineering sciences. 3. This course deals with the basic concepts of differential equations 4. This is the fundamental topic of all scientific branches 5. Interpreting some laws of natural phenomena and working to solve their problems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Identify the types of differential equations. 2. Re-explaining integration methods because they have a fundamental role in solving differential equations 3. Identify the types of solutions used in differential equations. 4. Discuss the methods of solving differential equations according to each type. 5. Identify each type of equation according to its rank and degree 6. Identify the use of solving equations in applied aspects such as electrical, physical, and chemical.
Indicative Contents المحتويات الإرشادية	Instructional content includes the following. Part A - Theory of Differential Equations Definition of differential equations mathematically as well as their form, methods of integration, types of differential equations, clarifying the definition of the order and degree of equations as well as their type, linear or not, how is this proven to solve the differential equation. [15 hours] If the solution is found, how can the differential equation be found? Find a solution to the differential equation. Learn about the types of solutions. [10 hours]

	Using methods for solving equations according to the conditions available in differential equations (separable, homogeneous, complete, incomplete, linear, Bernoulli) as well as other methods . [15 hours] Review Problem Categories [4 hours] Part B - Analog Electronics It includes everything related to the previous topics, such as assignments and discussion of finding the solution to each type of differential equation. [15 hours]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy to be adopted in delivering this unit is to encourage students to engage in exercises, while at the same time improving and expanding their critical thinking skills. This will be accomplished through interactive classes and tutorials and by looking at types of simple experiments that include some sampling activities of interest to students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment التقييم التكويني	**Quizzes**	2	20% (10)	6 and 9	LO #1, #2 and #10, #11
	Assignments	2	5% (5)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	0	0)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment التقييم التلخيصي	**Midterm Exam**	2hr	10% (10)	14	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	Review of Integration Laws
Week 2	Examples of these laws
Week 3	Methods of Integration (First Method) Partial
Week 4	Examples of the Partial Method
Week 5	Examples of the Second Method, Rational and Radical
Week 6	Daily Test
Week 7	Definition of Differential Equations (Degree and Order)
Week 8	General Solution and Particular Solution
Week 9	Proof of the Solution for the Differential Equation
Week 10	Daily Test
Week 11	Differential Equations (Separable) and Homogeneous Differential Equations
Week 12	Exact Differential Equations
Week 13	Inexact Differential Equations
Week 14	Midterm Exam
Week 15	Linear Differential Equations
Week 16	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts النصوص المطلوبة		
Recommended Texts	Parmanand Gupta,Differential equations and Differential geometry,(2008)	No
Websites	https://link.springer.com/book/10.1007/978-3-319-45261-6	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	Excellence	90 - 100	Outstanding Performance أداء مذهل
	B - Very Good	very good	80 - 89	Above average with some errors فوق المتوسط مع بعض الأخطاء
	C - Good	good	70 - 79	Sound work with notable errors العمل السليم مع أخطاء ملحوظة
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings عادل ولكن مع نواقص كبيرة
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria العمل يلبي الحد الأدنى من المعايير
Fail Group (0 – 49)	**FX –** Fail	Deposit (in process)	(45-49)	More work required but credit awarded مطلوب المزيد من العمل ولكن الائتمان الممنوح
	F – Fail	Failed	(0-44)	Considerable amount of work required قدر كبير من العمل المطلوب

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

Module Information

Module Title	Crimes of the Former Ba'ath Regime in Iraq	Module Delivery
Module Type	Basic	☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	UOM2050	
ECTS Credits	4	
SWL (hr/sem)	50	

Module Level	UGI	Semester of Delivery	3
Administering Department	OR	College	CSM
Module Leader	م.د . محمود مال الله قنبر	e-mail	Mahmood.knbr@uomosul.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	MSc.
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	1/02/2025	Version Number	1.0

Relation with other Modules

Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives	1- Raising awareness among the current generation about the crimes of the Ba'ath regime and the dangers of dictatorial systems on nations and people. 2- Helping students learn about an important period in modern Iraqi history. 3- Teaching students the difference between the advantages of a democratic system and the crimes of a dictatorial regime. 4- Educating students about different types of international and local crimes, as well as societal crimes. 5- Informing students about the mass grave crimes in Iraq, which are among the worst types of international crimes. 6- Teaching students about the methods of torture and oppression used by the regime against significant segments of the Iraqi population. 7- Highlighting the issue of environmental and radioactive pollution, which contributed to the destruction of Iraq's environment due to the policies of the Ba'ath regime. 8- Exploring the most important decisions of the Iraqi Special Tribunal against the symbols of the former regime. 9- Shedding light on crimes that had a significant impact on Iraq and the region, such as the burning of oil wells and the draining of the marshes. Learning about the types and locations of secret prisons and the crimes that -10 ..occurred within them
Module Learning Outcomes	1- The student learns about the history of the Arabic language and its relationship with other sciences, especially from a societal perspective. 2- The student learns the difference between linguistic duality and bilingualism. 3- Learn how to use linguistic duality and bilingualism in daily life. 4- The student knows the phenomena of the Arabic language. 5- The student learns how the grammatical movement affects the meaning of the word. 6- The student knows the characteristics of Arabic. 7- The student knows the common linguistic errors among speakers. 8- The student knows the Arabic sentence and how to differentiate between sentences that have a place in grammar and those that do not have a place in grammar.

	9- The student learns about the history of the Arabic dictionary. 10- Learn about the types of ancient and modern Arabic dictionaries. 11- Know the difference between the source and the reference. 12- The prose piece helps the student on how to apply linguistic issues to Arabic texts. 13- Learning linguistic skills: developing linguistic taste and improving the style of learners
Indicative Contents	1. *The Definition of Crime Linguistically and Terminologically According to the Humanities* (4 hours) 2. *Student Understanding of Crime and Its Types* (4 hours) 3. *Crimes Committed by the Baathist Regime According to the Decisions of the Iraqi Criminal Court* (4 hours) 4. *Student Knowledge of the Details of the Dujail Massacre, the Execution of Iraqi Merchants, and the Shaaban Intifada* (4 hours) 5. *Student Knowledge of the Crime of Displacing the Feyli Kurds and the Anfal Operations* (4 hours) 6. *Student Knowledge of the Crime of Using Chemical Weapons Against the Defenseless Population in Halabja* (4 hours) 7. *Student Knowledge of Environmental Pollution Crimes in Iraq, Particularly Radiation Pollution in Southern Iraq* (4 hours) 8. *The Crime of Landmine Proliferation and Victims of Explosive Ordnance Stockpiles in the Country* (4 hours) 9. *The Crime of Draining the Marshes and Wetlands in the Country, and the Destruction of Palm Groves and Crops* (4 hours) 10. *Identifying Secret Prisons and Their Locations* (4 hours) 11. *Mass Graves, Their Locations, and the Categories of Victims* (4 hours) 12. *Ethnicities, Religious Sects, and Social Groups That Suffered Injustice* (4 hours) 13. *The Dangers of Dictatorial Regimes and the Advantages of Democratic Systems* (4 hours)

Learning and Teaching Strategies	
Strategies	he main strategy that will be adopted in delivering this module is to raise cultural and psychological awareness among students about the dangers of oppressive, dictatorial regimes that rely on repression and criminal acts against their opponents, particularly the former Baathist regime in Iraq, which committed the most heinous crimes against the people. This will be achieved by highlighting the most significant crimes it committed against the Iraqi people, such as wars, the squandering of the nation's wealth, the suppression and elimination of political dissidents, and its policies that brought ongoing tragedies and calamities to Iraq to this day. Students will also be encouraged to research sources and the internet to educate themselves and increase .their awareness

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
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**	1	10% (10)	5, 10 and 12	LO #1, #2 and #10, #11
	Assignments	2	10% (20)	2,5 and 12	LO #3, #4 and #6, #7
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO #1 - #7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Crimes of the Ba'ath Regime According to the Iraqi Criminal Court
Week 2	The concept of crime and its classifications
Week 3	Types of international crimes
Week 4	Decisions issued by the Iraqi High Criminal Court
Week 5	Psychological crimes
Week 6	Mechanisms of psychological crimes
Week 7	Effects of psychological crimes
Week 8	Societal crimes
Week 9	Militarization of society
Week 10	The Ba'ath regime's stance on religion
Week 11	Mass grave crimes
Week 12	Locations of prisons and detention centers under the Ba'ath regime
Week 13	War and radioactive pollution
Week 14	City destruction and the scorched-earth policy
Week 15	**Draining of the marshes and bulldozing of palm groves and crops**
Week 16	**End of semester exam**

Learning and Teaching Resources

مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Phoebe Marr, The Modern History of Iraq	No
Recommended Texts	Abdul Sattar Al-Douri, Old Papers from the Notebooks of the Ba'ath Party	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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية		
Module Title	**English Language**	**Module Delivery**
Module Type	**Support**	☐ **Theory** ☒ **Lecture**
Module Code	**UOM2022**	

ECTS Credits	**2**			☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
SWL (hr/sem)	**50**				
Module Level		**UGI**	**Semester of Delivery**		**3**
Administering Department		**OR**	**College**	**CSM**	
Module Leader	**Zainab Qusay Ahmed Taqi**		**e-mail**	**Zainab.q@uomosul.edu.iq**	
Module Leader's Acad. Title		**Asst. lecturer**	**Module Leader's Qualification**		**master**
Module Tutor	**None**		**e-mail**	**None**	
Peer Reviewer Name		**None**	**e-mail**	**None**	
Scientific Committee Approval Date		**23/01/2025**	**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 Objectives أهداف المادة الدراسية	1. To be able to speak English fluently and accurately. 2. To think in English and then speak.

	3. To be able to compose freely and independently in speech and writing. 4. To be able to read books with understanding.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Addressing grammatical problems that students face in their daily speech, writing, reading and listening. 2. Identifying sentence structure. 3. Addressing grammatical errors that affect effective communication. 4. Improving reading skills through vocabulary enrichment practice, speed reading strategies, written responses, discussions and reflections. 5. Developing writing skills.
Indicative Contents المحتويات الإرشادية	The tutoring content includes: Introduction: About the syllabus [1 hour] Tenses: Past-present-future, wh-questions. Vocabulary - Using a bilingual dictionary, Reading (communication). Everyday English (social expressions) [9 hours] Grammar: Review of tenses, present tenses, have, have. Vocabulary: About (everyday life), listening, matching verbs and nouns. Practice on the present simple and present continuous, Reading: About living in the USA. Social expressions on everyday English. [8 hours] Past tenses, past simple and past continuous, practice, reading and listening, regular and irregular verbs. Vocabulary: About adjective, verb, noun. Everyday English (time expressions). [6 hours] Grammar: Quantities, practices. Reading: About markets and practices. [6 hours]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	- - The basic strategy that will be adopted in developing the four skills: - - Speaking skill. - - Reading skill. - - Writing skill. - - Listening skill. - - It also enables students to use grammar correctly.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	32	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	18	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
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% (15)	4,9 and 11	LO #1, #2 and #5
	Assignments	2	10% (15)	2,10 and 13	LO #3, #4 and #6

	Report	1	10% (10)	13	LO #1, #4
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO #1 - #5
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction: new headway pre-intermediate plus
Week 2	Grammar: present tenses, and practices.
Week 3	Word formation, time expressions, and practices.
Week 4	Everyday English (social expressions), listening, practices.
Week 5	Grammar: quantities and practices.
Week 6	Articles, listening, and practices.
Week 7	Mid-term Exam.
Week 8	Shopping, prices, listening, practices.
Week 9	Verbs patterns, future forms, listening, and practices.
Week 10	Grammar: everyday expressions, how do you feel? and practices.
Week 11	What…. like, practices.
Week 12	Comparative and superlative, practices.
Week 13	Vocabulary: synonyms and antonyms, practice.
Week 14	directions, listening, and practices.

Week 15	Reading.
Week 16	**Preparatory week before the Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	None
Week 2	None
Week 3	None
Week 4	None
Week 5	None
Week 6	None
Week 7	None

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Headway pre-intermediate plus student's book. (John and Liz Soars)	Yes
Recommended Texts	Headway pre-intermediate plus work's book	Yes

Websites	https://7esl.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.

Semester Four

MODULE DESCRIPTION FORM

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Probability Theory (2)**			**Module Delivery**	
Module Type	**Core**			☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	**OR207**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	**UGII**		**Semester of Delivery**	**4**	
Administering Department	**OR**		**College**	**CSM**	
Module Leader	**Saifuldeen Dh. Saeed Alrefaee**		**e-mail**	**Saifldeen.alrefaee@uomosul.edu.iq**	
Module Leader's Acad. Title	**lecturer**		**Module Leader's Qualification**	**M.Sc.**	
Module Tutor	**Salih Muayad Shakir**		**e-mail**	**Salih.mooaed@uomosul.edu.iq**	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	**1/02/2025**		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Probability Theory (1)	**Semester**	3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1- Gain a clear understanding the concept of random variables, including discrete and continuous types, and learn about their probability functions and distribution functions in this module. 2- Acquire the skills to compute the probability mass function (p.m.f.) for discrete random variables and the probability density function (p.d.f.) for continuous random variables. This module covers the necessary formulas and techniques for calculating these functions. 3- Discover discrete and continuous distributions. Learn their characteristics and applications. 4- Gain insight into mathematical expectation by studying definitions, properties, and calculations for various distributions, and explore related properties. 5- Developing the student's role in benefiting from the generated functions and developing problem-solving skills through these functions. 6- Provide a solid foundation for advanced work on probability and its applications, and is essential to understanding many applied fields. Overall, the objectives of this module include gaining a solid understanding of random variables, probability functions, and distribution functions. Students will learn to calculate p.m.f. and p.d.f., explore various discrete and continuous distributions, understand the mathematical expectation, and work with moments and the moment-generating function (MGF) for analyzing random variables.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	13- Understand the fundamental concept of a random variable and its significance in probability theory. 14- Differentiate between discrete and continuous random variables and their respective characteristics. 15- Explain the probability density function (p.d.f) and its role in describing the probability distribution of continuous random variables. 16- Explain the probability mass function (p.m.f) and its role in describing the probability distribution of discrete random variables. 17- Understand the distribution function (c.d.f) and its relationship to discrete and continuous random variables. 18- Study and explore some of the distributions and their significance in various fields. 19- Ability to characterize and use random variables with general distributions. 20- Calculate and interpret mathematical expectations, means, and variances of random variables. 21- Understand the concept of moments and central moments in analyzing the shape and characteristics of probability distributions.

	22- The acquisition of knowledge to calculate and use moment-generating functions and be able to use it to compute the expectation and variance of random distributions. 23- Building a basic base for the student to move to the future stages of subjects in which probability theory is a basis.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: <u>Part A - The concept of Random variable & Random distributions</u> The concept of Random variable, Discrete Random variable, Introduction to the probability function, how to obtain the probability mass function from discrete random variables, studying the properties of the probability mass function and discrete Distribution Function (c.d.f), how to obtain the probability density function from continues random variables, studying the properties of the probability density function and continues Distribution Function (c.d.f) [15 hrs.] Some discrete distributions; Uniform distribution, Bernoulli distribution, Binomial distribution, Poisson distribution, Geometric distribution, Hypergeometric distribution, and Negative Binomial distribution [15 hrs.] Some Continuous distribution; Uniform continuous distribution, Exponential distribution, Normal distribution, Gamma distribution, and Beta distribution [20 hrs.] <u>Part B - Mathematical expectation & Moment generating function</u> Mathematical expectation; Definitions and properties, the expectation of discrete distribution, the expectation of continuous distribution, Mean and Variance for discrete and continuous distribution [10 hrs.] The moment and central moment; Definitions and examples, the moment generating function (m.g.f), Applications of the moment generating function on Some discrete and continuous distribution [15 hrs.]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in introducing this unit is to encourage students to participate in the exercises while improving and expanding their critical thinking skills at the same time by getting acquainted with the theory of probability, in the first part and developing the student's mind. This will be achieved through classes and interactive educational programs to learn about random variables and their distributions, and more through learning about the mathematical expectation and moment generating function as well as using it in some random distributions its various forms, which will be the basis for the student for his future stages.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	20% (20)	5 and 11	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	4 and 12	LO #3, #4 and #6, #7

	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	8	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	The concept of Random variable.
Week 2	Discrete Random variable, Probability mass function (p.m.f), and its Distribution function (c.d.f).
Week 3	Continuous Random variable, Probability density function (p.d.f), and its Distribution function (c.d.f).
Week 4	Some discrete distribution; Uniform & Bernoulli distribution.
Week 5	Some discrete distribution; Binomial & Poisson distribution + Quiz.
Week 6	Some discrete distributions; Geometric, Hypergeometric distribution & Negative Binomial.
Week 7	Some Continuous distribution; Uniform continuous distribution.
Week 8	Mid-term Exam + Some Continuous distribution; Exponential distribution.
Week 9	Some Continuous distribution; Normal distribution.
Week 10	Some Continuous distribution; Gamma & Beta distribution.
Week 11	Mathematical expectation + Quiz.
Week 12	Mean and Variance.
Week 13	The moment and central moment.
Week 14	The moment generating function (m.g.f).

Week 15	Applications of the moment generating function on Some distribution (m.g.f).
Week 16	**Preparatory week before the Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	There are no laboratories
Week 2	There are no laboratories
Week 3	There are no laboratories
Week 4	There are no laboratories
Week 5	There are no laboratories
Week 6	There are no laboratories
Week 7	There are no laboratories

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	5- 1-Introduction to probability theory, Dr. Dhafir H. Rasheed,1999,2-nd edition, Baghdad University 6- 2-probability, Dr.kubais S. A Fahady Dr. Pirlanty J. Shamoon, Ministry of Higher Education and Scientific Research University of Mosul	Yes
Recommended Texts	7- A first course in probability, Sheldon Ross, 2010, Eighth edition. 8- Probability, schume series	No
Websites	https://www.coursera.org/learn/probability-theory-foundation-for-data-science? https://www.khanacademy.org/math/statistics-probability	

	https://www.coursearena.io/topic/free-probability-theory-courses

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	**Numerical Analysis (2)**	**Module Delivery**

Module Type	**Basic**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**
Module Code	**OR208**			
ECTS Credits	**6**			
SWL (hr/sem)	**150**			
Module Level	**UGII**	**Semester of Delivery**	**4**	
Administering Department	**OR**	**College**	**CSM**	
Module Leader	**د. زينب توفيق حامد**	**e-mail**	**E-mail zainab.tawfeek @uomosul.edu.iq**	
Module Leader's Acad. Title	**lectuer**	**Module Leader's Qualification**	**Master's**	
Module Tutor	**م. اسماء عبد المنعم عبدالله**	**e-mail**	**asmaa.abd@uomosul.edu.iq**	
Peer Reviewer Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/02/2025	**Version Number**	1.0	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	**Numerical Analysis (1)**	**Semester**	
Co-requisites module	Non	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1- To increase and develop the student's information on the subject of 1 numerical analysis and its uses 2- To facilitate the solution of a system of nonlinear differential equations in different ways 4- To learn about improved methods in numerical analysis

	5- To facilitate the solution of a system of linear differential equations in 5 different ways 6- To learn how to apply programming to numerical methods
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	هام: اكتب 6 مخرجات تعليمية على الأقل ، ومن الأفضل أن تكون مساوية لعدد أسابيع الدراسة. **1. Learn how to use numerical analysis to solve a system of linear equations.** **2. Learn how to use numerical analysis to solve a system of nonlinear equations.** **3. Learn how to improve numerical methods to improve the output and reduce the number of iterations** **4. How to find differential equations by giving data values and function values at the given points and using inclusion, interpolation, and Lacrange formulas.** **5. Use trigonometric analysis by using matrices to solve.** **6. Use general and special methods to find the solution to a system of linear equations.** **7. Using matrices in special methods for solving, such as the special Jacobi method and the special Kaus-Seidel method** .
Indicative Contents المحتويات الإرشادية	يتضمن المحتوى الإرشادي ما يلي. Part A - Sources of errors Cramer's method (practical examples - practical program), Newton Raphson's method for solving a system of nonlinear equations using the Jacobi matrix (algorithm - flow chart - applied examples - practical program in Mathlab) . [10 hours] The improved Newton-Raphson method for solving a system of nonlinear equations (algorithm - flow chart - applied examples - practical program in Mathlab), - using numerical analysis to solve the linear system indirectly. [10 hours]

	Trigonometric analysis method (explanation of the method - applied examples) - Jacobi's general method (explanation of the method - applied examples, practical program in Mathlab language) - Jacobi's special (trigonometric) method (explanation of the method - applied examples, a practical program in the Mathlab language) [20 hours] General Chaos-Seidel method (explanation of the method - applied examples, practical program in Mathlab language) - Chaos-Seidel's own method (explanation of the method - practical examples, a practical program in the Mathlab language. [15 hours] - Inclusion and completion Polynomials (quadratic inclusion, cubic inclusion) - Lagrangian Inclusion Parametric (explanation of the method, example, practical program in Mathlab language) [20 ساعة] .

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy to be adopted in delivering this unit is to encourage students to engage in exercises, while at the same time improving and expanding their critical

	thinking skills. This will be accomplished through interactive classes and educational programs and by considering the types of computer programs that benefit the student.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment التقييم التكويني	**Quizzes**	3	15% (15)	4 ,8 and 10	LO #1, #2 and #5, #6
	Assignments	1	5% (5)	6	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All

	Report	1	10% (10)	13	LO #2, #4and #6
Summative assessment التقييم التلخيصي	**Midterm Exam**	2hr	10% (10)	8	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	Cramer's method (practical examples - practical program)
Week 2	Newton Raphson's method for solving a system of nonlinear equations using the Jacobi matrix (algorithm - flow chart - applied examples - practical program in Mathlab)
Week 3	The improvement Newton-Raphson method for solving a system of nonlinear equations (algorithm - flow chart - applied examples - practical program in Mathlab)
Week 4	-Trigonometric analysis method (explanation of the method - applied examples)
Week 5	Jacobi's general method (explanation of the method - applied examples, a practical program in the Mathlab language

Week 6	Jacobi's special (trigonometric) method (explanation of the method - applied examples, a practical program in the Mathlab language)
Week 7	General causs-Seidel method (explanation of the method - applied examples, practical program in Mathlab language)
Week 8	Mid-term Exam
Week 9	- causs-Seidel's method practical (explanation of the method - applied examples, practical program in Mathlab language)
Week 10	- Inclusion and interpolation: polynomials (quadratic inclusion, cubic inclusion)
Week 11	Inclusion and interpolation: polynomials (quadratic inclusion, cubic inclusion)
Week 12	Solutions to the numerical methods problems above
Week 13	Lagrange Inclusion Parametric (Explanation of the method, example, practical program in Mathlab language
Week 14	Solutions to the numerical methods problems above
Week 15	Solutions to the numerical methods problems above
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Review of Mathlab programs
Week 2	Cramer method programming
Week 3	Programming the triangle analysis method
Week 4	Programming the public and private Jacobi method
Week 5	General causs-Seidel method programming
Week 6	Special causs- seidel method programming
Week 7	Lagrange method programming

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts النصوص المطلوبة	حسن مجيد حسون الدلفي و محمود عطا الله مشكور"التحليل الهندسي والعددي التطبيقي".	Yes
Recommended Texts	Fast algorithms for solving a system of linear equations Math and logic	No
Websites	https://www.bacldung.com/cs/category/core-concepts/math-logic)	

Grading Scheme

مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance أداء مذهل
	B - Very Good	جيد جدا	80 - 89	Above average with some errors فوق المتوسط مع بعض الأخطاء
	C - Good	جيد	70 - 79	Sound work with notable errors العمل السليم مع أخطاء ملحوظة
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings عادل ولكن مع نواقص كبيرة
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria العمل يلبي الحد الأدنى من المعايير
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded مطلوب المزيد من العمل ولكن الائتمان الممنوح
	F – Fail	راسب	(0-44)	Considerable amount of work required قدر كبير من العمل المطلوب

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	**Assignment problems**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**OR209**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	**UGII**	**Semester of Delivery**	**4**		
Administering Department	**OR209**	**College**	**CSM**		
Module Leader	Ghalya tawfeeq basheer	**e-mail**	ghalia.tawfeek@uomosul.edu.iq		
Module Leader's Acad. Title		**Module Leader's Qualification**			
Module Tutor		**e-mail**			
Peer Reviewer Name		**e-mail**			
Scientific Committee Approval Date	**27/1/2025**	**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 Objectives أهداف المادة الدراسية	1- Identify the different types of transportation and assignment problems. 2- Developing drafting skills in transportation models and finding optimal solutions. 3- Understand the basics in the field of transportation and assignment. 4- How to formulate the transportation and assignment problems.

	5- Understanding ways to solve various transportation and assignment problems. 6- Using the Hungarian method to solve assignment problems. 7- How to solve unbalanced problems. 8- Understand the solution of assignment problems related to profit maximization. 9- Understand the types of assignment problems. 10- Identify the Travelling salesman problem and methods to solve it.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	هام: اكتب 6 مخرجات تعليمية على الأقل ، ومن الأفضل أن تكون مساوية لعدد أسابيع الدراسة. 1. The use of transportation and assignment models in industry and business. 2. Formulating the transportation and assignment problems. 3. Knowledge of the assignment problem and its assumptions. 4. Solve the assignment problem using the Hungarian method. 5. Know and determine whether the optimal solution includes alternative or multiple solutions. 6. How to deal with the state of degenerate and imbalance in transportation and assignment problems. 7. Application of transportation and assignment models in business and real-life application. 8. Recognize the importance of transportation and assignment problems in solving practical problems in industry and production. 9. Interpret solutions of transportation and assignment models and derive solutions to real-world problems. 10. Keeping pace with developments in the field of specialization.
Indicative Contents المحتويات الإرشادية	يتضمن المحتوى الإرشادي ما يلي. Part A - The transportation problem Basic concepts, transportation problem, methods for solving transportation problems, optimality test, applied examples. Part B - The assignment problem Basic concepts, methods for solving the assignment problem, special cases, formulation of the assignment matrix, types of assignment problems, applied examples.

	Part C – The Travelling Salesman Problem Basic concepts, description of the problem, mathematical model, applied examples.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	الإستراتيجية الرئيسية التي سيتم تبنيها في تقديم هذه الوحدة هي تشجيع الطلاب على المشاركة في التمارين ، مع تحسين مهارات التفكير النقدي وتوسيعها في نفس الوقت. سيتم تحقيق ذلك من خلال الفصول والبرامج التعليمية التفاعلية ومن خلال النظر في أنواع التجارب البسيطة التي تتضمن بعض أنشطة أخذ العينات التي تهم الطلاب.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150

Module Evaluation تقييم المادة الدراسية					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment التقييم التكويني	**Quizzes**	**4**	**20% (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.			**Continuous**	**All**
	Report	**1**	**10% (10)**	**13**	**LO #5, #8 and #10**
Summative assessment التقييم التلخيصي	**Midterm Exam**	**2hr**	**10% (10)**	**7**	**LO #1 - #7**
	Final Exam	**3hr**	**50% (50)**	**16**	**All**
Total assessment			**100% (100 Marks)**		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Transportation Problems (Models) Definitions and basic concepts, formulation of the transportation problem (model), mathematical model
Week 2	Methods for finding the feasible basic solution to the transportation problem North west corner method, least cost method

Week 3	Vogel's method
Week 4	Methods for finding the optimal solution to the transportation problem (optimality test) Multipliers Method
Week 5	Stepping Stone Method
Week 6	Assignment Problems Definitions, basic concepts and applications
Week 7	Methods of solving assignment problems complete enumeration method
Week 8	Hungarian Method
Week 9	Linear programming method, Transportation method
Week 10	Special cases of assignment problems Maximization Problems
Week 11	Unbalanced Problems Handing unaccepted Assignment
Week 12	A job-Assignment Problem
Week 13	Formulating the assignment matrix
Week 14	Standard assignment problem (typical)
Week 15	Travelling Salesman Problem Basic concepts, Traveling salesman idea, mathematical model, applications
Week 16	A week of preparation before the final exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered

Week 1	
Week 2	
Week 3	
Week 4	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts النصوص المطلوبة	P.K. Gupta & D.S.Hira,2008,Operations Research, S.Chand & Company Ltd. New Delhi	Yes
Recommended Texts	1) الجواد، دلال صادق ، الفتال ، حميد ناصر ،2008، بحوث العمليات ،دار اليازوري العلمية للنشر والتوزيع، عمان الأردن . 2) Rainer Burkard ; Mauro Dell'Amico and Silvano Martello,2009, Assignment Problems, SIAM.	No
Websites	https://www.youtube.com/watch?v=rfu2Zbjc7q8 https://www.youtube.com/watch?v=zhGdKrS_G38 https://www.youtube.com/watch?v=PFRa3ZnFID8	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group	**A -** Excellent	امتياز	90 - 100	Outstanding Performanceأداء مذهل

(50 - 100)	**B -** Very Good	جيد جدا	80 - 89	Above average with some errors فوق المتوسط مع بعض الأخطاء
	C - Good	جيد	70 - 79	Sound work with notable errors العمل السليم مع أخطاء ملحوظة
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings عادل ولكن مع نواقص كبيرة
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria العمل يلبي الحد الأدنى من المعايير
Fail Group **(0 – 49)**	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded مطلوب المزيد من العمل ولكن الائتمان الممنوح
	F – Fail	راسب	(0-44)	Considerable amount of work required قدر كبير من العمل المطلوب

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	**Reliability Theory**	**Module Delivery**
Module Type	**Basic**	**☒ Theory**

Module Code	**OR210**		☒ Lecture Lab ☒ Tutorial ☐ Practical ☐ Seminar	
ECTS Credits	**5**			
SWL (hr/sem)	**125**			
Module Level	**UGII**	**Semester of Delivery**	**4**	
Administering Department	**OR**	**College**	**CSM**	
Module Leader	**Ahmed Naziyah alkhateeb**	**e-mail**	**ahmed.alkhateeb@uomosul.edu.iq**	
Module Leader's Acad. Title	**lecturer**	**Module Leader's Qualification**	**MSc.**	
Module Tutor	**Ahmed Naziyah alkhateeb**	**e-mail**	**ahmed.alkhateeb@uomosul.edu.iq**	
Peer Reviewer Name		**e-mail**		
Scientific Committee Approval Date	2025/01/23	**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 Objectives أهداف المادة الدراسية	develop students' skills in relation to the subject: 1. study of the reliability of the machines and the amount of time to reach the state of failure of the machine

	2. and the study of probability distributions related to failure, as well as, identifying its reliability 3. study the methods of estimating reliability
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Calculating the reliability function used in evaluating the performance of machines and systems 2. Knowledge of the failure function and the risk function and their relationship with the reliability function 3. recognize the amount of time to reach the state of failure of the machine 4. recognize the bath-tub in reliability 5. Knowledge of probability distributions related to failure models and calculate their reliability 6. Knowledge of systems, their types, and calculating their reliability 7. Know the methods of estimating reliability 8. Accuracy in analysis and decision making
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Reliability function, Failure Rate, Average Failure Rate , relationship of reliability and failure function and Failure Rate, Design life, Mean time to Failure, median time to failure, Conditional reliability, Bath tub carve . [20 hr] Failure Models:[20 hr] Exponential failure Model: reliability function , Failure function , hazard function, , Design life, Mean time to Failure, median time to failure, memory lessness. Weibull Failure Model: reliability function , Failure function , hazard function, , Design life, Mean time to Failure, median time to failure. Gamma Failure Model: reliability function , Failure function Normal Failure Model: reliability function , Failure function , hazard function System Reliability : [20 hr] Series system, Parallel system, Series –parallel system, K out of n system independent components, Complex configurations.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	4	20% (20)	2 and 12	LO #3, #4 and #6, #7, #9

	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction and Overview
Week 2	Reliability function – Failur function – hazard function
Week 3	The relationship between Reliability function ,Failur function , hazard function
Week 4	Time to Failure Distribution (Some Well – Known Failure Model)
Week 5	Mean time to failure – median time to failure- Design life
Week 6	Bath tub carve
Week 7	Mid-term Exam +Conditional reliability
Week 8	Exponential Failure Model : reliability function - Failur function – hazard function…
Week 9	Gamma Failure Model: reliability function - Failur function – hazard function…
Week 10	Weibull Failure Model: reliability function - Failur function – hazard function..
Week 11	Normal Failure Model: reliability function - Failur function – hazard function…
Week 12	Reliability of System: Series system- Parallel system
Week 13	Series –parallel system

Week 14	K out of n system independent components
Week 15	Complex configurations
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	مكان النشر والناشر: ;*الاحصاء الرياضي* ;المؤلف :*امير حنا هرمز* الموصل:جامعة الموصل; تاريخ النشر: 1990; عدد الصفحات: 704ص	Yes
Recommended Texts	Ebeling; C. E. "An Introduction to Reliability and Maintainability Engineering"; 2009 Zacks ,s.," Introduction to Reliability Analysis probability Models and statistical methods ",1992 Al – Nasser; Abdul Majeed "**Statistical Reliability**", 2009	No
Websites	https://www.sciencedirect.com/topics/computer-science/reliability-theory	

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	**Game Theory**		**Module Delivery**	
Module Type	**Core**		☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	OR211			
ECTS Credits	**5**			
SWL (hr/sem)	**125**			
Module Level	**2**	**Semester of Delivery**	4	
Administering Department	**OR**	**College**	CSM	
Module Leader	Dr.Mohammed Ahmed Alkailany	**e-mail**	**alkailanym@uomosul.edu.iq**	
Module Leader's Acad. Title	**Lecture**	**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)	**e-mail**	E-mail	
Peer Reviewer Name		**e-mail**		
Scientific Committee Approval Date	2/02/2025	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None وحدة المتطلبات الممهدة	**Semester**	
Co-requisites module	None وحدة المتطلبات المكملة	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This course aims to introduce students to solving cooperative and non-cooperative game models, especially when time, cost, and quality are important factors in the solution.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• The student should write some terms. • The student should describe the model. • The student should distinguish between models. • The student should explain the mathematical formulation. • The student should summarize the steps for solving the mathematical formulation. • The student should present a real-world problem. • The student should compare solution methods. • The student should rearrange the solution method. • The student should plan how to use the appropriate method for solving. • The student should apply the model to a real-life case. • The student should identify errors in the model. • The student should tabulate the results.

Indicative Contents المحتويات الإرشادية	The guide content includes the following: **1. Principles and Concepts of Game Theory** • Covers game components and elements, along with definitions and examples of each. • **Duration: 15 hours** **2. Types of Games and Their Solutions** • Introduction to dynamic games, static games, Bayesian games, fuzzy games, and differential games. • **Duration: 15 hours** **3. Minimax Method, Game Value, and Saddle Point** • Understanding how to apply these three principles and find the equilibrium point. • **Duration: 30 hours** **4. Cooperative Games and Their Solutions** • These games involve agreements or contracts between competing players. • Solution methods include **Nash approach, elimination method, and probability method** in cooperative games. • **Duration: 15 hours** **5. Nash Equilibrium Approach** • This approach is used when the **payoff matrix size is 3×3**. • **Duration: 4 hours** **6. Elimination Method** • This method is used to **reduce the size of the payoff matrix** and reach the equilibrium point. • **Duration: 4 hours** **7. Cooperative Probability Method** • Used when the **payoff matrix size is 2×2**. • **Duration: 4 hours**

	8. Non-Cooperative Games • Games that **do not rely on agreements** between players, where competition is complete—**one player's loss equals the other player's gain** and vice versa. • **Duration: 4 hours** **Solution Methods for Non-Cooperative Games** **9. Arithmetic Method** • Used when the **matrix size is 2×2**. • **Duration: 4 hours** **10. Algebraic Method** • Used when the **payoff matrix is 3×3 and square**. • **Duration: 4 hours** **11. Graphical Method** • Used when **one of the rows or columns is two, while the other is greater than two**. • **Duration: 4 hours** **12. Linear Programming Method** • Used **if all previous methods fail**. • **Duration: 18 hours**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**Motivating and Encouraging Students to Understand the Role of Game Theory in the Evolving Knowledge Society**

	The goal is to help students become aware of the **scientific applications of competitive game theory using computers** through the following steps: 1. **Identifying Scientific Concepts and Principles** o Presenting them in the form of a **question or problem** to stimulate curiosity and engagement. 2. **Preparing the Necessary Educational Materials** o Ensuring all **resources and tools** required for lesson execution are available. 3. **Formulating the Problem into Sub-Questions** o Encouraging learners to develop **hypothesis formulation skills** by breaking down the main issue into smaller investigative questions. 4. **Defining Discovery Activities or Experiments** o Designing activities that allow students to **explore concepts and verify outcomes** through hands-on experiences. 5. **Assessing Learners and Helping Them Apply Their Knowledge** o Providing **evaluations and guidance** to ensure students can implement what they have learned in real-world situations

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
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 التقييم التكويني	**Quizzes**	3	15% (15)	5 and 10	LO #1, #2 and #10, #11
	Assignments	3	15% (15)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.				
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment التقييم التلخيصي	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Summative assessment التقييم التلخيصى		Formative assessment التقييم التكويني
الامتحان النهائي	امتحان نصف الفصل	% ٤٠
% ٥٠	% ١٠	

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Principles and Concepts of Game Theory
Week 2	Game Elements and Classification
Week 3	Types of Games and Solution Methods
Week 4	Two-Person Game Model
Week 5	Minimax Method, Game Value, and Saddle Point
Week 6	Pure Strategy, Convergence Point, and Game Analysis
Week 7	Multiple Saddle Points
Week 8	Non-Zero-Sum Game Model

Week 9	Cooperative Games and Their Solutions
Week 10	Nash Equilibrium Approach
Week 11	Elimination Method
Week 12	Cooperative Probability Method
Week 13	Solution Methods for Non-Cooperative Games
Week 14	Arithmetic Method
Week 15	Joint Probability Method
Week 16	Algebraic Method
Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	non
Week 2	non

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**

Required Texts النصوص المطلوبة	Operation Research (2011) Gupta	Yes
Recommended Texts	مقدمه في بحوث العمليات 2010 حمدي طه	No
Websites	https://www.gametheory.net	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group **(50 - 100)**	**A** - Excellent	امتياز	90 - 100	Outstanding Performanceأداء مذهل
	B - Very Good	جيد جدا	80 - 89	Above average with some errors فوق المتوسط مع بعض الأخطاء
	C - Good	جيد	70 - 79	Sound work with notable errors العمل السليم مع أخطاء ملحوظة
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings عادل ولكن مع نواقص كبيرة
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria العمل يلبي الحد الأدنى من المعايير
Fail Group **(0 – 49)**	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded مطلوب المزيد من العمل ولكن الائتمان الممنوح
	F – Fail	راسب	(0-44)	Considerable amount of work required قدر كبير من العمل المطلوب

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

Module Information

Module Title	**Arabic Language 2**		**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**
Module Code	**UOM2012**			
ECTS Credits	**2**			
SWL (hr/sem)	**50**			
Module Level	UGI	**Semester of Delivery**	4	
Administering Department	OR	**College**	CSM	
Module Leader	م.م. مروة عدنان إسماعيل	**e-mail**	Marwa-Adnan@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Lecturer	**Module Leader's Qualification**	MSc.	
Module Tutor		**e-mail**		
Peer Reviewer Name		**e-mail**		
Scientific Committee Approval Date	1/02/2025	**Version Number**	1.0	

Relation with other Modules

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives	1- Learn about language and its relationship to society 2- The student learns about the functions of language, its characteristics and advantages 3- Learns the difference between bilingualism and linguistic duality 4- The student knows linguistic phenomena in terms of syntax and intonation 5- The student knows the phenomenon of contrast, verbal homonym and synonymy 6- The student knows the phenomenon of alleviation and derivation 7- The student knows the phenomenon of Arabization, coining and generation in Arabic 8- Say and do not say: common mistakes among speakers and writers 9- Know the linguistic triangle of the linguistic term 10- Learn about the sentence that has a place in syntax and that does not have a place in syntax 11- Learn about the history of Arabic dictionaries and the difference between the .source and the reference
Module Learning Outcomes	1- The student learns about the history of the Arabic language and its relationship with other sciences, especially from a societal perspective. 2- The student learns the difference between linguistic duality and bilingualism.

	3- Learn how to use linguistic duality and bilingualism in daily life. 4- The student knows the phenomena of the Arabic language. 5- The student learns how the grammatical movement affects the meaning of the word. 6- The student knows the characteristics of Arabic. 7- The student knows the common linguistic errors among speakers. 8- The student knows the Arabic sentence and how to differentiate between sentences that have a place in grammar and those that do not have a place in grammar. 9- The student learns about the history of the Arabic dictionary. 10- Learn about the types of ancient and modern Arabic dictionaries. 11- Know the difference between the source and the reference. 12- The prose piece helps the student on how to apply linguistic issues to Arabic texts. 13- Learning linguistic skills: developing linguistic taste and improving the style of learners
Indicative Contents	1- Language and its relationship to society [2 hours] 2- Knowledge of language and its functions, 2 hours 3- Recognizing linguistic duality and bilingualism, 2 hours 4- The student's knowledge of the characteristics and advantages of the Arabic language, 2 hours 5- The student's knowledge of the phenomenon of syntax, 2 hours 6- The student's knowledge of the phenomenon of intonation and intonation, 2 hours 7- The student's knowledge of the phenomenon of verbal ambiguity and contrast, 2 hours 8- Recognizing the phenomenon of alleviation and derivation, 2 hours 9- Learning the phenomenon of Arabization, 2 hours 10- Recognizing sculpture in Arabic and its methods, 2 hours

	11- Say and do not say: common mistakes among speakers and writers, 2 hours 12- A prose piece, a linguistic and semantic study, 2 hours 13- Recognizing sentences that have a place in syntax and those that do not have a place in syntax, 2 hours Learn about the history of the Arabic dictionary and its types, 2 hours -14

Learning and Teaching Strategies	
Strategies	The main strategy that will be adopted in delivering this unit is to encourage students to participate in speaking and writing Arabic correctly, while at the same time improving and expanding their critical thinking skills. This will be achieved through interactive classes and tutorials and by considering the types of simple experiments that include some sampling activities that interest students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
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**	1	10% (10)	5, 10 and 12	LO #1, #2 and #10, #11
	Assignments	2	10% (20)	2,5 and 12	LO #3, #4 and #6, #7
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO #1 - #7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Language and its relationship to society
Week 2	Bilingualism and bilingualism
Week 3	Characteristics and advantages of Arabic
Week 4	Phenomena of the Arabic language
Week 5	The phenomenon of intonation
Week 6	The phenomenon of verbal homonym
Week 7	Review and exam
Week 8	The phenomenon of derivation and synonymy
Week 9	The phenomenon of alleviation, Arabization and coining
Week 10	An applied study of a prose piece
Week 11	Linguistic issues Say and do not say
Week 12	The linguistic triangle
Week 13	An analytical image of poetic verses
Week 14	The Arabic sentence
Week 15	**The dictionary in Arabic**
Week 16	**End of semester exam**

Learning and Teaching Resources

مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Bin Dharel, Adnan, "Language and Style: A Study," Second Edition, 2006	No
Recommended Texts	Bahri, Saeed Hassan, "The Basis of Arabic Linguistics," 2000	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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية		
Module Title	**حاسوب 2**	**Module Delivery**
Module Type	**Support**	☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial**
Module Code	**Uom2032**	
ECTS Credits	**3**	

SWL (hr/sem)	**75**	☐ **Practical** ☐ **Seminar**	
Module Level	**UGI**	**Semester of Delivery**	4
Administering Department	**OR**	**College**	**CMS**
Module Leader	**Neaam Hazem alfahady**	**e-mail**	**Neam.alfahady@uomosul.edu.iq**
Module Leader's Acad. Title	Assistant lecturer	**Module Leader's Qualification**	**Ph.D.**
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	**1/02/2025**	**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 Objectives أهداف المادة الدراسية	1. Utilize the computer for fundamental tasks 2. Identify and discuss the hardware components of the computer system. 3. Creating documents using a word processor and creating presentations. 4. Conducting research on the Internet. 5. An introduction to Artificial Intelligence
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Enhancing the ability of information technology to adapt and respond to the multiple, renewable and constantly changing needs of all parties benefiting from the outputs of the information system, especially the university leaders in the researched university, and thus enables information technology to carry out its work efficiently and effectively. Predicting the studied phenomenon in the future by means of Box-Jenkins model. 2. Employing information technologies in the axes of the educational process worked to build a bridge of vital communication between faculty members and all sources of the educational process, and this necessarily means facilitating the teacher's task in delivering information to the student within an interactive technical environment, and information technologies provide multiple sources in order to obtain information Whether it is from sources within the university or from the Internet and the educational technologies it contains.
Indicative Contents المحتويات الإرشادية	Although the information technology specialization is one of the most demanded fields currently in all global markets, some specializations range from stagnant to saturated and required, so you should study the market well before choosing a specialization. But if you are looking for the best majors that have a future in the field of information technology, then they are as follows: Network security major in programming - software engineering - 3D printing - data science major - Artificial Intelligence - Computer Science - Aerospace Engineering

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

	by Using appropriate teaching strategies and methods and teaching aids to develop thinking skills.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	3	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	3	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
	Midterm Exam	3hr	10% (10)	7	LO #1 - #7

Summative assessment	**Final Exam**	3	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Security and Networking: What is a network? Types of networks. Basic network components.
Week 2	Security and Networking (Cont.): Network Security Basics. Understanding network threats.
Week 3	E-Commerce: Concepts of Electronic banking services this include online banking: ATM and debit card services, Phone banking, SMS banking, electronic alert, Mobile banking
Week 4	Computer Troubleshooting: Identifying and solving common hardware and software problems that computer users encounter.
Week 5	Computer Troubleshooting (Cont.): Basic troubleshooting techniques and tools for diagnosing and resolving issues.
Week 6	Introduction to Al: Definition of Al, History of Al, Al Techniques and Approaches,
Week 7	Introduction to Al(Cont.): Key Characteristics of Al, Benefits of Al, Challenges and Ethical considerations.

Week 8	The Role of Al in Modern Smartphones: Al-Driven Mobile Technologies, Virtual Assistants (Siri, Google Assistant, Alexa).
Week 9	The Role of Al in Modern Smartphones (Cont.): Adaptive Learning, Real-Time Translation Services.
Week 10	Applications and Tools of Al: Overview of Al Applications in Various Industries, Education and Healthcare.
Week 11	Applications and Tools of Al (Cont.): Transportation, Marketing and Advertising.
Week 12	Applications and Tools of Al(Cont.): Finance, Robotics and Automation Technologies.
Week 13	Al and Society: How Al affects social, Al and international relations, Al and the future of humanity.
Week 14	The Future of Al: Future trends in Al, recent research and emerging technologies.
Week 15	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Lab 1	applications

Learning and Teaching Resources

مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Ahmed banafa"introduction to Artificial intelligence AI" 1st edition, 2024	no
Recommended Texts	Microsoft Ofice 2016 Step by Step `st Edition by Joan Lambert & Curtis Frye	no
Recommended Texts	مدخل الى عالم الذكاء الاصطناعي ، الدكتور عادل عبدالنور	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.