Academic Program Description Form

University Name: Tikrit University

Faculty/Institute: College of Computer Science and Mathematics

Scientific Department: Department of Mathematics

Academic or Professional Program Name: University Performance

Final Certificate Name: Bachelor's

Academic System: Semester

Description Preparation Date:

File Completion Date:

Signature:

Head of Department Name: الدكتور احمد ماهر صالح رئيس قسم الرياضيات

Date: 2/9/2024

Signature:

Scientific Associate Name: الاستاذ المساعد الدكتور ماجد حامد علي معاون العميد للشؤون العلمية والدراسات العليا

Date: 2/9/2024

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date:

Signature:

Yamar A. Hussen
2/9/2024

Approval of The Dean

محمود ماهر صالح علاوي
عميد كلية علوم الحاسوب والرياضيات

1. Program Vision

The Department of Mathematics aspires to gain global recognition in the fields of scientific research and teaching by achieving academic quality, as well as local recognition in the field of supplying the labor market with highly qualified scientific personnel.

2. Program Mission

Raising the efficiency of mathematicians and mathematical sciences in society and supporting various science specializations with high-level graduates to effectively contribute to the scientific renaissance and developing ways that would build qualified athletes at the highest level in teaching and training to contribute to raising the level of mathematical thought among trainees.

3. Program Objectives

1. Continuous aspiration towards cognitive excellence in education and scientific research.
2. How the student is able to collect information and acquire scientific and practical skills through graduation projects.
3. Qualifying students for postgraduate studies in the field of mathematics.
4. Preparing specialized scientific cadres in the postgraduate studies program and interacting with other sciences.
5. Qualifying students as teachers in the Education Directorate.
6. Encouraging scientific research and improving student discussion skills.

4. Program Accreditation

Does the program have program accreditation? And from which agency?

5. Other external influences

Is there a sponsor for the program?

6. Program Structure			
Program Structure	Number of Courses	Credit hours	Percentage
Institution Requirements			
College Requirements			
Department Requirements			
Summer Training			
Other			

7. Program Description				
Year/Level	**Course Code**	**Course Name**	**Credit Hours**	
			theoretical	**practical**
First stage / first semester	MATH 111	Foundation of Mathematics I	3	1
	CCMS112	Calculus I	3	1
		Topic in Mathematics	3	2
		General Physics	2	2
	UOTM112	Arabic Language I	2	-
	UOTM111	Democracy and Human Rights	2	-
First stage / second semester	MATH121	Foundation of Mathematics II	3	1
	MATH122	Calculus II	3	1
	MATH123	Linear Algebra	3	2
		Computer Applications I	1	2
		Principles of Statistics	2	-
	UOTM113	English Language I	2	-
Second stage / first semester	MATH212	Advance Calculus	3	**2**
	MATH221	Ordinary Differential Equations	3	1
	CCMS301	Probability and Statistics	3	1
		Group Algebra	3	1

		English Languish II	2	-
		Ba'ath Party Crimes"	2	-
Second stage / second semester		Partial Differential Equations	3	2
		Numerical Analysis I	2	2
		Rings Algebra	3	1
		Computer Applications II	1	2
		Arabic Language II	2	-
		Research Methodology	2	-
Third stage / first semester		Mathematical Analysis I	3	1
		Operation Research	3	1
	MATH 412	Mathematical Statistics	3	1
	MATH 358	Numerical Optimization	3	1
		Numerical Analysis II	3	1
	MATH 411	Mathematical Modeling	3	1
Third stage / second semester		Mathematical Analysis II	3	1
		Financial Mathematics	3	1
	MATH 354	Number Theory	3	1
		Subjects in Geometry	3	1
	MATH 352	Arabic Language II	3	1
		Medical physics	2	-
		Computer Mathematics	2	2
Fourth stage / first semester	MATH 414	Complex Analysis I	3	1
	MATH 324	Topology I	3	1
	MATH459	Fractals	3	1
		Functional Analysis I	3	1
	MATH 456	Chaos Theory	3	1
		Encryption	3	1
Fourth stage / second semester		Graph Theory	3	1
	MATH 422	Complex Analysis II	3	1
	MATH 413	Topology II	3	1
	MATH 421	Functional Analysis II	3	1
		Theory of Differential Equations	3	1
	MATH 415	Research	2	-

8. Expected learning outcomes of the program	
Knowledge	
1. Enabling the student to gain an understanding of mathematics. 2. Preparing qualified teachers to teach in educational institutions. 3. Preparing a high-quality mathematics teacher.	
Skills	
1. That the student acquires the skill of mathematical operations. 2. That the student acquires skills in methods of proof and thinking. 3. The student should be able to link the information.	1. The correct scientific thinking method. 2. Discussion method. 3. Daily, monthly and annual tests.
Ethics	
1. Utilizing the acquired information. 2. Personal development through reading and updating knowledge. 3. Engaging in the teaching profession. 4. Participation in seminars, conferences and workshops Specialized.	
9. Teaching and Learning Strategies	
1. Develop a plan for asking and setting quick questions and exams. 2. Use the discussion method in teaching. 3. Assign the student some group activities and assignments. 4. Exercises, problems and mathematical solutions.	
10. Evaluation methods	
1. Conducting scientific and practical tests, mathematically and statistically, to measure the extent of students' comprehension and understanding of the achievement. 2. Conducting tests on the computer with instant interpretation and analysis of the results.	

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements / Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Professor Doctor	Mathematics	Measure Theory			1	0
Professor Doctor	Mathematics	Applied Mathematics and Dynamical Systems			1	0
Professor Doctor	Mathematics	Algebra			1	0
Assistant Professor Doctor	Mathematics	Algebra			2	0
Professor Doctor	Mathematics	Functional Analysis			1	0
Professor Doctor	Mathematics	Graph Theory and its Topological and Algebraic Applications			1	0
Professor Doctor	Mathematics	Optimization and Artificial Intelligence			1	0
Professor Doctor	Mathematics	Mathematical Statistics			1	0
Assistant Professor Doctor	Mathematics	Numerical Analysis			1	0
Professor Doctor	Mathematics	Topology			1	0
Assistant Professor Doctor	Mathematics	Time Series			1	0
Professor Doctor	Mathematics	Numerical Optimization			1	0
Assistant Professor Doctor	Mathematics	Fluid Dynamics			1	0
Assistant Professor Doctor	Mathematics	Operations Research			1	0
Assistant Professor Doctor	Mathematics	Differential Equations			1	0
Assistant Professor Doctor	Mathematics	Mathematical Statistics			1	0
Assistant Professor Doctor	Mathematics	Graph Theory			1	0
Assistant Professor Doctor	Physics	Solid State Physics			1	0

Professor Doctor	Management and Economics				1	0
Professor Doctor	Mathematics				4	0
Professor Doctor	Arabic Language				1	0
Assistant Professor Doctor	Law				1	0

Professional development
Mentoring new faculty members
New faculty members are instructed to complete a teaching competency test and take part in training courses and workshops to develop their teaching and research skills.
التطوير المهني لأعضاء هيئة التدريس
1. Preparing the curriculum program for each subject by the instructor. 2. Following up the program accurately. 3. Preparing questions and discussions and evaluating students based on actual participation in the scientific discussion to find appropriate solutions to these questions, which in turn instills the correct concept of the scientific material.
12. Acceptance Criterion
1. Adopting the conditions for accepting students according to the regulations of the Ministry of Higher Education and Scientific Research (central admission criteria). 2. Successfully pass a special test or personal interview set by the college council. 3. Be medically fit for the specialization applied for. 4. The capacity of the scientific department.
13. The most important sources of information about the program
Relying on sources taken from international universities in addition to local books, courses and scientific theses.
14. Program Development Plan

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
First stage / first semester	MATH 111	Foundation of Mathematics I		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	CCMS112	Calculus I		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
		Topic in Mathematics		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
		General Physics		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	UOTM112	Arabic Language I		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	UOTM111	Democracy and Human Rights		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
First stage / second semester	MATH121	Foundation of Mathematics II		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MATH122	Calculus II		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MATH123	Linear Algebra		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
		Computer Applications I		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
		Principles of Statistics		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	UOTM113	English Language I		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
Second stage / first semester	MATH212	Advance Calculus		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MATH221	Ordinary Differential Equations		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	CCMS301	Probability and Statistics		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
		Group Algebra		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
		English Languish II		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
		Ba'ath Party Crimes"		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓

Second stage / second semester		Partial Differential Equations		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
		Numerical Analysis I		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
		Rings Algebra		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
		Computer Applications II		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
		Arabic Language II		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
		Research Methodology		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
Third stage / first semester		Mathematical Analysis I		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
		Operation Research		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MATH 412	Mathematical Statistics		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MATH 358	Numerical Optimization		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
		Numerical Analysis II		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MATH 411	Mathematical Modeling		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
Third stage / second semester		Mathematical Analysis II		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
		Financial Mathematics		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MATH 354	Number Theory		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
		Subjects in Geometry		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MATH 352	Arabic Language II		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
		Medical physics		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
		Computer Mathematics		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
Fourth stage / first semester	MATH 414	Complex Analysis I		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MATH 324	Topology I		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MATH459	Fractals		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
		Functional Analysis I		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓

	MATH 456	Chaos Theory		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
		Encryption		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
Fourth stage / second semester		Graph Theory		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MATH 422	Complex Analysis II		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MATH 413	Topology II		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MATH 421	Functional Analysis II		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
		Theory of Differential Equations		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MATH 415	Research		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓

Course Description Form

1. Course Name:
Fractals
2. Course Code:
MATH-404
3. Semester / Year:
First Semester/Fourth Year
4. Description Preparation Date:
2/9/2024
5. Available Attendance Forms:
Classroom or electronic by Web
6. Number of Credit Hours (Total) / Number of Units (Total)
60 Hours / 3 Units
7. Course administrator's name (mention all, if more than one name)
Name: Azher Abbas Mohammad Email:drazh64@tu.edu.iq
8. Course Objectives
1. Students' realization of the basic concepts of fractals, such as the fractal dimension, the box dimension, and self-similarity. 2. Knowing the types of famous fractals and how to create them. 3. Paying attention to the philosophical and mathematical content of the subject of fractals and linking it to the subject of chaos. 4. Developing students' ability to deal with transformations and their applications in constructing fractals, such as reflection, rotation, and projection 5. Giving the student the necessary experience to deal with the IFS iterative functions system. 6. Giving students the necessary experience to construct fractals at the complex plane, the Julia and Mandelbrot groups, and the relationships between them.
9. Teaching and Learning Strategies

This course is characterized by the fact that it needs a special approach that depends mainly on the development of geometrical thinking and the mathematical approach in thinking. It also depends on prior courses in real analysis, chaos, and some imagination. Teaching is mainly based on the home works that are given at the end of each week, and the student notes the interdependence between the serial topics of this course, in addition to assigning the student (or a group of students) to write one report and represent it as a seminar for the purpose of training in the use of scientific resources and the method of writing a subject in mathematics.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	The concept of fractal	Introduction to Fractals	Theoretical Lecture and discussion	Oral tests and quizzes
2	4	Fractal dimension and how to calculate it	Definitions and examples on fractal and topological dimensions	Theoretical Lecture and discussion	Oral tests and quizzes
3	4	The mathematical structure of fractals	Topological properties of fractal	Theoretical Lecture and discussion	Oral tests and quizzes
4	4	How to construct a fractal	Iterations of functions and self-similarity property	Theoretical Lecture and discussion	Oral tests and quizzes
5	4	Examples of fractals and how to construct it with calculating its dimension	Contour set, Sherpenski triangle, Koch curve, Pythagorean tree,… etc	Theoretical Lecture and discussion	Oral tests and quizzes
6	4	Construct a transformation systems	Linear transformations and rotation with angle and inversion with axes	Theoretical Lecture and discussion	Oral tests and quizzes
7	4	How to construct a fractal by iteration functions system	Iteration functions system (IFS) and attractors.	Theoretical Lecture and discussion	Oral tests and quizzes
8	4	How to calculate the distance between two sets & midterm exam	Euclidean and Housdorf distances	Theoretical Lecture and discussion	1st Midterm exam in previous weeks(1-7)
9	4	The concept of attraction and properties of attractors.	IFS and Attractors	Theoretical Lecture and discussion	Oral tests and quizzes
10	4	The concept of stereographic projection	Riemann Sphere and stereographic projection extended	Theoretical Lecture and discussion	Oral tests and quizzes

			complex plane		
11	4	Julia set	Definitions in Julia set With related theorems and examples	Theoretical Lecture and discussion	Oral tests and quizzes
12	4	Mandelbrot set	Definitions in Mandelbrot set With related theorems and examples	Theoretical Lecture and discussion	Oral tests and quizzes
13	4	Topological concepts of Julia and Mandelbrot set	The relation between Julia and Mandelbrot set	Theoretical Lecture and discussion	Oral tests and quizzes
14	4	Haw to find and plot Mandelbrot set in complex plan	Some theorems and examples in Mandelbrot set	Theoretical Lecture and discussion	Oral tests and quizzes
15	4	Haw to find Julia set in complex plane such as $J_0, J_{-2}, \ldots$ etc	Some examples of Julia sets in complex plane	Theoretical Lecture and discussion	2nd Midterm exam

11. Course Evaluation

Couse evolution of a student including the sum of the following two parts

1. Formative Evalution 40%

   (2 exams through the term 30% and Oral discussion 5% and Quizzes 5%)

2. Summative Evalution

   (Final Exam 60%)

12. Learning and Teaching Recourses

Required textbook(Curricular book, if any):

Elayadi , S.N.,(1999),"Discrete Chaos", CHAPMAN & HALL/CRC

Main References (Sources):

1. Gulick , D.,(1992) "Encounters with Chaos", Library of Congress
2. Paul S. Addison, "Fractals and Chaos", Institute of physics London , (1997)

Recommended book and references (Scientific journals, reports,…):

Katheleen, T. Aligood, Tim D. Sauer , James A. Yorke, (1996), "An Introduction To Dynamical Systems", Springer

Electronic Reference ,Web sites:

https://books.google.iq/books?hl=ar&lr=&id=l2E4ciBQ9qEC&oi=fnd&pg=PR9&dq=fractal+and+chaos+literature&ots=7JNqaOvP2Z&sig=Zv_kOWJBarI8hnrfHMm5MFdnoEY&redir_esc=y#v=onepage&q=fractal%20and%20chaos%20literature&f=false

1. Program Vision

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3. Program Objectives

7. Continuous aspiration towards cognitive excellence in education and scientific research.
8. How the student is able to collect information and acquire scientific and practical skills through graduation projects.
9. Qualifying students for postgraduate studies in the field of mathematics.
10. Preparing specialized scientific cadres in the postgraduate studies program and interacting with other sciences.
11. Qualifying students as teachers in the Education Directorate.
12. Encouraging scientific research and improving student discussion skills.

4. Program Accreditation

Does the program have program accreditation? And from which agency?

5. Other external influences

Is there a sponsor for the program?

6. Program Structure			
Program Structure	Number of Courses	Credit hours	Percentage
Institution Requirements	18		%12.5
College Requirements	19		%13.2
Department Requirements	107		%74.3
Summer Training			
Other			

7. Program Description				
Year/Level	**Course Code**	**Course Name**	**Credit Hours**	
			theoretical	**practical**
First stage / first semester	MS 101	Foundation of Mathematics I	3	1
	MS 102	Calculus I	3	1
	MS 103	Topic in Mathematics	3	2
	MS 104	General Physics	2	2
	UOT001	Arabic Language I	2	-
	UOT004	Democracy and Human Rights	2	-
First stage / second semester	MS 107	Foundation of Mathematics II	3	1
	MS 108	Calculus II	3	1
	MS 109	Linear Algebra	3	2
	UOT003	Computer Applications I	1	2
	MS 111	Principles of Statistics	2	-
	UOT002	English Language I	2	-
Second stage / first semester	MS 201	Advance Calculus	3	**2**
	MS 202	Ordinary Differential Equations	3	1
	MS 203	Probability and Statistics	3	1
	MS 204	Group Algebra	3	1

	UOT021	English Languish II	2	-
	UOT005	Ba'ath Party Crimes"	2	-
Second stage / second semester	MS 205	Partial Differential Equations	3	2
	MS 206	Numerical Analysis I	2	2
	MS 207	Rings Algebra	3	1
	UOT031	Computer Applications II	1	2
	UOT011	Arabic Language II	2	-
	MS 208	Research Methodology	2	-
Third stage / first semester	MS 301	Mathematical Analysis I	3	1
	MS 302	Operation Research	3	1
	MS 303	Mathematical Statistics	3	1
	MS 304	Numerical Optimization	3	1
	MS 305	Numerical Analysis II	3	1
	MS 30	Mathematical Modeling	3	1
Third stage / second semester	MS 306	Mathematical Analysis II	3	1
	MS 307	Financial Mathematics	3	1
	MS 308	Number Theory	3	1
	MS 310	Subjects in Geometry	3	1
	MS 311	Arabic Language II	3	1
	MS 312	Medical physics	2	-
	MS 313	Computer Mathematics	2	2
Fourth stage / first semester	MS 401	Complex Analysis I	3	1
	MS 402	Topology I	3	1
	MS 403	Fractals	3	1
	MS 404	Functional Analysis I	3	1
	MS 405	Chaos Theory	3	1
	MS 413	Encryption	3	1
Fourth stage / second semester	MS 412	Graph Theory	3	1
	MS 406	Complex Analysis II	3	1
	MS 407	Topology II	3	1
	MS 410	Functional Analysis II	3	1
	MS 409	Theory of Differential Equations	3	1
	MS 411	Research	2	-

8. Expected learning outcomes of the program	
Knowledge	
4. Enabling the student to gain an understanding of mathematics. 5. Preparing qualified teachers to teach in educational institutions. 6. Preparing a high-quality mathematics teacher.	
Skills	
4. That the student acquires the skill of mathematical operations. 5. That the student acquires skills in methods of proof and thinking. 6. The student should be able to link the information.	4. The correct scientific thinking method. 5. Discussion method. 6. Daily, monthly and annual tests.
Ethics	
5. Utilizing the acquired information. 6. Personal development through reading and updating knowledge. 7. Engaging in the teaching profession. 8. Participation in seminars, conferences and workshops Specialized.	
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1. Develop a plan for asking and setting quick questions and exams. 2. Use the discussion method in teaching. 3. Assign the student some group activities and assignments. 4. Exercises, problems and mathematical solutions.	
10. Evaluation methods	
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11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements / Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Professor Doctor	Mathematics	Measure Theory			1	0
Professor Doctor	Mathematics	Applied Mathematics and Dynamical Systems			1	0
Professor Doctor	Mathematics	Algebra			1	0
Assistant Professor Doctor	Mathematics	Algebra			2	0
Professor Doctor	Mathematics	Functional Analysis			1	0
Professor Doctor	Mathematics	Graph Theory and its Topological and Algebraic Applications			1	0
Professor Doctor	Mathematics	Optimization and Artificial Intelligence			1	0
Professor Doctor	Mathematics	Mathematical Statistics			1	0
Assistant Professor Doctor	Mathematics	Numerical Analysis			1	0
Professor Doctor	Mathematics	Topology			1	0
Assistant Professor Doctor	Mathematics	Time Series			1	0
Professor Doctor	Mathematics	Numerical Optimization			1	0
Assistant Professor Doctor	Mathematics	Fluid Dynamics			1	0
Assistant Professor Doctor	Mathematics	Operations Research			1	0
Assistant Professor Doctor	Mathematics	Differential Equations			1	0
Assistant Professor Doctor	Mathematics	Mathematical Statistics			1	0
Assistant Professor Doctor	Mathematics	Graph Theory			1	0
Assistant Professor Doctor	Physics	Solid State Physics			1	0

Professor Doctor	Management and Economics				1	0
Professor Doctor	Mathematics				4	0
Professor Doctor	Arabic Language				1	0
Assistant Professor Doctor	Law				1	0

Professional development
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13. The most important sources of information about the program
Relying on sources taken from international universities in addition to local books, courses and scientific theses.
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Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
First stage / first semester	MS 101	Foundation of Mathematics I	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 102	Calculus I	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 103	Topic in Mathematics	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 104	General Physics	Optional	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	UOT001	Arabic Language I	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	UOT004	Democracy and Human Rights	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
First stage / second semester	MS 107	Foundation of Mathematics II	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 108	Calculus II	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 109	Linear Algebra	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	UOT003	Computer Applications I	Optional	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 111	Principles of Statistics	Optional	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	UOT002	English Language I	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
Second stage / first semester	MS 201	Advance Calculus	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 202	Ordinary Differential Equations	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 203	Probability and Statistics	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 204	Group Algebra	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	UOT021	English Languish II	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	UOT005	Ba'ath Party Crimes"	Optional	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓

Second stage / second semester	MS 205	Partial Differential Equations	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 206	Numerical Analysis I	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 207	Rings Algebra	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	UOT031	Computer Applications II	Optional	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	UOT011	Arabic Language II	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 208	Research Methodology	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
Third stage / first semester	MS 301	Mathematical Analysis I	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 302	Operation Research	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 303	Mathematical Statistics	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 304	Numerical Optimization	Optional	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 305	Numerical Analysis II	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 30	Mathematical Modeling	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
Third stage / second semester	MS 306	Mathematical Analysis II	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 307	Financial Mathematics	Optional	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 308	Number Theory	Optional	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 310	Subjects in Geometry	Optional	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 311	Arabic Language II	Optional	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 312	Medical physics	Optional	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 313	Computer Mathematics	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
Fourth stage / first semester	MS 401	Complex Analysis I	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 402	Topology I	Optional	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 403	Fractals	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 404	Functional Analysis I	Optional	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓

	MS 405	Chaos Theory	Optional	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 413	Encryption	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
Fourth stage / second semester	MS 412	Graph Theory	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 406	Complex Analysis II	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 407	Topology II	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 410	Functional Analysis II	Optional	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 409	Theory of Differential Equations	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
	MS 411	Research	Basic	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓

Course Description Form

1. Course Name:
Topology1
2. Course Code:
MS 402
3. Semester / Year:
First Semester / Fourth Year
4. Description Preparation Date:
2/9/2024
5. Available Attendance Forms:
My presence and electronically by creating an electronic class through the platform
6. Number of Credit Hours (Total) / Number of Units (Total)
60 Hours / 30 Units
7. Course administrator's name (mention all, if more than one name)
Name: Luma Saad Abdalbaqi Email: lumahhany1977@tu.edu.iq .....
8. Course Objectives

Course Objectives Study and knowledge of topological space and types of topological space	• ..... • •
9. Teaching and Learning Strategies	
Strategy	Applying various teaching methods, including: • Giving lectures • Discussion and electronic communication methods
10. Course Structure	

Week	Hou	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Topological Spaces	Topological Spaces	Electronic lectures,	Written and daily exams with assignments and reports
2	4	Euclidean Spaces	Euclidean Spaces	Electronic lectures, smart board and pen	
3	4	Sets in Topological Spaces	Open and Closed Sets	Electronic lectures, smart board and pen	Written and daily exams with assignments and reports
4	4	Topological Spaces	Definition of Continuous Functions and Open	Electronic lectures, smart board and pen	Exam
5	4	Types of Topological Spaces	Types of Topological Spaces	Electronic lectures, smart board and pen	Written and daily exams with assignments and reports
6	4	Ordinary Topological Spaces	Examples and Theorems	Electronic lectures, smart board and pen	Exam
7	4	Separation Axioms	Zero Separation Axioms	Electronic lectures, smart board and pen	Written and daily exams with assignments and reports
8	4	Separatio n Axioms T1…	Hausdorff Separation Axioms	Electronic lectures, smart board and pen	Exam
9	4	Open Sets Function	Normal and Regular Spaces	Electronic lectures, smart board and pen	Written and daily exams with assignments and reports
10	4	Topological Isomorphism	Open Set and Local Functions	Electronic lectures, smart board and pen	Exam
11	4	Topological Properties	Topological Identicality	Electronic lectures, smart board and pen	Written and daily exams with assignments and reports
12	4	Multiplicative Topological Spaces	Topological Properties	Electronic lectures, smart board	Exam

				and pen	
13	4	Some Types of Open Sets	Multiplied Topological Spaces	Electronic lectures, smart board and pen	Written and daily exams with assignments and reports
14	4	Some Types of Open Sets	Regular, Alpha, Prior, Semi and Beta	Electronic lectures, smart board and pen	Exam
15	4	Some Types of Continuous Alpha and A priori Functions	Continuous, Alpha and Prior Functions	Electronic lectures, smart board and pen	Written and daily exams with assignments and reports

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .....etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Functional analysis 1
2. Course Code:
MS 404
3. Semester / Year:
First Semester/Fourth Year
4. Description Preparation Date:
2/9/2024
5. Available Attendance Forms:
Classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
60 Hours/3 Units
7. Course administrator's name (mention all, if more than one name)
Name: Prof. Dr. Laith K. Shaakir Email: dr.laithkhaleel@tu.edu.iq

8. Course Objectives

Course Objectives	Functional analysis aims to introduce the student to the concepts of: vector spaces - metric spaces – normed spaces - convergence in normed spaces - Banach spaces. Linear functions defined on vector spaces and normed spaces

9. Teaching and Learning Strategies

Strategy	

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Vector spaces, definitions and examples	Vector spaces	Lectures	Discussion and tests

2	4	definitions and examples about symmetric and absorbing sets	symmetric and absorbing sets	Lectures	Discussion and tests
3	4	Subspaces with some examples	Subspaces	Lectures	Discussion and tests
4	4	definitions and examples with some theorems	Examples and theorems	Lectures	Discussion and tests
5	4	Concept of Basis and dimension of vector spaces	Basis and dimension	Lectures	Discussion and tests
6	4	Definition of Direct sum with some examples	Direct sum	Lectures	Discussion and tests
7	4	Definition of normed spaces	normed spaces	Lectures	Discussion and tests
8	4	Concept of product normed spaces	product normed spaces	Lectures	Discussion and tests

9	4	Equivalent normed spaces with some examples	Equivalent normed spaces	Lectures	Discussion and tests
10	4	The relation between normed spaces and metric spaces	Metric and normed spaces	Lectures	Discussion and tests
11	4	Converge sequences and Cauchy sequences in normed spaces	Convergence in normed spaces	Lectures	Discussion and tests
12	4	Banach spaces with examples	Banach spaces	Lectures	Discussion and tests
13	4	Convex sets, theorems and examples	Convexity	Lectures	Discussion and tests
14	4	Convex hull, theorems	Convex hull	Lectures	Discussion and tests
15	4	Definitions, examples and theorems	examples and theorems	Lectures	Discussion and tests

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports …etc

12. Learning and Teaching Resouces

Required textbooks (curricular books, if any)

مقدمة في التحليل الدالي,نوري فرحان المياحي و علي حسين بتور, 2005

Main references(sources)

1- **Introductory Functional Analysis With Applications "Kreyszig1978 ,**
2- **Introduction To Functional Analysis " by Sharma J.Vasishtha A.R, 1975**

Reconnended books and references (scientific journals, reports,…)

Electronic references, websites

Course Description Form

1. Course Name:
Complex Analysis 1
2. Course Code:
MS 401
3. Semester / Year:
First Semester/Fourth Year
4. Description Preparation Date:
2/9/2024
5. Available Attendance Forms:
Classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
60 Hours / 3 Units
7. Course administrator's name (mention all, if more than one name)
Name: AKRAM SALIM Email: akr_tel@tu.edu.iq

8. Course Objectives

Course Objectives	• For the student to become familiar with analytical functions and what is related to them in limits, continuity, and derivation. • To become familiar with the Cauchy-Riemann equations, their sufficient conditions, and harmonic functions • For the student to become familiar with prime, exponential, logarithmic, trigonometric, hyperbolic trigonometric functions, inverse trigonometric functions, and inverse hyperbolic trigonometric functions. • For the student to become familiar with definite integration and linear integration, in addition to the theorems related to integration.

9. Teaching and Learning Strategies

Strategy	

10. Course Structure

Week	Hour	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	4	The complex analysis and complex plane	Definition of complex analysis with a historical overview, the most important applications of the topic, and the emergence of complex numbers with algebraic properties.	Lecture	Discussion and tests
2	4	The complex analysis and complex plane	Cartesian and polar representation of complex numbers, powers and roots	Lecture	Discussion and tests
3	4	Topology in $\mathbb{C}$, functions, limit, and continuity	Definition of topology at the complex plane with some examples, definition of functions with some examples, and theorems	Lecture	Discussion and tests
4	4	Cauchy-Riemann theorem	Cauchy-Riemann theorem with some examples	Lecture	Discussion and tests
5	4	Analytical functions, harmonic functions	Definition of analytic and Harmonic functions with some examples and theorems	Lecture	Discussion and tests
6	4	Mandelbrot and Julia sets	Definitions and examples with some theorems	Lecture	Discussion and tests
7	4	Elementary Analytic functions	Definition of analytic functions, polynomials, and trigonometric functions with some properties, some examples, and the exponential function.	Lecture	Discussion and tests
8	4	Elementary Analytic functions	Rational functions, Logarithmic functions, and Hyperbolic functions	Lecture	Discussion and tests

9	4	Complex integrations	Definition of complex integration with some theorems and examples	Lecture	Discussion and tests
10	4	Contours Integrals and Contour curves	The basic theorems of contour integrals with some examples	Lecture	Discussion and tests
11	4	Definite integration, Contour Integration to solve definite Integrals	Some theorems and examples	Lecture	Discussion and tests
12	4	Green's theorem, Cauchy's inequality	Green's theorem, Cauchy's inequality with some examples	Lecture	Discussion and tests
13	4	Cauchy-Corsa theorem, Cauchy integral formulas	Theorems and examples of Cauchy-Corsa theorem and Cauchy's integral formulas	Lecture	Discussion and tests
14	4	Liouville's theorem, Moreira's theorem	Liouville's theorem, Moreira's theorem with some examples	Lecture	Discussion and tests
15	4	The average value theorem, Mean Value Theorem	The average value theorem of Chaos and also the basic theorem in algebra with its result and properties.	Lecture	Discussion and tests

11. Course Evaluation
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports.....etc

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Chaos Theory
2. Course Code:
3. Semester / Year:
1st / 4d
4. Description Preparation Date:
2/9/2024
5. Available Attendance Forms:
Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
60 Hours / 3 Units
7. Course administrator's name (mention all, if more than one name)
Name: Prof.Dr. Mizal Hamad Email: mizalobaidi@tu.edu.iq
8. Course Objectives

Course Objectiv	• Identify the basic concepts of chaos theory.…. • Identify fixed points and their importance. ….. • Identify fixed points and their stability. ….. • Knowledge of the chaoticity in various sciences. • Identify the one dimensional chaos and its basis.

9. Teaching and Learning Strategies

Strategy	**Learning Strategy for Chaos: Fixed points and their stability, families of Functions and their characteristics.** **General Objective:** Enable students to understand various concepts of chaos, the importance of chaoticity in different fields of science. **Educational Steps:**

Phase 1: Basic Concepts

1. **Iterates of Functions.:**
   - Graphical Analysis of Iterates.
   - Fixed points.
   - Criteria for stability of fixed points.
2. **Families of functions:**
   - The family .
   - The tent family.
   - Quadratic family.

Phase 2: One Dimensional Chaos.

1. **Sensitive dependence on initial conditions**
   - Define SDIC.
   - Example of SDIC.
2. **Lyapunov exponent.**
   - Define Lyapunov exponent.
   - Example of Lyapunov exp.
3. **Transitivity and strong chaos**
   - Define and theorems
   - example.
4. **Conjugacy**

   Theorems and examples

Educational Resources:

- **Books and References:**
  - Encounters with Chaos, and fractals, 3d ed. Denny Gulick
  - Discrete Chaos with applications in science and engineering, 2nd ed.

    Saber N Elaydi

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Fixed points	Definitions and examples,	lectures	daily and periodic exams.
2	4	Criteria for stability	Definitions and examples,	lectures	daily and periodic exams.

3	4	Periodic points	Definitions and examples,	lectures	daily and periodic exams.
4	4	Families of functions	Definitions and examples,	lectures	daily and periodic exams.
5	4	The tent family	Definitions and cases	lectures	daily and periodic exams.
6	4	Quadratic family	Definitions and cases,	lectures	daily and periodic exams.
7	4	One dimensional Chaos	Definitions and theorems , examples,	lectures	daily and periodic exams.
8	4	Sensitive dependence on initial conditions	Definitions and examples,	lectures	daily and periodic exams.
9	4	Lyapunov exponent	Definitions and examples,	lectures	daily and periodic exams.
10	4	Transitivity and strong chaos	Definitions and examples,	lectures	daily and periodic exams.
11	4	conjugacy	Definitions and examples, theorems	lectures	daily and periodic exams.
12	4	Cantor sets	Definitions and examples,	lectures	daily and periodic exams.
13	4	The cantor ternary set	Definitions and examples,	lectures	daily and periodic exams.
14	4	Strong chaos of functions	Definitions and examples,	lectures	daily and periodic exams.
15	4	Q - chaos	Definitions and examples,	lectures	daily and periodic exams.

Effort (40 Marks): The effort marks are distributed as follows:

- **First Exam:** 15 marks.
- **Second Exam:** 15 marks.
- **Assignments and Class Participation:** 10 marks.
- **Final Exam:** 60 marks, making the total 100 marks.

Course Description Form

1. Course Name:
Functional analysis 2
2. Course Code:
MS 410
3. Semester / Year:
Second Semester/Fourth Year
4. Description Preparation Date:
2/9/2024
5. Available Attendance Forms:
Classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
60 Hours/3 credits
7. Course administrator's name (mention all, if more than one name)
Name: Prof. Dr. Laith K. Shaakir Email: dr.laithkhaleel@tu.edu.iq
8. Course Objectives

Functional analysis aims to introduce the student to the concepts of: quotient spaces, the space of linear functions, the space of continuous linear functions, bounded linear functions, Hahn-Benach's theorem, Hilbert spaces, orthogonality, orthonormal sets, orthonormal basis, weak convergence, Rice's representation, adjoint operators, and projections.	....

9. Teaching and Learning Strategies

Unit or subject	

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	the concept of Quotient spaces with some theorems	Quotient spaces	Lectures	Discussion and tests

2	4	Linear functions	The space of linear functions	Lectures	Discussion and tests
3	4	continuous linear functions with some theorems	continuous linear functions	Lectures	Discussion and tests
4	4	Bounded linear functions with some theorems	Bounded linear functions	Lectures	Discussion and tests
5	4	Study the space of bounded linear functions	the space of bounded linear functions	Lectures	Discussion and tests
6	4	Hahn –Banach theorm with some results	Hahn –Banach theorm	Lectures	Discussion and tests
7	4	Pre-Inner product spaces with some examples	Pre-Inner product spaces	Lectures	Discussion and tests
8	4	Hilbert space with examples and theorems	Hilbert space	Lectures	Discussion and tests

9	4	Orthogonal ses with examples and theorems	orthogonality	Lectures	Discussion and tests
10	4	Orthonormal sets with examples and theorems	Orthonormal sets	Lectures	Discussion and tests
11	4	orthonormal basis with examples	orthonormal basis	Lectures	Discussion and tests
12	4	Riesz theorem	Riesz representation	Lectures	Discussion and tests
13	4	the concept of Weakly converge	Weakly converge	Lectures	Discussion and tests
14	4	Adjoint operators	Adjoint operators	Lectures	Discussion and tests
15	4	projections	projections	Lectures	Discussion and tests

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports …etc

12. Learning and Teaching Resouces

Required textbooks (curricular books, if any)

مقدمة في التحليل الدالي,نوري فرحان المياحي و علي حسين بتور, 2005

Main references(sources)

3- **Introductory Functional Analysis With Applications "Kreyszig1978 ,**

4- **Introduction To Functional Analysis " by Sharma J.Vasishtha A.R, 1975**

Reconnended books and references (scientific journals, reports,…)

Electronic references, websites

Course Description Form

1. Course Name:
Graph theory
2. Course Code:
MS 408
3. Semester / Year:
Second Semester/Fourth Year
4. Description Preparation Date:
2/9/2024
5. Available Attendance Forms:
Classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
60 Hours / 3 Units
7. Course administrator's name (mention all, if more than one name)
Name: dr. Ahmed Maher Salih & Dr. Narmin Jamal Khaleel Email: ahmed.m.salih@tu.edu.iq & Narmin.j.khaleel@tu.edu.iq
8. Course Objectives

Course Objectives	Identify the concepts and basics of ..... statement theory
9. Teaching and Learning Strategies	
Unit or subject	-Sudden daily and continuous weekly tests. -Exercises and activities in the classroom. -Guiding students to some sources that contain examples and exercises to benefit from them. Managing the lecture in an applied manner linked to the reality of daily life to attract the student to the topic of the lesson without straying from the core of the topic so that the material is flexible and amenable to understanding and analysis. Assigning the student to some group activities and duties. Allocate a percentage of the grade to daily assignments and tests.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First	4	Graph, order and size and simple, Multiple graph, and sub graph	Graph Concepts	theoretical	Through tests, general questions, and discussion
Second	4	Directed and undirected graph	Graph Concepts	theoretical	General questions and discussion
Third	4	Concepts of adjacent vertex and degree of vertex with some of examples	Adjacent vertex, degree of vertex	theoretical	General questions and discussion
Fourth	4	Some of its application	The first theorem of graph	theoretical	General questions and discussion
Fifth	4	Some of its application and theorems of degree	Degree sequences	theoretical	Quiz
Sixth	4	Intersection of graphs, complement of graph	Operations on the graph	theoretical	General questions and discussion
Seventh	4	Product of graphs, composition of graphs	Operations on the graph	theoretical	General questions and discussion
Eighth	4	Definitions, theorems and examples	Path, connected, strongly connected, weakly connect graphs	theoretical	Quiz
Ninth	4	Definitions, theorems and examples	Isomorphism of graph, self complementary graph	theoretical	General questions and discussion
Tenth	4	Definition of walk, open and closed walk, cycle path	Walk	theoretical	Monthly exam
Eleventh	4	Some important matrix, adjacent matrix, path matrix and	Matrix	theoretical	General questions and discussion

		incidence matrix			
Twelfth	4	Definitions, theorems and examples	Bipartite graph and complete	theoretical	General questions and discussion
Thirteenth	4	Definitions and some of its applications	Loop and circuits and circuit matrix	theoretical	General questions and discussion
Fourteenth	4	Eulerian path, Eulerian circuit, Eulerian graph and Eulerian cycle	Eulerian	theoretical	General questions and discussion
Fifteenth	4	Some theorems of trees and it's applications	Trees	theoretical	General questions and discussion

11. Course evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

12. Learning and teaching resources

Required textbooks (methodology, if any)	Graph Theory by H. K. Taluja and D. Bhardwaj2016
Main references (sources) Recommended supporting books and references (scientific journals, reports...	Harary, Frank (2010), Graph Theory, Reading, MA: Addison-Wesley.
Electronic references, Internet sites	Discreet websites. Virtual library. Library locations in some international universities.

Course Description Form

1. Course Name:
Theory of Differential Equations
2. Course Code:
MS 409
3. Semester / Year:
Second Semester/Fourth Year
4.Description Preparation Date:
2/9/2024
5. Available Attendance Forms:
Classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
60 hours / 3 units
7. Course administrator's name (mention all, if more than one name)
Name: Dr.Esraa Habeeb Khaleel Email: esraa.h.khaleel@tu.edu.iq
8. Course Objectives

Course Objectives	• Learning about theoretical concepts of differential equations. ..... • Studying the existence and the uniqueness theorems for solutions of differential equations. • To understand the Linear independence theorems for solutions of differential equations. • To Learn about solving linear homogeneous differential systems using eigenvalues and eigenvectors. • Identify the concept of stability of solutions of differential systems and types of critical points for systems and the phase Plane and trajectory for those points • The ability to prove the existence and the uniqueness solutions of differential equations by applying the theorems. • Gaining the ability to analyze, explain and solve problems. • Providing the student with the skills of communication, expression and discussion

	to stimulate mathematical thinking, understanding and solving mathematical issues.

9. Teaching and Learning Strategies

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

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	System of Differential Equations	System of First Order Equations, Vector-Matrix Notation of Systems	Lectures	Discussion and tests
2	4	System of Differential Equations	Existence, Uniqueness, and Continuity, The Gronwall's Inequality	Lectures	Discussion and tests
3	4	Linear Systems, with an introduction to Phase Space Analysis	Existence and Uniqueness for Linear Systems, Linear Homogeneous Systems	Lectures	Discussion and tests
4	4	Linear Systems, with an introduction to Phase Space Analysis	Linear Nonhomogeneous Systems, Similarity of Matrices and Jordan Canonical Form	Lectures	Discussion and tests
5	4	Existence Theory	Existence Theory for Systems of First-Order Equations, Uniqueness of Solutions	Lectures	Discussion and tests
6	4	Existence Theory	Continuation of Solutions, Dependence on Initial Conditions and Parameters	Lectures	Discussion and tests
7	4	Stability of Linear and Almost Linear Systems	Definitions of Stability, Linear Systems, Almost Linear Systems	Lectures	Discussion and tests
8	4	Stability of Linear and Almost Linear Systems	Conditional Stability, Asymptotic Equivalence, Stability of Periodic Solutions	Lectures	Discussion and tests
9	4	Lyapunov's Second Method	Introductory Remarks ,Lyapunov's Theorems	Lectures	Discussion and tests
10	4	Lyapunov's Second Method	Proofs of Lyapunov's Theorems	Lectures	Discussion and tests
11	4	Lyapunov's Second Method	Proofs of Lyapunov's Theorems	Lectures	Discussion and tests
12	4	One Dimensional Movement of a Particle	Perron's Theorem, Stability of periodic solutions and other	Lectures	Discussion and tests

			notions of stability		
13	4	One Dimensional Movement of a Particle	Classical Mechanics with One Degree on Freedom	Lectures	Discussion and tests
14	4	One Dimensional Movement of a Particle	Replicator Equation and Mathematical Biology	Lectures	Discussion and tests
15	4	One Dimensional Movement of a Particle	Replicator Equation and Mathematical Biology	Lectures	Discussion and tests

Course Description Form

1. Course Name:
Topology 2
2. Course Code:
MS 407
3. Semester / Year:
Second Semester / Fourth Year
4. Description Preparation Date:
2/9/2024
5. Available Attendance Forms:
Official working hours
6. Number of Credit Hours (Total) / Number of Units (Total)
60 Hours / 3 Units
7. Course administrator's name (mention all, if more than one name)
Name: prof . Luma Saad Abdalbaqi Email: Lumahhany1977@tu.edu.iq
8. Course Objectives

Course Objectives	Identify the concepts and basics of statement theory
9. Teaching and Learning Strategies	
Unit or subject	Sudden daily and continuous weekly tests. -Exercises and activities in the classroom. -Guiding students to some sources that contain examples and exercises to benefit from them. Managing the lecture in an applied manner linked to the reality of daily life to attract the student to the topic of the lesson without straying from the core of the topic so that the material is flexible and amenable to understanding and analysis. Assigning the student to some group activities and duties. Allocate a percentage of the grade to daily assignments and tests.
10. Course Structure	

nameek	Hour	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First	4	Topological Spaces:	Definition and Examples	theoretical	General questions and discussion
Second	4	Compactness: Compact	Covers ,compact sets , locally compact	theoretical	General questions and discussion
Third	4	Compact Spaces	(Definition and Examples)	theoretical	General questions and discussion
Fourth	4	The relationship of compact spaces to Hausdorff space	(Definition and Examples)	theoretical	General questions and discussion
Fifth	4	Locally Compact Spaces	(Definition and Examples)	theoretical	Quiz
Sixth	4	Finite intersection property and its relation to compact spaces	(Definition and Examples)	theoretical	General questions and discussion
Seventh	4	Heine-Paul theorem and its weakness in space	Definition and Examples	theoretical	General questions and discussion
Eighth	4	Connectedness	Connected Topological Spaces,.	theoretical	General questions and discussion
Ninth	4	Not Connected Topological Spaces,.	Separated sets , Examples	theoretical	General questions and discussion
Tenth	4	Path-wise Connected Spaces	connected sets, locally connected	theoretical	General questions and discussion
Eleventh	4	Locally connected Spaces	(Definition and Examples)	theoretical	Quiz
Twelfth	4	Connected Space Applications	mean value theorem	theoretical	General questions and discussion
Thirteenth	4	Path-connected spaces	(Definition and Examples)	theoretical	General questions and discussion
Fourteenth	4	homotopy theory	Introduction to homotopy theory and homotopy functions	theoretical	General questions and discussion
Fifteenth	4	Fundamental group	Understand the concept of group and some examples	theoretical	General questions and discussion

11. name	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .....etc	
method Learning and Teaching Resources	
Required textbooks (curricular booksеek	
Main references (sources)	
Recommended books and references name	
Electronic References, Websites	

Sharma J.N,Topology, Krishna Prakashan Media P Ltd , 2003

وليم بيرفن,ترجمة عطا الله ثامر العاني, أساسيات التبولوجيا العامة, جامعة بغداد-العراق, 1986.

عبد ربه محمد اسليم, فقه التبولوجيا,فلسطين, 1999.

Course Description Form

1. Course Name:	
Mathematical Analysis (1)	
2. Course Code:	
MS 301	
3. Semester / Year:	
First Semester / Third Year	
4. Description Preparation Date:	
2/9/2024	
5. Available Attendance Forms:	
Official working hours	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hours/ 3 units	
7. Course administrator's name (mention all, if more than one name)	
Name: dr. Ahmed Maher Salih Email: ahmed.m.salih@tu.edu.iq	
8. Course Objectives	
Course Objectives	1.This module aims mathematical analysis aims to introduce the student to the basic concepts and techniques of real analysis. 2.Exploration of the properties of mathematical numbers: mathematical analysis investigates the properties of real numbers, such as their order, completeness, and algebraic and topological properties. It delves into the structure of the real number system and its various subsets. 3.Rigorous understanding of calculus: mathematical analysis provides a rigorous foundation for calculus. It aims to give a precise definition of limits, continuity, which are fundamental concepts in calculus. 4.Study of mathematical functions: mathematical analysis focuses on the behavior and properties of functions defined on the real numbers. 5.Development of mathematical reasoning and proof-writing skills: mathematical analysis is a discipline that emphasizes rigorous proofs and logical reasoning. It aims to develop students' ability to construct and present mathematical arguments in a precise and coherent manner.
9. Teaching and Learning Strategies	
Unit or subject	- 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 type of simple experiments involving

	some sampling activities that are interesting to the students.

10. Course Structure

name eek	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First	4	Inclusion concepts, Equal sets, Subsets	Real numbers and rational numbers	theoretical	Through tests, general questions, and discussion
Secon d	4	Proper subset, Empty set, Universal set	The relation between the field of rational numbers and the field of real numbers	theoretical	General questions and discussion
Third	4	Union, Intersection, Disjoint set, Symmetric difference	The density of rational (irrational) numbers	theoretical	General questions and discussion
Fourth	4	Sequence of real numbers	Power set, Complement set, Algebra of sets	theoretical	General questions and discussion
Fifth	4	Convergence and divergence of sequence	Compound statements, Condition statements, Biocondition statement	theoretical	Quiz
Sixth	4	Montonic and bounded sequence	Tautology, Contradiction and Arguments	theoretical	General questions and discussion
Seven th	4	Cauchy sequence	Open sentence, Quantified statements	theoretical	General questions and discussion
Eighth	4	Infinite series	Cartesian product, Relations	theoretical	Quiz
Ninth	4	Convergence test	Symmetric relation	theoretical	General questions and discussion
Tenth	4	Metric space	Transitive - relation	theoretical	Monthly exam
Eleven	4	Basic principales	Equivalence	theoretical	General

th		in Topology	relation, Partition of the set		questions and discussion
Twelfth	4	Convergence sequence in a metric space	Partially ordered set	theoretical	General questions and discussion
Thirteenth	4	Cauchy sequence in a matric space	Totally ordered set	theoretical	General questions and discussion
Fourteenth	4	Complete metric space	Domain and Co-domain of the function	theoretical	General questions and discussion
Fifteenth	4	Compact metric space	Algebra of functions	theoretical	General questions and discussion

11. Course evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

12. Learning and teaching resources

Required textbooks (methodology, if any)	مقدمة في التحليل الرياضي تاليف: الاستاذ الدكتور عادل غسان نعوم Real analysis,Royden,new York , 2 Principles of Mathematical analysis,Rudin, 2000. • Introduction of Mathematical analysis,WilliamR.2015.
Main references (sources) Recommended supporting books and references (scientific journals, reports...	The most important books and special sources in mathematical analysis. Located in the central library, the science library and the department.
Electronic references, Internet sites	Discreet websites. □ Virtual library. □ Library locations in some international universities.

Course Description Form

1. Course Name:
Operations research
2. Course Code:
MS 302
3. Semester / Year:
1st semester /Third Year
4. Description Preparation Date:
2/9/2024
5. Available Attendance Forms:
Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
60 hours / 3units
7. Course administrator's name (mention all, if more than one name)
Name: Scm. Hind Khaled Kolaib Email:Hind.Khaled@tu.edu.iq
8. Course Objectives

Course Objectives	1. Understanding of the fundamental principles and methodologies underlying Operations Research. 2. Ability to apply mathematical models and analytical techniques to solve complex decision-making problems. 3. Familiarity with tools and software commonly used in Operations Research, such as linear programming, network analysis, and simulation. 4. Ability to formulate and solve optimization problems, including linear and nonlinear programming, integer programming, and dynamic programming. 5. Knowledge of stochastic models and their application in decision-making under uncertainty. 6. Understanding of queueing theory and its application in service operations. 7. Ability to analyze and optimize supply chain systems, including inventory management, transportation, and facility location. 8. Familiarity with game theory and its application in strategic

	decision-making. 9. Ability to communicate effectively and present technical findings to both technical and non-technical audiences.

9. Teaching and Learning Strategies

Unit or subject	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 type of simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure

nameek	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	**Introduction, Theoretical models for linear programming problems.**	**Definitions and examples.**	lectures	Discussion and tests
2	4	**Numerical procedures for soling linear programming problems, Graphical method.**	**Definitions and examples.**	lectures	Discussion and tests
3	4	**Basic and Basic feasible solution.**	**Definitions and examples.**	lectures	Discussion and tests
4	4	**Simplex method (slack variables).**	**Definitions and examples.**	lectures	Discussion and tests

5	4	**Simplex method (artificial variables).**	**Definitions and examples.**	lectures	Discussion and tests
6	4	**Simplex multipliers method.**	**Definitions and examples.**	lectures	Discussion and tests
7	4	**Introduction , Dual method and Dual theorem.**	**Definitions and examples.**	lectures	Discussion and tests
8	4	**The relationship between the two models solution and what results from them, The inverse basis method.**	**Definitions and examples.**	lectures	Discussion and tests
9	4	**Mid Examination.**	**Definitions and examples.**	lectures	Discussion and tests
10	4	**Sensitivity analysis method ,Changes in the right side of the constraints , Changes in objective function coefficients.**	**Definitions and examples.**	lectures	Discussion and tests
11	4	**Introduction, Find a primary solution , West corner method , Least cost method.**	**Definitions and examples.**	lectures	Discussion and tests

12	4	**Vogle's method, Unbalanced transport problems.**	**Definitions and examples.**	lectures	Discussion and tests
13	4	**The total of the sources contains the greatest goals you need, The total of the sources is less than what the ends need.**	**Definitions and examples.**	lectures	Discussion and tests
14	4	**Find the optimal solution to the transport problem.**	**Definitions and examples.**	lectures	Discussion and tests
15	4	**Examples of the optimal solution**	**Definitions and examples.**	lectures	Discussion and tests

11. name
Quizzes 5/ Homworks 8/ midterm exam 40/ final exam 60

method Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references name	
Electronic References, Websites	

Course Description Form

1. Course Name:
Mathematical statistics
2. Course Code:
MS 303
3. Semester / Year:
1st / 3rd
4. Description Preparation Date:
2/9/2024
5. Available Attendance Forms:
Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
60 Hours / 3 Units
7. Course administrator's name (mention all, if more than one name)
Name: Prof.Dr. Mundher Abdullah Khaleel Email: mun880088@tu.edu.iq
8. Course Objectives

Course Objectiv	• Identify the basic concepts of mathematical statistics. • Identify distributions and their importance. ..... • Identify random sampling distributions. ..... • Knowledge of the applications of distributions in various sciences. • Identify the principle of ordered statistics and their distributions.
9. Teaching and Learning Strategies	
Unit or subject	**Learning Strategy for Statistics: Distributions and Random Variable Functions** **General Objective:** Enable students to understand various statistical distributions, apply them in data analysis, and use appropriate methods to estimate statistical parameters and evaluate the quality of estimators. **Educational Steps:**

Phase 1: Basic Concepts

3. **Distributions of Random Variable Functions and Methods of Finding Them:**
    - Define random variables (continuous and discrete).
    - Derive distributions using integration and summation methods.
    - Practical examples of distributions in real-world contexts.
4. **Continuous and Discrete Distributions:**
    - Explain the differences between continuous and discrete distributions.
    - Study common examples such as the normal distribution, uniform distribution, and binomial distribution.

Phase 2: Advanced Statistical Distributions

5. **Sampling Distributions:**
    - Explain the concept of sampling distribution.
    - Applications of statistics distributions like mean and standard deviation.
6. **Order Statistics Distributions:**
    - Define order statistics.
    - Use order statistics distributions in data analysis.
7. **Limit Theorems (Central Limit Theorem):**
    - Explain the theorem and its significance.
    - Practical applications of the theorem.

Phase 3: Statistical Estimation

1. **Point Estimation:**
    - Define point estimation.
    - Practical examples of estimation using real data.
2. **Methods of Finding Estimators:**
    - **Method of Moments:** Explain the method with practical examples.
    - **Least Squares Method:** Apply it in statistical models.
    - **Maximum Likelihood Estimation:** Explain and use it to estimate parameters.
3. **Properties of Point Estimators:**
    - Explain properties: unbiasedness, consistency, sufficiency, completeness, uniqueness, and efficiency.
    - Apply the Cramer-Rao inequality to evaluate efficiency.

Phase 4: Practical Applications and Assessment

1. **Practical Activities:**
    - Analyze real data using various distributions.

- Apply estimation methods to solve statistical problems.

2. **Group Projects:**
   - Projects requiring real-world data analysis and report writing.
3. **Periodic Tests:**
   - Evaluate students' understanding of fundamental concepts and practical applications.

Educational Resources:

- **Books and References:**
  - Detailed coverage of basic concepts and practical examples.
- **Statistical Software:**
  - Use software like R and SPSS to apply distributions and estimation methods.
- **Interactive Lectures:**
  - Discussion sessions and practical exercises.

10. Course Structure

namemethod	Hours	Required Learning Outcomes	name	Learning method	Evaluation
1	4	Distributions of Random Variable Functions and Methods of Finding Them	Definitions and examples,	lectures	daily and periodic exams.
2	4	Continuous Distributions	Definitions and examples,	lectures	daily and periodic exams.
3	4	Discrete Distributions	Definitions and examples,	lectures	daily and periodic exams.
4	4	Sampling Distributions	Definitions and examples,	lectures	daily and periodic exams.
5	4	Order Statistics Distributions	Definitions and examples,	lectures	daily and periodic exams.
6	4	Limit Theorems (Central Limit Theorem)	Definitions and examples,	lectures	daily and periodic exams.
7	4	Point Estimation	Definitions and examples,	lectures	daily and periodic exams.
8	4	Methods of Finding Estimators Method of Moments:	Definitions and examples,	lectures	daily and periodic exams.
9	4	MLE	Definitions and examples,	lectures	daily and periodic exams.

10	4	Least Squares Method:	Definitions and examples,	lectures	daily and periodic exams.
11	4	Properties of Point Estimators: Unbiasedness, Consistency	Definitions and examples,	lectures	daily and periodic exams.
12	4	Sufficiency, Completeness:	Definitions and examples,	lectures	daily and periodic exams.
13	4	Cramer-Rao Inequality	Definitions and examples,	lectures	daily and periodic exams.
14	4	Exponential Families:	Definitions and examples,	lectures	daily and periodic exams.
15	4	Distributions of Random Variable Functions and Methods of Finding Them	Definitions and examples,	lectures	daily and periodic exams.

Effort (40 Marks): The effort marks are distributed as follows:

- **First Exam:** 15 marks.
- **Second Exam:** 15 marks.
- **Assignments and Class Participation:** 10 marks.
- **Final Exam:** 60 marks, making the total 100 marks.

Course Description Form

1. Course Name:
Optimization
2. Course Code:
MS 304
3. Semester / Year:
First Semester/ Third Stage
4. Description Preparation Date:
2/9/2024
5. Available Attendance Forms:
Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
60 Hours / 3 Units
7. Course administrator's name (mention all, if more than one name)
Dr. Nizar Khalf Hussein **Email: nizar.dikhil@tu.edu.iq**
8. Course Objectives

Course Objectives	1. **Acquire the concept of statements and mathematical logic and methods of dealing with them algebraically.** 2. **Clarify the concept of sets, relations, functions, and the connections between them, as well as related theorems.** 3. **Provide students with experience in dealing with matrices of various types and performing different operations on them.**
9. Teaching and Learning Strategies	
Unit or subject	• **Divide the content into clear units, use theoretical lectures, practical examples, and exercises to reinforce understanding, encourage interaction through discussions and group work.** • **Use technology and software to facilitate learning, assign students practical projects to apply concepts.** • **Evaluate students through periodic tests and final exams, with continuous feedback to ensure effective achievement of objectives.**

10. Course Structure

name eek	Hours	Required Learning	Unit or subject	Learning	Evaluation

		Outcomes			
1	4	General Introduction	Optimization	Lecture	Discussion and Tests
2	4	Basic Definitions and Concepts	Vectors and Vector Spaces	Lecture	Discussion and Tests
3	4	Basic Definitions and Concepts	Matrices	Lecture	Discussion and Tests
4	4	Basic Definitions and Concepts	Eigenvalues and Eigenvectors	Lecture	Discussion and Tests
5	4	Basic Definitions and Concepts	Functions	Lecture	Discussion and Tests
6	4	Unconstrained Optimization	Necessary and Sufficient Conditions	Lecture	Discussion and Tests
7	4	Unconstrained Optimization	Optimization of Single-Variable Functions	Lecture	Discussion and Tests
8	4	Unconstrained Optimization	Derivative-Free Optimization Methods	Lecture	Discussion and Tests
9	4	Unconstrained Optimization	Derivative-Free Optimization Methods	Lecture	Discussion and Tests
10	4	Unconstrained Optimization	Derivative-Based Optimization Methods	Lecture	Discussion and Tests
11	4	Unconstrained Optimization	Optimization of Multi-Variable Functions	Lecture	Discussion and Tests
1	4	General Introduction	Optimization	Lecture	Discussion and Tests
2	4	Basic Definitions and Concepts	Vectors and Vector Spaces	Lecture	Discussion and Tests
3	4	Basic Definitions and Concepts	Matrices	Lecture	Discussion and Tests
4	4	Basic Definitions and Concepts	Eigenvalues and Eigenvectors	Lecture	Discussion and Tests

11. Effort (40 Marks): The effort marks are distributed as follows:

- **First Exam:** 15 marks.
- **Second Exam:** 15 marks.
- **Assignments and Class Participation:** 10 marks.
- **Final Exam:** 60 marks, making the total 100 marks.

12. Teaching and Learning Resources:

- **Required Textbooks (if any): None**
- **Main References (Sources):**
  Operations Research, Gupta & Hira, 2008
- **Supplementary Books and References (Scientific Journals, Reports, etc.):**
  Engineering Optimization, Rao, 2009
- **Electronic References, Internet Sites:**
  Engineering Optimization, Rao, 2009

Course Description Form

1. Course Name:
Numerical Analysis 2
2. Course Code:
MS 205
3. Semester / Year:
1st semester /Third Year
4. Description Preparation Date:
2/9/2024
5. Available Attendance Forms:
Classroom or by Web
6. Number of Credit Hours (Total) / Number of Units (Total)
60 Hours/ 3 Units
7. Course administrator's name (mention all, if more than one name)
Name: Firas Adel Fawzi Email:firasadil01@tu.edu.iq
8. Course Objectives
1. The student's teaching of Numerical Analysis 2 aims at his knowledge of the numerical methods for solving a problem that may be difficult to find an analytical solution. 2. Study numerical methods to find the numerical integral with their application in solving examples. 3. Study the error analysis of the approximate solutions of these numerical methods to make it easier for us to know which numerical methods are better in finding the value of numerical integration. 4. To understand the methods of solving ordinary differential equations numerically with different examples. 5. To understand the least square approximation, linear, nonlinear approximation for x and for constants. 6. Writing algorithms for those numerical methods and programming them using Matlab language practically.
9. Teaching and Learning Strategies
The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure

nameek	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation
1	4	Numerical integration	Trapezium rule with example solution and write an algorithm	Theoretical Lecture and discussion	Oral tests and quizzes
2	4	Simpson method	Study of error analysis, solving an example, and writing an algorithm	Theoretical Lecture and discussion	Oral tests and quizzes
3	4	Midpoint method	Solve an example and write the algorithm	Theoretical Lecture and discussion	Oral tests and quizzes
4	4	Romberg method	Solve an example and write the algorithm	Theoretical Lecture and discussion	Oral tests and quizzes
5	4	Open and closed Newton-Coates roads	Solve some examples	Theoretical Lecture and discussion	Oral tests and quizzes
6	4	Gauss-Legendre integral method	Solve some examples	Theoretical Lecture and discussion	Oral tests and quizzes
7	4	Approximation by least squares method	Linear and binary approximation	Theoretical Lecture and discussion	Oral tests and quizzes
8	4	Approximation by least squares method	Nonlinear exponential approximation	Theoretical Lecture and discussion	1st Midterm exam in previous weeks(1-7)
9	4	Ordinary differential equations of first order	Explicit Euler method with error order and example solution	Theoretical Lecture and discussion	Oral tests and quizzes
10	4	Ordinary differential equations of first order	Implicit Euler method by error ordering, solving examples and writing the algorithm	Theoretical Lecture and discussion	Oral tests and quizzes
11	4	Taylor series method	Taylor series method, solving examples and writing the algorithm	Theoretical Lecture and discussion	Oral tests and quizzes
12	4	Rung-Kutta roads of the second and fourth order	Fourth order Runge-Kutta method, solving examples and writing the algorithm	Theoretical Lecture and discussion	Oral tests and quizzes
13	4	Derivation of Adam-Bashforth multistep methods	Solve examples	Theoretical Lecture and discussion	Oral tests and quizzes
14	4	Higher order ordinary differential equations	(Boundary value problems) Finite difference methods for linear equations	Theoretical Lecture and discussion	Oral tests and quizzes
15	4	Elementary value problems	Internal modification methods	Theoretical Lecture and discussion	2nd Midterm exam

11. Course Evaluation

Couse evolution of a student including the sum of the following two parts

1. Formative Evalution 40%

   (2 exams through the term 30% and Oral discussion 5% and Quizzes 5%)

2. Summative Evalution

   (Final Exam 60%)

12. Learning and Teaching Recourses

Required textbook(Curricular book, if any):

-Numerical Analysis, Puma Chanadra Biswal (2008)

Main References (Sources):

1. Butcher, J. C. (2016). *Numerical methods for ordinary differential equations*. John Wiley & Sons.

2. Dormand, J. R. (2018). *Numerical methods for differential equations: a computational approach*. CRC press.

Recommended book and references (Scientific journals, reports,…):

Electronic Reference ,Web sites:

https://scholar.google.com/scholar?hl=en&as_sdt=0,5&q=Numerical+Methods+For+Differential+Equations+A+Computational+Approach#d=gs_cit&t=1711840744034&u=%2Fscholar%3Fq%3Dinfo%3A3wm8DutzH7sJ%3Ascholar.google.com%2F%26output%3Dcite%26scirp%3D0%26hl%3Den

Course Description Form

1. Course Name:
Mathematical Modeling
2. Course Code:
3. Semester / Year:
First Semester / Third Year
4. Description Preparation Date:
2/9/2024
5. Available Attendance Forms:
Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
60 hours / 3 units
7. Course administrator's name (mention all, if more than one name)
Name: Rana Hazim Jasim Email: **rana.hazim@tu.edu.iq**
8. Course Objectives

Course Objectives	Mathematical modeling aims to introduce the student to the concepts of: 1. The ability to transform a real problem into a mathematical model 2. The ability to interpret the results of the model and evaluate its accuracy 3. The ability to use mathematical modeling to make decisions 4. The ability to solve mathematical models using analytical tools.

9. Teaching and Learning Strategies

Unit or subject	

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation
1.	4	Introduction to Mathematical Modeling	Definition of mathematical	Discussion	lectures and tests

			modeling and its importance		
2.	4	Application Examples	Conditions of mathematical models	Discussion	lectures and tests
3.	4	Examples of Step Applications	Basic steps in building the model	Discussion	lectures and tests
4.	4	Definition and Examples	Classification of mathematical models	Discussion	lectures and tests
5.	4	Examples and Applications	Errors and error measures	Discussion	lectures and tests
6.	4	Examples and Applications	Definition of approximation and its types	Discussion	lectures and tests
7.	4	Definition and Examples	Modeling change with difference equations	Discussion	lectures and tests
8.	4	Definitions and Examples	Case studies in deterministic modeling of change	Discussion	lectures and tests
9.	4	Definitions and Application Examples	Newton's law of cooling	Discussion	lectures and tests
10.	4	Definitions and Examples	Definition of nonlinear systems and multidimensional systems	Discussion	lectures and tests
11.	4	Definitions and Application Examples	Logistic model	Discussion	lectures and tests
12.	4	Definitions and Examples	Least squares method	Discussion	lectures and tests
13.	4	Definition and Application Examples	Stochastic modeling of kinetic systems	Discussion	lectures and tests
14.	4	Application Examples	Case study: Modeling transportation and election movement	Discussion	lectures and tests

15.	4	Application Examples	Modeling by differential equations	Discussion	lectures and tests

11. Course Evaluation	
The grade is distributed out of 100 according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly and written exams, reports, etc.	
12. Learning and teaching resources	
Required textbooks (methodology if any)	Introduction to Mathematical Modeling Using MATLAB Prof. Basil Dhnoon
Main References (Sources)	athematical Modeling :Techniques and Application by derick Mosteller first Course in Mathematical by nk R.Girordano,William C.Brey,and Mauro D.
Recommended supporting books and references (scientific journals, reports...)	
Electronic references, websites	

Course Description Form

1. Course Name:
English 4
2. Course Code:
411
3. Semester / Year:
1st semester /Third Year
4. Description Preparation Date:
2/9/2024
5. Available Attendance Forms:
Inside the class
6. Number of Credit Hours (Total) / Number of Units (Total)
30 Hours / 2 Units
7. Course administrator's name (mention all, if more than one name)
Name: Ayham Mahmoud Abbad Email: ayham.m.abbad@tu.edu.iq
8. Course Objectives

Course Objectives	1. To be able to speak English fluently and accurately. 2. To think in English and then speak. 3. To be able to talk in English. 4. To be able to compose freely and independently in speech and writing. 5. To be able to read books with understanding.
9. Teaching and Learning Strategies	
Unit or subject	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, enable the students for the use of grammar correctly.

10. Course Structure

name eek	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation

1	2	Speaking – Listening – Reading – Writing	Introduction: about study materials of Headway Pre-intermediate Plus.	Teacher-Student Orientation	Discussion
2	2	Speaking – Listening – Reading – Writing	Grammar: Have (got) to, practices.	Teacher-Student Orientation	Discussion
3	2	Speaking – Listening – Reading – Writing	Should/must, questions and answers. Reading.	Teacher-Student Orientation	Discussion
4	2	Speaking – Listening – Reading – Writing	Vocabulary: words that go together, everyday English at the doctors.	Teacher-Student Orientation	Discussion
5	2	Speaking – Listening – Reading – Writing	Grammar: verb patterns and infinitives, practices.	Teacher-Student Orientation	Discussion
6	2	Speaking – Listening – Reading – Writing	Time and conditional clauses, practices (when, as soon as). listening and speaking/ life in 2050.	Teacher-Student Orientation	Discussion
7	2	Mid-term Exam	Mid-term Exam	Mid-term Exam	Mid-term Exam

8	2	Speaking – Listening – Reading – Writing	Reading and speaking/ the world's first megalopolis.	Teacher-Student Orientation	Discussion
9	2	Speaking – Listening – Reading – Writing	Vocabulary: Hot verbs/ take- get- do and make.	Teacher-Student Orientation	Discussion
10	2	Monthly exam	Monthly exam	Monthly exam	Monthly exam
11	2	Speaking – Listening – Reading – Writing	Expressions about exclamations with so and such.	Teacher-Student Orientation	Discussion
12	2	Speaking – Listening – Reading – Writing	Grammar: actives and passives voice, practices.	Teacher-Student Orientation	Discussion
13	2	Speaking – Listening – Reading – Writing	Verbs and nouns that go together, practices.	Teacher-Student Orientation	Discussion
14	2	Speaking – Listening – Reading – Writing	Reading: about the discovery of DNA., expressions about(notices).	Teacher-Student Orientation	Discussion

15	2	Speaking – Listening – Reading – Writing	Study material review	Teacher-Student Orientation	Discussion

11. name
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports ..... etc

method Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Headway pre-intermediate plus student's book
Main references (sources)	
Recommended books and references name	
Electronic References, Websites	

Course Description Form

1. Course Name:
Mathematical Analysis (2)
2. Course Code:
MS 306
3. Semester / Year:
Second Semester / Third Year
4. Description Preparation Date:
2/9/2024
5. Available Attendance Forms:
Official working hours
6. Number of Credit Hours (Total) / Number of Units (Total)
60 hours / 3 units
7. Course administrator's name (mention all, if more than one name)
Name: dr. Ahmed Maher Salih Email: ahmed.m.salih@tu.edu.iq
8. Course Objectives

Course Objectives	1. Mathematical analysis aims to introduce the student to the basic concepts and techniques of real analysis. 2. Understanding Differentiation helps students develop an understanding of how a function's output changes in response to small changes in its input. 3. Analyzing Extrema: Differentiation enables the identification and analysis of critical points, which include local maxima and minima of a function. 4. Analyzing Graphs and Behavior: Differentiation provides valuable insights into the behavior of a function's graph. 5. Approximating Areas: Riemann integration allows us to approximate the area under a curve by dividing the region into smaller rectangles and summing their individual areas. The aim is to obtain a close approximation to the exact area. 6. Understanding Measurable Sets: Measure theory aims to study measurable sets and their properties. Measurable sets are subsets of a measure space. The aim is to define and characterize measurable sets and explore their properties. 7. Generalizing Integration: The Lebesgue integral aims to provide a more general and flexible framework for integration compared to the Riemann integral.

	8. Overcoming Riemann's Limitations: The Lebesgue integral aims to overcome the limitations of the Riemann integral, such as the inability to integrate functions with unbounded or discontinuous points.

9. Teaching and Learning Strategies

Unit or subject	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 type of simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure

Week name	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation W
First	4	Definitions and examples	Continuity	theoretical	Through tests, general questions, and discussion
Second	4	Definitions and examples	Uniformly continuous	theoretical	General questions and discussion
Third	4	Property and application	Intermediate value	theoretical	General questions and discussion
Fourth	4	Definitions and examples	The sequence and series of functions	theoretical	General questions and discussion
Fifth	4	Property and application	Uniformly convergence and point wise convergence	theoretical	Quiz
Sixth	4	Interval of convergence of power series	Power series	theoretical	General questions and discussion
Seventh	4	Definitions and examples	Riemann integration	theoretical	General questions and discussion
Eighth	4	Definitions and examples	Continuous functions and Riamann	theoretical	Quiz

			integration		
Ninth	4	Definitions and examples	Monotonic functions and Riamann integration	theoretical	General questions and discussion
Tenth	4	Some properties of Lebesgue integration	Lebesgue Theory of Integration	theoretical	Monthly exam
Eleven th	4	Definitions and examples	Lebesgue Theory of Integration	theoretical	General questions and discussion
Twelft h	4	Definitions and examples	Convergence Linear space of Riemann integration function	theoretical	General questions and discussion
Thirte enth	4	Definitions and examples	Measurable function and Lebesgue integration	theoretical	General questions and discussion
Fourte enth	4	Definitions and examples	Continuity of Lebesgue integration	theoretical	General questions and discussion
Fifteen th	4	Definitions and examples	Functions of bounded variations	theoretical	General questions and discussion

11. Course evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

12. Learning and teaching resources

Required textbooks (methodology, if any)	Adel Ghassan Naoum, Introduction to Mathematical Analysis, Mosul University Press, 1986
Main references (sources) Recommended supporting books and references (scientific journals, reports...	Rudin, W., Principles of Mathematical Analysis, 3rd ed., 1976, McGraw-Hill, Inc., New York, USA.
Electronic references, Internet sites	https://en.wikipedia.org/wiki/Mathematical_analysis

Course Description Form

1. Course Name:
Number theory
2. Course Code:
MATH 354
3. Semester / Year:
Second Semester / Third Year
4. Description Preparation Date:
2/9/2024
5. Available Attendance Forms:
In attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
60 hours / 3 unit
7. Course administrator's name (mention all, if more than one name)
Name: Rana Hazim Jasim Email: **rana.hazim@tu.edu.iq**
8. Course Objectives

Course Objectives	Number theory aims to introduce the student to the concepts of: 1. Divisibility 2. Linear congruence 3. Inverse square law 4. Introduce the student to Ferman's theorem and Wilson's theorem 5. Power sediments 6. Arithmetic functions 7. Dieuw-Watt equations.

9. Teaching and Learning Strategies

Unit or subject	

10. Course Structure

Unit or Subject name	Hours	Required Learning Outcomes	name method	Learning method	Evaluation w
1	4	Algorithmic division and greatest common divisor, examples and definitions	divisibility	Lectures	Discussion and tests
2	4	Definitions and Examples	Prime numbers	Lectures	Discussion and tests
3	4	Examples of Applications of the Theorem	The fundamental theorem of arithmetic and some of its applications	Lectures	Discussion and tests
4	4	The Concept of Congruence and Its Basic Properties	Linear congruence	Lectures	Discussion and tests
5	4	Examples of Applications of the Theorem	Chinese remainder theorem	Lectures	Discussion and tests
6	4	Examples of Applications of the Theorem	Ferman's theorem	Lectures	Discussion and tests
7	4	Examples of Applications of the Theorem	Wilson's theorem	Lectures	Discussion and tests
8	4	Definitions and Examples	Power sediments	Lectures	Discussion and tests
9	4	Quadratic Remainders and the Law of Binary Inverse	Inverse square law	Lectures	Discussion and tests
10	4	Definitions and Examples	Arithmetic functions	Lectures	Discussion and tests
11	4	Definitions and Examples	Derschelt multiplication	Lectures	Discussion and tests
12	4	Linear Diophantine Equations and Special Cases	Diewathen equations	Lectures	Discussion and tests
13	4	Definitions and Examples	Irrational numbers	Lectures	Discussion and tests
14	4	Definitions and Examples	Algebraic numbers	Lectures	Discussion and tests
15	4	Definitions and Examples	Representing integers as sums of squares	Lectures	Discussion and tests

11. Course Evaluation

The grade is distributed out of 100 according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly and written exams, reports, etc.

12. Learning and teaching resources	
Required textbooks (methodology if any)	Prof. Dr. Faleh bin Imran Al-Dosari, “Introduction to Number Theory”, Umm Al-Qura University - Makkah Al-Mukarramah, 2007
Main References (Sources)	William Stein," Elementary Number Theory: Primes, Congruences, and Secrets" ,November 16, 2011. Victor Shoup , "A Computational Introduction to Number Theory and Algebra", (Version 2), 2008.
Recommended supporting books and references (scientific journals, reports...)	
Electronic references, websites	

Course Description Form

1. Course Name:
Subjects in Geometry
2. Course Code:
MATH-3011
3. Semester / Year:
Second Semester/Third Year
4. Description Preparation Date:
2/9/2024
5. Available Attendance Forms:
Classroom or electronic by Web
6. Number of Credit Hours (Total) / Number of Units (Total)
60 Hours/3 Units
7. Course administrator's name (mention all, if more than one name)
Name: Azher Abbas Mohammad Email:drazh64@tu.edu.iq
8. Course Objectives
1. Students must realize basic concepts in Euclidean geometry. 2. Learning a student's haw the Axiomatic system work with its contents, postulates, theorems, exercises. 3. Students must know a philosophy of Euclidean and non- Euclidean geometry. 4. Developing the ability of students in treat with a non-Euclidean geometry such as points, lines, surfaces, spaces which takes its meaning from the axiomatic system. 5. Providing students with experience and skills in treatment with the concepts in hyperbolic and Elliptic geometry 6. Providing students with experience and skills in treatment with the concepts in hyperbolic and Elliptic triangles and the triangular relations for them.
9. Teaching and Learning Strategies
This course characterized that it represent one of the three mathematical structures

which is geometrical structure. So the learning strategy based on training the student to expand his imaginative understanding to comprehended concepts of non-Euclidean geometries that contradict each other .This comes by helping the students to imagine a non-planer spaces such as Poincare and Riemann spaces that deals with a different concepts of parallelism and Orthogonality and deals with a non-Euclidean triangles. Then the focus will be on following up with students by assigning them some home works and discussing solutions and proofs in each lecture in order to adopting proof methods based on axiomatic system and the mathematical thinking approach and adopting several methods to evaluate the extent of students understanding of the scientific material based on oral scientific discussion and some quizzes, in addition to two quarterly tests during the semester.

10. Course Structure

Week name	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation
1	4	Learn about the history of geometry and its origins	Brief history of geometry and Euclidean Axiomatic system	Theoretical Lecture and discussion	Oral tests and quizzes
2	4	Concepts of axiom, postulate and axiomatic systems	Hilbert Axiomatic system	Theoretical Lecture and discussion	Oral tests and quizzes
3	4	Dealing with the most important concepts of circles	The power of a point with respect to a circle , pencil of hyperbolic and elliptic circles	Theoretical Lecture and discussion	Oral tests and quizzes
4	4	Inversion concept with respect to a circle	Inversion , inversion relations and some theorems and exercises	Theoretical Lecture and discussion	Oral tests and quizzes
5	4	Cross ratio concept	Cross ratio of collinear four points on a line definitions and properties	Theoretical Lecture and discussion	Oral tests and quizzes
6	4	Developing of non-Euclidean concepts in geometry	Fifth Euclidean postulate reward and axiomatic system of hyperbolic geometry in Poincare space	Theoretical Lecture and discussion	Oral tests and quizzes
7	4	Haw to measure a hyperbolic distance in Poincare space	Hyperbolic distance between two points in Poincare space	Theoretical Lecture and discussion	Oral tests and quizzes
8	4	Learning a parallelism concept in Poincare	Hyperbolic lines , parallel and meeting	Theoretical Lecture and	1st Midterm exam in previous

		space	lines	discussion	weeks(1-7)
9	4	Haw to measure a vertical hyperbolic distance	Hyperbolic vertical distance and angle of parallelism	Theoretical Lecture and discussion	Oral tests and quizzes
10	4	Recognition the relation between the elements of hyperbolic right triangle	Hyperbolic right triangle ,relation between its elements with examples	Theoretical Lecture and discussion	Oral tests and quizzes
11	4	Recognition the relation between the elements of hyperbolic oblique triangle	Hyperbolic oblique triangle ,relation between its elements with examples	Theoretical Lecture and discussion	Oral tests and quizzes
12	4	Identifying the axiomatic system of elliptic geometry	Introduction in elliptic geometry and Riemann unite sphere and stereographic projection	Theoretical Lecture and discussion	Oral tests and quizzes
13	4	Haw to calculate a elliptic distance on Riemann Sphere	The elliptic distance between two points on Riemann sphere and its projection in a plane	Theoretical Lecture and discussion	Oral tests and quizzes
14	4	Recognition the relation between the elements of elliptic right triangle	Elliptic right triangle ,relation between its elements with examples	Theoretical Lecture and discussion	Oral tests and quizzes
15	4	Recognition the relation between the elements of elliptic oblique triangle	Elliptic oblique triangle ,relation between its elements with examples	Theoretical Lecture and discussion	2nd Midterm exam

11. Course Evaluation

Couse evolution of a student including the sum of the following two parts

1. Formative Evalution 40%
   (2 exams through the term 30% and Oral discussion 5% and Quizzes 5%)
2. Summative Evalution
   (Final Exam 60%)

12. Learning and Teaching Recourses

Required textbook(Curricular book, if any):

امال شهاب العطار , " مفاهيم اساسية في الهندسة", دار الحكة للطباعة والنشر – بغداد 1992

Main References (Sources):

عبد الوهاب احمد السراج ,"نظم البديهيات والهندسة " , مطابع جامعة الموصل 1985

ملزمة من اعداد ا.م. يحيى عبد سعيد من كلية التربية جامعة الموصل

Recommended book and references (Scientific journals, reports,…):

خالد احمد السامرائي , " الهندسة الحديثة" , مطابع التعليم العالي – بغداد – 1988

Electronic Reference ,Web sites:

كتاب الهندسة اللااقليدية ومصادرة اقليدس الخامسة

https://www.alfreed-ph.com/2018/03/No-Euclid-Engineering-pdf.html#google_vignette

Course Description Form

1. Course Name:
Fuzzy Mathematics
2. Course Code:
MATH 352
3. Semester / Year:
Second Semester/ Third Year
4. Description Preparation Date:
2/9/2024
5. Available Attendance Forms:
Classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
60Hours / 3 Units
7. Course administrator's name (mention all, if more than one name)
Dr. Nizar Khalf Hussein **Email: nizar.dikhil@tu.edu.iq**
8. Course Objectives

Course Objectives	1. **Introduce students to the principles and concepts of fuzzy mathematics and its applications in various fields.** 2. **Develop a strong understanding of fuzzy sets, their properties, and how they differ from traditional crisp sets.** 3. **Explore different types of fuzzy mathematical systems.** 4. **Provide practical experience in designing and implementing fuzzy mathematical systems using appropriate software tools and programming languages.** 5. **Enable students to analyze and evaluate the performance of fuzzy mathematical systems in terms of accuracy, interpretability, and computational efficiency.** 6. **Enhance critical thinking and problem-solving skills by applying fuzzy mathematics techniques to real-world problems characterized by uncertainty and ambiguity.** 7. **Encourage exploration and discussion of advanced topics in fuzzy logic, such as fuzzy control systems, fuzzy decision-making, and fuzzy pattern recognition.**

9. Teaching and Learning Strategies

Unit or subject	1. **Active Learning:** Encourage active participation through engaging questions and mathematical challenges to stimulate curiosity and interaction. 2. **Practical Application:** Link learning to practical applications by presenting real-world problems that students must solve using fuzzy mathematics. 3. **Collaborative Learning:** Promote group work in small teams to solve modeling problems, allowing students to exchange knowledge, ideas, and experiences. 4. **Use of Technology:** Utilize available technological tools and software to enhance learning and analyze fuzzy models.

10. Course Structure

nameek	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation
1	4	Introduction to Fuzzy Mathematics	The difference between classical logic and fuzzy logic	Lecture	Discussion and Tests
2	4	Basic Definitions and Concepts	Representation of membership functions	Lecture	Discussion and Tests
3	4	Basic Definitions and Concepts	Triangular function, trapezoidal function, and Gaussian function	Lecture	Discussion and Tests
4	4	Basic Definitions and Concepts	Operations on fuzzy sets	Lecture	Discussion and Tests
5	4	Basic Definitions and Concepts	Linguistic variables	Lecture	Discussion and Tests
6	4	Fuzzy Sets	Properties of fuzzy sets	Lecture	Discussion and Tests
7	4	Fuzzy Sets	Fuzzy Relation	Lecture	Discussion and Tests
8	4	Fuzzy Sets	Methods of representing fuzzy relations	Lecture	Discussion and Tests
9	4	Fuzzy Sets	Operations on matrices	Lecture	Discussion and Tests
10	4	Fuzzy Sets	Properties of fuzzy relations	Lecture	Discussion and Tests
11	4	Fuzzy Sets	Composition of relations in α-cut	Lecture	Discussion and Tests

12	4	Fuzzy Sets	Cylindrical Extension	Lecture	Discussion and Tests
13	4	Fuzzy Sets	Application on relations	Lecture	Discussion and Tests
14	4	Fuzzy Sets	Fuzzy arithmetic	Lecture	Discussion and Tests
15	4	Fuzzy Sets	Fuzzy arithmetic	Lecture	Discussion and Tests

11. Effort (40 Marks): The effort marks are distributed as follows:

- **First Exam:** 15 marks.
- **Second Exam:** 15 marks.
- **Assignments and Class Participation:** 10 marks.
- **Final Exam:** 60 marks, making the total 100 marks.

12. Teaching and Learning Resources:

- **Required Textbooks (if any):** None
- **Main References (Sources):**
  - Chen, G., Pham, T.T., 2000. Introduction to fuzzy sets, fuzzy logic, and fuzzy control systems. CRC press.
  - Ross, T.J., 2005. Fuzzy logic with engineering applications. John Wiley & Sons.
- **Supplementary Books and References (Scientific Journals, Reports, etc.):**
  - Sivanandam, S., Sumathi, S., Deepa, S., 2007. Introduction to fuzzy logic using MATLAB. Springer.
- **Electronic References, Internet Sites:**
  - Sivanandam, S., Sumathi, S., Deepa, S., 2007. Introduction to fuzzy logic using MATLAB. Springer.

Course Description Form

1. Course Name:
Medical physics
2. Course Code:
MS205
3. Semester / Year:
First Semester / Third Years
4. Description Preparation Date:
2/9/2024
5. Available Attendance Forms:
Theory
6. Number of Credit Hours (Total) / Number of Units (Total)
30hrs /2 units
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Sabah Salman Hamdi
8. Course Objectives

Course Objectives	Introducing the student to the meaning of medical physics, how physics is involved in medicine, and how to use physical concepts in medicine to diagnose and treat diseases, such as the use of Etc.) and its harm to human health, plants, animals, and soil. What are the harms resulting from pollution to everything that surrounds humans and the most important possible ways to reduce pollution.

9. Teaching and Learning Strategies

Unit or subject	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 type of simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure

nameeek	Hour	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation W
1	4	Definition & examples	The principle of laser operation +	course	Examinations: daily &

			the characteristics of laser light + its uses in medicine. Lectures, discussion, dialogue, and tests.		monthly
2	4	Definition & examples	Definition of X-rays - their characteristics, method of generation, lectures, discussion, dialogue and tests.	course	Examinations: daily & monthly
3	4	Definition & examples	Types of environmental pollution\lectures, discussion, dialogue and tests.	course	Examinations: daily & monthly
4	4	Definition & examples	The harms of pollution, its effects, and solutions to environmental pollution.	course	Examinations: daily & monthly
5	4	Definition & examples	Various questions, lectures, discussion, dialogue and tests.	course	Examinations: daily & monthly
6	4	Definition & examples	Risks of X-rays + risks of using ultrasound waves + risks of MRI.	course	Examinations: daily & monthly
7	4	Definition & examples	Treatment using radioactive elements: (radium + cesium + gold + iodine).	course	Examinations: daily & monthly
8	4	Definition & examples	Radiation protection: sources	course	Examinations: daily &

			of ionizing radiation + units used to measure radiation and its effects		monthly
9	4	Definition & examples	Magnetic resonance imaging device + helical scanner, lectures, discussion, dialogue, and tests.	course	Examinations: daily & monthly
10	4	Definition & examples	Ultrasound, lectures, discussion, dialogue and tests.	course	Examinations: daily & monthly
11	4	Definition & examples	Biological effects of ionizing radiation.	course	Examinations: daily & monthly
12	4	Definition & examples	Ionizing radiation measuring devices, lectures, discussion, dialogue and tests General definitions and examples.	course	Examinations: daily & monthly
13	4	Definition & examples	Treatment using ultraviolet radiation	course	Examinations: daily & monthly
14	4	Definition & examples	Types of radiological imaging devices, lectures, discussion, dialogue and tests	course	Examinations: daily & monthly

Course Description Form

1. Course Name:
Computer mathematics
2. Course Code:
MS 309
3. Semester / Year:
Second Semester/Third Year
4. Description Preparation Date:
2/9/2024
5. Available Attendance Forms:
Theory & Lab
6. Number of Credit Hours (Total) / Number of Units (Total)
60hrs / 3 units
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Thekra Ibraheem Latif Samer Abdulqader Salih Email: thekra.i.latif@tu.edu.iq samer.a.salih@tu.edu.iq
8. Course Objectives

Course Objectives	7. Know the history & the basic concepts of matlab. 8. How to install matlab. 9. Know the basic interfaces of matlab & the commands. 10. Know how input all commands. 11. Learning how to graph in D2, D3. 12. Know what the algorithm & flowchart. 13. Programming in matlab

9. Teaching and Learning Strategies

Unit or subject	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 type of simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure

name**eek**	**Hour**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation**

1	4	Definition & examples	History & definition of Matlab.	Course & Lab	Examinations :daily& monthly
2	4	Definition & examples	The basic interface of matlab .	Course & Lab	Examinations :daily & monthly
3	4	Definition & examples	The basic interface of matlab.	Course & Lab	Examinations :daily & monthly
4	4	Definition & examples	Define mathematics structure	Course & Lab	Examinations :daily & monthly
5	4	Definition & examples	Important command in matlab.	Course & Lab	Examinations :daily & monthly
6	4	Definition & examples	Write different equations.	Course & Lab	Examinations :daily & monthly
7	4	Definition & examples	Graphe in matlab D2, D3.	Course & Lab	Examinations :daily & monthly
8	4	Definition & examples	Graphe in matlab D2, D3.	Course & Lab	Examinations :daily & monthly
9	4	Definition & examples	Program in matlab	Course & Lab	Examinations :daily & monthly
10	4	Definition & examples	Program in matlab	Course & Lab	Examinations :daily & monthly
11	4	Definition & examples	Program in matlab	Course & Lab	Examinations :daily & monthly
12	4	Definition & examples	Program the mathematical methods.	Course & Lab	Examinations :daily & monthly
13	4	Definition & examples	Program the mathematical methods.	Course & Lab	Examinations :daily & monthly
14	4	Definition & examples	Equation 3D and programming	Course & Lab	Examinations :daily & monthly
15	4	Definition & examples	Preparatory week before the final Exam	Course & Lab	Examinations :daily &

					monthly

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Advanced Calculus**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MS 201**				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level		UGII	**Semester of Delivery**		4
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	**Asst.prof Dr. Zeyad Mohammed Abdullah**		**e-mail**	Zeyaemoh1978@tu.edu.iq	
Module Leader's Acad. Title		Assistant Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	**Samir Abdulkadir Salih**		**e-mail**	Samiraliraqi92@tu.edu.iq	
Peer Reviewer Name					
Scientific Committee Approval Date		07/01/2024	**Version Number**		1.1

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	**Calculus (2)**	**Semester**	1
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	14. Identify the basic concepts in moments and centers of masses. 15. Learn to find moments and centers of masses by double and triple integrals. 16. Learn about the relationship between linear integrals and Crane's theorem. 17. Learn the basic concepts of divergence and rotation.

	18. Use the Stokes case to find the work done on vectors.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize the fundamental principles associated with moments and centers of masses. 2. Acquire the skills to determine moments and centers of masses using double and triple integrals. 3. Gain an understanding of the correlation between linear integrals and Crane's theorem. 4. Familiarize yourself with the fundamental ideas behind divergence and rotation. 5. Employ the Stokes case as a method to calculate the work performed on vectors.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - Masses and Moments Masses and Moments in two and three Dimensions. Mass, First Moments, Center of Mass, Moments of Inertia (second moments), 2- Masses and Moments in Two and Three Dimensions (Polar, Cylindrical and Spherical Coordinates [25 hrs] Part B - Integrals Line Integral, Green's Theorem and Surface Area. Divergence and Circulation, Flux (Divergence and Stokes's Theorem). [32 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	107	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7.1
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	**Quizzes**	3	15% (15)	5,7, 10	LO #1, 2, 10 and 11

assessment	**Assignments**	3	15% (15)	3,8,12	
	Projects / Lab.				
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	15% (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	Functions of Several Variables , Limits, continuous
Week 2	Partial derivatives , The Chain Rule, Directional Derivatives and Gradient Vectors
Week 3	Tangent Planes and Differentials, Extreme Values and Saddle Points
Week 4	Double Integrals , Area in polar coordinates
Week 5	Masses and Moments in two Dimensions , Mass, First Moments, Center of Mass, Moments of Inertia (second moments), Radius of gyration, Centroid
Week 6	Triple integrals Masses and Moments in two Dimensions and Three Dimensions
Week 7	Masses and Moments in (Polar, Cylindrical and Spherical Coordinates)
Week 8	Mid Exam
Week 9	Line Integral
Week 10	vector fields, , work
Week 11	Circulation and flux
Week 12	Green's Theorem
Week 13	Surface Area
Week 14	The Divergence Theorem
Week 15	Stokes's Theorem
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	Thomas, George Brinton, Maurice D. Weir, Joel Hass, Frank R. Giordano, and Recep Korkmaz. Thomas' calculus. Vol. 12. Boston: Pearson, 2010.	Yes
Recommended Texts	Thomas, George Brinton, Ross L. Finney, Maurice D. Weir, and Frank R. Giordano. Thomas' calculus. Reading: Addison-Wesley, 2003.	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	**Ordinary Differential Equations**			**Module Delivery**	
Module Type	**C**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MS 202**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		UGII	**Semester of Delivery**		3
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Esraa Habeeb Khaleel		**e-mail**	Esraa.h.khaleel@tu.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		//	**e-mail**	//	
Scientific Committee Approval Date		2/9/2024	**Version Number**	1.1	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	19. To learn the basics of differential equations 20. To learn the classification and types of differential equations. 21. Training the student on methods and strategies for solving differential equations.

	22. Identify the applications of differential equations in different fields such as physics, chemistry and engineering sciences .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	6. Understanding the basics concepts of differential equations 7. The ability to recognize between types of differential equations of the first order. 8. The ability to distinguish between methods of solving ordinary differential equations of first order. 9. Gaining the ability and skill to use methods of solving first order differential equations and dealing with them. 10. learning the linear homogenous and non-homogenous differential equations with constant coefficients of n-th order. 11. The ability to solve linear homogenous and non-homogenous differential equations with constant coefficients of n-th order by using different methods. 12. learning the Linear differential equations with variable coefficient like Euler equation and the method of solving this equation 13. Gaining the ability to analyze, explain and solve problems. 14. Providing the student with the skills of communication, expression and discussion to stimulate mathematical thinking, understanding and solving mathematical issues.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Chapter 1 Fundamental concepts, differential equations, order of differential equation, degree of differential equation, solution of differential equation, kinds of solution, formulation of differential equation, initial value problem. [15 hrs] Chapter 2 Differential equations of first order and first degree, equations of separation variables, homogenous equations, differential equation with linear coefficients, exact and non- exact equations, linear differential equation and Bernoulli equation with examples . [18 hrs] Chapter 3 Linear differential equation of n th order with constant Coefficient, linearly dependent functions, linearly independent functions, Wronskian determinate. Operator method, examples. [18 hrs] Chapter 4 Linear homogenous differential equation with constant coefficients of n-th , Characteristic equation roots, linear non - homogenous differential equation with constant coefficients of n-th, Undetermined Coefficients method , Variation of parameters, examples. [18 hrs] Chapter 5 Linear differential equations with variable coefficient, Euler equation, examples [18 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 type of simple experiments involving some sampling activities that are interesting to the students.

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

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	6	30% (30)	3,5,7, 10,12,15	LO #1-4 ,6 and 7
	Assignments	5	10% (10)	2,4,6,11,13	LO # 1,3,4,5 and 8
	Projects / Lab.				
	Report				
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO # 1-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Fundamental concepts, Differential equation, order of D.E. , degree of D.E., Solution of D.E.
Week 2	Kinds of solutions, formulation of D.E., Initial value problem, examples
Week 3	Differential Es. of first order and first degree, equations of separation variables, examples.

Week 4	Homogeneous D.Es. and equations with linear coefficients, methods of solution ,examples.
Week 5	Exact and not Exact differential equations, integral factor, examples
Week 6	Linear differential equation and Bernoulli equation, methods of solution , examples.
Week 7	Linear D.Es. of n- th order with constant coefficients and the linearly independence,examples.
Week 8	Mid-term Exam
Week 9	Linear differential equations with constant coefficients and the operator method, examples.
Week 10	Linear homogenous D.Es. with constant coefficients , Characteristic equation roots,examples.
Week 11	linear non homogenous D.Es. with constant coefficients, Undetermined Coefficients ,examples
Week 12	linear non homogenous D.Es. with constant coefficients, Variation of parameters ,examples
Week 13	Linear differential equations with variable coefficient, Euler equation .
Week 14	Homogenous Euler equation, method of solution , examples.
Week 15	Non -homogenous Euler equation, method of solution, examples.
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	1) خالد أحمد السامرائي ويحيى عبد سعيد، "طرق حل المعادلات التفاضلية " وزارة التعليم العالي والبحث العلمي، 1980. 2) فرانك ايرز" المعادلات التفاضلية " ملخصات شوم ، ترجمة نخبة من الاساتذة المتخصصين ، دار ماكجر وهيل للنشر، 1972	Yes
Recommended Texts	1. Elementary differential equations – Earl D. Rainville and Bedient E , 1990 2. Ordinary Differential Equations , Gabriel Nagy, 2021	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	احتماليه			**Module Delivery**	
Module Type	C			☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	MS 203				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		UGII	**Semester of Delivery**		3
Administering Department		MS	**College**	CSM	
Module Leader	Ahmed Maher Salih		**e-mail**	ahmed.m.salih@tu.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D
Module Tutor	Sara Ismail Khalil		**e-mail**	Sarah.khalil@tu.edu.iq	
Peer Reviewer Name		Mundher Abdullah Khalee	**e-mail**	mun880088@tu.edu.iq	
Scientific Committee Approval Date		2/9/2024	**Version Number**		1.1

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	**1.** توضيح المفاهيم الأساسية لموضوع الاحتمالية. 2. التعرف على مبرهنه بيز والاحتمالية الشرطية. 3. التعرف على التوزيعات المتقطعة ومعرفه كيفيه ايجاد التوقع والتباين . 4. التعرف على التوزيعات المستمرة ومعرفه كيفيه ايجاد التوقع والتباين ودراسة المبرهنات عليها دراسة داله كثافه الاحتمال وكتله الاحتمال وداله كثافه الاحتمال المشتركة. 5- دراسة داله كثافه الاحتمال وكتله الاحتمال وداله كثافه الاحتمال المشتركة.
Module Learning	1. ان يذكر الطالب التعاريف الأساسية

Outcomes مخرجات التعلم للمادة الدراسية	2. التعرف على مقدمة وتعاريف اساسية لموضوع الاحتمالية 3. التمييز بين داله كثافه الاحتمال وداله كتله الاحتمال وداله كثافه الاحتمال المشتركة مع امثله متنوعه. 4. التعرف على التوزيعات المتقطعة وانواعها ودراسة امثله عليها مع مبرهنات للتوقع والتباين . 5. ان يصف الطالب الطريقة. 6. شرح الصيغة الرياضية للطريقة. 7. تلخيص خطوات حل الطريقة. 8. تطبيق الطريقة على مسألة عددية. 9. جدولة ومناقشة النتائج.
Indicative Contents المحتويات الإرشادية	1- مقدمة وتعاريف اساسية لموضوع الاحتمالية (10ساعات) 2- دراسه مبرهنه بيز والاحتمالية الشرطية (10ساعات) 3- التعرف على التوزيعات المتقطعة وانواعها (10ساعات) 4- دراسة امثله عليها مع مبرهنات للتوقع والتباين(10ساعات) 5- التعرف على التوزيعات المستمرة والى من اهمها هو التوزيع الطبيعي والطبيعي القياسي مع امثله عليها (12ساعات) 6- ايجاد توليد العزوم وداله توليد الاحتمال للتوزيعات والتعرف على داله كثافه الاحتمال وداله كتله الاحتمال وداله كثافه الاحتمال المشتركة مع امثله متنوعه. (10ساعات)

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 أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
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**	4	20% (20)	4 -5-8-10	LO #1, #2 and #7, #8
	Assignments	2	10% (10)	6 -12	LO #3, #4 and #5, #6, #8
	Projects / Lab.				
	Report	1	10% (10)	13	LO #5, #7 and #8
Summative assessment التقييم التلخيصي	**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) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**القواعد - الفضاء العيني والأحداث -تعريف الاحتمالية ومفاهيمها الأساسية - مقدمة في الاحتمالية الأساسية للاحتمالية**
Week 2	**ق انون الضرب للأحداث - الأحداث المستقلة والمرتبطة -قانون الجمع للأحداث -قواعد الاحتمالية**
Week 3	**الاحتمال و الاحتمال والتحليل التوافقي والاحتمال بالرسم**
Week 4	**نظرية بيز**
Week 5	**- المتغيرات المتغيرات العشوائية المنفصلة - تعريف المتغير العشوائي - المتغيرات العشوائية العشوائية المستمرة**
Week 6	**الدالة التوزيعية للمتغير - الدالة التوزيعية للمتغير العشوائي المنفصل - دوال التوزيع الاحتمالية العشوائي المستمر - الفرق بين الدالتين**

Week 7	القيمة المتوقعة والعزوم والتباين
Week 8	الالتواء والتسطح ودالة توليد العزوم
Week 9	التوقع الشرطي والتباين الشرطي و الارتباط والانحدار
Week 10	التوزيع المنتظم المتقطع و توزيع برنولي و توزيع ذو الحدين
Week 11	التوزيع الهندسي والتوزيع الهندسي الفوقي و توزيع بواسون
Week 12	التوزيع المنتظم و توزيع برنولي والتوزيع الاسي
Week 13	توزيع كاما وتوزيع بيتا
Week 14	التوزيع الطبيعي
Week 15	توزيع كوشي وتوزيع مربع كاي
Week 16	امتحان نهاية الفصل

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	**باسل يونس ذنون " الاحتمالية والاحصاء**	Yes
Recommended Texts		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	**Group Algebra**			**Module Delivery**	
Module Type	C			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MS 204**				
ECTS Credits	6				
SWL (hr/sem)	**150**				
Module Level		UGII	**Semester of Delivery**		3
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Ali Shebl Ajeel		**e-mail**	ali.shebl@tu.edu.iq	
Module Leader's Acad. Title		Instructor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Omer Abdulrazzaq Abdullah		**e-mail**	omerabdulrazzaqa@tu.edu.iq	
Peer Reviewer Name		Akram Salim Mohammed	**e-mail**	akr_tel@tu.edu.iq	
Scientific Committee Approval Date		**2/9/2024**	**Version Number**	**1.1**	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Giving the student definitions of groups and their examples and theorems. 2. Make the student distinguish between groups, cyclicgroups, and subgroups 3. The ability to describe different theorems to study the types and characteristics of group .
Module Learning	1. Know the concept of algebraic structure, especially groups

Outcomes مخرجات التعلم للمادة الدراسية	2. Identify examples of non-commutative groups 3. How to find subgroups 4. How to find division groups with Lagrange's theorem 5. Study the concept of group homomorphism.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Chapter 1 Definition of semi-group and group with some examples , Definition of abelian group and cyclic group with some examples , Cyclic group , Some fundamental theorems of group , Dirct product Group . [15 hrs] Chapter 2 Definition of sub-group and center of group with some examples and theorems , Product of two sub-group and some theorems , Normal sub-group and Quotient Groups , Lagrange theorem's and index of sub-group . [15 hrs] Chapter 3 Homomorphisms of Definition and examples , Kernel of function, Isomorphism and basic properties , The fundamental Theorems Factor theorem and First theorem , [12 hrs] Chapter 4 Integer group modulo n, (Congruent modulon) groups of Zn and theorems . [15 hrs] Chapter 5 Symmetric group of G with theorems . [15 hrs]

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 type 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	5.2

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
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**	3	15% (15)	5,8,10	LO #1, 2, 3
	Assignments	3	15% (15)	2, 7,12	LO # 1-4
	Projects / Lab.				
	Report	1	10%(10)	10	L0 # 4
Summative assessment	**Midterm Exam**	1 hr	10% (10)	8	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	Definition and Elementary Properties of group
Week 2	Definition of semi-group and group with some examples
Week 3	Definition of abelian group and cyclic group with some examples
Week 4	الزمر المولدة (Cyclic group)
Week 5	Some fundamental theorems of group
Week 6	Dirct product Group
Week 7	Definition of sub-group and center of group with some examples and theorems
Week 8	Product of two sub-group and some theorems
Week 9	Normal sub-group and Quotient Groups
Week 10	Lagrange theorem's and index of sub-group
Week 11	Homomorphisms of Definition and examples
Week 12	Kernel of function, Isomorphism and basic properties
Week 13	The fundamental Theorems Factor theorem and First theorem
Week 14	(Congruent modulon) groups of Zn and theorems
Week 15	Symmetric group of G with theorems
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	

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Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Abstract Algebra, David, M. Burton, 1988..	Yes
Recommended Texts	The Theory of Groups, Macdonald, Qxford. The Theory of Groups, Rotman, J.J., 2nd, Baton	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 Languish II**			**Module Delivery**	
Module Type	B			☒ **Theory** ☒ **Lecture**	
Module Code	UOT021				
ECTS Credits	**2**				
SWL (hr/sem)	50				
Module Level		UGII	**Semester of Delivery**		3
Administering Department		Mathematics	**College**	College of Computer Science & Math	
Module Leader	Ayham Mahmoud Al-Abbad		**e-mail**	ayham.m.abbad@tu.edu.iq	
Module Leader's Acad. Title		Assistant Lecturer	**Module Leader's Qualification**		M.A
Module Tutor	None		**e-mail**	-	
Peer Reviewer Name		Mundher A. Khalil	**e-mail**	mun880088@tu.edu.iq	
Scientific Committee Approval Date		2/9/2024	**Version Number**	1.1	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	English	**Semester**	1
Co-requisites module	None	**Semester**	0

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The module aims at: 1. Develop Communication Skills: Enable students to engage in basic conversations, express opinions, and ask questions on familiar topics in both formal and informal settings, enhancing their confidence in speaking and listening. 2. Strengthen Grammar and Vocabulary: Build a solid foundation of essential grammar structures and expand vocabulary, allowing students to form correct sentences and improve their understanding of written and spoken English.

	3. Improve Reading and Writing Abilities: Help students comprehend short texts on common academic and everyday topics and develop writing skills to produce structured paragraphs, emails, and simple essays.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Demonstrate Basic Oral Communication: By the end of the module, students will be able to participate in short conversations, express ideas, and respond appropriately in discussions on familiar topics, using correct pronunciation and basic grammar structures. 2. Comprehend and Analyze Short Texts: Students will be able to read and understand short written texts, identifying main ideas and key details in both academic and general contexts, and respond to comprehension questions with increased accuracy. 3. Write Structured Paragraphs: Students will be able to write coherent and grammatically correct paragraphs and simple essays, demonstrating the ability to organize thoughts, use appropriate vocabulary, and apply basic punctuation rules.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following:** - Teaching students to communicate with one another in English by integrating the four skills—speaking, listening, reading, and writing. Using real-life examples, dialogues, conversations, and weekly writing assignments will further enhance their language development. [60 hours]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Task-Based Learning: Incorporate real-world tasks such as role-plays, group discussions, and problem-solving activities to help students practice English in practical, meaningful situations. 2. Integrated Skill Activities: Design lessons that blend speaking, listening, reading, and writing skills, such as listening to a short podcast and discussing or summarizing it in writing, to promote well-rounded language proficiency. 3. Personalized Feedback: Provide individualized feedback on assignments and class participation, focusing on areas where each student needs improvement, to help them recognize and correct their mistakes. 4. Use of Authentic Materials: Include authentic texts and media, such as news articles, videos, and podcasts, to expose students to real-life language usage and encourage familiarity with different accents and contexts. 5. Interactive Technology: Utilize digital tools and platforms like language learning apps, online quizzes, and interactive grammar games to make learning engaging and accessible, while promoting self-paced practice outside the classroom.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.1
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	**Assignments (Homework)**	1	5% (5)	2, 4, 6, 10, 12, 14	LO # 1, 2, 3, ……., 14.
	Daily Activity	1	5% (5)	continuous	LO # 1, 2, 3, …….. 14.
Summative assessment	**Midterm Exam**	2 hr	30% (30)	15	LO # 1-6
	Final Exam	2hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction – Getting to Know you - Tenses – Questions – Questions Words
Week 2	The Way We live – Present Tense – Simple Present – Present Continuous – Have, have got
Week 3	It all went wrong – Past Tense – Past Simple – Past Continuous
Week 4	Let's go shopping – Quantity – Much and Many – Some and Any - Articles
Week 5	What do you want to do? Verb Patterns – Future Intentions
Week 6	Tell me what's it like? Comparative and Superlative Adjectives
Week 7	Famous Couples – Present Perfect and Past Simple – For and Since – Tense Revision
Week 8	Do's and Don'ts – have (got) to – should – must
Week 9	Going Places – Time and Conditional Clauses – What if …. ?
Week 10	Scared to Death – Verb Patterns 2 – Infinitives
Week 11	Things that Changed the World – Passives
Week 12	Dreams and Reality – Second Conditional – Might

Week 13	Earning and Living – Present Perfect Continuous – Present Perfect Simple vs Continuous
Week 14	Love you and Leave you – Past Perfect – Reported Statements
Week 15	Reported Statements
Week 16	Preparatory week before the final exam.

Delivery Plan (Weekly Lab. Syllabus): There is no Lab activities المنهاج الأسبوعي للمختبر: لا توجد فعاليات مختبرية	
	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	1. Pre-Intermediate New Headway (2002) by John and Liz Soars.	Yes
Recommended Texts	Any helping test on Internet.	No
Websites	https://test-english.com/grammar-points/	

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 DESCRIPTOR

جرائم حزب البعث

Module Information معلومات المادة الدراسية					
Module Title	جرائم حزب البعث			**Module Delivery**	
Module Type	B			☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☒ Seminar	
Module Code					
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level	UGII		**Semester (s) offered**	3	
Min number of students	15		**Max number of students**	100	
Administering Department	Math		**College**	CCSM	
Module Leader	Saad Hussein Ali		**e-mail**	Saad.h.ali@tu.edu.iq	
Module Leader's Acad. Title	Assistant Lecturer		**Module Leader's Qualification**	Master's	
Module Tutor	None		**e-mail**	None	
Peer Reviewer Name	Mundher A. Khaleel		**e-mail**	mun880088@tu.edu.iq	
Review Committee Approval	2/9/2024		**Version Number**	1.1	

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	لايوجد	**Semester**	1
Co-requisites module	لايوجد	**Semester**	-

Module Aims, Learning Outcomes, Indicative Contents and Brief Description أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر	
Module Aims أهداف المادة الدراسية	**1- يتعرف على جرائم حزب البعث.** **2- يدرس كيفية معالجة الدين الاسلامي الحنيف لحقوق الانسان الدينية والدنيوية.** **3- يدرس المقرر الوسائل التي اتبعها النظام البعثي لتجويع الشعب ومنها مصادرة اموال التجار.** **4- التعرف على مصادر وخصائص وسمات حقوق الانسان.** **5ـــمعرفة اثر التطور التكنولوجي على حقوق الانسان.**

	6- يفهم كيف تمت معالجة موضوع حقوق الانسان في عصبة الامم. **7 – يدرس المقرر اثار الجرائم النفسية والاجتماعية .**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1- التعرف على المصطلحات ذات الصلة بمفهوم الديمقراطية.** **2- التعرف على اهم الحقوق التي كفلها الاسلام واستثمارها في معالجة الآفات والحالات السلبية التي تغزو المجتمعات في العصر الحالي .** **الاستفادة من مزايا الديمقراطية ومكوناتها في معالجة التذبذب وعدم الاستقرار في المجتمع والحفاظ على الاستقرار والسلم المجتمعي.** **3- الاطلاع على المواثيق الدولية المختصة و الصادرة عن المنظمات الدولية وجمعية الأمم المتحدة.** **4- الاستفادة من تجارب الاخرين (الدول المتقدمة في مجالات الديمقراطية).** **5- اللمام بالقوانين والدساتير الدولية والإقليمية والمحلية المختصة بالحريات العامة والديمقراطية.** **7- التعرف على جرائم الإبادة الجماعية والجرائم الإنسانية ومدى تأثيرها على مفهوم الديمقراطية.**
Indicative Contents المحتويات الإرشادية	**يتضمن المحتوى الارشادي مايأتي:** **1- اقسام الجرائم (4 ساعات).** **2- مصادرو خصائص وسمات الجرائم (4 ساعات).** **3- الجرائم البيئية والسياسية (6 ساعات).** **4- الجرائم النفسية والاجتماعية (6 ساعات).** **5- جرائم المقابر الجماعية (4 ساعات)**
Course Description	**جرائم حزب البعث / ارتكب نظام البعث في العراق عدد كبير من الجرائم المختلفة ومنها الجرائم ضد الانسانية والجرائم الاجتماعية والجرائم البيئية والمقابر الجماعية**

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	تم وضع استراتيجية التعلم والتعليم من اجل ان يحصل الطالب على معلومات كاملة تغطي المنهج الدراسي المعد للمادة ولكي تتحقق الغاية الاساسية للمنهج الذي ينصب نحو المام وادراك الطالب بالمفاهيم الاساسية لحقوق الانسان والديمقراطية ، والاطلاع على المصادر والضمانات والمواثيق الدولية للمصطلحين من اجل استثمارها في معالجة الظواهر السلبية في المجتمع والحفاظ على الاستقراروالسلم المجتمعي .

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل **In class lectures 30** **In class tests 3**	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation
تقييم المادة الدراسية

		Time (hr)	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	20% (20)	3, 5, ,7, 9,11,13,	LO #1, 2,3,....., 11
	Assignments (Homeworks)	6	15% (15)	2, 4, 6, 10,12,14	LO # 1, 2, 3, ...,11
	Discussions	7	5% (5)	Continuous	
Summative assessment	Midterm Exam	2	10% (10)	8	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	الفصل الاول/ جرائم حزب البعث وفق قانون المحكمة الجنائية العراقية العليا
Week 2	مفهوم الجرائم واقسامها
Week 3	انواع الجرائم
Week 4	الجرائم التي نظرت بها المحكمة الجنائية العليا
Week 5	الفصل الثاني/ الجرائم النفسية والاجتماعية
Week 6	اليات الجرائم النفسية
Week 7	اثار الجرائم النفسية + Midterm Exam
Week 8	الجرائم الاجتماعية
Week 9	انتهاكات القوانين العراقية والدولية من قبل النظام البعثي
Week 10	الانتهاكات السياسية والعسكرية من قبل حزب البعث
Week 11	الفصل الثالث/ الجرائم البيئية
Week 12	جرائم تدمين المدن وتجفيف الاهوار
Week 13	الفص الرابع / جرائم المقابر الجماعية
Week 14	المقابر الجماعية التي تعود لأحداث عام 1963
Week 15	مقابر الابادة الجماعية لضحايا مجزرة الانفال وحلبجة للمدة من 1987 لغاية 1988.
Week 16	امتحان نهاية الفصل

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	وزارة التعليم العالي والبحث العلمي	Yes
Recommended Texts	.	No
Websites	N/A	

APPENDIX:

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

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

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Partial differential equation**			**Module Delivery**	
Module Type	C			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MS 205				
ECTS Credits	8				
SWL (hr/sem)	200				
Module Level		UGII	**Semester of Delivery**		4
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Esraa Habeeb Khaleel		**e-mail**	Esraa.h.khaleel@tu.edu.iq	
Module Leader's Acad. Title		Lecture	**Module Leader's Qualification**		D.
Module Tutor	//		**e-mail**	//	
Peer Reviewer Name		//	**e-mail**	//	
Scientific Committee Approval Date		2/9/2024	**Version Number**	1.1	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	23. To familiarize the student with the definition and concept of partial differential equations and their formation. 24. That the student recognize the classification of the partial differential in terms of degree and rank.

	25. Identify the applications of partial differential equations in various fields.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Knowledge and understanding 2. Learn the methods and rules for finding solutions to different partial differential equations with initial and limit values 3. Learn about the Lagrange system and how to solve this system 4. Students will learn how to expand functions using Fourier series 5. The student is acquainted with the legal formulas for partial equations (hyperbolic, ellipse, parabola) 6. The student was introduced to the integral transformation: Laplace transform, Fourier transform, and some of its applications
Indicative Contents المحتويات الإرشادية	The content of the indicative is the following. **Part A –(30 h)** • Basic definitions (4 h) • Definition of partial differential equations (4 h) • finding the order of equations (4 h) • finding degree of equations (4 h) • linear partial equation and its features (4 h) • Solution Methods (5 h) • The direct solution method (5 h) **Part B –(42 h)** • the method of separating the variables in the event that the molecular equations are homogeneous (7 h) • inhomogeneous (7 h) • the first and second order (7 h) • expanding the function using the Fourier series (7 h) • Integral transformation : Laplace transformation (7 h) • Fourier transformation (7 h)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy to be adopted in this unit is to encourage students to participate in the exercises, while at the same time improving and expanding their thinking skills. This will be achieved through assignments and how to solve them

Student Workload (SWL) الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	97	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	107	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	6	5% (30)	3, 5,8,10,13,14	LO #1, 2, 3
	Assignments	5	10% (10)	2, 4,8,12	LO # 1- 4
	Projects / Lab.				
	Report				
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-3
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction - First order partial differential equation (Basic diffention)
Week 2	First order partial differential equation (linear P.D.E. , quasi-linear P.D.E)
Week 3	First order partial differential equation (Lagrang system, some examples)
Week 4	Second order partial differential (ellipse ,parabolla)
Week 5	Second order partial differential (hyperola, wave equation, heat and Laplace equation)
Week 6	Second order partial differential (Bondary condition , cauchy problem)
Week 7	Mid-term Exam + Unit-Step First and Second order partial differential equation
Week 8	Fourier series
Week 9	Fourier series (sine and cos)
Week 10	Fourier series (sine and cos)
Week 11	separation of variables
Week 12	Integral transformation : Laplace transformation
Week 13	Integral transformation : Laplace transformation
Week 14	Fourier transformation
Week 15	Fourier transformation: some of applications
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	1. Theory and problem of differential equation	Yes

	Frank Ayres JR. 2. Elements of partial differential equation I An Sneddon	
Recommended Texts	مقدمة إلى المعادلات التفاضلية الج	yes
Websites	**None**	

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

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MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Numerical Analysis (1)**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MS 206**				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level		UGII	**Semester of Delivery**		4
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Firas Adel Fawzi,		**e-mail**	Firasadil01@tu.edu.iq	
Module Leader's Acad. Title		Assistant Professor,	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		**Nazar K. Hussein**	**e-mail**	nazar.dikhil@tu.edu.iq	
Scientific Committee Approval Date		2/9/2024	**Version Number**		1.1

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To introduce numerical approximation techniques for solving standard problems in Mathematics. 2. To derive some of these techniques from mathematics principles. 3. To explain how computer software is able to produce numerical solutions, and to enable a judgment of whether the results are

	reliable. 4. To provide opportunities for implementing numerical techniques on a computer. 5. To develop problem solving skills via numerical methods.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	15. Summarize what is meant by a basic numerical methods. 16. Recognize how used numerical methods . 17. Compute error estimates for simple numerical methods. 18. Derive elementary numerical methods from first principles. 19. The student learns how to find the approximate value of nonlinear equations using numerical methods. 20. Apply the numerical methods which discussed to simple examples. 21. The student learns how to find the approximate solutions of linear and nonlinear systems using numerical methods. 22. Implement numerical methods using computer software, and apply them in examples. 23. Understand some elements of computer programming.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Numerical errors Error sources, Define the absolute error and relative error with solving an examples, Error sources and errors in calculations(addition, subtraction, multiplication and division) and solve examples.[12 hrs] Define the root of the equation and determination of roots positions with solving examples.[10 hrs]. A review of the language MatLab, A review of the language MatLab, A review of the language MatLab, Write program of errors in calculations, Write program of Bisection method, Write program of False position method, Write program of Secant method, Write program of Newton -Raphson method and daily examination. [9 hrs] Part B - Numerical methods to solve nonlinear equations Numerical methods to solve nonlinear equation , Bisection method and False position method and solving an example and write algorithm, Derivative of the approximation root of Secant method with solving an example and write algorithm, Derivative of the approximation root of Newton-Raphson method and solve examples and write algorithm , Special cases of Newton-Raphson method and solve examples.[14 hrs] Fixed point method with solving several examples and write algorithm , Aitken method with solving examples and write properities.[10 hrs] Write program of Fixed point, Write program of Aitken method, Write program of Gauss elimination method, Write program of Gauss Jordan method, Write program of Jacobi method, Write program of Gauss-seidel method.[10 hrs] Part C - Numerical solutions of linear systems(direct methods and iterative methods):

	Gauss elimination metod and Gauss Jordan method to solve linear system of equations, LU-Decomposition method and solve examples, Iterative methods : Jacobi and Gauss-seidel methods.[12 hrs] Write program of exponential approximation, Solving examples by programs.[10 hrs]

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 type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	107	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5, 12	LO #1, 2, 3 and 8
	Assignments	2	10% (10)	3,10	LO # 1, 2, 6 and 9
	Projects / Lab.	2	10% (10)	7,13	LO # 8 and 9
	Report	1	10% (10)	15	LO # 4, 5 and 7
Summative assessment	**Midterm Exam**	2 hr	10% (10)	8	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	Introduction in numerical analysis and define rounding and chopped.
Week 2	Define the absolute error and relative error with solving an examples.
Week 3	Error sources and errors in calculations(addition, subtraction, multiplication and division) and solve examples , write a duty.
Week 4	Define the root of the equation and determination of roots positions with solving examples.
Week 5	daily exam + Numerical methods to solve nonlinear equation , Bisection method with write algorithm.
Week 6	False position method and solving an example and write algorithm.
Week 7	Derivative of the approximation root of Secant method with solving an example and write algorithm.
Week 8	**Mid-term Exam**
Week 9	Derivative of the approximation root of Newton-Raphson method and solve examples and write algorithm.
Week 10	Special cases of Newton-Raphson method and solve examples , write a duty.
Week 11	Fixed point method with solving several examples and write algorithm.
Week 12	daily exam + Aitken method with solving examples and write properties.
Week 13	Gauss elimination metod and Gauss Jordan method to solve linear system of equations.
Week 14	LU-Decomposition method and solve examples.
Week 15	Iterative methods : Jacobi and Gauss-seidel methods , Report.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: A review of the language MatLab
Week 2	Lab 2: A review of the language MatLab
Week 3	Lab 3: A review of the language MatLab
Week 4	Lab 4: Write program of errors in calculations
Week 5	Lab 5: Write program of Bisection method
Week 6	Lab 6: Write program of False position method
Week 7	Lab 7: Write program of Secant method+ Projects/ Lab.
Week 8	Lab 8: Write program of Newton -Raphson method and daily examination
Week 9	Lab 9: Write program of Fixed point
Week 10	Lab 10: Write program of Aitken method

Week 11	Lab 11: Write program of Gauss elimination method
Week 12	Lab 12: Write program of Gauss Jordan method
Week 13	Lab 13: Write program of Jacobi method+ Projects/ Lab.
Week 14	Lab 14: Write program of Gauss-seidel method

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Principles of Numerical Analysis, Dr. Ali Muhammad Siddiq and Ibtisam Kamal Al-Din: 1986	Yes
Recommended Texts	Numerical Methods Using MatLab, fourth edition, John H.M. and Kurtis D.F.(2004).	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	**Rings Algebra**			**Module Delivery**	
Module Type	**S**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MS 207**				
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level	UGII		**Semester of Delivery**	4	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Ali Shebl Ajeel		**e-mail**	ali.shebl@tu.edu.iq	
Module Leader's Acad. Title	Instructor		**Module Leader's Qualification**	Ph. D.	
Module Tutor	Omer Abdulrazzaq Abdullah		**e-mail**	omerabdulrazzaqa@tu.edu.iq	
Peer Reviewer Name	Akram Salim Mohammed		**e-mail**		
Scientific Committee Approval Date	2/9/2024		**Version Number**	1.1	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Giving the student definitions of rings, examples and related theorems 2. Make the student distinguish between rings and subrings.

	3. The ability to employ different theorems to study the types and properties of rings.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Identify the concept of algebraic structure, especially rings 2. Identify examples of non-commutative rings 3. How to find sub rings 4. How to find the division ring 5. Study the concept of ring homomorphism .
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Chapter 1 Definition of ring and some example , Definition of Zero divisor and integral domain , Integral domain and commutative ring with identity with examples , [15 hrs] Chapter 2 Definitions of Sub-ring and center of rings , Some theorems of rings and sub-rings , definitions of Ideals with examples and theorems , [15 hrs] Chapter 3 Prime ideals, maximal ideal and principal ideal , Idempotent elements and nilpotent elements , Jacobson radical of rings and unite elements , [12 hrs] Chapter 4 Definition Quotient Rings with examples and theorems , Polynomial Rings and Boolean Rings , [15 hrs] Chapter 5 Definition of Homomorphisms and isomorphisms, examples and theorems , Definition of fields and sub-fields , [15 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 type 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	5.2

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	97	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	3	15% (15)	5 ,8, 10	LO #1, 2, 3
	Assignments	3	15% (15)	2,7, 12	LO # 1-4
	Projects / Lab.				
	Report	1	10% (10)	10	LO # 4
Summative assessment	**Midterm Exam**	1 hr	10% (10)	8	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	Definition and Elementary Properties of Rings
Week 2	Definition of ring and some example
Week 3	Definition of Zero divisor and integral domain
Week 4	Integral domain and commutative ring with identity with examples
Week 5	Definitions of Sub-ring and center of rings
Week 6	Some theorems of rings and sub-rings
Week 7	definitions of Ideals with examples and theorems
Week 8	Special ideals and elements such as : Prime ideals, maximal ideal and principal ideal
Week 9	Idempotent elements and nilpotent elements
Week 10	Jacobson radical of rings and unite elements
Week 11	Definition Quotient Rings with examples and theorems
Week 12	Polynomial Rings and Boolean Rings
Week 13	Definition of Homomorphisms and isomorphisms, examples and theorems
Week 14	Definition of fields and sub-fields
Week 15	Some important theorems of fields
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	Abstract Algebra, David, M. Burton, 1988	Yes
Recommended Texts	The Theory of Rings Algebra	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 2			**Module Delivery**	
Module Type	Sportive			☒ **Theory** ☒ **Lecture** **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	UOT031				
ECTS Credits	3				
SWL (hr/sem)	48				
Module Level		2	**Semester of Delivery**		2nd
Administering Department		Mathematics Science	**College**	CCSM	
Module Leader			**e-mail**		
Module Leader's Acad. Title		Asst.Lecturer	**Module Leader's Qualification**		master
Module Tutor			**e-mail**		
Peer Reviewer Name		Ahmed Maher	**e-mail**	ahmed.m.salih@tu.edu.iq	
Scientific Committee Approval Date		2/9/2024	**Version Number**	1.1	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	This course aims to introduce students to fundamental concepts of networking, including types, components, and security, alongside the principles of e-commerce and modern banking services. It equips students with practical troubleshooting skills to resolve common hardware and software issues. Additionally, the course provides a

	foundational understanding of artificial intelligence (AI), exploring its history, techniques, and applications in industries such as healthcare, education, and automation. Emphasis is placed on the societal impact, ethical challenges, and future trends of AI, encouraging students to critically evaluate its role in shaping technology and society.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**Learning Outcomes** 1. **Understand Networking Fundamentals and Security** Students will be able to define networks, identify different types of networks, and explain the basic components of a network. They will also gain foundational knowledge of network security and recognize common threats. 2. **Comprehend E-Commerce Concepts and Services** Students will understand the principles of electronic banking and explore various services such as online banking, mobile banking, and ATM services, gaining insight into their role in modern commerce. 3. **Demonstrate Computer Troubleshooting Skills** Students will learn basic troubleshooting techniques, diagnose common hardware and software issues, and apply practical solutions to resolve them effectively. 4. **Explore the Basics of Artificial Intelligence (AI)** Students will understand the definition, history, and key characteristics of AI, as well as the techniques, benefits, challenges, and ethical considerations associated with AI development. 5. **Evaluate AI Applications in Modern Technology** Students will explore AI's role in technologies such as smartphones, virtual assistants, and adaptive learning systems, while also studying its impact across industries including healthcare, education, and robotics. 6. **Analyze the Societal and Ethical Implications of AI** Students will critically examine the effects of AI on society, its ethical challenges, and its influence on global relations and the job market. They will also assess future trends and research in AI development.
Indicative Contents المحتويات الإرشادية	**Indicative Contents** **1. Networking Fundamentals** o **Introduction to networks: types and components** o **Basics of network security and common threats** **2. E-Commerce and Electronic Banking** o **Concepts of e-commerce** o **Online banking services: ATM, debit card, mobile banking, SMS alerts**

	3. Computer Troubleshooting o **Basic troubleshooting techniques and tools** o **Diagnosing and resolving common hardware and software issues** **4. Introduction to Artificial Intelligence (AI)** o **Definition, history, and techniques of AI** o **Key characteristics, benefits, and ethical considerations** **5. Applications of AI in Modern Technology** o **AI-driven smartphone technologies: virtual assistants, adaptive learning** o **AI applications across industries: healthcare, education, robotics, finance** **6. Ethical and Societal Impact of AI** o **AI ethics: privacy, surveillance, and job market impact** o **AI's influence on society and global relations** **7. Future of Artificial Intelligence** o **Emerging AI technologies and research** o **Trends shaping the future of AI and its applications**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	- Board - Computer - Presentation software - Exchanging experiences among colleagues.
Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا	

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل		**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	60		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	2	5, 11	#LO 1-3, #LO 3-5
	Assignments	1	2	7, 12	#LO 3-5, #LO 1-4
	Projects	1	2	continuous	
	Report	1	2	14	#LO 1-5
Summative assessment	**Midterm Exam**	2 hr	40	11	#LO 1-3
	Final Exam	2 hr	50	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

Week No.	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 (Cont.): Basic troubleshooting techniques and tools for diagnosing land resolving issues.
Week 5	Computer Troubleshooting: Identifying and solving common hardware and software problems that computer users encounter.

Week 6	Introduction to Al: Definition of Al, History of AI, AI ; Techniques and Approaches.
Week 7	Introduction to Al(Cont.): Key Characteristics of Al, Benefits of Al, Challenges and Ethical Considerations.
Week 8	Role of Al in Modern Smartphones: AI-Driven Mobile Technologies, Virtual Assistants (Siri, google Assistant, Alexa).
Week 9	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	Ethical Challenges in Al: Al ethics, privacy and surveillance, the impact of Al on the job market..
Week 15	The Future of Al: Future trends in Al, recent research and emerging technologies.

Delivery Plan (Weekly Lab. Syllabus): المنهاج الاسبوعي للمختبر:	
Week 1	Identifying network components and configuring network settings.
Week 2	Configuring basic security features (firewall, antivirus).
Week 3	Using online banking features like mobile banking, SMS alerts, and secure login.
Week 4	Using diagnostic tools to troubleshoot basic system errors.
Week 5	Practical scenarios for troubleshooting network connectivity problems.
Week 6	Demonstration of simple AI algorithms using interactive platforms.

Week 7	Group activity: Discussing challenges like privacy, surveillance, and bias in AI systems.
Week 8	Analyzing real-world case studies on AI ethics.
Week 9	Testing real-time translation apps and voice recognition tools.
Week 10	Exploring AI-driven marketing tools and automation software.
Week 11	Demonstrating automation technologies using AI-driven tools.
Week 12	Discussing potential solutions to societal challenges posed by AI.
Week 13	evaluating the impact of AI decisions in controlled scenarios
Week 14	using open-source AI platforms for simple problem-solving tasks.
Week 15	Peer review and refinement of projects.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	اساسيات الحاسوب – الخضر علي الخضر	No
Recommended Texts	مدخل الى عالم الذكاء الاصطناعي	No

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.

وصف مادة

اللغة العربية

Module Information معلومات المادة الدراسية					
Module Title	**اللغة العربية 2**			**Module Delivery**	
Module Type	**غير أساسية**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	UOT011				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level		UGII	**Semester of Delivery**		4
Administering Department		**Math**	**College**	**CCSM**	
Module Leader	**Bushra Adel Saleh**		**e-mail**	**Bushra.a.salih@st.tu.edu.iq**	
Module Leader's Acad. Title		**Assistant Lecturer**	**Module Leader's Qualification**		**Master**
Module Tutor	None		**e-mail**	/	
Peer Reviewer Name		**Bushra Adel Saleh**	**e-mail**	Bushra.a.salih@st.tu.edu.iq	
Scientific Committee Approval Date		2/9/2024	**Version Number**	1.1	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	**1_ تقوية القدرة اللغوية لدى الطلاب .** **2_ اكتساب الطالب المعرفة الكاملة لأسس اللغة العربية وإكسابهم مهارة التعبير الصحيح.** **3_ توضيح اهمية القواعد النحوية للغة** **4_ تقوية ملكة الطلاب اللغوية ومعرفة الأخطاء الشائعة في اللغة.** **5_ معرفة القواعد الأساسية والقدرة على استخدامها وتطبيقها.**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1- تعريف الطالب بالمصطلحات ذات الصلة بمفهوم القواعد الإملائية والنحوية .** **2- تعريف الطالب على القواعد النحوية والقدرة على استخدامها.** **3- تعريف الطالب على أهمية الدقة في الملاحظة والتمييز بين الصواب والخطأ فيما يسمعون أو يقرؤون مما يساعدهم على فهم معاني الجمل والأساليب.** **4_ تعريف الطالب بالكلام وما يتألف منه ، ومعرفته بالتمييز بين الفعل والاسم والحرف من خلال**

	عرض علامات كل قسم من أقسام الكلام. **5_ تعريف الطالب بالممنوع من الصرف.**
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	وُضِعت استراتيجية التعلم والتعليم من أجل ان يحصل الطالب على معلومات كاملة تغطي المنهج الدراسي المعد للمادة ولكي تتحقق الغاية الاساسية للمنهج الذي ينصب نحو المام وادراك الطالب بالمفاهيم الاساسية لمادة اللغة العربية ,إذ يتميز هذا المساق بحقيقة أنه يحتاج إلى نهج خاص يعتمد بشكل أساسي على تنمية قدرات الطالب على فهم القواعد النحوية والإملائية وكيفية تطبيقها على النصوص القرآنية والنصوص الشعرية ، وعدم الوقوع في اللحن.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	32	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	18	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.1
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**	4	20% (20)	5, 10,12	LO #1-3 , LO# 9 - 11
	Assignments	6	15% (15)	2, 12	LO # 3, 4, LO#8 -10
	Projects / Lab.	7			
	Report	2	5% (5)	12	LO # 5, 9 and 11
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-8
	Final Exam	3	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	الكلام وما يتألف منه

Week 2	أقسام الفعل
Week 3	علامات الاسم والفعل
Week 4	التاء المربوطة والتاء المبسوطة
Week 5	الاسم المقصور وتثنيته وجمعه، والاسم الممدود وتثنيته وجمعه
Week 6	كان وأخواتها
Week 7	أقسام كان وأخواتها
Week 8	الأحرف المشبهة بالفعل ومعانيها
Week 9	امتحان نصف الفصل
Week 10	مواضع كسر همزة إن وفتحها
Week 11	الفاعل وأحواله
Week 12	المعرب والمبني
Week 13	الأفعال الخمسة وإعرابها
Week 14	الممنوع من الصرف
Week 15	الأخطاء الشائعة في العربية
Week 16	امتحان نهاية الفصل

Delivery Plan (Weekly Lab. Syllabus): There is no Lab activities 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	اللغة العربية العامة للأقسام غير الاختصاص / جمع واعداد ، م.م. بشرى عادل صالح / جامعة تكريت / علوم الحاسوب والرياضيات	No
Recommended Texts	شرح ابن عقيل ، و قطر الندى	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	منهج البحث العلمي			**Module Delivery**	
Module Type	B			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MS 208				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level	UGII		**Semester of Delivery**	4	
Administering Department			**College**	Type College Code	
Module Leader	Mizal Hamad Thawi		**e-mail**	mizalobaidi@tu.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	---		**e-mail**	---	
Peer Reviewer Name	Hassan Hussien Ebrahim		**e-mail**	Hassan1962pl@tu.edu.iq	
Scientific Committee Approval Date	2/9/2024		**Version Number**	1.1	

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- فهم طبيعة وأهمية المعرفة العلمية. 2- التعرف على أنواع البحث العلمي المختلفة. 3- تعلم كيفية تحديد وتعريف مشكلة البحث. 4- تنمية المهارات في تقييم مشاكل البحث. 5- تعلم كيفية اختيار منهجية بحث مناسبة لدراسة معينة. 6- تنمية المهارات في جمع البيانات البحثية وتنظيمها.
Module Learning	1- فهم أهمية العلم والمعرفة ودورهما في تطور المجتمع والتقدم العلمي.

Outcomes مخرجات التعلم للمادة الدراسية	2- التعرف على أنواع البحث العلمي وفهم الاختلافات بينها وأهدافها المختلفة. 3- اكتساب مهارات تحديد مشكلة البحث وتصميم دراسة بحثية متعلقة بها. 4- القدرة على تقييم مشكلة البحث وصياغة فرضية قابلة للاختبار. 5- فهم أهمية اختيار منهج البحث المناسب لتحقيق أهداف الدراسة البحثية. 6- اكتساب مهارات جمع وتصنيف البيانات المتعلقة بالبحث العلمي. 7- تعلم كيفية تنظيم وإدارة البيانات المجمعة لضمان سهولة الوصول إليها وتحليلها. 8- فهم الفروق بين مصادر البيانات الأولية والثانوية واستخدامها بشكل فعال في البحث العلمي. 9- تطوير مهارات تحليل البيانات وتقديم النتائج بطريقة دقيقة ومناسبة. 10- تعزيز قدرات قراءة مصادر البحث والتمكن من استخلاص المعلومات الهامة منها.
Indicative Contents المحتويات الإرشادية	يتضمن المحتوى الإرشادي ما يلي: العلم والمعرفة، البحث العلمي وانواعه، خصائص البحث العلمي وتحديد مشكلة البحث، تقييم مشكلة البحث وصياغة الفرضية، تحديد منهج البحث [6 hrs.] تجميع وتصنيف البيانات، تبويب وإدارة البيانات، انواع مصادر البيانات (أولية، ثانوية)، التحليل وعرض نتائج البيانات [6 hrs.] قراءة مصادر البحث، الاساليب والقواعد العلمية في كتابة البحث، طرائق التثبيت والكتابة للهوامش، معنى الحاشية للبحث وإعداد قائمة المصادر، الملاحق والإعدادات، ملخص البحث [5 hrs.]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	تتمثل الإستراتيجية الرئيسية التي سيتم تبنيها في تقديم هذه الوحدة في تشجيع الطلاب على المشاركة في التدريبات، وفي نفس الوقت تحسين مهارات التفكير النقدي وتوسيعها. 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.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم			
Strategies			
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	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.1
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**	3	15% (15)	5, 11 and 13	LO #1, #2 and #9, #10
	Assignments	3	15% (15)	3,7 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	العلم والمعرفة
Week 2	البحث العلمي وانواعه
Week 3	خصائص البحث العلمي وتحديد مشكلة البحث
Week 4	تقييم مشكلة البحث وصياغة الفرضية
Week 5	تحديد منهج البحث
Week 6	تجميع وتصنيف البيانات
Week 7	تبويب وإدارة البيانات
Week 8	اختبار نصف الفصل + انواع مصادر البيانات (أولية، ثانوية)
Week 9	التحليل وعرض نتائج البيانات
Week 10	قراءة مصادر البحث
Week 11	الاساليب والقواعد العلمية في كتابة البحث
Week 12	طرائق التثبيت والكتابة للهوامش
Week 13	معنى الحاشية للبحث وإعداد قائمة المصادر
Week 14	الملاحق والإعدادات
Week 15	ملخص البحث
Week 16	أسبوع تحضيري قبل الامتحان النهائي

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	عبد الكريم، عبد العزيز مصطفى وكداوي، طلال محمود، (2006)، "اساسيات البحث العلمي في العلوم الإنسانية، دار ابن الاثير للطباعة والنشر، جامعة الموصل، العراق.	Yes
Recommended Texts	None	No
Websites	https://www.coursera.org/learn/research-methodologies	

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	**Foundations of Mathematics I**			**Module Delivery**	
Module Type	C			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	**MS 101**				
ECTS Credits	8				
SWL (hr/sem)	**200**				
Module Level		UGI	**Semester of Delivery**		1
Administering Department		Math	**College**	CCSM	
Module Leader	Nabeel Ezzulddin Arif		**e-mail**	nabarif@tu.edu.iq	
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Dabya Mahmood Ali		**e-mail**	dhabiaa.m.ali@tu.edu.iq	
Peer Reviewer Name		Azher Abbas Mohammad	**e-mail**	drazh64@tu.edu.iq	
Scientific Committee Approval Date		2/9/2024	**Version Number**	1.1	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Real analysis	**Semester**	6
Co-requisites module	Abstract Algebra	**Semester**	3

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	It is highly beneficial that students master previous mathematics concepts, applications, and skills, prior to learning algebra and other higher level mathematical courses such as: 1- The student's acquisition of the concept of statements, mathematical logic,

	and methods of dealing with them algebraically 2- Clarifying the concept of groups, relationships, applications, types and theories related to them 3- Giving the student experience in dealing with basic numbers 4 - Knowledge of the origin of natural numbers
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon successful completion, students will have the knowledge and skills to: 1- Explain the fundamental concepts from the foundations of mathematics and its role in modern mathematics and applied contexts. 2 -Demonstrate accurate and efficient use of logical and set theoretical techniques. 3- Demonstrate capacity for mathematical reasoning through analyzing, proving and explaining concepts from the foundations of mathematics.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: Part A – Mathematical Logic is the study of formal logic within mathematics. Major subareas include model theory, proof theory, set theory, and recursion theory. Research in mathematical logic commonly addresses the mathematical properties of formal systems of logic such as their expressive or deductive power. However, it can also include uses of logic to characterize correct mathematical reasoning or to establish foundations of mathematics. [12 hours] Part B- Set Algebra The algebra of sets, defines the properties and laws of sets, the set-theoretic operations of union, intersection, and complementation and the relations of set equality and set inclusion. It also provides systematic procedures for evaluating expressions, and performing calculations, involving these operations and relations. Any set of sets closed under the set-theoretic operations forms a Boolean algebra with the join operator being *union*, the meet operator being *intersection*, the complement operator being *set complement*, the bottom being and the top

	being the universe set under consideration. [16 hours] Part C- The Relations **Relations and its types** concepts in mathematics foundation are one of the important topics of set theory. Sets, relations and functions all three are interlinked topics. Sets denote the collection of ordered elements whereas relations and functions define the operations performed on sets. The relations define the connection between the two given sets. Also, there are types of relations stating the connections between the sets. Hence, here we will learn about relations and their types in detail. Study types of relations:Empty Relation, Universal Relation, Identity Relation, Inverse Relation, Reflexive Relation, Symmetric Relation, Transitive Relation, Equivalence Relation then study the classes of equivalence with examples [16 hours] Part D- Mapping Mapping in complex plane with their properties especially a geometrical properties study of all types of mapping : injective mapping, bijective mapping, surjective mapping, inverse mapping then their theories and examples. [16 hours)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This course is characterized by the fact that it needs a special approach that depends mainly on the development of engineering thinking and the mathematical approach in thinking. It also depends on prior courses ino real analysis, chaos, and some imagination. Teaching is mainly based on the home works that are given at the end of each week, and the student notes the interdependence between the serial topics of this course, in addition to assigning the student (or a group of students) to write one report and represent it as a seminar for the purpose of training in the use of scientific resources and the method of writing a subject in mathematics.
Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا	

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	107	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7.2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	15% (15)	2, 7,12	LO #1-3 , LO# 9 - 11
	Assignments	2	10% (10)	4, 8	LO # 3, 4, LO#8 -10
	Projects / Lab.				
	Report	1	15% (15)	12	LO # 5, 9 and 11
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-8
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	**المنطق الرياضي**.(Mathematical Logic) العبارات الرياضية(Mathematical statements) الجمل المركبة :(Compound statements) النفي ،(Negation).
Week 2	الوصلات(Connectives) اقتران :(Conjunction) الانفصال ،(Disjunction) ، العبارات الشرطية والثنائية الشرطية(Conditional and biconditional statements).
Week 3	التكافؤ المنطقي(Logical equivalence) التحصيل ،(Tautology) التناقض ، (Contradiction).
Week 4	• جبر العبارات(Algebra of statements) القوانين الذاتية :(Idempotent laws) ، التوزيع (Commutativity)، التبادلية (Associatively)التجميعية ، قوانين دي (Complimentary)، المتممة (Identity)، المحايد (Distributivity) مورغان (De Morgan's laws).

Week 5	، المجموعات المتساوية (Belong)، الانتماء (Subsets)، المجموعات الجزئية (Set)الممجموعة (Equal sets) Disjoint، الانفصال (Complement)، المتممة (Intersection)، التقاطع (Union)الاتحاد ()، التجزئة (Partition)
Week 6	، مجموعة(Universal set)، المجموعة الشاملة (Empty set)المجموعة الخالية Exam and القوى (Power Set).
Week 7	**Midterm Exam +** جبر المجموعات(Algebra of sets) ، القانون (Commutative law)، القانون التبادلي (Idempotent law) القانون الذاتي ، قانون دي مورغان (Distributive law)، قانون التوزيع (Associative law)التجميعي (De Morgan's law). الضرب الديكارتي للمجموعات(Cartesian product of sets).
Week 8	**التطبيقات**(Mappings) ، (Domain): المجال (Basic concepts and definitions)مفاهيم تعاريف أساسية ، الرسم البياني للتطبيقات (Range)، المدى (Codomain)المجال المقابل (Graph of the mapping).
Week 9	، التطبيقات (Onto mappings)، التطبيقات المتباينة (1-1 mappings)التطبيقات المتقابلة 1-1 (Equality of mapping)، تساوي التطبيقات (Bijective mapping)المتقابلة 1-1 والمتباينة.
Week 10	، التطبيق (Identity mapping): التطبيق المحايد (Types of mapping)أنواع التطبيقات ، توسيع التطبيق (Restriction of mapping)، تقييد التطبيق (Constant mapping)الثابت (Extension of mapping)، تطبيق القيمة المطلقة (Absolute value function)
Week 11	تركيب ومعكوس التطبيقات(Composition mapping and inverse mapping)
Week 12	رسم التطبيقات ومعكوساتها Exam, (Direct images and inverse images under mapping).
Week 13	**عدد العناصر في المجموعات والحساب**(Cardinality, Cardinal Numbers, Arithmetic on Cardinal Numbers)
Week 14	المجموعات المنتهية وغير المنتهية(Finite and infinite sets
Week 15	المجموعات القابلة للعد والغير قابلة للعد(Countable and uncountable sets).
Week 16	**Final exam.**

Delivery Plan (Weekly Lab. Syllabus): There is no Lab activities المنهاج الاسبوعي للمختبر: لا توجد فعاليات مختبرية	
	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	1. **Introduction to the foundations of mathematics, Wildel R. ,2nd 1965,New York** 2. **أسس الرياضيات*,هادي جابر مصطفى وآخرون جامعة البصرة، العراق 1983 الجزئين الأول والثاني**	Yes
Recommended Texts	**مقدمة في أسس الرياضيات* عادل غسان نعوم و باسل عطا الهاشمي,1 جامعة بغداد – العراق (2000)**	yes
Websites	https://www.math.tamu.edu/~florent/teaching/lecture_notes/220lecture_notes.pdf	

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.

Calculus I

تفاضل وتكامل 1

Module Information معلومات المادة الدراسية					
Module Title	**Calculus I**			**Module Delivery**	
Module Type	C			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MS 102				
ECTS Credits	8				
SWL (hr/sem)	200				
Module Level		UGI	**Semester of Delivery**		1
Administering Department		Math	**College**	CCSM	
Module Leader	Omer Abdulrazzaq Abdullah		**e-mail**	omerabdulrazzaqa@tu.edu.iq	
Module Leader's Acad. Title		Assistant Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Ali Shebl Ajeel		**e-mail**	ali.shebl@tu.edu.iq	
Peer Reviewer Name		Akram Salim Mohammed	**e-mail**	akr_tel@tu.edu.iq	
Scientific Committee Approval Date		2/9/2024	**Version Number**	1.1	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	Calculus II, Advanced Calculus	**Semester**	2

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The goal of studying differential calculus at university is to enable students to gain a deep understanding of this fundamental element of mathematics and its applications in different fields. By studying differential calculus, students learn how to calculate derivatives and understand the concept of a derivative as the instantaneous rate of

	change of a function. Students can apply the concepts of calculus to solve practical problems, analyze the behavior of functions, determine critical points, least and largest values of functions, and estimate changes of variable quantities. In addition, the study of differential calculus provides a foundation for the study of other topics in mathematics, science, and engineering, such as integration, calculus in multiple variables, and the solution of differential equations. Learning differential calculus aims to develop students' analytical thinking and mathematical reasoning capabilities and provide them with powerful mathematical tools to deal with complex technical and scientific problems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Deep understanding of concepts: Students are expected to gain a deep understanding of basic concepts in differential calculus. Students should be able to understand the concept of a derivative and its meaning as the rate of change of a function, as well as the concept of inverse differential and integration of functions. 2. Numerical and Application Skills: Students should acquire strong skills in calculating and using derivatives in solving applied calculus problems. They should be able to compute the derivative of a variety of functions and apply it in analyzing the behavior of functions, identifying critical points, and estimating absolute values and variable ratios. 3. Analytical Thinking: By studying differential calculus, students are expected to develop abilities in analytical thinking and mathematical reasoning. They should be able to analyze mathematical problems and draw conclusions based on learned mathematical concepts and tools. 4. Applications in Other Fields: Students should have the ability to apply the concepts of differential calculus in other fields such as science, engineering, and economics. They learn how to represent real phenomena by functions and use differential calculus to analyze these phenomena and derive practical results. 5. Use of Technology: Students should have the ability to use appropriate technology such as mathematical calculation programs and
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: 1. Introduction to calculus: includes the definition of a derivative and the concept of a derivative as the instantaneous rate of change of a function. Students are exposed to the basic rules of calculus and related concepts. 2. The basic rules of differentiation: It includes studying the basic rules of differentiation such as the rule of differentiation rules, the rule of differentiation of constants, the rule of differentiation of forces, and other rules of differentiation of known functions. 3. Higher Derivatives: Students learn how to calculate higher derivatives, how to work with recursive differentiation, and how to use differential rules related to it. 4. Applications in differential calculus: Students explore the practical applications of calculus in different fields such as physics, engineering, and computer science. Practical examples of solving various differential problems are presented. 5. Relative and Total Differential: Students learn the concept of relative

	differential and total differentiation and how to calculate them. They are exposed to its applications in analyzing the behavior of functions and estimating variable changes. 6. Practical Applications of Calculus: Students are introduced to the use of differential calculus in solving problems in mathematical modeling, economic analysis, statistics, and other fields.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Student interaction: Active participation and interaction between students and the lecturer or teacher is encouraged. Small group discussions or collaborative sessions can be organized to solve various differential problems. Technology, such as online forums or distance learning tools, can be used to encourage communication and collaboration among students. 2. Practical Application and Projects: The course should include practical activities and application projects that allow students to apply differential concepts and skills in real-world contexts. For example, teams can be formed to solve multidimensional differential problems or applications in fields such as engineering and medical science. 3. Use of Technology: Calculus software and mathematical applications can be used to enhance interaction and interactive learning. Students can use graphing software or computer mathematics programs to analyze functions and graph their curves. 4. Provide examples and practical exercises: A wide range of examples and practical exercises covering various differential calculus concepts should be provided. Students can practice solving the exercises

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	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	107	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	3	15% (15)	5, 10,12	LO #1-3 , LO# 9 - 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, LO#8 -10
	Projects / Lab.				
	Report	1	15% (15)	12	LO # 5, 9 and 11
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-8
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to function, domain, range .
Week 2	Invers functions, even and odd function .
Week 3	Graph the functions
Week 4	Limits
Week 5	Continuous
Week 6	Exponential Functions , Logarithm Functions, Trigonometric functions.
Week 7	**Mid-term exam** + Trigonometric functions.
Week 8	Derivatives
Week 9	Rules of differentiation
Week 10	Applications of Derivatives.
Week 11	The mean value theorem
Week 12	The derivative and extrema
Week 13	Derivatives of Exponential Functions , Logarithm Functions
Week 14	Derivatives of Trigonometric functions.
Week 15	Derivatives of inverse functions
Week 16	**Preparatory week before the final exam.**

Delivery Plan (Weekly Lab. Syllabus): There is no Lab activities

المنهاج الاسبوعي للمختبر:لا توجد فعاليات مختبرية

	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	1. Courant, R., John, F., Blank, A. A., & Solomon, A. (1965). *Introduction to calculus and analysis* (Vol. 1). New York: Interscience Publishers. 2. Tall, D. (1996). Functions and calculus. *International handbook of mathematics education*, *1*, 289-325. 3. Tall, D. (1996). Functions and calculus. *International handbook of mathematics education*, *1*, 289-. 4. Marsden, J., & Weinstein, A. (1985). *Calculus I*. Springer Science & Business Media. 5. *Thomas' Calculus*, Early Transcendental, 12th ed. 6. Calculus and Analytic Geometric, Durfee. W.H ,1971 New York (3).	No
Recommended Texts	Grossman, Stanley I. *Calculus*. Academic Press, 2014.	No
Websites	https://books.google.iq/books?hl=ar&lr=&id=0aziBQAAQBAJ&oi=fnd&pg=PP1&dq=calculus+book&ots=a1k4tINdCZ&sig=tmAQQ_yHi9mTDBLcx-qi7hy9uo8&redir_esc=y#v=onepage&q=calculus%20book&f=false	

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	**Topic in Mathematics**			**Module Delivery**	
Module Type	C			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	MS 103				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		UGI	**Semester of Delivery**		1
Administering Department		Math	**College**	CCSM	
Module Leader	Hind Khaled Kolaib			Hind.Khaled@tu.edu.iq	
Module Leader's Acad. Title		assistant teacher	**Module Leader's Qualification**		M.Sc
Module Tutor			**e-mail**		
Peer Reviewer Name		Narmin jamal khaleel	**e-mail**	Narmin.j.khaleel35382@st.tu.edu.iq	
Scientific Committee Approval Date		2/9/2024	**Version Number**	1.1	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1-Acquisition of the student to the concept of phrases and mathematical logic and ways to deal with them algebraically. 2- Clarifying the concept of groups, relationships, functions and the links

	between them and the theories related to them. 3- Giving the student experience in dealing with matrices of all kinds and performing various operations on them.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The Intended Subject Specific Learning Outcomes. On successful completion of the module students: (a) should have a reasonable understanding of the definitions and terms relating to topic in mathematics introduced in the module; (b) should have a reasonable understanding of the statements, proofs and implications of the basic theorems given in the module (sufficiently well to be able to construct simple proofs of related results); (c) should have confidence and reasonable skill in calculating with matrices and in specific vector spaces, etc. using the theorems derived during the module and with relatively little guidance ; (d) should have developed a critical appreciation of the central role of topic in Mathematics and in its applications; (e) should be able to present simple arguments and conclusions in topic in mathematics with reasonable clarity; (f) should be aware of the possibilities for using Maple to solve simple problems just beyond the range of "hand calculation". The Intended Generic Learning Outcomes. On successful completion of the Module students will have: -developed their problem-solving skills in relation to topic in mathematics . -have acquired a reasonable facility in numerical and symbolic calculation with matrices and other related constructs in topic in mathematics . -have furthered their time-management and organisational skills, as evidenced by the ability to plan and implement efficient and effective modes of working. -have furthered their study skills in an area that lies at the heart of most advanced Mathematics, Statistics and applications of these areas and is therefore valuable for continuing professional development.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following:. <u>Part A – Systems of Linear Equations</u> Introduction to Systems of Linear Equations, Gaussian Elimination, Consistent and Inconsistent Systems. [12 hours] <u>Part B- Matrices</u> Matrices and Matrix Operations, Square Matrices, Determinants, Inverses, More Systems of Linear Equations [16 hours] <u>Part C- Eigenvectors</u> Eigenvalues, Eigenvectors and Diagonalization [16 hours] <u>Part D- introduction to Complex number ℂ</u> Introduction to complex numbers and their properties, Recognition of complex

	numbers, . [16 hours)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This course is characterized by the fact that it needs a special approach that depends mainly on the development of engineering thinking and the mathematical approach in thinking. It also depends on prior courses ino real analysis, chaos, and some imagination. Teaching is mainly based on the home works that are given at the end of each week, and the student notes the interdependence between the serial topics of this course, in addition to assigning the student (or a group of students) to write one report and represent it as a seminar for the purpose of training in the use of scientific resources and the method of writing a subject in mathematics.

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	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
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	15% (15)	5, 10,12	LO #1-3 , LO# 9 - 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, LO#8 -10
	Projects / Lab.				
	Report	1	15% (15)	12	LO # 5, 9 and 11
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-8
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Linear, coherent and inconsistent systems.
Week 2	Homogeneous equations and their solutions
Week 3	Matrices and some of their types
Week 4	Algebraic operations on matrices.
Week 5	Algebraic properties of operations on matrices
Week 6	transposed matrix
Week 7	The abbreviated classroom format class equivalence
Week 8	Matrix inverse and how to find it
Week 9	anomalous and non anomalous matrices,
Week 10	Determinants are their properties
Week 11	Use the propagation method by coefficients to find the value of the determinants
Week 12	Gramer's method for solving linear systems
Week 13	Introduction to complex numbers and their properties
Week 14	Polynomials and their properties
Week 15	The relationship of coefficients of polynomials with their roots
Week 16	**Preparatory week before the final exam.**

Delivery Plan (Weekly Lab. Syllabus): There is no Lab activities المنهاج الاسبوعي للمختبر: لا توجد فعاليات مختبرية	
	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	1- Introduction to Linear Algebra with Applications, Bernard Coleman, translated by Adel Ghassan Naoum and Basil Atta Al-Hashemi, first edition 1990 University of Baghdad-Iraq	Yes
Recommended Texts	1- Mathematical Methods, Riyad Shakir Naoum and others, first edition 1985, Basra University – Iraq. 2- Matrices, Adel Zainal Al-Bayati, first edition 1978, Al-Mustansiriya University - Iraq	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.

General physics

فيزياء عامة

Module Information معلومات المادة الدراسية					
Module Title	general physics			**Module Delivery**	
Module Type	E			محاضرات نظرية	
Module Code	MS 104				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	UGI		**Semester of Delivery**	1	
Administering Department	Math		**College**	CCSM	
Module Leader	Sabah Salman Hamdi		**e-mail**	Sabah.s.hamdi@tu.edu.iq	
Module Leader's Acad. Title	Assistant Lecturer		**Module Leader's Qualification**	Master's	
Module Tutor	No		**e-mail**	/	
Peer Reviewer Name	No		**e-mail**	/	
Scientific Committee Approval Date	2/9/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1-القدرة على ادراك المفهوم الكميات العددية والمتجهة . 2- القدرة على فهم مفهوم القوة وانواعها ز 3- يعرف مفهوم القصور الذاتي في الحركة 4- التعرف على قوانين الحركة لنيوتن

	5ـــمعرفة مفهوم الاحتكاك وانواعه.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1- تعريف الطالب بمفاهيم : الكميات العددية والمتجهة – جمع المتجهات وطرحها -الضرب النقطي والاتجاهي .** **2- تعريف الطالب الحركة الخطية والدورانية والعلاقة بينهما** **3- تعريف الطالب بقوانين نيوتن للحركة** **4- تعريف الطالب بمفهوم القوة – التوازن – محصلة القوى المتوازية – مركز الثقل – الاحتكاك – الزخم الخطي – التصادم بالإضافة الى أنواع**
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	1- يتميز هذا المساق بحقيقة أنه يحتاج إلى نهج خاص يعتمد بشكل أساسي على تنمية التفكير الهندسي . والمنهج الرياضي للتفكير الفيزيائي . التعلم النشط: شجع المشاركة النشطة من خلال إشراك الطلاب في أنشطة حل المشكلات والمناقشات والتمارين العملية. هذا يمكن أن يعزز فهم المفاهيم والاحتفاظ بها. أمثلة من العالم الواقعي: اربط مفاهيم الفيزيائية بتطبيقات العالم الواقعي ، وأثبت مدى ملاءمتها وعمليتها. استخدم أمثلة من مجالات مختلفة لجعل المواد أكثر صلة. التصورات: استخدم الوسائل المرئية والمخططات لمساعدة الطلاب على تصور المفاهيم الفيزيائية لتسهل الفهم الاعمق 2- تمارين عملية: تزويد الطلاب بفرص وافرة لتطبيق المفاهيم الرياضية من خلال التدريبات العملية. يساعد ذلك في تطوير مهاراتهم التحليلية ومهارات حل المشكلات. التقييم التكويني: قم بتقييم فهم الطلاب بانتظام من خلال الاختبارات القصيرة والواجبات والأنشطة داخل الفصل. قدم ملاحظات بناءة لمساعدتهم على تحديد مجالات التحسين وتعزيز تعلمهم. التغذية الراجعة والدعم: تقديم ملاحظات بناءة في الوقت المناسب للطلاب ، ومعالجة المفاهيم الخاطئة لديهم وتوضيح شكوكهم. قدم دعمًا إضافيًا من خلال ساعات العمل أو البرامج التعليمية أو الموارد عبر الإنترنت لضمان حصول الطلاب على المساعدة عند الحاجة.

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**	2	15% (15)	5, 10,12	LO #1-3 , LO# 9 - 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, LO#8 -10

	Projects / Lab.				
	Report	1	15% (15)	12	LO # 5, 9 and 11
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-8
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	الكميات العددية غير المتجهة
Week 2	الكميات العددية غير المتجهة/ تعاريف وامثلة
Week 3	جمع وطرح وضرب المتجهات / امثلة متنوعة على المتجهات
Week 4	الازاحة والسرعة والتعجيل
Week 5	الحركة على خط مستقيم
Week 6	الاجسام الحرة السقوط - القذائف
Week 7	أسئلة متنوعة
Week 8	القوة – التوازن – قانون نيوتن الأول
Week 9	محصلة القوى المتوازية – مركز الثقل – قانون نيوتن الثاني - تطبيقات قانون نيوتن الثاني
Week 10	الاحتكاك – الزخم الخطي- التصادم – مركز الكتلة
Week 11	الحركة الدائرية- القوة المركزية
Week 12	الحركة الدورانية ذات التعجيل الزاوي المنتظم
Week 13	قانون نيوتن للحركة الدورانية
Week 14	أنواع الحركة
Week 15	تعاريف وامثلة
Week 16	أسبوع تحضيري قبل الامتحان النهائي.

Delivery Plan (Weekly Lab. Syllabus): There is no Lab activities 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	1- الفيزياء الجامعية / الميكانيك وخواص المادة والحركة الموجية والحرارة تأليف :- د. رحيم عبد د. عبد السلام عبد الأمير عباس د. طالب ناهي الخفاجي فياض عبد اللطف نجم	No
Recommended Texts	Francis Weston Sears , Mechanics, Wave motion ,and Heat .Addison Wesley Publishing Company,London1965.	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	**Arabic Language**			**Module Delivery**	
Module Type	**B**			☒ **Theory**	
Module Code	**UOT001**			☒ **Lecture**	
ECTS Credits	**2**			☐ **Lab**	
SWL (hr/sem)	**50**			☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	**UGI**		**Semester of Delivery**		
Administering Department	**Math**		**College**	CCSM	
Module Leader	بشرى عادل صالح		**e-mail**	**Bushra.a.salih@st.tu.edu.iq**	
Module Leader's Acad. Title	Assist Lecturer		**Module Leader's Qualification**	M.Sc	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	2/9/2024		**Version Number**	1.1	

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- منه. التعرف على الكلام العربي: من ناحية تعريفة، اقسامة، الى علامات كل قسم 2- معرفة الجملة العربية واقسام الجملة العربية والجمل الاسمية والجمل الفعلية 3- التعرف على حركات الاعراب: سواء كانت اصلية او فرعية

	4- معرفة الطالب بالعفل العربي: من حيث الصحة والاعلال 5- معرفة الطالب الفعل العربي من حيث اللزوم والتعدي 6- معرفة لطالب الفعل العربي من حيث الزمن 7- طرق كتابة العدد و تذكرة وتانيثه 8- معرفة علامات الترقيم في الكلام 9- تعلم قواعد رسم الهمزة 10- التعرف على طريقة كتابة التاء المربوطة، والمبسوطة 11- قل ولا تقل: الأخطاء الشائعة لدى المتكلمين والكتاب 12- معرفة ماهو الأسلوب الخبري، 13- معرفة ماهو الأسلوب الانشائي، 14- تعلم مهارات لغوية: تنمية الذوق اللغوي، وتحسين الأسلوب لدى المتعلمين
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- ان يعرف الطالب الكلام العربي: من ناحية تعريفة، اقسامة، الى علامات كل قسم منه. 2- ان يتعلم الطالب الجملة العربية واقسام الجملة العربية والجمل الاسمية والجمل الفعلية 3- التعرف على حركات الاعراب: سواء كانت اصلية او فرعية 4- ان يعرف الطالب العفل العربي: من حيث الصحة والاعلال 5- ان يتعلم الطالب الفعل العربي من حيث اللزوم والتعدي 6- معرفة الطالب الفعل العربي من حيث الزمن 7- معرف الطالب طرق كتابة العدد و تذكرة وتانيثه 8- معرفة الطالب لعلامات الترقيم في الكلام 9- ان يتعلم الطالب قواعد رسم الهمزة 10- معرف الطالب على طريقة كتابة التاء المربوطة، والمبسوطة 11- قل ولا تقل: الأخطاء الشائعة لدى المتكلمين والكتاب 12- التعرف على الأسلوب الخبري، 13- معرفة ماهو الأسلوب الانشائي، 14- التعلم على مهارات لغوية: تنمية الذوق اللغوي، وتحسين الأسلوب لدى المتعلمين
Indicative Contents المحتويات الإرشادية	1- [التعرف على الكلام العربي: من ناحية تعريفة، اقسامة، الى علامات كل قسم منه ساعه 2] 2- معرفة الجملة العربية واقسام الجملة العربية والجمل الاسمية والجمل الفعلية، ساعه 2 3- التعرف على حركات الاعراب: سواء كانت اصلية او فرعية، ساعه 2 4- معرفة الطالب بالعفل العربي: من حيث الصحة والاعلال، ساعه 2 5- معرفة الطالب الفعل العربي من حيث اللزوم والتعدي، ساعه 2 6- معرفة لطالب الفعل العربي من حيث الزمن، ساعه 2 7- طرق كتابة العدد و تذكرة وتانيثه، ساعه 2 8- معرفة علامات الترقيم في الكلام، ساعه 2 9- تعلم قواعد رسم الهمزة، ساعه 2 10- التعرف على طريقة كتابة التاء المربوطة، والمبسوطة، ساعه 2 11- قل ولا تقل: الأخطاء الشائعة لدى المتكلمين والكتاب ، ساعه 2 12- معرفة ماهو الأسلوب الخبري، ساعه 2 13- معرفة ماهو الأسلوب الانشائي، ساعه 2 14- التعلم مهارات لغوية: تنمية الذوق اللغوي، وتحسين الأسلوب لدى المتعلمين، ساعه 2

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	الإستراتيجية الرئيسية التي سيتم تبنيها في تقديم هذه الوحدة هي تشجيع الطلاب على المشاركة على المشاركه

	في الكلام الفربي وكتابته بالصورة الصحيحه ، 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 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**	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	**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	الكلام العربي: تعريفة، اقسامة، وعلامات كل قسم.
Week 2	الجملة العربية: تعريفها ، اقسامها : الاسمية والفعلية
Week 3	حركات الاعراب: اصلية، فرعية
Week 4	العفل العربي: من حيث الصحة والاعلال
Week 5	الفعل العربي من حيث اللزوم والتعدي
Week 6	الفعل العربي من حيث الزم
Week 7	امتحان
Week 8	العدد: تذكرة، وتانيثه

Week 9	علامات الترقيم في الكلام
Week 10	قواعد رسم الهمزة
Week 11	التاء المربوطة، والمبسوطة
Week 12	قل ولا تقل: الأخطاء الشائعة لدى المتكلمين والكتاب
Week 13	الأسلوب الخبري،
Week 14	والأسلوب الإنشائي
Week 15	مهارات لغوية: تنمية الذوق اللغوي، وتحسين الأسلوب لدى المتعلمين
Week 16	امتحان نهاية الفصل

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1:
Week 2	Lab 2
Week 3	Lab 3
Week 4	Lab 4:
Week 5	Lab 5:
Week 6	Lab 6:
Week 7	Lab 7:

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	جامع الدروس العربية: الشيخ مصطفى الغلاييني	no
Recommended Texts	الجملة العربية: تأليفها وأقسامها د. فاضل السامرائي	No
Websites	https://www.almrsal.com/post/923401	

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 DESCRIPTOR
وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	الديمقراطية و حقوق الانسان			**Module Delivery**	
Module Type	E			محاضرات نظرية	
Module Code	UOT004				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level	UGI		**Semester (s) offered**	1	
Min number of students	15		**Max number of students**	100	
Administering Department	Mathematics		**College**	Compoter Science& Mathematics	
Module Leader	saad hussein ali		**e-mail**	saad.h.ali@tu.edu. iq	
Module Leader's Acad. Title	Assistant Lecturer		**Module Leader's Qualification**	Master	
Module Tutor	None		**e-mail**	None	
Peer Reviewer Name	Mundher A. Khalil		**e-mail**	mun880088@tu.edu.iq	
Review Committee Approval	2/9/2024		**Version Number**	1.1	

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	لايوجد	**Semester**	1
Co-requisites module	لايوجد	**Semester**	-

Module Aims, Learning Outcomes, Indicative Contents and Brief Description أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر	
Module Aims أهداف المادة الدراسية	**1-القدرة على ادراك المفهوم الاساسي لديمقراطية.** **2- القدرة على فهم الاصول التاريخية للمفهومين. ومعرفة ايجابيات وسلبيات الديمقراطية.** **3- الاطلاع على الديمقراطية في الاسلام.** **4- التعرف على مصادر وخصائص وسمات الديمقراطية.** **5ـــمعرفة اثر التطور التكنولوجي على الديمقراطية.** **6-التطرق لمفاهيم ذات صلة بالمصطلح مثل (العولمة، مؤسسات المجتمع المدني ،**

	الانتخابات والاستفتاء ، الحكم الرشيد ، الجرائم الانسانية، الدستور). **7-الاطلاع على الضمانات التي تكفل النظام الديمقراطي والحقوق والحريات العامة.**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1- التعرف على المصطلحات ذات الصلة بمفهوم الديمقراطية.** **2- التعرف على اهم الحقوق التي كفلها الاسلام واستثمارها في معالجة الآفات والحالات السلبية التي تغزو المجتمعات في العصر الحالي .** **الاستفادة من مزايا الديمقراطية ومكوناتها في معالجة التذبذب وعدم الاستقرار في المجتمع والحفاظ على الاستقرار والسلم المجتمعي.** **3- الاطلاع على المواثيق الدولية المختصة و الصادرة عن المنظمات الدولية وجمعية الأمم المتحدة.** **4- الاستفادة من تجارب الاخرين (الدول المتقدمة في مجالات الديمقراطية).** **5- اللمام بالقوانين والدساتير الدولية والإقليمية والمحلية المختصة بالحريات العامة والديمقراطية.** **7- التعرف على جرائم الإبادة الجماعية والجرائم الإنسانية ومدى تأثيرها على مفهوم الديمقراطية.**
Indicative Contents المحتويات الإرشادية	**يتضمن المحتوى الارشادي مايأتي:** **1- الديمقراطية في الحضارات القديمة والإسلام (8 ساعات).** **2- مصادرو خصائص وسمات الديمقراطية (4 ساعات).** **3- ضمانات النظام الديمقراطي العالمية والمحلية (4 ساعات).** **4- الديمقراطية واثر التقدم التكنولوجي عليها(4 ساعات).** **5- العولمة ، مؤسسات المجتمع المدني ، الانتخابات والاستفتاء، الدستور(4 ساعات)** **6- الجرائم الإنسانية وانواعها ، الحكم الرشيد ، (2 ساعة).** **7- الوثائق الدولية الخاصة بالديمقراطية المعاصرة (4 ساعات).**
Course Description	**الديمقراطية: يرجع مصطلح الديمقراطية الى الحضارة اليونانية القديمة وهي عبارة عن مصطلح مكون من مقطعين هما: (Cratia) و (Demo) التي تعني حكم التي تعني الشعب ليصبح المفهوم حكم الشعب ، وتتضمن الديمقراطية التطرق الى مفهومها ومعرفة الجذور التاريخية لها ، المكونات ، الخصائص ، المميزات ، الضمانات ، علاقة الديمقراطية ب (الدستور ، مؤسسات المجتمع المدني ، حقوق الانسان ، الحكم الرشيد، الانتخابات) ، الديمقراطية المعاصرة**
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	تم وضع استراتيجية التعلم والتعليم من اجل ان يحصل الطالب على معلومات كاملة تغطي المنهج الدراسي المعد للمادة ولكي تتحقق الغاية الاساسية للمنهج الذي ينصب نحو المام وادراك الطالب بالمفاهيم الاساسية لحقوق الانسان والديمقراطية ، والاطلاع على المصادر والضمانات والمواثيق الدولية للمصطلحين من اجل استثمارها في معالجة الظواهر السلبية في المجتمع والحفاظ على الاستقراروالسلم المجتمعي .

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل **In class lectures 30** **In class tests 3**	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.1
Total SWL (h/sem)	50		

الحمل الدراسي الكلي للطالب خلال الفصل	

Module Evaluation
تقييم المادة الدراسية

		Time (hr)	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	20% (20)	3, 5, ,7, 9,11,13,	LO #1, 2,3,....., 11
	Assignments (Homeworks)	6	15% (15)	2, 4, 6, 10,12,14	LO # 1, 2, 3, ...,11
	Discussions	7	5% (5)	Continuous	
Summative assessment	Midterm Exam	2	10% (10)	8	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	الجذور التاريخية الديمقراطية في الحضارات القديمة
Week 2	مفهوم الديمقراطية في الاسلام
Week 3	الديمقراطية بين العالمية والخصوصية
Week 4	اشكال الديمقراطية ، الديمقراطية المباشرة
Week 5	الديمقراطية شبه المباشرة والديمقراطية التمثيلية
Week 6	المجلس النيابي
Week 7	ألية النظام التمثيلي أو النيابي (الانتخابات)
Week 8	امتحان نصف الفصل
Week 9	هيئة الناخبين
Week 10	تنظيم عملية الانتخابات والقوائم الانتخابية
Week 11	مفهوم المرشحون والحملة الانتخابية والتصويت
Week 12	الدستور وانواعه
Week 13	نظم الانتخابات
Week 14	الجرائم الانسانية (جرائم الابادة الجماعية) والانظمة الديمقراطية
Week 15	الديمقراطية المعاصرة ودراسة حالات لأمثلة واقعية حدثت في المجتمعات الدولية والعربية وفي العراق.
Week 16	امتحان نهاية الفصل

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the

		Library?
Required Texts	**كتاب حقوق الانسان والديمقراطية.** **من تأليف :1-ا.د. ماهر صالح علاوي الجبوري، ا.د رياض عزيز هادي ، ا.د. رعد ناجي الجدة، ا.م.د كامل عبد العنكود ، ا.م.د علي عبد الرزاق محمد، ا.د. حسان محمد شفيق، (2009)**	Yes
Recommended Texts	**1- -الديمقراطية ،من تأليف : تشارلز تيللي ، ترجمة محمد فاضل طباخ ، الهيئة المصرية العامة للكتاب،(2010).** **2- كتاب حقوق الانسان الاساسية والدور الامني لحمايتها، المؤلف: الدكتور مبارك علوي محمد،(2019).**	No
Websites	N/A	

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

Note:

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

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Foundations of Mathematics II**			**Module Delivery**	
Module Type	C			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	**MS 107**				
ECTS Credits	8				
SWL (hr/sem)	**175**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Math		**College**	CCSM	
Module Leader	Nabeel Ezzulddin Arif		**e-mail**	nabarif@tu.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dabya Mahmood Ali		**e-mail**	dhabiaa.m.ali@tu.edu.iq	
Peer Reviewer Name	Azher Abbas Mohammad		**e-mail**	drazh64@tu.edu.iq	
Scientific Committee Approval Date	2/9/2024		**Version Number**	1.1	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Real analysis	**Semester**	6
Co-requisites module	Abstract Algebra	**Semester**	3

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	It is highly beneficial that students master previous mathematics concepts, applications, and skills, prior to learning algebra and other higher level

	mathematical courses such as: A- That the student be acquainted with the most important basics of mathematics, such as its mathematical systems, how to build them, and the relationship between them b- The student will be familiar with the establishment of the integral numbers C- The student will be familiar with the construction of rational, real and complex number fields D- The student realizes the basis of the operations he performs on numbers, especially the integral numbers, through studying his introduction to the theory of numbers
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon successful completion, students will have the knowledge and skills to: 1- Explain the fundamental concepts from the foundations of mathematics and its role in modern mathematics and applied contexts. 2 -Demonstrate accurate and efficient use of logical and set theoretical techniques. 3- Demonstrate capacity for mathematical reasoning through analyzing, proving and explaining concepts from the foundations of mathematics. 4- That the student be acquainted with the most important basics of mathematics, such as its mathematical systems and how to establishment of the natural numbers, integral numbers rational numbers, real numbers and complex numbers
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: Part A – Relations **Relations and its types** concepts in mathematics foundation are one of the important topics of set theory. Sets, relations and functions all three are interlinked topics. Sets denote the collection of ordered elements whereas relations and functions define the operations performed on sets. The relations define the connection between the two given sets. Also, there are types of relations stating the connections between the sets. Hence, here we will learn about relations and their types in detail. Study equivalence relation then study the classes of equivalence and properties of equivalent classes , with examples [12 hours] Part B- Natural numbers Natural numbers appear to us as the simplest numbers. They seem to be

	the fundamental blocks of mathematics. But they are not. Nearly all mathematical theories are rather based on **set theory**. In these theories, all mathematical objects are sets. The way they interact is then defined by the axioms of the theory. In this context, natural numbers exist only if these axioms allow the construction of sets which perfectly match what we would expect from natural numbers. Study their theories and example [16 hours] Part C- integral numbers We have seen how we can start with an algebraic system the (informal) system of Z integers and create new "algebraic systems" Z_m whose members are actually equivalence classes. We are going to use this same idea creating a new system whose members are equivalence classes to carefully define a new, formal algebraic system Z. [16 hours] Part D- Mapping In mathematics, we often don't really care what something "is" in some fundamental sense, but what its properties are. In this way, we may view the real numbers as any complete, ordered field R which contains the rational numbers as an ordered subfield then show their theories and examples.[16 hours)
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This course is characterized by the fact that it needs a special approach that depends mainly on the development of engineering thinking and the mathematical approach in thinking. It also depends on prior courses ino real analysis, chaos, and some imagination. Teaching is mainly based on the home works that are given at the end of each week, and the student notes the interdependence between the serial topics of this course, in addition to assigning the student (or a group of students) to write one report and represent it as a seminar for the purpose of training in the use of scientific resources and the method of writing a subject in mathematics.

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	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	97	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.4

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	15% (15)	2, 7,12	LO #1-3 , LO# 9 - 11
	Assignments	2	10% (10)	4, 8	LO # 3, 4, LO#8 -10
	Projects / Lab.				
	Report	1	15% (15)	12	LO # 5, 9 and 11
Summative assessment	**Midterm Exam**	2 hr	10% (10)	9	LO # 1-8
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	**العلاقات** .(Relations) أنوع العلاقات(Type of relations) انعكاسية :(Reflexive) متناظرة ، (Symmetric) متعدية ،(Transitive) شبه-متناظرة ،(Anti-symmetric). علاقات التكافؤ(Equivalence relations) صفوف التكافؤ ،(Equivalent classes) خصائص صفوف التكافؤ(Properties of equivalent classes) التجزئة ، (Partition)
Week 2	**الترتيب** .(Ordering) الترتيب الجزئي والترتيب التام(Partial order and total order). أصغر وأكبر عنصر (Least and greatest elements). المجموعة المقيدة(Bounded set) القيد الأعلى :(Upper bound) القيد الأدنى ، (Greatest lower bound) أكبر قيد أدنى ،(Least upper bound) أقل قيد أعلى (Lower bound) المجموعة الكاملة .(Complete set) مجموعات مرتبة جيدًا (Well-ordered sets)
Week 3	**مجموعة الاعداد الطبيعية** .ℕ (The Set of Natural Numbers ℕ) • بديهيات بيانو(Peano's Axioms). • العمليات الجبرية على الاعداد الطبيعية(Arithmetic of the natural number) : الجمع(Addition) الطرح ،(Subtraction) الضرب ،(Multiplication). • الخصائص(Properties) قوانين التجميع للجمع والضرب :(Associative law of addition and multiplication) القانون التبادلي للجمع والضرب ، (Commutative law of addition and multiplication) قانون التوزيع ،

	(Distribution law) قانون الحذف في الجمع والضرب (Cancelation law of addition and multiplication). • مبدا الترتيب الحسن في الاعداد (Ordering on ℕ) الترتيب في الاعداد الطبيعية (Well ordering of ℕ) الطبيعية.
Week 4	**مجموعة الاعداد الصحيحة** ℤ (The Set of Integer Numbers ℤ) • بناء مجموعة الأعداد الصحيحة (Construction of the set of integers). • الجمع والضرب على مجموعة الأعداد الصحيحة (The addition and multiplication on integers). • قوانين التجميع للجمع (Properties) خصائص الجمع والضرب للاعداد الصحيحة : (Associative law of addition and multiplication) القانون ، والضرب (Commutative law of addition and multiplication) التبادلي للجمع والضرب ، قانون الحذف في الجمع (Distribution law)، قانون التوزيع (Cancelation law of addition and multiplication) والضرب. • مبدا الترتيب على الاعداد الصحيحة (Ordering on ℤ).
Week 5	**مجموعة الاعداد النسبية** ℚ (The Set of Rational Numbers ℚ) • بناء مجموعة الأعداد النسبية (Construction of the rational numbers). الجمع والضرب على مجموعة الاعداد النسبية وخواصها (Addition and multiplication on ℚ and its properties).)
Week 6	المجموعة الترتيب على مجموعة الاعداد النسبية ℚ (Ordering on) ، كثافة Exam and الاعداد النسبية (Density of ℚ)
Week 7	**مجموعة الاعداد الحقيقية** ℝ (The Set of Real Numbers ℝ) **Midterm Exam +** خاصية كمال الاعداد الحقيقية (Completeness property of real numbers)
Week 8	**خصائص اضافية لمجموعة الاعداد الصحيحة** (Additional Properties of the Integer Numbers) قابلية القسمة والأعداد الأولية (Divisibility and primes).
Week 9	القاسم المشترك الاعظم والمضاعف المشترك الأصغر (Greatest common divisor and least common multiple). المبرهنة الأساسية في الحساب (The fundamental theorem of arithmetic)
Week 10	**مجموعة الاعداد العقدية** ℂ (The Set of Complex Numbers ℂ) الجمع والضرب في مجموعة الاعداد العقدية (Addition and multiplication on complex numbers).
Week 11	العملية الثنائية (Binary Operation).
Week 12	**مفاهيم اساسية في نظرية الزمر** Exam and (Basic Concepts in Group Theory)

Week 13	التعاريف الاساسية(Basic definitions) الزمر :(Groups) ، الزمر التبادلية (Commutative group)، الزمر الجزئية (Subgroup)، رتبة الزمرة (Order of group)
Week 14	**مفاهيم اساسية في نظرية الحلقة**.(Basic Concepts in Ring Theory) الحلقات :(Rings) ، الحلقة التبادلية التعاريف الاساسية(Basic definitions) (Commutative ring) ،
Week 15	**مفاهيم اساسية في الحقل**(Basic Concepts in the field)
Week 16	**Preparatory week before the final exam.**

Delivery Plan (Weekly Lab. Syllabus): There is no Lab activities

المنهاج الاسبوعي للمختبر:لا توجد فعاليات مختبرية

	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	1. **Introduction to the foundations of mathematics, Wildel R. ,2nd 1965,New York** 2. **أسس الرياضيات*,هادي جابر مصطفى وآخرون جامعة البصرة، العراق 1983 الجزئين الأول والثاني**	Yes
Recommended Texts	**مقدمة في أسس الرياضيات* عادل غسان نعوم و باسل عطا الهاشمي,1 جامعة بغداد – العراق (2000)**	yes
Websites	https://www.math.tamu.edu/~florent/teaching/lecture_notes/220lecture_notes.pdf	

Grading Scheme

مخطط الدرجات

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

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

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, 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.

Calculus II

تفاضل وتكامل 2

Module Information
معلومات المادة الدراسية

Module Title	**Calculus II**	**Module Delivery**	
Module Type	C	☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	MS 108		
ECTS Credits	**8**		
SWL (hr/sem)	**200**		
Module Level	UGI	**Semester of Delivery**	2
Administering Department	Math	**College**	CCSM
Module Leader	Omer Abdulrazzaq Abdullah	**e-mail**	omerabdulrazzaqa@tu.edu.iq
Module Leader's Acad. Title	Assistant Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	Ali Shebl Ajeel	**e-mail**	ali.shebl@tu.edu.iq
Peer Reviewer Name	Akram Salim Mohammed	**e-mail**	akr_tel@tu.edu.iq
Scientific Committee Approval Date	2/9/2024	**Version Number**	1.1

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Calculus I	**Semester**	1

Co-requisites module	Advanced Calculus	**Semester**	3

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Understanding the basic concepts: The study of differential and integral calculus aims to enhance students' understanding of the basic concepts in this mathematical field. Students learn about derivatives, integrals, and mathematical functions and how to interpret and use them to solve mathematical problems. 2. Developing arithmetic skills: Studying differential and integral arithmetic works to develop students' arithmetic skills. Students learn how to calculate derivatives and integrals and solve problems related to calculus. 3. Practical Applications: Studying differential and integral calculus helps in introducing students to the practical applications of this course in different fields. Students learn how to use calculus to solve problems in physics, engineering, economics, and other fields. 4. Developing mathematical thinking: Studying differential and integral calculus develops students' abilities in mathematical thinking and analysis. Students learn how to apply mathematical concepts in solving complex problems and understand the relationships between variables. 5. Prepare for academic and professional disciplines: Calculus is essential for many scientific, engineering and economic disciplines. The study of this course aims to qualify students and prepare them for related disciplines, enabling them to continue in the fields of research
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Solid and comprehensive understanding of the basic concepts of calculus. Students learn about the derivative, the rules of calculus and their related applications. 2. Mathematical analysis and critical thinking: Students develop mathematical analysis and critical thinking through studying this course. Students learn how to analyze complex mathematical problems and apply computational concepts and tools to solve them. 3. Calculus and Calculus Skills: Students gain practical calculus and calculus skills by solving a variety of mathematical problems. Students will be able to calculate derivatives and integrals and use appropriate techniques for solving. 4. Practical applications: Studying differential and integral calculus helps develop students' abilities to use these concepts in solving practical problems and real-world applications. Students learn how to use calculus in different

	fields such as physics, engineering, and economics. 5. Preparation for advanced subjects: Study of differential and integral calculus provides the strong foundation needed for students to continue in relevant advanced subjects. This subject is a prerequisite for advanced mathematical and engineering courses
Indicative Contents المحتويات الإرشادية	7. The concept of unlimited integration and integration. 8. Integration rules and the basic property of integration. 9. Integration of exponential, radical, trigonometric, and logarithmic functions. 10. Integration by substitution and division by part. 11. Integration applications in calculating areas and volumes of geometric shapes and work calculation. 12. differential equations: 13. First order differential equations. 14. High order differential equations and their analytical solutions. 15. Practical applications of differential equations in various fields such as physics, engineering and economics. 16. Convergence of Calculus: 17. Central convergence, right convergence, and left convergence. 18. Parenthesis convergence, series, and final convergence. 19. Indefinite integrals: 20. Integration of functions defined by forms.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	5. Student interaction: Active participation and interaction between students and the lecturer or teacher is encouraged. Small group discussions or collaborative sessions can be organized to solve various differential problems. Technology, such as online forums or distance learning tools, can be used to encourage communication and collaboration among students. 6. Practical Application and Projects: The course should include practical activities and application projects that allow students to apply differential concepts and skills in real-world contexts. For example, teams can be formed to solve multidimensional differential problems or applications in fields such as engineering and medical science. 7. Use of Technology: Calculus software and mathematical applications can be used to enhance interaction and interactive learning. Students can use graphing software or computer mathematics programs to analyze functions and graph their curves. 8. Provide examples and practical exercises: A wide range of examples and practical exercises covering various differential calculus concepts should be provided. Students can practice solving the exercises

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	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	107	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	15% (15)	5, 10,12	LO #1-3 , LO# 9 - 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, LO#8 -10
	Projects / Lab.				
	Report	1	15% (15)	12	LO # 5, 9 and 11
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-8
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Parametric Equations
Week 2	Curves defined by Parametric Equations
Week 3	Calculus with parametric curves
Week 4	Tangents and Arc length; exclude Area and Surface Area
Week 5	Polar Coordinates with applications
Week 6	Graph polar coordinates and Areas
Week 7	**Mid-term exam** and length in polar coordinates
Week 8	Sequences & series

Week 9	The Integral Test and Estimates of Sums The Comparison Tests
Week 10	Alternating Series Absolute Convergence, Ratio and Root Tests Strategy for testing series
Week 11	Power Series Representation of functions as Power Series Taylor and Maclaurin Series (no Multiplication and Division) Application of Taylor polynomials (only Approximating functions by polynomials
Week 12	Vectors , Cross Product
Week 13	Dot Product and Orthogonality
Week 14	Component and Projection
Week 15	Equations of Lines and Planes in Space
Week 16	**Preparatory week before the final exam.**

Delivery Plan (Weekly Lab. Syllabus): There is no Lab activities المنهاج الاسبوعي للمختبر:لا توجد فعاليات مختبرية	
	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	7. Courant, R., John, F., Blank, A. A., & Solomon, A. (1965). *Introduction to calculus and analysis* (Vol. 1). New York: Interscience Publishers. 8. Tall, D. (1996). Functions and calculus. *International*	No

	handbook of mathematics education, *1*, 289-325. 9. Tall, D. (1996). Functions and calculus. *International handbook of mathematics education*, *1*, 289-. 10. Marsden, J., & Weinstein, A. (1985). *Calculus I*. Springer Science & Business Media. 11. *Thomas' Calculus*, Early Transcendental, 12th ed. 12. Calculus and Analytic Geometric, Durfee. W.H ,1971 New York (3).	
Recommended Texts	Grossman, Stanley I. *Calculus*. Academic Press, 2014.	No
Websites	https://books.google.iq/books?hl=ar&lr=&id=0aziBQAAQBAJ&oi=fnd&pg=PP1&dq=calculus+book&ots=a1k4tINdCZ&sig=tmAQQ_yHi9mTDBLcx-qi7hy9uo8&redir_esc=y#v=onepage&q=calculus%20book&f=false	

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
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Linear Algebra

الجبر الخطي

Module Information معلومات المادة الدراسية					
Module Title	Linear Algebra			**Module Delivery**	
Module Type	B			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	MS 109				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	UGI		**Semester of Delivery**	1	
Administering Department	Math		**College**	CCSM	
Module Leader	Hind Khaled Kolaib		**e-mail**	Hind.Khaled@tu.edu.iq	
Module Leader's Acad. Title	Assistant Lecturer		**Module Leader's Qualification**	M.A	
Module Tutor	Samer Abdulkadir		**e-mail**	Samer.A.Salih@tu.edu.iq	
Peer Reviewer Name	Laith Khalil Shakir		**e-mail**	nazar.dikhil@tu.edu.iq	
Scientific Committee Approval Date	2/9/2024		**Version Number**	1.1	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Optimization	**Semester**	4
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To introduce students to the fundamental concepts and techniques of linear algebra. 2. To develop students' understanding of vector spaces and their properties.To provide students with the tools and skills necessary for solving systems of linear equations. 3. To enhance students' ability to manipulate and perform operations on vectors and matrices. 4. To introduce students to the concept of linear transformations and their applications.

	5. To develop students' understanding of eigenvalues and eigenvectors and their role in various applications. 6. To provide students with the knowledge and skills to perform matrix computations, such as matrix factorizations. 7. To develop students' ability to apply linear algebra in real-world problems and applications, such as data analysis, computer graphics, and optimization. 8. To enhance students' mathematical reasoning, logical thinking, and problem-solving skills. 9. To prepare students for advanced courses in mathematics, physics, engineering, computer science, and other disciplines where linear algebra plays a significant role.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Demonstrate a thorough understanding of fundamental concepts and techniques in linear algebra, such as vectors, matrices, and systems of linear equations. 2. Apply appropriate methods to solve systems of linear equations, including Gaussian elimination, matrix inverses, and matrix factorizations. 3. Perform operations on vectors and matrices, including addition, scalar multiplication, matrix multiplication, and matrix transformations. 4. Identify and analyze properties of vector spaces and subspaces, and apply these concepts in solving problems. 5. Apply knowledge of linear transformations to understand and analyze their properties, including invertibility, kernel, and image. 6. Understand and apply the concepts of eigenvalues and eigenvectors, including diagonalization of matrices and solving differential equations. 7. Use appropriate matrix factorizations, such as LU decomposition and QR decomposition, to solve problems and analyze the properties of matrices. 8. Apply linear algebra techniques to practical applications, such as data analysis, image processing, optimization, and computer graphics. 9. Demonstrate proficiency in mathematical reasoning, logical thinking, and problem-solving skills within the context of linear algebra. 10. Communicate mathematical ideas and solutions effectively, both orally and in written form, using appropriate mathematical language and notation.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: <u>Part A – Fundamental concepts and Vectors and vector Spaces</u> Vector Spaces and Subspaces: This section introduces the fundamental concepts of vector spaces and subspaces. It covers the definition of vector spaces, their properties, and provides examples of vector spaces and subspaces. Null Spaces, Column Spaces, and Linear Transformations: This section focuses on the null space and column space of a matrix, which are important subspaces associated with linear transformations. It discusses their definitions, properties, and their relationship to the solutions of linear systems. Additionally, it explores the concept of linear transformations and their connection to vector spaces. **[12 hours]**

	Part B- Eigenvalues and Eigenvectors Eigenvalues and Eigenvectors: This section introduces eigenvalues and eigenvectors of matrices. It explains their definitions and properties, including their relationship to linear transformations. The Characteristic Equation and Diagonalization: This section discusses the characteristic equation of a matrix, which is used to find its eigenvalues. It explains how to compute the characteristic polynomial and solve for the eigenvalues. Additionally, it covers the concept of diagonalization, where a matrix is represented as a diagonal matrix using its eigenvectors. **[16 hours]** Part C- Orthogonality and Least Squares Orthogonality: This section introduces the concept of orthogonality in vector spaces and inner product spaces. It covers the definition of orthogonal vectors and orthogonal sets, as well as their properties. Inner Product Spaces and Orthogonal Projections: This section focuses on inner product spaces, which are vector spaces equipped with an inner product. It discusses the properties of inner products and introduces examples of inner product spaces. Additionally, it explores orthogonal projections, which are used to find the closest approximation to a vector within a subspace. **[24 hours]** Part D- Symmetric Matrices and Quadratic Forms Diagonalization of Symmetric Matrices: This section explores the diagonalization of symmetric matrices, which have special properties. It explains how to find the eigenvalues and eigenvectors of symmetric matrices and their applications in solving systems of equations. Quadratic Forms and Positive Definite Matrices: This section discusses quadratic forms, which are expressions involving squares of variables. It explores the properties of quadratic forms and their relationship to symmetric matrices. It also covers positive definite matrices and their significance in optimization and eigenvalue problems. **[10 hours]**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Active Learning: Students are actively engaged in the learning process through problem-solving activities, group discussions, and hands-on exercises. This approach encourages students to actively participate in exploring and understanding the fundamental concepts of linear algebra. By actively working through problems, students develop a deeper understanding of the subject matter and improve their problem-solving skills. Real-World Applications: The course connects the principles of linear algebra to real-world applications, demonstrating their relevance and practicality. Through examples from various fields such as engineering, computer science, and physics, students can see how linear algebra is applied to solve real-world problems. This helps students understand the importance of linear algebra in practical contexts and motivates their learning. Visual Representations: Visual aids, diagrams, and graphs are utilized to help students visualize abstract concepts in linear algebra. Visual representations enhance understanding and enable students to grasp the geometric interpretations of vectors, matrices, and transformations. This visual approach facilitates the comprehension of complex ideas and fosters a deeper understanding of the subject matter.

	Practice and Feedback: Students are provided with ample opportunities to apply their knowledge through practical exercises, problem sets, and projects. Regular formative assessments, including quizzes and assignments, allow students to receive feedback on their progress and identify areas for improvement. This iterative feedback process helps students refine their understanding and reinforces their learning.

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	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
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	15% (15)	5, 10,12	LO #1-3 , LO# 9 - 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, LO#8 -10
	Projects / Lab.				
	Report	1	15% (15)	12	LO # 5, 9 and 11
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-8
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Vectors and Vector Spaces
Week 2	Vector Addition and its Applications
Week 3	Subspaces and Linear Independence
Week 4	Bases and Dimension of Vector Spaces

Week 5	Rank of Matrices and Linear Transformations.
Week 6	Linear Transformations and Transformation Matrix
Week 7	**Mid-term exam**
Week 8	Eigenvalues and Eigenvectors and Characteristic Equation and Diagonalization
Week 9	Applications of Eigenvalues and Eigenvectors
Week 10	Symmetric Matrices and Quadratic Forms
Week 11	Complex Eigenvalues
Week 12	Orthogonality and Least Squares
Week 13	Inner Product Spaces and Orthogonal Sets
Week 14	Orthogonal Projections and the Gram-Schmidt Process
Week 15	Least Squares Problems and their Applications
Week 16	**Preparatory week before the final exam.**

Delivery Plan (Weekly Lab. Syllabus): There is no Lab activities المنهاج الاسبوعي للمختبر: لا توجد فعاليات مختبرية	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1. Kolman, B., & Beck, R. E. (1995). *Elementary linear programming with applications*. Gulf Professional Publishing. 2. Anton, H., & Rorres, C. (2013). *Elementary linear algebra: applications version*. John Wiley & Sons.	No
Recommended Texts	Larson, R. (2016). *Elementary linear algebra*. Cengage Learning.	No
Websites	Library Genesis (libgen.is)	

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 Application I**			**Module Delivery**	
Module Type	Sportive			☒ **Theory** ☒ **Lecture** **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	UOT002				
ECTS Credits	3				
SWL (hr/sem)	75				
Module Level		1	**Semester of Delivery**		2nd
Administering Department		Mathematics Science	**College**	CCSM	
Module Leader	**Noor Saud Abd**		**e-mail**	Noorsaud033@gmail.com	
Module Leader's Acad. Title		Asst.Lecturer	**Module Leader's Qualification**		master
Module Tutor			**e-mail**		
Peer Reviewer Name		Ahmed Maher	**e-mail**	ahmed.m.salih@tu.edu.iq	
Scientific Committee Approval Date		2/9/2024	**Version Number**	1.1	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	This course aims to allow the students to utilize fundamental computer tasks and identify and discuss the hardware components of the computer system. In

	addition, teach students how to create and use word processor and create a presentation. Furthermore, gaining the ability to conduct research on the internet and surf the web. Finally, introduction to artificial intelligence.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**Learning Outcomes** 1. **Demonstrate Proficiency in Fundamental Computer Tasks** Students will be able to perform essential computer operations, including file management, basic troubleshooting, and navigation of operating systems. 2. **Identify and Explain Computer Hardware Components** Students will gain the ability to recognize and describe the functions of key hardware components, such as the CPU, RAM, storage devices, and peripheral devices. 3. **Create and Use Word Processing Documents and Presentations** Students will acquire practical skills in using word processors to create professional documents and presentation software to design visually engaging and informative presentations. 4. **Conduct Effective Research and Navigate the Internet** Students will develop the ability to utilize search engines and online resources effectively for research purposes, while adhering to ethical and safe browsing practices. 5. **Understand Basic Concepts of Artificial Intelligence** Students will be introduced to fundamental concepts of artificial intelligence, including its applications, ethical considerations, and impact on various industries.
Indicative Contents المحتويات الإرشادية	**Indicative Contents** 1. **Introduction to Computers** o Overview of computer systems o Types of computers (desktops, laptops, tablets, etc.) o Basic computer terminology 2. **Hardware and Software** o Identification and functions of hardware components (CPU, RAM, storage, input/output devices) o Introduction to software: system software vs. application software 3. **Word Processing and Presentations**

	○ Creating, formatting, and editing documents using word processors ○ Designing professional presentations with multimedia elements 4. **Internet Basics and Research Skills** ○ Introduction to web browsers and search engines ○ Conducting research effectively ○ Evaluating online information for credibility and reliability 5. **Introduction to Artificial Intelligence** ○ Definition and history of AI ○ Real-world applications of AI (e.g., virtual assistants, robotics, machine learning) ○ Ethical considerations in AI development and usage

Learning and Teaching Strategies استراتيجيات التعلم والتعليم			
Strategies	- Board - Computer - Presentation software - Exchanging experiences among colleagues.		
Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل		**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	60		

Module Evaluation تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	2	5, 11	#LO 1-3, #LO 3-5
	Assignments	1	2	7, 12	#LO 3-5, #LO 1-4
	Projects	1	2	continuous	
	Report	1	2	14	#LO 1-5
Summative assessment	**Midterm Exam**	2 hr	40	11	#LO 1-3
	Final Exam	2 hr	50	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Week No.	Material Covered
Week 1	Introduction to Computer: concepts of hardware and software with their components: concept of computing, data, and information, connecting I/O device 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, basic 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	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 (Cont.): World Wide Web; Web Browsing software's, Search Engines; Understanding URL; Domain name; IP Address.
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.

Delivery Plan (Weekly Lab. Syllabus): المنهاج الاسبوعي للمختبر:	
Week 1	**identifying hardware components (CPU, RAM, storage, etc.)**
Week 2	**Exploring memory types: RAM vs. storage, and understanding I/O units.**
Week 3	**Identifying and classifying personal computer types and features.**
Week 4	**Practicing basic mouse and keyboard techniques.**
Week 5	**Creating shortcuts, opening/closing multiple windows, and using the status bar.**
Week 6	**formatting text, using basic templates, and paragraph alignment.**
Week 7	**Applying styles, themes, headers, and footers in documents.**
Week 8	**Creating worksheets and formatting cells.**
Week 9	**Advanced functions: IF, VLOOKUP, Pivot Tables.**

Week 10	**data validation, error checking, and creating charts and graphs.**
Week 11	**Designing a simple presentation using templates and themes.**
Week 12	**Adding speaker notes and using timers.**
Week 13	**Navigating a web browser and performing basic searches.**
Week 14	**Exploring browser settings and managing bookmarks.**
Week 15	**Creating and managing an email account.**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	اساسيات الحاسوب – الخضر علي الخضر	No
Recommended Texts	**Ahmed banfa "introduction to AI"**	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	مبادئ الاحصاء			**Module Delivery**	
Module Type	Baisc			☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	MS 111				
ECTS Credits	4.00				
SWL (hr/sem)	100				
Module Level	UGII		**Semester of Delivery**	2	
Administering Department	MS		**College**	CSM	
Module Leader	Ahmed Maher Salih		**e-mail**	ahmed.m.salih@tu.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D	
Module Tutor	Sara Ismail Khalil		**e-mail**	Sarah.khalil@tu.edu.iq	
Peer Reviewer Name	Mundher Abdullah Khalee		**e-mail**	mun880088@tu.edu.iq	
Scientific Committee Approval Date	2/9/2024		**Version Number**	1.1	

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	**توضيح المفاهيم الأساسية مقدمة عن الإحصاء (تعاريف + أمثلة).** **التعرف على العرض الجدولي للتوزيعات المتجمعة وأنواعها.** **التمثيل البياني (المدرج المضلع المنحني التكراري).** **مقاييس التمركز (الوسط الحسابي للبيانات المبوبة وللبيانات غير المبوبة مع الأمثلة ومبرهنات والوسيط).**

	الوسط التوافقي مع الأمثلة. الوسط الهندسي مع تعريف والأمثلة. الانحراف المتوسط والتباين والانحراف القياسي للبيانات المبوبة وغير المبوبة. **معامل الاختلاف والدرجة القياسية مع الأمثلة والعزم الزائدي حول الصفر وأنواعه.** **العزم الزائدي حول الوسط الحسابي (أنواعه + أمثلة) والتفلطح ومعامل الاختلاف التوافيق والتباديل مع بعض الأمثلة.**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	10. توضيح المفاهيم الأساسية مقدمة عن الإحصاء (تعاريف + أمثلة). 11. التعرف على العرض الجدولي للتوزيعات المتجمعة وأنواعها. 12. التمثيل البياني (المدرج المضلع المنحني التكراري). 13. مقاييس التمركز (الوسط الحسابي للبيانات المبوبة وللبيانات غير المبوبة مع الأمثلة ومبرهنات). 14. الوسط التوافقي مع الأمثلة. الوسط الهندسي مع تعريف والأمثلة. الانحراف المتوسط والتباين والانحراف القياسي للبيانات المبوبة وغير المبوبة. 15. معامل الاختلاف والدرجة القياسية مع الأمثلة والعزم الزائدي حول الصفر وأنواعه. 16. العزم الزائدي حول الوسط الحسابي (أنواعه + أمثلة) والتفلطح ومعامل الاختلاف والتوافيق والتباديل مع بعض الأمثلة.
Indicative Contents المحتويات الإرشادية	7- دراسة المفاهيم الأساسية مقدمة عن الإحصاء (تعاريف + أمثلة) [5 ساعات]. 8- التعرف على العرض الجدولي للتوزيعات المتجمعة وأنواعها [5 ساعات]. 9- التمثيل البياني (المدرج المضلع المنحني التكراري) [5 ساعات]. 10- مقاييس التمركز (الوسط الحسابي للبيانات المبوبة وللبيانات غير المبوبة مع الأمثلة ومبرهنات والوسيط. الوسط التوافقي مع الأمثلة. الوسط الهندسي مع تعريف والأمثلة. الانحراف المتوسط والتباين والانحراف القياسي للبيانات المبوبة وغير المبوبة) [5 ساعات]. 11- معامل الاختلاف والدرجة القياسية مع الأمثلة والعزم الزائدي حول الصفر وأنواعه. العزم الزائدي حول الوسط الحسابي (أنواعه + أمثلة) والتفلطح ومعامل الاختلاف والتوافيق والتباديل مع بعض الأمثلة [6 ساعات]. 12- لتطبيق الإحصاء في الحياة العملية يجب فهم النتائج وتفسيرها بطريقة صحيحة وتطبيقها [6 ساعات].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	الاستراتيجية الرئيسية التي سيتم تبنيها في تقديم هذه الوحدة هي تشجيع الطالب على المشاركة في حل 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 الأنشطة أخذ العينات التي تهم الطالب.

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	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
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**	4	20% (20)	5, 7, 10	LO #1, #2 and #7, #8
	Assignments	2	10% (10)	2, 8, 12	LO #3, #4 and #5, #6, #8
	Projects / Lab.				
	Report	1	10% (10)	9	LO #5, #7 and #8
Summative assessment التقييم التلخيصي	**Midterm Exam**	2hr	10% (10)	8	LO #1 - #8
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	الأسبوع 1: مقدمة عن مفهوم الإحصاء (تعاريف + أمثلة)
Week 2	الأسبوع 2: التعرف على العرض الجدولي للتوزيعات المتجمعة وأنواعها.
Week 3	الأسبوع 3: التمثيل البياني (المدرج المضلع المنحني التكراري).
Week 4	الأسبوع 4: مقاييس التمركز (الوسط الحسابي للبيانات المبوبة وللبيانات غير المبوبة مع الأمثلة ومبرهنات).
Week 5	الأسبوع 5: الوسيط.
Week 6	الأسبوع 6: الوسط التوافقي للبيانات المبوبة وللبيانات غير المبوبة مع الأمثلة.
Week 7	الأسبوع 7: الوسط الهندسي للبيانات المبوبة وللبيانات غير المبوبة مع تعريف والأمثلة.
Week 8	الأسبوع 8: الانحراف المتوسط للبيانات المبوبة وغير المبوبة.
Week 9	الأسبوع 9: والتباين للبيانات المبوبة وغير المبوبة.

Week 10	الأسبوع 10: معامل الاختلاف والدرجة القياسية مع الأمثلة.
Week 11	الأسبوع 11: والعزم الزائدي حول الصفر للبيانات المبوبة وللبيانات غير المبوبة مع تعريف والأمثلة.
Week 12	الأسبوع 12: العزم الزائدي حول الوسط الحسابي للبيانات المبوبة مع أمثلة.
Week 13	الأسبوع 13: العزم الزائدي حول الوسط الحسابي للبيانات غير المبوبة مع الأمثلة.
Week 14	الأسبوع 14: والتفلطح ومعامل الاختلاف مع بعض الأمثلة.
Week 15	الأسبوع 15: التوافيق والتباديل مع بعض الأمثلة.
Week 16	**الامتحان النهائي**

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	**مبادئ الإحصاء** المؤلف: خاشع الراوي	Yes
Recommended Texts	مصادر عديدة في الإنترنت **المواقع:** Wolfram Alpha	No

Grading Scheme
مخطط الدرجات

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

Group (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	**English Languish I**			**Module Delivery**	
Module Type	B			☒ **Theory** ☒ **Lecture**	
Module Code	UOT002				
ECTS Credits	**2**				
SWL (hr/sem)	50				
Module Level		UGII	**Semester of Delivery**		3
Administering Department		Mathematics	**College**	College of Computer Science & Math	
Module Leader	Ayham Mahmoud Al-Abbad		**e-mail**	ayham.m.abbad@tu.edu.iq	
Module Leader's Acad. Title		Assistant Lecturer	**Module Leader's Qualification**		M.A
Module Tutor	None		**e-mail**	-	
Peer Reviewer Name		Mundher A. Khalil	**e-mail**	mun880088@tu.edu.iq	
Scientific Committee Approval Date		2/9/2024	**Version Number**	1.1	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	English	**Semester**	1
Co-requisites module	None	**Semester**	0

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The module aims at: 1. improving written skills through practice of writing descriptions, reports andother subject specific texts. 2. improving spoken interaction and production through the practice and production of presentations of science-related topics. 3. getting some specific terminology needed to study Mathematics.

	developing grammatical and lexical range and accuracy so that communicationhas a degree of fluency.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Knowledge of specific English terminology in Mathematics. 2. Improve the communication skills and specialist English language knowledgeof science students and professionals. 3. Enable students to communicate in English more confidently and effectivelyin their work or study environment. Develop the learners' language skills with practical reading and writing skills - such as applying for research funding or writing for publications - as well as with speaking and listening skills including 'describing and reporting Problems with experiments' and 'presenting at a conference'.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following:** - Teaching students how to communicate each other in English by using the four skills: speaking, listening, reading and writing. The use of different examples from the everyday life, dialogues, conversations and the weekly compositions are useful for more development. [60 hours]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Clear focus on grammar. 2. Balanced, integrated-skills syllabus. 3. New content engages learners with fresh topics. 4. More speaking opportunities. 5. Boosting student's motivation to study – the Student Book e-book comes to life with extra digital features to engage students and enhancetheir learning experience: Watch video straight from the page and complete interactive activities with automated marking; Listen to audiofor authentic listening practice, slow it down for improved comprehension, and voice record to practice speaking and pronunciation; Add notes, use the pen and highlighter tool to annotate the page, and save voice recordings; Easily navigate using bookmarks, jump to page, and the search tool. 6. Encouraging students to study anytime, anywhere – ready to go activities for inside or outside the classroom, accessible on any device,both online and offline. 7. . Connecting students to a world-famous dictionary – quickly look up thedefinitions of words and phrases from the Oxford Learner's Dictionarieswith helpful pronunciation guidance, at the right level.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	1.1
Unstructured SWL (h/sem)	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1

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

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	**Assignments (Homework)**	1	5% (5)	2, 4, 6, 10, 12, 14	LO # 1, 2, 3, ……., 14.
	Daily Activity	1	5% (5)	continuous	LO # 1, 2, 3, …….. 14.
Summative assessment	**Midterm Exam**	2 hr	30% (30)	15	LO # 1-6
	Final Exam	2hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction – Am, Is and Are – This is , How are You? Good morning – What's this? - Numbers 1-10 – Plurals.
Week 2	Countries – He , She, They, His and Her – Where he is from? - Numbers 11-30.
Week 3	Jobs – Is, Am and Are – Negative and Questions – Personal Information – Social Expressions.
Week 4	Family and Friends – Possessive S – Has and Have.
Week 5	Sports – Drinks – Present Simple – I, We, You and They - A and An - Language and
Week 6	Nationalities - Numbers and Prices.
Week 7	The Time - Present Simple He and She – Always, Sometimes and Never – Words that
Week 8	go together – Days of the week.
Week 9	Question words – Me, Him, Us and Them – This and That – Adjectives – Can I?
Week 10	Rooms and Furniture – There is and There are – Prepositions – Directions.
Week 11	Saying years – Was and Were born – Past Simple – Irregular Verbs – Have, Do and Go
Week 12	– When's your birthday?
Week 13	Past Simple – Regular and Irregular – Questions and Negatives – Sport and Leisure –
Week 14	Going sightseeing.
Week 15	Can and Can't – Adverbs – Adjective + Noun – Everyday problems.

Week 16	I'd like – Some and Any – In a restaurant – Signs all around.

Delivery Plan (Weekly Lab. Syllabus): There is no Lab activities المنهاج الأسبوعي للمختبر: لا توجد فعاليات مختبرية	
	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	1. New Headway Beginner Student's Book (2002) byJohn and Liz Soars. 2. New Headway English Course (2002) by Julia Starr Keddle.	Yes
Recommended Texts	Any helping test on net.	No
Websites	https://test-english.com/grammar-points/	

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.