

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



Academic Program and Course Description Guide Department of Mathematic

2024



Introduction:

The educational program is a well—planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

Concepts and terminology:

Academic Program Description: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

Program Vision: An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

Program Mission: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

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

Curriculum Structure: All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

Learning Outcomes: A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

Teaching and learning strategies: They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra—curricular activities to achieve the learning outcomes of the program.



Academic Program Description Form



University Name: Tikrit
Faculty/Institute: College of Education for woman
Scientific Department: Mathematic
Academic or Professional Program Name: B.Edu. Mathematic
Final Certificate Name: B.Edu. Mathematic
Academic System: Yearly
Description Preparation Date: 18/2/2024
File Completion Date 24/2/2024

Signature:

Name: Prof. Luma Saad Abdalrasqi

Head of Department

Date:

Signature:

Name: Prof. Dr. Intisar Etanem Abdel Wahab

Scientific Associate

Date 26/3/2024

The file is checked by: Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Signature:

Assis. lecturer, Shahid Khaled Hamid

Date: 25/3/2024

Approval of the Dean

Prof. Dr. Naglaa Abdel Hussein Aliwi

Concepts and terminology:

Academic Program Description: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

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Program Mission: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

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Curriculum Structure: All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

Learning Outcomes: A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

Teaching and learning strategies: They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra- curricular activities to achieve the learning outcomes of the program.

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. Providing students with the knowledge and learning of modern principles and methods in the study of mathematics.
2. Introducing students to the importance of mathematics.
3. Graduating an elite group of students who have the ability to continue graduate studies to support higher education in the future

4. Program Accreditation

Does the program have program accreditation? And from which agency? Yes, the program has program accreditation from the National Council for Accreditation of Programs of Colleges of the Educational Group

5. Other external influences

Is there a sponsor for the program? Ministry of Higher Education and Scientific Research, Scientific Supervision and Scientific Evaluation Apparatus, Directorate of Quality Assurance and Academic Accreditation, Accreditation Department.

6 Program Structure

Institution Requirements	Number of Courses	Credit hours	Percentage	Reviews•
College Requirements	36	162	%100	
College Requirements				
Department Requirements				
Summer Training	-	-	-	
Other	There is field training in high schools			

7. Program Description

First Year

Course Name	Course Code	Credit Hours		Units
		theoretical	practical	
Calculus	-	3	2	8
Foundations of Mathematics	-	2	2	6
Linear Algebra	-	2	2	6
General Physics	-	2	-	4
Computer Science	-	1	-	2
Foundations of Education	-	2	-	4
Educational Psychology	-	2	-	4
Arabic Language	-	1	-	2
English Language	-	1	-	2
Human rights and democracy	-	1	-	2
Total		17	6	40

Second Year

Course Name	Course Code	Credit Hours		Units
		theoretical	practical	
Advanced Calculus	-	3	2	8
Group Theory	-	2	1	5
Ordinary Differential Equation	-	2	2	6
Geometry and Axiomatic Systems	-	2	1	5
Computer Science	-	-	2	2
Administration and Supervision	-	2	-	4
Developmental Psychology	-	2	-	4
English Language	-	1	-	2
Baath Party Crimes	-	1	-	2
Total		15	8	38

Third year

Course Name	Course Code	Credit Hours		Units
		theoretical	practical	
Mathematical Analysis	-	2	2	6
Numerical Analysis	-	2	2	6
Probability	-	2	2	6
Rings	-	2	2	6
Partial Differential Equations	-	2	1	5
Philosophy of Scientific Research	-	2	-	4
Curricula and Teaching Method	-	1	2	4
Educational Guidance	-	2	-	4
English Language	-	1	-	2
Total		16	11	43

Forth year

Course Name	Course Code	Credit Hours		Units
		Theoretical	practical	
Topology	-	2	2	6
Mathematical Statistics	-	2	2	6
Complex Analysis	-	2	2	6
Operations Research	-	2	2	6
Graph Theory	-	2	2	6
Graduation Research Work	-	-	2	2
Measuring and Amendment	-	-	2	4
English Language	-	1	-	2
Professional ethics	-	1	-	2
Practical Teaching		1	2	4
Total		15	14	44

8. Expected learning outcomes of the program	
Knowledge	
A1- Enabling the student to gain an understanding of mathematics. A2- Preparing qualified teachers to teach in educational institutions. A3- Preparing a high-quality mathematics teacher.	
Skills	
B1 - That the student acquires the skill of mathematical operations. B2 - That the student acquires skills in methods of proof and thinking. B3 - The student should be able to link the information.	1. The correct scientific thinking method. 2. Discussion method. 3. Daily, monthly and annual tests.
C1- The method of discussion and dialogue between the student and the professor. C2- Conclusion. C3- Mathematical logic	1. Through daily and monthly tests. 2. Discussions. 3. Practical and applied tests. 4. By reviewing the experiences of different universities.
Ethics	
D1- Utilizing the acquired information. D2- Personal development through reading and updating knowledge. D3- Engaging in the teaching profession. D4- Participation in seminars, conferences and workshops Specialized.	

9. Teaching and Learning Strategies
Theoretical and practical teaching of mathematics sciences, as well as graduation research and others.

10. Evaluation methods
1. Theoretical and practical tests. 2. Discussions. 3. Final exams.

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)	Number of the teaching staff	
	General	Special		Staff	Lecturer
Prof. Dr Rana bahjat yaseen	Mathematics	Topology		√	
Prof. Luma saad abdalbaqi	Mathematics	Topology		√	
Assist. Prof. Dr Israa Munir Tawfik	Mathematics	Topology		√	
Assist. Prof. Dr Mohammad Abd moheemmed	Mathematics	Numerical Analysis		√	
Assist. Prof. Dr. Amer fadhel nassar	Mathematics	Applied mathematics		√	
Assist. Prof. Nihad Shareef Khalaf	Mathematics	Time series		√	
Assist. Prof. Elaf Sabah Abdulwahid	Mathematics	Functional analysis		√	
Assist. Prof. Dr	Physics	solid physics		√	
Assist. Prof. Hiba omer mousa	Mathematics	Topology		√	
Assist. Prof. Dr Sondos Nouri Shukr	Mathematics	Methods of Teaching		√	
Lecturer Dr Ihab Ahmed Najm	Computer	Computer		√	
Lecturer Dr Heba Hani Abdullah	Mathematics	Time series		√	
Lecturer. Zeina Taha Abdel Qader	Mathematics	Topology		√	
Lecturer Nada Jassim Mohammed	Mathematics	algebra		√	
Lecturer. Kholoud Gamal Mouloud	Computer	Computer		√	
Lecturer Asmaa Saleh Qaddouri	Mathematics	Statistics		√	
Lecturer Fadia Abdel Fattah Habib	Computer	Computer		√	
Assist. Lect. Muhammad Muayyad Sultan	Computer	Computer		√	
Assist. Lect. Raghad Wameed Fares	Mathematics	Statistics		√	
Assist. Lect. Farah Amer Abdulaziz	Computer	Computer		√	
Assist. Lect. Faten Haitham Mouloud	Physics	Physics		√	

Professional Development

Mentoring new faculty members

New faculty members were directed to complete a teaching suitability test and entered training courses and workshops to develop their skills in teaching and scientific research.

Professional development of faculty members

Introducing faculty members into training courses and workshops to develop their skills in teaching and scientific research. .

12. Acceptance Criterion

- (1- Central admission.
- 2- Scientific interview.
- 3- The graduate of the preparatory stage is accepted exclusively in the scientific stream (biology - applied).
- 4- Medical examination.

13. The most important sources of information about the program

- 1- Sources approved by the university (sectoral committee).
- 2- External sources and various books.
- 3- The Internet.

14. Program Development Plan

- 1- Many duties that require external information.
- 2- Many practical applications.

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 Year		Calculus	Basic	√	√	√		√	√	√		√	√	√	√
		Foundations of Mathematics	Basic	√	√	√		√	√	√		√	√	√	√
		Linear Algebra	Basic	√	√	√		√	√	√		√	√	√	√
		General Physics	Basic	√	√	√		√	√	√		√	√	√	√
		Computer Science	Basic	√	√	√		√	√	√		√	√	√	√
		Foundations of Education	Basic	√	√	√		√	√	√		√	√	√	√
		Educational Psychology	Basic	√	√	√		√	√	√		√	√	√	√
		Arabic Language	Basic	√	√	√		√	√	√		√	√	√	√
		English Language	Basic	√	√	√		√	√	√		√	√	√	√
	Human rights and democracy	Basic	√	√	√		√	√	√		√	√	√	√	
Second Year		Advanced Calculus	Basic	√	√	√		√	√	√		√	√	√	√
		Group Theory	Basic	√	√	√		√	√	√		√	√	√	√
		Ordinary Differential Equation	Basic	√	√	√		√	√	√		√	√	√	√
		Geometry and Axiomatic Systems	Basic	√	√	√		√	√	√		√	√	√	√
		Computer Science	Basic	√	√	√		√	√	√		√	√	√	√
		Administration and Supervision	Basic	√	√	√		√	√	√		√	√	√	√
		Developmental Psychology	Basic	√	√	√		√	√	√		√	√	√	√
		English Language	Basic	√	√	√		√	√	√		√	√	√	√
		Baath Party Crimes	Basic	√	√	√		√	√	√		√	√	√	√

year.		Mathematical Analysis	Basic	√	√	√		√	√	√		√	√	√	√
		Numerical Analysis	Basic	√	√	√		√	√	√		√	√	√	√
		Probability	Basic	√	√	√		√	√	√		√	√	√	√
		Rings	Basic	√	√	√		√	√	√		√	√	√	√
		Partial Differential Equations	Basic	√	√	√		√	√	√		√	√	√	√
		Philosophy of Scientific Research	Basic	√	√	√		√	√	√		√	√	√	√
		Curricula and Teaching Method	Basic	√	√	√		√	√	√		√	√	√	√
		Educational Guidance	Basic	√	√	√		√	√	√		√	√	√	√
		English Language	Basic	√	√	√		√	√	√		√	√	√	√
Forth year		Topology	Basic	√	√	√		√	√	√		√	√	√	√
		Mathematical Statistics	Basic	√	√	√		√	√	√		√	√	√	√
		Complex Analysis	Basic	√	√	√		√	√	√		√	√	√	√
		fuzzy	optional	√	√	√		√	√	√		√	√	√	√
		Functional analysis	optional	√	√	√		√	√	√		√	√	√	√
		Graduation Research Work	Basic	√	√	√		√	√	√		√	√	√	√
		Measuring and Amendment	Basic	√	√	√		√	√	√		√	√	√	√
		English Language	Basic	√	√	√		√	√	√		√	√	√	√
		Professional ethics	Basic	√	√	√		√	√	√		√	√	√	√
	Practical Teaching	Basic	√	√	√		√	√	√		√	√	√	√	

Course Description Form

1. Course Name:					
Foundations of mathematics					
2. Course Code:					
3. Semester / Year:					
2023-2024					
4. Description Preparation Date:					
18/2/2024					
5. Available Attendance Forms:					
6. Number of Credit Hours (Total) / Number of Units (Total)					
4 Hours					
7. Course administrator's name (mention all, if more than one name)					
Name: Rana Bahjat Yaseen Email: zain2016@tu.edu.iq					
8. Course Objectives					
Course Objectives			<ul style="list-style-type: none"> • • • 		
<ul style="list-style-type: none"> - Study and know mathematical logic - Relationship concept relationships and application and its types - Study of numbers ,their origins. 					
9. Teaching and Learning Strategies					
Strategy		Applying various teaching methods ,including <ul style="list-style-type: none"> - Giving lectures - Discussion method and electronic method 			
10. Course Structure					
Week		Required Learning Outcomes	Unit number	Learning method	Evaluation method
	12	Logic	The concept logic and mathematic s proof	Electronic lectures, smart board ,pen	Written and daily exams with assignments

5-8	12	The sets	algebraic operations	Electronic lectures, smart board ,pen	Written and daily exams with assignments
9-12	12	Relations	Types of relations	Electronic lectures, smart board ,pen	Written and daily exams with assignments
13-16	12	Mapping	Types of mapping	Electronic lectures, smart board ,pen	Written and daily exams with assignments
17-20	12	Number capacity	Number capacity	Electronic lectures, smart board ,pen	Written and daily exams with assignments
21-25	15	Natural number , Integers number , Real number and group	their origins and group	Electronic lectures, smart board ,pen	Written and daily exams with assignments

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)			Foundations of mathematics		
Main references (sources)			Foundations of mathematics		
Recommended books and references (scientific journals, reports...)			References		
Electronic References, Websites			Shawm series		

Course Description Form

1. Course Name:	
Computer	
2. Course Code:	
3. Semester / Year:	
2024/2023	
4. Description Preparation Date:	
18/2/2024	
5. Available Attendance Forms:	
Classroom and Google classroom	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hours	
7. Course administrator's name (mention all, if more than one name)	
Assist. Lect. Farah Amer Abdulaziz farah.amer@tu.edu.iq	
8. Course Objectives	
Course Objectives	<ul style="list-style-type: none">• The student gets to know the concept of computer science• The student should be familiar with the personal computer• For the student to recognize the difference and relationship between software and the physical parts inside the computer• For the student to recognize the importance of using a computer• The student gets to know how the internal computer parts work• The student gets to know the concept of information that the computer deals with and its classification• The student will know how information enters and exits to and from the computer• The student gets to know some operating systems• The student gets to know the relationship between operating systems and hardware• That the student be able to maintain some parts of the computer• For the student to learn about the benefits of the computer in his general life• That the student be able to know the internal parts of the computer in a concrete way• Introducing the student to theories, concepts and strategies for computer operation
9. Teaching and Learning Strategies	

Strategy	To apply what he has learned for the purpose of solving many issues and problems in the same subject --Distinguishes how information enters and exits from and to the computer -Distinguishes between different types of operating systems. -Recognizes the internal parts of the computer in a tangible way
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
4 10 4 12	8 hours 20 hours 8 hours 24	Chapter One Chapter two Chapter three Chapter four	Computer fundamentals Computer's components Computer security and software licenses operating systems	lectures, Computer, board and pen.	Report, Exams and discussions.

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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:					
University physics					
2. Course Code:					
3. Semester / Year:					
2023-2024					
4. Description Preparation Date:					
2024-2-18					
5. Available Attendance Forms:					
6. Number of Credit Hours (Total) / Number of Units (Total)					
2 Hours					
7. Course administrator's name (mention all, if more than one name)					
Name: : Sarwa A.Mohammed Email: srwa.muhammed@tu.edu.iq					
8. Course Objectives					
Course Objectives					
<ul style="list-style-type: none"> - Learn about the basics of general physics - The student acquires information about natural phenomena 			<ul style="list-style-type: none"> • • 		
9. Teaching and Learning Strategies					
Strategy		Applying various teaching methods ,including - Giving lectures , Discussion method and electronic method.			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject	Learning method	method Evaluation
1-2	4	Chapter one	Scalar and vector quantities	Electronic lectures, smart board ,pen	Written and daily exams with assignments
3-4	4	Chapter two	the movement	Electronic lectures, smart board ,pen	Written and daily exams with assignments
5-6	4	Chapter three	Newton's laws of motion	Electronic lectures, smart board ,pen	Written and daily exams with assignments

7-8	4	Chapter four	Circular and rotational movement	Electronic lectures, smart board ,pen	Written and daily exams with assignments
9-10	4	Chapter five	Work ,energy and capacity	Electronic lectures, smart board ,pen	Written and daily exams with assignments
11-12	4	Chapter six	Flexibility	Electronic lectures, smart board ,pen	Written and daily exams with assignments
13-14	4	Chapter seven	Harmonic motion	Electronic lectures, smart board ,pen	Written and daily exams with assignments
15-16	4	Chapter eight	Gravitational attraction	Electronic lectures, smart board ,pen	Written and daily exams with assignments
17-18	4	Chapter nine	Vibration of strings and columns	Electronic lectures, smart board ,pen	Written and daily exams with assignments
19-20	4	Chapter ten	the heat	Electronic lectures, smart board ,pen	Written and daily exams with assignments
21-22	4	Chapter eleven	Coulomb's law	Electronic lectures, smart board ,pen	Written and daily exams with assignments
23-24	4	Chapter twelve	Electric field	Electronic lectures, smart board ,pen	Written and daily exams with assignments
25-26	4	Chapter thirteen	Electrical voltage	Electronic lectures, smart board ,pen	Written and daily exams with assignments
27-28	4	Chapter fourteen	Current and resistance	Electronic lectures, smart board ,pen	Written and daily exams with assignments
29-30	4	Chapter fifteen	the magnetic field	Electronic lectures, smart board ,pen	Written and daily exams with assignments

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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)	University Physics, Part One and Two
Main references (sources)	Basics of physics
Recommended books and references (scientific journals, reports...)	Basics of physics
Electronic References, Websites	Shawm series

Course Description Form

1. Course Name:	
Computer	
2. Course Code:	
3. Semester / Year:	
2024/2023	
4. Description Preparation Date:	
18/2/2024	
5. Available Attendance Forms:	
Classroom and Google classroom	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hours	
7. Course administrator's name (mention all, if more than one name)	
Name: Lecturer Dr Ihab Ahmed Najm Email: Ihab@tu.edu.iq	
8. Course Objectives	
Course Objectives	<ul style="list-style-type: none">• The student gets to know the concept of computer science• The student should be familiar with the personal computer• For the student to recognize the difference and relationship between software and the physical parts inside the computer• For the student to recognize the importance of using a computer• The student gets to know how the internal computer parts work• The student gets to know the concept of information that the computer deals with and its classification• The student will know how information enters and exits to and from the computer• The student gets to know some operating systems• The student gets to know the relationship between operating systems and hardware• That the student be able to maintain some parts of the computer• For the student to learn about the benefits of the computer in his general life• That the student be able to know the internal parts of the computer in a concrete way• Introducing the student to theories, concepts and strategies for computer operation
9. Teaching and Learning Strategies	

Strategy	To apply what he has learned for the purpose of solving many issues and problems in the same subject --Distinguishes how information enters and exits from and to the computer -Distinguishes between different types of operating systems. -Recognizes the internal parts of the computer in a tangible way
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
4	8 hours	Chapter One	Computer fundamentals	lectures,	Report,
10	20 hours	Chapter two	Computer's components	Computer,	Exams and
4	8 hours	Chapter three	Computer security and software licenses	board and	discussions.
12	24	Chapter four	operating systems	pen.	

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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:
Computer
2. Course Code:
3. Semester / Year:
2024/2023
4. Description Preparation Date:
18/2/2024
5. Available Attendance Forms:
Classroom and Google classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
60 hours
7. Course administrator's name (mention all, if more than one name)
Name: fadya abdulfatah habeeb Email: fadya.habeeb@tu.edu.iq
8. Course Objectives
Course Objectives <ul style="list-style-type: none">• The student gets to know the concept of computer science• The student should be familiar with the personal computer• For the student to recognize the difference and relationship between software and the physical parts inside the computer• For the student to recognize the importance of using a computer• The student gets to know how the internal computer parts work• The student gets to know the concept of information that the computer deals with and its classification• The student will know how information enters and exits to and from the computer• The student gets to know some operating systems• The student gets to know the relationship between operating systems and hardware• That the student be able to maintain some parts of the computer• For the student to learn about the benefits of the computer in his general life• That the student be able to know the internal parts of the computer in a concrete way• Introducing the student to theories, concepts and strategies for computer operation
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10	20 hours	Chapter two	Computer's components	Computer,	Exams and
4	8 hours	Chapter three	Computer security and software licenses	board and	discussions.
12	24	Chapter four	operating systems	pen.	

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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:	
Linear algebra	
2. Course Code:	
3. Semester / Year:	
Academic Year (2023-2024)	
4. Description Preparation Date:	
18-2-2024	
5. Available Attendance Forms:	
Weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
120 hours / 6 unit	
7. Course administrator's name (mention all, if more than one name)	
Name: Assist . Lec . zinah taha abdlqader	
Email: ztaha@tu.edu.iq	
8. Course Objectives	
<ul style="list-style-type: none"> - Introducing the basic characteristics of the nature of scientific material - Understanding the mathematical system and matrices and learning the types of -----matrices, operations on them, and their properties - Differential equations and methods for solving them - Study vector space and operations on vectors <p>Find the kernel and the image of the linear application How to calculate distinct values, eigenvectors and polynomials</p>	
9. Teaching and Learning Strategies	
Strategy	<ul style="list-style-type: none"> - Use explanation and clarification to present concepts - Interact with students through discussions and practical exercises - Use real-life examples and applications to illustrate mathematical ideas

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
4	16	System of linear equation ,matrices and operation on them	System of linear equation ,matrices and operation on them	Electronic lectures, smart board ,pens	Written and daily exams with assignments
4	16	Finding determinants and methods for solving linear equations	Finding determinants and methods for solving linear equations	Electronic lectures, smart board ,pens	Written and daily exams with assignments
4	16	Vectors in 2-spaces and 3-spaces	Vectors in 2-spaces and 3-spaces	Electronic lectures, smart board ,pens	Written and daily exams with assignments
3	12	Vector spaces and subspaces	Vector spaces and subspaces	Electronic lectures, smart board ,pens	Written and daily exams with assignments
2	8	Internal product spaces	Internal product spaces	Electronic lectures, smart board ,pens	Written and daily exams with assignments
3	12	Liner transformation	Liner transformation	Electronic lectures, smart board ,pens	Written and daily exams with assignments
4	16	Eigenvalue and Eigenvector	Eigenvalue and Eigenvector	Electronic lectures, smart board ,pens	Written and daily exams with assignments
4	16	Complex vector spaces	Complex vector spaces	Electronic lectures, smart board ,pens	Written and daily exams with assignments
3	12	Application	Application	Electronic lectures, smart board ,pens	Written and daily exams with assignments

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...

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)

• Daige, L. S Wift, J and Slobko, T;
• Elements of Linear Algebra, XEROX
1974 •

Main references (sources)

• S rang. G; Linear Algebra and its
Applications, Academic Press, 1976

Recommended books and references (scientific journals, reports...)

• Lang S; Linear Algebra, Addison Wesley
Publishing Co., 1973.

Electronic References, Websites

Course Description Form

1. Course Name:	
Calculus	
2. Course Code:	
Math.204	
3. Semester / Year:	
2023-2024	
4. Description Preparation Date:	
18/2/2024	
5. Available Attendance Forms:	
Actual presence/distance learning/recording video lessons	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5/140	
7. Course administrator's name (mention all, if more than one name)	
Name: Hiba Hani Abdullah Email: hiba.h.a.83@tu.edu.iq	
8. Course Objectives	
Course Objectives	<ul style="list-style-type: none"> ● Differentiation and integration are considered one of the main topics in mathematics, and the student usually studies the subject in several areas, including the topic of calculus of differentiation and integration, especially integration methods. ● Emphasis on studying the differentiation and integration of special functions, including trigonometric, hyperbolic, logarithmic, inverse, etc. ● . Learn about several concepts in calculus ● Ensure knowledge of the applications and benefits of derivatives
9. Teaching and Learning Strategies	
Strategy	<ul style="list-style-type: none"> ● Use explanation and clarification to present concepts. ● Interact with students through discussions and practical exercises. ● Use real-life examples and applications to illustrate mathematical ideas.

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
2	10	Chapter one	Real numbers - intervals - inequalities - functions - algebra of functions - finding the domain and range - complex function - drawing functions	Electronic lectures, smart board and pen	Written exam with assignments and reports
2	10	The second and third chapter	Limits and their properties - The method of finding the limit - Theorems about limits - Infinite limits and limits at infinity - Continuity - Theories of continuity	Electronic lectures, smart board and pen	Written exam with assignments and reports
4	20	Chapter four	Derivation - Properties of differentiation - Derivation of the complex function - Chain law - Implicit derivative - Higher order derivatives - Rolle's theorem - Mean value theorem - Increasing and decreasing functions, maximum and minimum limits, points of concavity, convexity, and alignments	Electronic lectures, smart board and pen	Written exam with assignments and reports
3	15	Chapter five	Special functions (trigonometric functions, hyperbolic functions, logarithmic functions, and exponential functions) - drawing special functions - deriving special functions and finding their inverse functions	Electronic lectures, smart board and pen	Written exam with assignments and reports
4	20	Chapter six	Integration - indefinite integration - properties of integration - integration of functions (trigonometric - hyperbolic functions - exponential and logarithmic functions)	Electronic lectures, smart board and pen	Written exam with assignments and reports

8	40	Chapter seven	Integration methods	Electronic lectures, smart board and pen	Written exam with assignments and reports
2	10	Chapter eight	Applications to definite integration	Electronic lectures, smart board and pen	Written exam with assignments and reports
1	5	Chapter ninth	Infinite series - Naylor polynomial - Taylor and Maclaurin series	Electronic lectures, smart board and pen	Written exam with assignments and reports
2	10	Chapter tenth	Differential equations - the order of the equation and the solution of the differential equation - differential equations whose variables separate - the first-order and first-order complete differential equation	Electronic lectures, smart board and pen	Written exam with assignments and reports

11. Course Evaluation

Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, written exams, reports, etc.:

- Daily preparation.
- Daily exams.
- Oral and monthly tests.
- Written tests.
- Preparing reports and research projects.
- Quarterly activities and participation in discussions.
- Student performance in class and interaction with study materials

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Finney/Thomas calculus
Main references (sources)	Khaled Ahmed Al-Samarrai,, Calculus and Integration

Recommended books and references (scientific journals, reports...)	Thomas calculus 12th edition
Electronic References, Websites	1-Encyclopedia of scientific books and journals, Tikrit University Journal of Pure Sciences and the Shome series 2- Reliable websites. 3- Virtual library. 4- Library locations in some international universities .

Course Description Form

1. Course Name:	
Ordinary differential equations	
2. Course Code:	
Math.204	
3. Semester / Year:	
2023-2024	
4. Description Preparation Date:	
18/2/2024	
5. Available Attendance Forms:	
Actual presence/distance learning/recording video lessons	
6. Number of Credit Hours (Total) / Number of Units (Total)	
4/6	
7. Course administrator's name (mention all, if more than one name)	
Name: Amer Fadhel Nassar Email: amer6767@tu.edu.iq	
8. Course Objectives	
Course Objectives	<ul style="list-style-type: none">● Ordinary differential equations are considered one of the main topics in mathematics, and the student usually studies the topic after studying several chapters on the topic of calculus and integration, especially methods of integration● Emphasis on studying the concepts themselves and how they develop, and on the logical structure of the topic as a whole.● Emphasizing the importance of ordinary differential equations in our lives.● Ensure to demonstrate the role of ordinary differential equations and their applications.● Emphasis on studying the types of solutions.● Emphasizing the importance of studying theorems and their most important applications.● Emphasis on studying theorems that provide shortened solutions in time and effort.

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9. Teaching and Learning Strategies

Strategy	<ul style="list-style-type: none"> ● Use explanation and clarification to present concepts. ● Interact with students through discussions and practical exercises. ● Use real-life examples and applications to illustrate mathematical ideas.
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
3	12	Chapter 1	Types of differential equations - the order of the differential equation - the degree of the differential equation - linear differential equations - solving the differential equations - forming the differential equation from its general solution - the theorem of the existence of the solution of the differential equation and the unity of the solution and its generalization to order n	Electronic lectures, smart board and pen	Exam, reports
10	40	Chapter 2	Equations whose variables separate - equations of the homogeneous type - differential equations with linear coefficients - exact differential equations - linear differential equations - Bernoulli's equation - reducing the order of equations	Electronic lectures, smart board and pen	Exam, reports
2	8	Chapter 3	Higher order equations - simultaneous differential equations - engineering applications - physical applications	Electronic lectures, smart board and pen	Exam, reports

6	24	Chapter 4	Linear differential equations - the operator- solving linear differential equations - Euler's equation	Electronic lectures, smart board and pen	Exam, reports
2	8	Chapter 5	Laplace transforms - inverse Laplace transforms	Electronic lectures, smart board and pen	Exam, reports
8	32	Chapter 6	Solving differential equations with series - Frobenius method - Frobenius equation - Bessel differential equation	Electronic lectures, smart board and pen	Exam, reports

11. Course Evaluation

Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, written exams, reports, etc.:

- Daily preparation.
- Daily exams.
- Oral and monthly tests.
- Written tests.
- Preparing reports and research projects.
- Quarterly activities and participation in discussions.
- Student performance in class and interaction with study materials

12. Learning and Teaching Resources

Course Description Form

1. Course Name:	
Advanced Calculus	
2. Course Code:	
3. Semester / Year:	
2023-2024	
4. Description Preparation Date:	
2024-2-18	
5. Available Attendance Forms:	
Weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
150 hours / 8 unit	
7. Course administrator's name (mention all, if more than one name)	
Name: Elaf Sabah Abdulwahid	
Email: elafs.math@tu.edu.iq	
8. Course Objectives	
<ul style="list-style-type: none"> - Study and knowledge of sequences and series. - Study and knowledge of some types test of the series. - Study some properties of absolute converge and conditionally converge. - Study and knowledge polar coordinates. - Study draw in a polar coordinates. - Study and knowledge intersection in a polar coordinates - Study and knowledge double integrals and some applications. - Study and knowledge triple integrals. 	
9. Teaching and Learning Strategies	
Strategy	Applying various teaching methods ,including <ul style="list-style-type: none"> - Giving lectures Discussion method and electronic method.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	10	Study of infinite sequences	Infinite sequences	Electronic lectures, smart board ,pens	Written and daily exams with assignments
3-4	10	Study of some type of infinite series with some examples.	Infinite series	Electronic lectures, smart board ,pens	Written and daily exams with assignments
5-8	20	Study of some type test of infinite series with examples	Infinite series	Electronic lectures, smart board ,pens	Written and daily exams with assignments
9-11	15	Study of Absolute converge and conditionally converge	Absolute converge and conditionally converge	Electronic lectures, smart board ,pens	Written and daily exams with assignments
12-15	20	Study of first and second derivatives	Derivatives	Electronic lectures, smart board ,pens	Written and daily exams with assignments
16-18	15	Study of Taylor and Maclorin series.	Taylor and Maclorin series.	Electronic lectures, smart board ,pens	Written and daily exams with assignments
19-21	15	Study of Polar coordinates	Polar coordinates	Electronic lectures, smart board ,pens	Written and daily exams with assignments
22-24	15	Study area and length of a Polar coordinates	Application of Polar coordinates	Electronic lectures, smart board ,pens	Written and daily exams with assignments
25-27	15	Study of Double integrals	Double integrals	Electronic lectures, smart board ,pens	Written and daily exams with assignments
28-30	15	Study of Triple integrals	Triple integrals	Electronic lectures, smart board ,pens	Written and daily exams with assignments

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...

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Advanced calculus , second edition • Thomas.
Main references (sources)	التفاضل والتكامل تأليف رمضان محمد جهيميه واحمد عبد العالي
Recommended books and references (scientific journals, reports...)	سلسلة شوم في التفاضل المتقدم

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, reportsetc					
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:					
Euclidean geometry					
2. Course Code:					
Math.203					
3. Semester / Year:					
2023-2024					
4. Description Preparation Date:					
5/10/2023					
5. Available Attendance Forms:					
Actual attendance in the classroom / distance learning / recording video lessons					
6. Number of Credit Hours (Total) / Number of Units (Total)					
90 hour/ 5 units					
7. Course administrator's name (mention all, if more than one name)					
Name:Fatin Haitham Mawlood Email: Fatin.Haitham@tu.edu.iq					
8. Course Objectives					
Course Objectives			<ul style="list-style-type: none"> Good, correct, and integrated knowledge and understanding of engineering. Identify the concept of the intuitive system Learn about the concept of the intuitive system. 		
9. Teaching and Learning Strategies					
Strategy		<ul style="list-style-type: none"> Using explanation and clarification to present concepts through discussion, analysis and scientific thinking Using different proof methods to prove the basic theorems of geometry 			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1-4	12	Knowledge of the origins and development of the intuitive system	The Yonck/Fano axiomatic system	Electronic lectures, lecture method, smart board and pen	Exams with homework and reports
5-8	12	Properties of the axiomatic system: consistency/independence	Properties of the axiomatic system	Electronic lectures, lecture method, smart board and pen	Exams with homework and reports
9-12	12	The Hilbertian system definition/cuts and convex sets	Evaluation of Euclid's geometry (foundations of geometry)	Electronic lectures, lecture method, smart board and pen	Exams with homework and reports
13-16	12	Re-proof of some of Euclid's theorems	Elementary engineering	Electronic lectures, lecture method, smart board and pen	Exams with homework and reports

17-20	12	Elliptical definitions and theorems	Euclidean geometry	Electronic lectures, lecture method, smart board and pen	Exams with homework and reports
21-25	15	Study of structural projective geometry	Synthetic projective plane	Electronic lectures, lecture method, smart board and pen	Exams with homework and reports
26-40	15	Study of the analytical damage level	The analytical projective level	Electronic lectures, lecture method, smart board and pen	Exams with homework 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)	• Basic concepts in engineering (Amal Shehab Al-Mukhtar).
Main references (sources)	• Axiom, geometry, and non-Euclidean systems (Nouri Farhan Al-Mayahi) • Axiom and geometry systems (Abdul Wahab Ahmed Al-Sarraj)
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	Internet sites

Course Description Form

1. Course Name:					
Group Theory					
2. Course Code:					
Math.201					
3. Semester / Year:					
2023-2024					
4. Description Preparation Date:					
18/2/2024					
5. Available Attendance Forms:					
Classroom and Google Classroom					
6. Number of Credit Hours (Total) / Number of Units (Total)					
90 hour / 5 unite					
7. Course administrator's name (mention all, if more than one name)					
Name: Nada Jasim Mohammed Email: naya11415@tu.edu.iq					
8. Course Objectives					
Course Objectives			<ul style="list-style-type: none"> • Identify the concept of group, its types an Applications 		
9. Teaching and Learning Strategies					
Strategy		-Brainstorming -Feedback at lecture time -Collaboration and feedback series			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-4	12	Student's ability to - principles. theories and diagnose special cognitively to understand distinguish and Practice different - proofs. styles of mathematics Prossessing thinking skills.	system, Mathematics Definitions of binary operation, Group and semi group. Define agroup , Basic theorems of	Deductive - Induction - Discussion - Using Data Show and white board .	Oral discussion -Daily exams Monthly exams Homework - assignments –

5-8	12	=	group ,Symmetric group , Group of modulo n .	=	=
9-12	12	=	Theorems of group of modulo n ,Cyclic group , Subgroups	=	=
13-16	12	=	Lagrange theorem, Normal groups , The normal elements and subgroups,Simple groups, Quotient group.	=	=
17-20	12	=	Internal and External direct product , Homomorphism, Isomorphism.	=	=
21-25	15	=	The 1st fundamental theorem of Isomorphism, The 2nd and 3rd fundamental theorem of Isomorphism.	=	=
26-30	15	=	Chain, Jordan-Holder theorem , Cayley's theorem , P-group, Sylow theorems	=	=

Course Description Form

1. Course Name:	
Partial differential equations	
2. Course Code:	
Math.204	
3. Semester / Year:	
2023-2024	
4. Description Preparation Date:	
18/2/2024	
5. Available Attendance Forms:	
Actual presence/distance learning/recording video lessons	
6. Number of Credit Hours (Total) / Number of Units (Total)	
3/90	
7. Course administrator's name (mention all, if more than one name)	
Name: Hiba Hani Abdullah Email: hiba.h.a.83@tu.edu.iq	
8. Course Objectives	
Course Objectives	<ul style="list-style-type: none"> • Definition of partial equations and its most important applications. • The student learns about the methods of integration, the truth of the derivative and the fact of integration, and that the student learns about the link between them. • . The student should learn about the types of partial differential equations. • To understand some applications on partial differential equations • To understand derivation and integration and their relationship to partial differential equations • To understand the relationship of the usual differential equations with the partial differential equation
9. Teaching and Learning Strategies	

Strategy	<ul style="list-style-type: none"> ● Use explanation and clarification to present concepts. ● Interact with students through discussions and practical exercises. ● Use realistic examples and applications to illustrate mathematical ideas.
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
3	9	Partial differential equations of the second order	Classification of Partial Differential Equations of Second Order, Partial Differential Equations of Order N, Forer Sequences	Electronic lectures, smart board and pen	Exam, reports
3	9	Types of partial differential equations of the second rank with variable coefficients and ways to solve it	Studying the different types of equations with variable coefficients and ways to solve them, converting Laplas to solve this type of partial equations	Electronic lectures, smart board and pen	Exam, reports
3	9	The equation of spreading heat	The equation of spreading heat in an isolated metal arm and homogeneous boundary conditions, the equation of heat diffusion in an isolated metal arm and heterogeneous boundary conditions, the equation of heat spread in an isolated metal arm	Electronic lectures, smart board and pen	Exam, reports
3	9	Wave equation in one or two dimensions	The formation of the wave equation in and methods of solving it in one or two dimensions, problems applied to the wave equation	Electronic lectures, smart board and pen	Exam, reports

3	9	the Laplace equation and poisson	Solving the Laplace equation in the two dimensions in the way of separating the variables, the Laplace equation with the polar coordinates and solving it	Electronic lectures, smart board and pen	Exam, reports
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11. Course Evaluation

Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, written exams, reports, etc.:

- Daily preparation.
- Daily exams.
- Oral and monthly tests.
- Written tests.
- Preparing reports and research projects.
- Quarterly activities and participation in discussions.
- Student performance in class and interaction with study materials

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1- Partial differential equations for scientific and engineering colleges / translation Dr. Atallah Thamer Al-Ani 1989 2- Partial differential equations / Dr. Atallah Thamer Al-Ani 3- Introduction to Partial Differential Equations / d. Atallah Thamer Al-Ani 4- Khaled Ahmed Al-Samrai, Yahya Abdel Said: Ways to solve differential equations. 5- Salim Ismail Al-Ghrabi, Sabah Hadi Al-Jassim: Differential equations.
Main references (sources)	S. K. Kate: Engineering Mathematics – II Partial differential Equations Jhon.F.
Recommended books and references (scientific journals, reports...)	Thomas calculus 12th edition

Course Description Form

1. Course Name:	
Ring Theory	
2. Course Code:	
Math.303	
3. Semester / Year:	
Year 2023-2024	
4. Description Preparation Date:	
18/2/2024	
5. Available Attendance Forms:	
Classroom and Google classroom	
6. Number of Credit Hours (Total) / Number of Units (Total)	
120 / 6 units	
7. Course administrator's name (mention all, if more than one name)	
<p>Name: Nada Jasim Mohammed</p> <p>Email: naya11415@tu.edu.iq</p>	
8. Course Objectives	
Course Ob	<p style="text-align: center;">.....</p> <ul style="list-style-type: none"> On completion of this course; the student will be abl understand fundamentals concepts of Sequences series then study the convergence. Also, study the Rim and Lubuge Integral •Identify the concept of Ring,Modulo,Representation, its types applications
9. Teaching and Learning Strategies	
Strategy	<p>-We use examples and explain writing on board and so use discuses for more understand. So we give homeworks and discuses it.</p> <p>- Brainstorming -Feedback at lecture time -Collaboration and feedback series</p>

10. Course Structure						
Week	Hours	Required Learning	Unit or subject name	Learning method	Evaluation	
		Outcomes			method	
1.	4	-Student's ability to distinguish and understand cognitively to diagnose special theories and principles. -Practice different styles of mathematics proofs. -Possessing thinking skills	Definitions of Ring, commutative ring and ring with identity.		Discussion, exercises and exam	
2.	4	=	Divisors of zero, Integral domain		Discussion, exercises and exam	
3.	4	=	Subring, Field, Field of divisors		Discussion, exercises and exam	
4.	4	=	Ideals, Trivial and proper, Intersection		Discussion, exercises and exam	
5.	4	=	The center and characteristic of ring		Discussion, exercises and exam	
6.	4	=	The principal ideal		Discussion, exercises and exam	
7.	4	=	The smallest ideal, The principal ideal ring		Discussion, exercises and exam	
8.	4	=	The maximal ideal - Zorn's lemma		Discussion, exercises and exam	
9.	4	=	Cosets, Quotient ring		Discussion, exercises and exam	
10.	4	=	The prime ideal and example		Discussion, exercises and exam	
11.	4	=	The principal ideal domain		Discussion, exercises and exam	
12.	4	=	The idempotent element, Boolean ring		Discussion, exercises and exam	
13.	4	=	Nilpotent element, Primary ideal		Discussion, exercises and exam	
14.	4	=	Ring homomorphism		Discussion, exercises and exam	
15.	4	=	Theorems of the ring homomorphism, Kernel of homomorphism		Discussion, exercises and exam	
16.	4	=	Theorems of kernel of homomorphism, Image and types of homomorphism		Discussion, exercises and exam	

17.	4	=	The Natural mapping, Isomorphism and the 1st fundamental theorem		Discussion, exercises and exam
18.	4	=	The 2nd and 3rd fundamental theorem of Isomorphism		Discussion, exercises and exam
19.	4	=	The division ring (Skew field)		Discussion, exercises and exam
20.	4	=	Radical ideal		Discussion, exercises and exam
21.	4	=	Nil -radical ring		Discussion, exercises and exam
22.	4	=	Polynomials, Sum, Product, types of Polynomials		Discussion, exercises and exam
23.	4	=	Polynomials ring		Discussion, exercises and exam
24.	4	=	Polynomials field, Division algorithm		Discussion, exercises and exam
25.	4	=	Remainder and Factorization theorems, roots of polynomials		Discussion, exercises and exam
26.	4	=	Reducible & irreducible Polynomials		Discussion, exercises and exam
27.	4	=	Modules and submodules		Discussion, exercises and exam
28.	4	=	Modules homomorphism		Discussion, exercises and exam
29.	4	=	Representation, some types		Discussion, exercises and exam
30.	4	=	Examples		Discussion, exercises and exam

Week	Hours	Required Learning		Unit or subject name	Lea met	Evaluation	
		Outcomes				method	
31.	4			Ordered Sets		Discussion, exercises and exam	
32.	4			Dense of Rational numbers		Discussion, exercises and exam	
33.	4			Sequences of real numbers		Discussion, exercises and exam	
34.	4			Sequences of cauchy		Discussion, exercises and exam	
35.	4			Convergent sequences		Discussion, exercises and exam	
36.	4			Test of convergence		Discussion, exercises and exam	
37.	4			Metric Spaces		Discussion, exercises and exam	
38.	4			Example for Metric spaces		Discussion, exercises and exam	
39.	4			Accumulation Points		Discussion, exercises and exam	
40.	4			Open and Closed Sets		Discussion, exercises and exam	
41.	4			Compact Sets		Discussion, exercises and exam	
42.	4			Compact Sets		Discussion, exercises and exam	
43.	4			Tests		Discussion, exercises and exam	
44.	4			Continuity		Discussion, exercises and exam	
45.	4			Continuity		Discussion, exercises and exam	
46.	4			Compact and Continuity		Discussion, exercises and exam	
47.	4			Convergence and Continuity		Discussion, exercises and exam	
48.	4			Uniform continuous		Discussion, exercises and exam	
49.	4			Partition		Discussion, exercises and exam	
50.	4			Riemman Integral		Discussion, exercises and exam	
51.	4			Properties of Rimman Integral		Discussion, exercises and exam	
52.	4			Rimman Stlijest		Discussion, exercises and exam	
53.	4			Measure of Bounded Sets		Discussion, exercises and exam	
54.	4			Measure of unbounded Sets		Discussion, exercises and exam	
55.	4			Measureable function		Discussion, exercises and exam	
56.	4			UnMeasurable		Discussion, exercises and exam	
57.	4			Theorems and Examples		Discussion, exercises and exam	
58.	4			Theorems		Discussion, exercises and exam	

59.	4		Theorems and Examples		Discussion, exercises and exam
60.	4		Examples		Discussion, exercises and exam

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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)	Introduction mathematical statistics 1980 G.P. Beaumont الاحصاء الرياضي 1990 أمير حنا هرمز
Main references (sources)	
Recommended books and references (scientific journals, reports...)	1980 G.P. Beaumont • University websites that provide educational materials in statistics and probability Scientific articles and research available •
Electronic References, Websites	online in the field of statistics and probability

Course Description Form

1. Course Name:					
Statistics and Probability					
2. Course Code:					
3. Semester / Year:					
2023- 2024					
4. Description Preparation Date:					
28- 2- 2024					
5. Available Attendance Forms:					
Classroom and Google classroom					
6. Number of Credit Hours (Total) / Number of Units (Total)					
(120 hour per year) / Number of Units (6 units)					
7. Course administrator's name (mention all, if more than one name)					
Name: LEC .Asmaa Salih Qaddoori					
Email: asmaa.salih@tu.edu.iq					
8. Course Objectives					
Course Objectives <ul style="list-style-type: none"> • Learn about the concept of statistics and the most important statistical measures • Study random variables and learn about their types and probability functions. • Learn about the first principles of probability and random experimentation. • Identify the functions that generate moments. • Be careful to introduce the most important statistical distributions and know the properties of each distribution. 			<ul style="list-style-type: none"> • • • 		
9. Teaching and Learning Strategies					
Strategy		<ul style="list-style-type: none"> • Use explanation and clarification to present concepts. • Interact with students through discussions and practical exercises. • Use real-life examples and applications to illustrate mathematical ideas. 			
10. Course Structure					
Week	Hour	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Definition of the principles of statistics	The concept of descriptive statistics, statistical population, the concept of sample and its types	Dying and discussion	Daily and monthly testing and homework

2	4	Define measures of central tendency	Definition of the arithmetic mean, median, and mode for classified and non-classified data	=	=
3	4	Measures of dispersion	Variance, standard deviation, range measures, and coefficient of variation	=	=
4	4	Definition of correlation and linear regression	Correlation coefficient and simple linear regression equation	=	=
5	4	Exercises and discussion	Solve some different exercises	=	=
6	4	Definition of probability and random experiment	The most important laws of probability, the axioms of probability, and the most important theorems of probability	=	=
7	4	Learn about the most important counting methods	The concept of combinations and permutations	=	=
8	4	Solve some different exercises	General questions and group assignments	=	=
9	4	The concept of random sampling	Discussion, monthly exam	=	=
10	4	Introducing the student to the concept of field and probability space	Identify independent, dependent, and mutually exclusive incidents	=	=
11	4	To understand the concept of conditional probability	Conditional probability and some of its theorems	=	=
12	4	Learn about Bayes' theorem	Bayes' theorem and its most important probabilistic applications	=	=
13	4	Solve some different exercises	Exercises and discussion	=	=

14	4	The concept of random variable and its types	The student knows the concept of discrete random variables and continuous random variables and their respective probability functions	=	=
15	4	Introduce the student to the concept of the distributive function.	The distribution function in the case of a discrete random variable and in the case of a continuous random variable	=	=
16	4	The concept of mathematical expectation and variance	Discussion and monthly exam	=	=
17	4	For the student to become familiar with the concept of the function generating moments	Derivation of the moment generating function for the discrete random variable and the continuous random variable	=	=
18	4	Solve some different exercises	General questions and group assignments	=	=
19	4	Identify the probability distribution of two random variables.	The joint probability function for discrete random variables and continuous random variables	=	=
20	4	Conditional function and conditional probability	The conditional probability of two random variables	=	=
21	4	The concept of expectation for two random variables.	The mathematical expectation of two random variables if the variables are discrete and if the variables are continuous	=	=
22	4	Solve some different exercises.	General questions and group assignments	=	=
23	4	Introducing the student to the function that generates the moments of two random variables.	The function generating the moments of two random variables, whether the variables are discrete or continuous	=	=
24	4	Solve some different exercises.	Discussion and monthly exam	=	=
25	4	Introducing the student to some statistical distributions.	Uniform distribution of discrete and continuous random variables	=	=
26	4	Solve some different exercises.	Exercises and discussion	=	=
27	4	Familiarize the student with the binomial distribution function.	The probability function of the binomial distribution and its probability properties	=	=
28	4	Introducing the student to the gamma	distribution. Probability function of gamma distribution and chi-square distribution	=	=

29	4	Familiarize the student with the normal distribution.	The probability function of the normal distribution, the exponential distribution, and the Poisson distribution	=	=
30	4	Solve some different exercises.	General questions, group assignments, and a monthly exam	=	=

11 . Course evaluation

Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, written exams, reports, etc.:

- Daily preparation.
- Daily exams.
- Oral and monthly tests.
- Written tests.
- Preparing reports and research projects.
- Quarterly activities and participation in discussions.
- Student performance in class and interaction with study materials

12 . Learning and teaching resources

Required textbooks (methodology, if any)	• Mathematical statistics, Amir Hanna Hormuz, 1990
Main references (sources)	• Introduction mathematical statistics 1980 G.P. Beaumont • . Mathematical Statistics Amir Hanna Hormuz 1990
Recommended supporting books and references (scientific journals, reports...)	Introduction mathematical statistics G.P. Beaumont 1980
Electronic references, Internet sites	University websites that provide educational materials in statistics and probability • Scientific articles and research available online in the field of statistics and probability.

Course Description Form

1. Course Name:					
Mathematical Statistics					
2. Course Code:					
3. Semester / Year:					
2023- 2024					
4. Description Preparation Date:					
28- 2- 2024					
5. Available Attendance Forms:					
Classroom and Google classroom					
6. Number of Credit Hours (Total) / Number of Units (Total)					
(120 hour per year) / Number of Units (6 units)					
7. Course administrator's name (mention all, if more than one name)					
Name: LEC .Asmaa Salih Qaddoori					
Email: asmaa.salih@tu.edu.iq					
8. Course Objectives					
.....					
Course Objectives • Mathematical statistics is considered one of the main topics in any mathematics program. The student usually studies the subject after studying the concept of the random variable, probability functions, and the properties of some statistical distributions, as the subject of mathematical statistics includes learning about the concept of transformations and the concept of estimates and their methods, in addition to: testing statistical hypotheses. • Emphasis on the study of inferring distributions using transformations • Identify the concept of estimation and its types • Identify estimation methods and the characteristics of a good appraiser • Be careful to introduce the concept of statistical hypothesis					<ul style="list-style-type: none"> • • •
9. Teaching and Learning Strategies					
Strategy		<ul style="list-style-type: none"> • • Use explanation and clarification to present concepts. • Interact with students through discussions and practical exercises. • Use real-life examples and applications to illustrate mathematical ideas 			
10. Course Structure					
W	H	Required Learning	Unit or subject name	Learning method	Evaluation

		Outcomes			method
1	4	Learn how to use the moment generating function to extract statistical distributions.	Using the moment generating function to extract statistical distributions for the discrete random variable and the continuous random variable	Dying and discussion	Daily and monthly testing and homework
2	4	Learn how to use transformations to derive statistical distributions for a discrete random variable.	The concept of transformations and their use in deriving random distributions.	=	=
3	4	Learn how to use transformations to derive statistical distributions for a continuous random variable.	The concept of the conversion factor and how to use it in deducing random distributions for a continuous random variable	=	=
4	4	Exercises and discussion.	Solve some different exercises, monthly exam	=	=
5	4	Identify some distributions derived from other probability distributions.	Defining the t-Student distribution and how to extract its probability function and some of its probabilistic properties	=	=
6	4	Introducing the student to the F distribution and the Chi-square distribution..	The probability function of the F distribution and the Chi-square distribution, how to derive them, and their probabilistic properties	=	=
7	4	Solve some different exercises.	General questions and group assignments, monthly exam	=	=
8	4	What is the concept of estimation and random interval?	Explaining the concept of estimation and random interval and learning how to estimate with a period	=	=
9	4	Introducing the student to grading by one point.	Explain the concept of a confidence interval for a normal population mean	=	=
10	4	Introducing the student to the concept of variation.	Explain the concept of confidence interval for the variance of a normal population	=	=
11	4	To understand the concept of the difference between averages.	Find the confidence interval between the means	=	=
12	4	Solve some different exercises.	Exercises, discussion, and monthly exam	=	=
13	4	Introducing the student to grading methods.	Maximum likelihood method, least variance method, and least squares method	=	=
14	4	Introducing the student to the characteristics of a good appraiser.	Definition of the concept of consistency and the concept of impartiality and some examples of them.	=	=

15	4	Introducing the student to the concept of competence and efficiency	Identify the efficient guesser with adequate statistics and the unbiased guesser with less variance.	=	=
16	4	Explaining the analysis theorem and its applications.	Learn about the concept of the analysis theorem and how to use it to extract a sufficient estimate.	=	=
17	4	Recognize the text of the theorem Ro-Black Well.	Presentation of the theorem and some of its applications	=	=
18	4	Solve some different exercises.	General questions and group assignments.	=	=
19	4	. The characteristic of perfection with some examples and solutions to various exercises.	Discussion and monthly exam.	=	=
20	4	Learn about the concept of the exponential family	Introducing the student to the concept of the exponential family and identifying the members of the exponential function	=	=
21	4	Solve some different exercises	General exercises and group assignments	=	=
22	4	The concept of statistical hypothesis.	Defining the statistical hypothesis and distinguishing between the simple statistical hypothesis and the complex statistical hypothesis.	=	=
23	4	Introducing the student to the types of statistical hypotheses.	Definition of the null statistical hypothesis and the alternative statistical hypothesis.	=	=
24	4	Identify random error and its types.	Knowing random errors, their types, and how to distinguish between them.	=	=
25	4	Solve some different exercises.	Discussion and monthly exam.	=	=
26	4	Explain the concept of the critical Rigen.	. Definition of the critical region, test power, and characteristic function.	=	=

27	4	How to choose the best critical point	Introducing the student to the best area for testing and the best critical Rigen.	=	=
28	4	Various exercises on the topic.	Discussion and monthly exam	=	=
29	4	Define more robust tests regularly	Explain the Neyman-Pierson theorem and illustrate the concept of systematically more robust tests.	=	=
30	4	Solve some different exercises	General questions and group assignments	=	=

11 . Course evaluation

Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, written exams, reports, etc.:

- Daily preparation.
- Daily exams.
- Oral and monthly tests.
- Written tests.
- Preparing reports and research projects.
- Quarterly activities and participation in discussions.
- Student performance in class and interaction with study materials

12 . Learning and teaching resources

Required textbooks (methodology, if any)	• Mathematical statistics, Amir Hanna Hormuz, 1990
Main references (sources)	<ul style="list-style-type: none"> • Introduction to mathematical statistic, Robert V Hogg Allen Craig , • Joseph W McKean 2005 • . Mathematical Statistics Amir Hanna Hormuz 1990
Recommended supporting books and references (scientific journals, reports...)	<ul style="list-style-type: none"> • Introduction to mathematical statistics • Robert V Hogg • Allen Craig • Joseph W McKean 2005
Electronic references, Internet sites	<ul style="list-style-type: none"> • University websites that provide educational materials in statistics and probability • Scientific articles and research available online in the field of statistics and probability.

Course Description Form

1. Course Name:					
Topology					
2. Course Code:					
3. Semester / Year:					
2023-2024					
4. Description Preparation Date:					
5. Available Attendance Forms:					
6. Number of Credit Hours (Total) / Number of Units (Total)					
4 Hours					
7. Course administrator's name (mention all, if more than one name)					
Name: Rana Bahjat Yaseen Email: Zain 2016@tu.edu.iq					
8. Course Objectives					
Course Objectives				
<ul style="list-style-type: none"> - Study and knowledge of topological spaces - Study types of continuous functions - Study the concept of connoted and compact 			•		
9. Teaching and Learning Strategies					
Strategy		Applying various teaching methods ,including - Giving lectures Discussion method and electronic method.			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-4	12	Topological spaces	Open set ,closed set, Bases and subbases	Electronic lectures, smart board ,pen	Written and daily exams with assignments

5-8	12	Topological spaces	Interior , exterior ,boundary, closure of a set	Electronic lectures, smart board ,pen	Written and daily exams with assignments
9-12	12	Connectedness	Separated sets , connected sets, locally connected	Electronic lectures, smart board ,pen	Written and daily exams with assignments
13-16	12	Continuity and topological equivalence	Continuous functions , open and closed and homeomorphism	Electronic lectures, smart board ,pen	Written and daily exams with assignments
17-20	12	Compactness	Covers ,compact sets , locally compact	Electronic lectures, smart board ,pen	Written and daily exams with assignments
21-25	15	Separation axioms	T1 –space , T2- space, regular space and normal space	Electronic lectures, smart board ,pen	Written and daily exams with assignments

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)	General Topolgy Seymour lipschutz
Recommended books and references (scientific journals, reports...)	Topology and maps by T. Husain 1977 Introduced of Topology
Electronic References, Websites	Shawm series

Course Description Form

1. Course Name: fuzzy mathematics / fourth year					
2. Course Code: -----					
3. Semester / Year: 2023-2024					
4. Description Preparation Date: 15/3/2024					
5. Available Attendance Forms: Class lectures					
6. Number of Credit Hours (Total) / Number of Units (Total): 90 hours / 12 Units					
7. Course administrator's name (mention all, if more than one name)					
Name: Asst. Prof. Hiba Omar Mousa hiba_34@tu.edu.iq					
8. Course Objectives					
Course Objectives		The course develops and refines students' information about the meaning of fuzzy mathematics and fuzzy theory			
9. Teaching and Learning Strategies					
Strategy		<ul style="list-style-type: none"> The standard method (giving lectures). The text method. Brainstorming method. Some modern strategies. 			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
October	2		Identify the main idea of a specific information about the fuzzy mathematics	Standard method	Class performance and exams
November	2		The difference between the fuzzy mathematics and the	Standard method & Brainstorming method	Class performance and exams

			normal math.		
December	2		Definitions of the fuzzy sets and the fuzzy numbers	Standard method & text method	Class performance and exams
January	2		The Algebra of fuzzy sets	Standard method & text method	Class performance and exams
February	2		Fuzzy relations	Standard method & text method	Class performance and exams
April	2		The sets of pieces at alpha level	Standard method	Class performance and exams
March	2		Fuzzy symbol	Standard method	Class performance and exams
May 3&4	-----		Final Exams	-----	-----

11. Learning Outcomes

Cognitive objectives of Advanced Listening and speaking subject:

A1-Remembering: At the level of remembering, the student must:

- 1- The student knowing the fuzzy sets and the difference between them and between the normal sets
- 2- Recall the ideas used of the fuzzy math
- 3- He has knowledge of the fuzzy theory

A2-Understanding: The student must

- 1- Organize ideas within each sets
- 2- Elicits the uses of the form of fuzzy sets and fuzzy numbers
- 3- Gives various ideas within the topic of each form
- 4- Explain the use of the fuzzy rules mentioned within each sets

A3- Application: The student must:

- 1- Applies the sections, union and the analog differences
- 2- Produces multiple ideas within each units
- 3- Prepare various ideas and rules in each unit

A4-Analysis: The student must...

- 1- Distinguishes the use of the fuzzy math.
- 2- knowing the types of fuzzy relationships
- 3- It details the expressions that used in fuzzy math.
- 4- Recognizes the importance of fuzzy theory in knowing the fuzzy relationships
- 5- solution of theorems and problems
- 6- knowing the types of sets and give examples and theorems.

12. Course Evaluation

First Course: Monthly Exam: 20. Daily homework: 5. Total: 25

Second Course: Monthly Exam: 20. Daily homework: 5 Total: 25

Total for the 1st and 2nd Courses: 50 Final Exam: 50 Final Grade: 100

13. Learning and Teaching Sources

Required textbooks

Yuan, B. "Fuzzy sets and Fuzzy Logic"

Main references (sources)	Materials to be determined by course instructors
Recommended books and references (scientific journal, reports)	Encyclopedia of scientific books and journals
Electronic References, Websites	Electronic lectures

Course Description Form

1.Course	Name:
Scientific Research Methodology	
2.Course	Code:

MATH305						
3 Semester / Year:						
2023-2024						
4. Description Preparation Date:						
: 2023 /10/5						
5. Available Attendance Forms:						
Attendance Education and E-Learning						
6. Number of Credit Hours (Total) / Number of Units (Total)						
40 hour/2units						
7. Course administrator's name (mention all, if more than one name)						
Name: Sundus Noory Shukur Email: snory@tu.edu.iq						
8. Course Objectives						
Course Objectives		1-Acquire knowledge of the prescribed materials and understand and study the meaning of scientific research. 2- Scientific knowledge of the prescribed curriculum materials and the basics of descriptive statistics. 3- Practical application through conducting research to apply the statistical measures studied by the student, statistical analysis of the research results and writing the research according to what was taught to the student.				
9. Teaching and Learning Strategies						
Strategy		Discussion method, group participation, student self-activity by collecting information about the material and presenting it in the classroom				
10. Course Structure						
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method	
1	2	The student knows scientific research	The problem of scientific research and the formulation of research hypotheses	Lecture and discussion	Daily and monthly test Homework	
2	=	Enables tabulation of data in frequency distribution tables and frequency distribution graph	Tab data in a frequency distribution table and graph	=	=	
3	=	The student understands the principles and basics of statistics and statistical measures (central tendency and dispersion measures)	Measures of central tendency	=	=	
4	=	(central tendency and dispersion measures)	Dispersion meters	=	=	

5	=	The student writes a scientific research in the field of specialization	Writing scientific research and research departments	=	=
6	=	The student understands the difference between the sample and the population	Types of samples and principles of probability	=	=

11. Course Evaluation						
Daily preparation. Daily exams. Oral and monthly tests. Written tests. Preparing reports and research projects. Quarterly activities and participation in discussions. Student performance in class and interaction with his subjects						
Required textbooks (curricular books, if any)			Scientific research methodology. Dr. Muthanna Abdul Razzaq Al-Omar (2001)			
Main references (sources)			Scientific research and its methods. Dr. Wajih Mahjoub (2008) Scientific Research Methods Dr. Abdul Rahman Badawi (1977) Descriptive Statistics. Dr. Sharaf El-Din Khalil Statistical analysis using spss program. Dr. Jassim Mohammed Ali and Wissam Malik Dawood. (2016)			
Recommended books and references (scientific journals, reports...)						
Electronic References, Websites						

Course Description Form

1.Course Name:

Modern mathematics teaching methods.

2.Course Code:

3.Semester / Year:

2023-2024

4.Description PreparationDate:

:2023 /10/5

5. Available Attendance Forms:

Attendance Education and E-Learning

6. Number of Credit Hours (Total) / Number of Units (Total)

40 hour/2units

7. Course administrator's name (mention all, if more than one name)

Name:Sundns Noory Shukur

Email:snory@tu.edu.iq

8. Course Objectives

Course Objective	Providing students with theoretical information on how to communicate the teaching method Teaching students basic and supportive sciences Providing students with scientific and theoretical information on how to face the profession and build a strong professional personality for them through the guidance and advice provided to them
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9. Teaching and Learning Strategies

Strategy

Modern learning and teaching strategies – where the teacher is prepared, trained and adequately

10. Course Structure

Week	Hours	Required Learning	Unit or subject name	Learning method	Evaluation
		Outcomes			method
1	2	Chapter 1	Definition of teaching methods	Lecture and discussion	Daily and monthly test Homework
2	2	Chapter2	The importance of teaching methods	Lecture and discussion	Daily and monthly test Homework
3	2	Chapter 3	Educational objectives and behavioral goals	Lecture and discussion	Daily and monthly test Homework
4	2	Chapter 4	Types of teaching methods	Lecture and discussion	Daily and monthly test Homework
5	2	Chapter 5	Planning for teaching	Lecture and discussion	Daily and monthly test Homework
6	2	Chapter 6	Types of plans	Lecture and discussion	Daily and monthly test Homework

7	2	Chapter 7	Thinking Maps	Lecture and discussion	Daily and monthly test Homework
8	2	Chapter 8	Survey	Lecture and discussion	Daily and monthly test Homework

9

11. Course Evaluation					
Daily preparation. Daily exams. Oral and monthly tests. Written tests. Preparing reports and research projects. Quarterly activities and participation in discussions. Student performance in class and interaction with study materials					
12					
Required textbooks (curricular books, if any)			Curriculum and textbook		
Main references (sources)			General teaching methods		
Recommended books and references (scientific journals, reports...)			Cognitive learning and teaching strategies		
Electronic References, Websites			Sober websites. - Virtual library. - Library sites in some international universities		

Course Description Form

1.Course Name:					
Measurement and evaluation					
2.Course Code:					
3.Semester / Year:					
2023-2024					
4.Description PreparationDate:					
: 2023 /10/5					
5. Available Attendance Forms:					
Attendance Education and E-Learning					
6. Number of Credit Hours (Total) / Number of Units (Total)					
40 hour/2units					
7. Course administrator's name (mention all, if more than one name)					
Name:Sundus Noory Shukur					
Email: snory@tu.edu.iq					
8. Course Objectives					
Course Objectives	The curriculum aims to prepare students to practice the teaching profession by identifying: 1- Many concepts and terms, including measurement, testing, evaluation. 2- Types of achievement tests, how to formulate them, their advantages and disadvantages.				
9. Teaching and Learning Strategies					
Strategy	Discussion method, group participation, student self-activity by collecting information about the material and presenting it in the classroom				
10. Course Structure					
Week	Hours	Re O	Unit or subject name	Learning method	Evaluation method
October 1	2		Overview of the evolution of the calendar and measurement	Discussion and questioning	Classroom performance and exams
October2	=		Concepts of evaluation, measurement and testing and the relationship between them	Discussion and questioning	Classroom performance and exams
October3	=		The importance of evaluation and measurement in the educational process 20	Discussion and questioning	Classroom performance and exams

October 4	=	Types of educational calendar	Discussion and questioning	Classroom performance and exams
November 1	=	Types of educational calendar	Discussion and questioning	Classroom performance and exams
November 2	=	Achievement tests set by the teacher	Discussion and questioning	Classroom performance and exams
November 3	=	Test Map	Discussion and questioning	Classroom performance and exams
November 4	=	Article tests	Discussion and questioning	Classroom performance and exams
December 1	=	Tests with short answers	Discussion and questioning	Classroom performance and exams
December 2	=	Performance Tests	Discussion and questioning	Classroom performance and exams
December 3	=	Objective tests	Discussion and questioning	Classroom performance and exams
December 4	=	Objective tests	Discussion and questioning	Classroom performance and exams
January 1	=	Analyze and optimize test items	Discussion and questioning	Classroom performance and exams
January 2	=	Statistical analysis of test items	Discussion and questioning	Classroom performance and exams
January 3	=	Ease coefficient	Discussion and questioning	Classroom performance and exams
January 4	=	Coefficient of difficulty	Discussion and questioning	Classroom performance and exams
February 1	=	Discrimination coefficient	Discussion and questioning	Classroom performance and exams
February 2	=	Good Test Specification	Discussion and questioning	Classroom performance and exams
March 1	=	Types of honesty	Discussion and questioning	Classroom performance and exams
March 2		application		
March 3		application		
March 4		application		
April 1		application		
April 2		application		
April 3	=	constancy	Discussion and questioning	Classroom performance and exams
April 4	=	Objectivity and comprehensiveness	Discussion and questioning	Classroom performance and exams
May 1	=	Improving some non-test assessment methods	Discussion and questioning	Classroom performance and exams
May 2		General Review		
May 3,4		Final Exams		

Course Description Form

1. Course Name:					
Partial differential equations					
2. Course Code:					
Math.204					
3. Semester / Year:					
2023-2024					
4. Description Preparation Date:					
18/2/2024					
5. Available Attendance Forms:					
Actual presence/distance learning/recording video lessons					
6. Number of Credit Hours (Total) / Number of Units (Total)					
3/90					
7. Course administrator's name (mention all, if more than one name)					
Name: Hiba Hani Abdullah Email: hiba.h.a.83@tu.edu.iq					
8. Course Objectives					
Course Objectives		<ul style="list-style-type: none"> ● Definition of partial equations and its most important applications. ● The student learns about the methods of integration, the truth of the derivative and the fact of integration, and that the student learns about the link between them. ● . The student should learn about the types of partial differential equations. ● To understand some applications on partial differential equations ● To understand derivation and integration and their relationship to partial differential equations ● To understand the relationship of the usual differential equations with the partial differential equation 			
9. Teaching and Learning Strategies					
Strategy		<ul style="list-style-type: none"> ● Use explanation and clarification to present concepts. ● Interact with students through discussions and practical exercises. ● Use realistic examples and applications to illustrate mathematical ideas. 			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
3	9	Partial differential equations of the second order	Classification of Partial Differential Equations of Second Order, Partial Differential Equations of Order N, Forer Sequences	Electronic lectures, smart board and pen	Exam, reports
3	9	Types of partial differential equations of the second rank with variable coefficients and ways to solve it	Studying the different types of equations with variable coefficients and ways to solve them, converting Laplas to solve this type of partial equations	Electronic lectures, smart board and pen	Exam, reports

3	9	The equation of spreading heat	The equation of spreading heat in an isolated metal arm and homogeneous boundary conditions, the equation of heat diffusion in an isolated metal arm and heterogeneous boundary conditions, the equation of heat spread in an isolated metal arm	Electronic lectures, smart board and pen	Exam, reports
3	9	Wave equation in one or two dimensions	The formation of the wave equation in and methods of solving it in one or two dimensions, problems applied to the wave equation	Electronic lectures, smart board and pen	Exam, reports
3	9	the Laplace equation and poisson	Solving the Laplace equation in the two dimensions in the way of separating the variables, the Laplace equation with the polar coordinates and solving it	Electronic lectures, smart board and pen	Exam, reports

11. Course Evaluation

Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, written exams, reports, etc.:

- Daily preparation.
- Daily exams.
- Oral and monthly tests.
- Written tests.
- Preparing reports and research projects.
- Quarterly activities and participation in discussions.
- Student performance in class and interaction with study materials

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	<ol style="list-style-type: none"> 1- Partial differential equations for scientific and engineering colleges / translation Dr. Atallah Thamer Al-Ani 1989 2- Partial differential equations / Dr. Atallah Thamer Al-Ani 3- Introduction to Partial Differential Equations / d. Atallah Thamer Al-Ani 4- Khaled Ahmed Al-Samrai, Yahya Abdel Said: Ways to solve differential equations. 5- Salim Ismail Al-Ghrabi, Sabah Hadi Al-Jassim: Differential equations.
Main references (sources)	S. K. Kate: Engineering Mathematics – II Partial differential Equations Jhon.F.
Recommended books and references (scientific journals, reports...)	Thomas calculus 12th edition
Electronic References, Websites	<ul style="list-style-type: none"> - Sober websites - Virtual library. - Library locations in some international universities.

Course Description Form

1.Course Name:					
Scientific Research Methodology					
2.Course Code:					
MATH305					
3.Semester / Year:					
2023-2024					
4.Description Preparation Date:					
: 2023 /10/5					
5. Available Attendance Forms:					
Attendance Education and E-Learning					
6. Number of Credit Hours (Total) / Number of Units (Total)					
40 hour/2units					
7. Course administrator's name (mention all, if more than one name)					
Name: SundusNooryShukur Email: snory@tu.edu.iq					
8. Course Objectives					
Course Objectives		<p>1-Acquire knowledge of the prescribed materials and understand and study the meaning of scientific research.</p> <p>2- Scientific knowledge of the prescribed curriculum materials and the basics of descriptive statistics.</p> <p>3- Practical application through conducting research to apply the statistical measures studied by the student, statistical analysis of the research results and writing the research according to what was taught to the student.</p>			
9. Teaching and Learning Strategies					
Strategy		Discussion method, group participation, student self-activity by collecting information about the material and presenting it in the classroom			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	The student knows scientific research	The problem of scientific research and the formulation of research hypotheses	Lecture and discussion	Daily and monthly test Homework

2	=	Enables tabulation of data in frequency distribution tables and frequency distribution graph	Tab data in a frequency distribution table and graph	=	=
3	=	The student understands the principles and basics of statistics and statistical measures (central tendency and dispersion measures)	Measures of central tendency	=	=
4	=	(central tendency and dispersion measures)	Dispersion meters	=	=
5	=	The student writes a scientific research in the field of specialization	Writing scientific research and research departments	=	=
6	=	The student understands the difference between the sample and the population	Types of samples and principles of probability	=	=

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11. Course Evaluation

Daily preparation. Daily exams. Oral and monthly tests. Written tests. Preparing reports and research projects. Quarterly activities and participation in discussions. Student performance in class and interaction with his subjects

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Scientific research methodology. Dr. Muthanna Abdul Razzaq Al-Omar (2001)
Main references (sources)	Scientific research and its methods. Dr. Wajih Mahjoub (2008) Scientific Research Methods Dr. Abdul Rahman Badawi (1977) Descriptive Statistics. Dr. Sharaf El-Din Khalil Statistical analysis using spss program. Dr. Jassim Mohammed Ali and Wissam Malik Dawood. (2016)
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name: fuzzy mathematics / fourth year						
2. Course Code: -----						
3. Semester / Year: 2023-2024						
4. Description Preparation Date: 15/3/2024						
5. Available Attendance Forms: Class lectures						
6. Number of Credit Hours (Total) / Number of Units (Total): 90 hours / 12 Units						
7. Course administrator's name (mention all, if more than one name)						
Name: Asst. Prof. Hiba Omar Mousa hiba_34@tu.edu.iq						
8. Course Objectives						
Course Objectives	The course develops and refines students' information about the meaning of fuzzy mathematics and fuzzy theory					
9. Teaching and Learning Strategies						
Strategy	<ul style="list-style-type: none"> The standard method (giving lectures). The text method. Brainstorming method. Some modern strategies. 					
10. Course Structure						
Week	Hours	Required Learning		Unit or subject name	Learning method	Evaluation
		Outcomes				method
October	2			Identify the main idea of a specific information about the fuzzy mathematics	Standard method	Class performance and exams
November	2			The difference between the fuzzy mathematics and the normal math.	Standard method & Brainstorming method	Class performance and exams

December	2		Definitions of the fuzzy sets and the fuzzy numbers	Standard method & text method	Class performance and exams
January	2		The Algebra of fuzzy sets	Standard method & text method	Class performance and exams
February	2		Fuzzy relations	Standard method & text method	Class performance and exams
April	2		The sets of pieces at alpha level	Standard method	Class performance and exams
March	2		Fuzzy symbol	Standard method	Class performance and exams
May 3&4	-----		Final Exams	-----	-----

11. Learning Outcomes

Cognitive objectives of Advanced Listening and speaking subject:

A1-Remembering: At the level of remembering, the student must:

- 1- The student knowing the fuzzy sets and the difference between them and between the normal sets
- 2- Recall the ideas used of the fuzzy math
- 3- He has knowledge of the fuzzy theory

A2-Understanding: The student must

- 1- Organize ideas within each sets
- 2- Elicits the uses of the form of fuzzy sets and fuzzy numbers
- 3- Gives various ideas within the topic of each form
- 4- Explain the use of the fuzzy rules mentioned within each sets

A3- Application: The student must:

- 1- Applies the sections, union and the analog differences
- 2- Produces multiple ideas within each units
- 3- Prepare various ideas and rules in each unit

A4-Analysis: The student must...

- 1- Distinguishes the use of the fuzzy math.
- 2- knowing the types of fuzzy relationships
- 3- It details the expressions that used in fuzzy math.
- 4- Recognizes the importance of fuzzy theory in knowing the fuzzy relationships
- 5- solution of theorems and problems
- 6- knowing the types of sets and give examples and theorems.

12. Course Evaluation

First Course:

Monthly Exam: 20

Daily homework: 5

Total: 25

Second Course:

Monthly Exam: 20

Daily homework: 5

Total: 25

Total for the 1st and 2nd Courses: 50

Final Exam: 50 Final Grade: 100	
13. Learning and Teaching Sources	
Required textbooks	Yuan, B. “ Fuzzy sets and Fuzzy Logic”
Main references (sources)	Materials to be determined by course instructors
Recommended books and references (scientific journal, reports)	Encyclopedia of scientific books and journals
Electronic References, Websites	Electronic lectures

Course Description Form

1. Course Name: Complex analysis	
2. Course Code:	
3. Semester / Year: 2023/2024	
4. Description Preparation Date: 18/2/2023	
5. Available Attendance Forms:	
6. Number of Credit Hours (Total) 30 / Number of Units (Total) 8	
7. Course administrator's name (mention all, if more than one name)	
Name: Nihad Shareef Khalaf	
Email: nihad.shreef16@tu.edu.iq	
8. Course Objectives	
Course Objectives	<p>•For many of our students, complex analysis is their first rigorous analysis (if not mathematics) class they take, and these topics reflect this very much. We tried to rely on as few concepts from real analysis as possible. The complex numbers have many nice properties which make us think a lot how to show that the complex numbers are set up in order to explore the properties of the complex numbers, since these properties will be both algebraic properties (such as commutative and distributive properties) for example, that multiplication can be described geometrically that is why the complex numbers will be built on the properties that we mentioned above. These tools will make us be able to take limits and do calculus. And, there will be a root of any complex equation. Also we tried to introduce some principle concept on the behavior of complex functions, such as holomorphic functions which are related with main theorem in complex analysis Riemann mapping theorem, Cauchy Riemann equations in order to prepare ourself to study harmonic functions and its conjugate. In particular, series and sequences are treated " from scratch." This also has advantageous to see how would be easy to evaluate the integral of complex function through series, residues, Cauch theorem, First Cauchy integral formula and Second Cauchy integral formula (for derivative). consequence that power series, and the integration subject with (poles, removable singularity, essential singularity and residues theorem) are introduced in this course as well.</p>
9. Teaching and Learning Strategies	

Strategy	<p>Use explanation and clarification to present concepts.</p> <ul style="list-style-type: none"> • Interact with students through discussions and practical exercises. • Use real-life examples and applications to illustrate mathematical ideas.
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10. Course Structure

Week	Hours	Required Learning Outcomes	Learning method	Evaluation method
1-4	16	Field of complex numbers		
5-6	8	Paths		
7-11	16	Functions of complex		
12-17	24	Some special functions and harmonic conjugate functions		
18-20	8	Harmonic functions, their conjugates, and applications		
20-23	12	Exponential, trigonometric, and compound hyperbolic functions		
24-30	24	Logarithmic functions, properties of complex exponents, and their applications Path integral and Cauchy's theorem Cauchy-Goursat theorem and its applications Cauchy's integral formula and its applications		

11. Course Evaluation					
12. Learning and Teaching Resources					
Required textbooks (curricular books, if any)					
Main references (sources)					
Complex functions for the third grade of physics					
EA First Course in Complex Analysis with Applications (2003). Dennis G. Zill and Patrick D. Shanahan.					

Course Description Form

1. Course Name:					
Functional Analysis					
2. Course Code:					
3. Semester / Year:					
2023-2024					
4. Description Preparation Date:					
2024-2-18					
5. Available Attendance Forms:					
Weekly					
6. Number of Credit Hours (Total) / Number of Units (Total)					
120 hours / 4 unit					
7. Course administrator's name (mention all, if more than one name)					
Name: Elaf Sabah Abdulwahid					
Email: elafs.math@tu.edu.iq					
8. Course Objectives					
<ul style="list-style-type: none"> - Study and knowledge of normed space. - Study and knowledge of inner product space. - Study and knowledge some properties of Hilbert space. - Study and knowledge linear functional and linear operator on Hilbert space.. 					
9. Teaching and Learning Strategies					
Strategy		Applying various teaching methods ,including - Giving lectures Discussion method and electronic method.			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-4	16	Introduction to metric space	Metric space	Electronic lectures, smart board ,pens	Written and daily exams with assignments

5-7	12	Introduction to normed space and Banach space with some examples and theorems.	Normed space, Banach space.	Electronic lectures, smart board ,pens	Written and daily exams with assignments
8-11	16	Introduction to inner product space with some examples and theorems.	Inner product	Electronic lectures, smart board ,pens	Written and daily exams with assignments
12-15	16	Introduction to Hilbert space with some examples and theorems.	Hilbert space	Electronic lectures, smart board ,pens	Written and daily exams with assignments
16-18	12	study orthogonal and orthogonal complement with some examples and theorems	Orthogonal and orthogonal complement	Electronic lectures, smart board ,pens	Written and daily exams with assignments
19-22	16	Study some properties of Fourier series and convex set.	Fourier series and convex set	Electronic lectures, smart board ,pens	Written and daily exams with assignments
23-26	16	Study some properties of bounded Linear functional	Linear functional	Electronic lectures, smart board ,pens	Written and daily exams with assignments
27-30	16	Study some properties of bounded Linear operator with some examples.	Linear operators	Electronic lectures, smart board ,pens	Written and daily exams with assignments

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...

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Introductory Functional Analysis with Application By Erwin Kreyszig.
Main references (sources)	Linear Functional Analysis by Bryan P. Rynne and Martin A. Yongson.
Recommended books and references (scientific journals, reports...)	A course in Functional Analysis , Tohan B. C
Electronic References, Websites	

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