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

Academic Program and Course Description Guide

University of Anbar
Educational collage for Pure Sciences
Mathematical Department

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

Academic Program Description Form

University Name: University Of Anbar

Faculty/Institute: College of Education for Pure Sciences

Scientific Department: Mathematical Department

Academic or Professional Program Name: Mathematical Education

Final Certificate Name: Bachelor's degree in Mathematical Education

Academic System: Semester

Description Preparation Date: 1/3/2024

File Completion Date: 1/3/2024

Signature:

Head of Department Name:

Dr. Mohammed Yousif Turki

Date: 1/3/2024

Signature:

Scientific Associate Name:

Dr. Harith Kamil Buniya

Date: 1.3.2024

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Dr. Feras Shaker Mahmood

Date: 1/3/2024

Signature:

Approval of the Dean

Prof.Dr. Abdul Rahman Salman Juma

1/3/2024

This academic program description provides a necessary summary of the most important characteristics of the program and the learning outcomes that the student is expected to achieve, demonstrating whether he has made the most of the available opportunities. It is accompanied by a description of each course within the program.

1. Program Vision
A scientific and educational department that seeks leadership in university education and scientific research locally and globally in a way that contributes to serving society and achieving sustainable development and global reliability.

2. Program Mission
Providing a pioneering program to prepare qualified educational and scientific cadres to create an educational environment based on a clear vision that supports teaching skills using modern technologies and in cooperation with the local community.

3. Program Objectives
1. Achieving the specified standards for the quality of material, human, technical and financial resources. **2. Providing competent administrative staff who know their duties and powers in accordance with work structures and regulations and fulfill the requirements of the job description.** **3. Providing specialized teaching staff who are proficient in using modern technologies and methods in education with good job satisfaction.** **4. Preparing academic programs in accordance with international academic standards and providing their knowledge, training and technical requirements.** **5. Preparing students with cognitive, practical and educational skills that meet the needs of the labor market.** **6. Paying attention to scientific research from the perspective of the researcher and the researcher in order to achieve a distinguished research reputation locally and internationally.** **7. Research and professional openness to community institutions in a way that meets their needs and aspirations.** **8. Evaluating all individuals and processes to ensure quality performance and continuous improvement.**

4. Program Accreditation

Procedures have been initiated to obtain accreditation according to the national standards for accrediting the programs of the educational group colleges in 2024.

5. Other external influences

The start of the school year for first-year students was delayed

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	8	16	%11	
College Requirements	11	22	%17	
Department Requirements	36	110	%72	
Summer Training				
Other				

*** This can include notes whether the course is basic or optional.**

Requirements of the institution (university) Number of accredited units (16)

Introduction	Weekly hours			Course title	Course code	Year: 2023-2024 the level
	Practi	theory	Unit			
Essential according to the Ministry's letter 7937 dated 10/26/2023	-	2	2	English language 1	UOA101	The first stage
UOA101	-	2	2	English language2	UOA201	The second phase
Essential according to the Ministry's letter 7937 dated 10/26/2023	-	2	2	Arabic	UOA102	The first stage
UOA102	-	2	2	Freedom and democracy	UOA202	The first stage
Essential according to the Ministry's letter 7937 dated 10/26/2023	2	1	2	Calculators 1	UOA103	The first stage
UOA103	2	1	2	Calculators 2	UOA203	The second phase
Essential according to the Ministry's letter 7588 dated 10/19/2023	-	2	2	human rights	UOA104	The first stage

Essential according to the Ministry's letter 7588 dated 10/19/2023	-	2	2	**The crimes of the Baath regime in Iraq**	**UOA105**	**The second phase**
	4	14	16		-	**Others**

College requirements: 22 credit units

Introduction	Weekly hours			Course title	Course code
	Practi	theory	Unit		
	-	2	2	Educational psychology	EPS101
	-	2	2	Foundations of education	EPS102
	-	2	2	Childhood psychology	EPS202
	-	2	2	Educational administration	EPS201
	-	2	2	Scientific research method	EPS211
	-	2	2	Curricula and teaching methods	EPS311
	-	2	2	Counseling and mental health	EPS312
	-	2	2	Measurement and evaluation	EPS411
	-	2	2	Teaching applications	EPS412
	4		2	School applications	EPS413
	-	2	2	Graduation Project	EPS414
	4	20	22	the total	

متطلبات القسم 110 وحدة معتمدة

Introduction	Weekly hours			Course title	Course code
	Practice	theory	Credit units		
	2	3	4	Calculus 1	MAT105
	2	2	3	Mathematics foundations 1	MAT106
	2	2	3	Linear algebra 1	MAT107
	2	1	2	Phsisc 1	PHY105
MAT105	2	3	4	Calculus 2	MAT113
MAT106	2	2	3	Mathematics foundations 2	MAT114
MAT107	2	2	3	Linear algebra 2	MAT115
PHY105	2	1	2	Phsisc 2	PHY115
MAT105	2	3	4	Advanced calculus 1	MAT201
MAT105	2	2	3	Ordinary differential equations 1	MAT202
	2	2	3	Group algebra 1	MAT203
	2	2	3	Geometry 1	MAT204
MAT104	2	1	2	Advanced computers 1	MAT205
MAT105	2	3	4	Advanced calculus 2	MAT206
MAT202	2	2	3	Ordinary differential equations 2	MAT207
	2	2	3	Group algebra 2	MAT208
	2	2	3	Geometry 2	MAT209
	2	2	2	Advanced computers 2	MAT210
	2	2	3	Mathematical analysis 1	MAT301
MAT202	2	2	3	Partial differential equations 1	MAT302
MAT203	2	2	3	Algebra of rings 1	MAT303
	2	2	3	Probability 1	MAT304
	2	2	3	Numerical analysis 1	MAT305
MAT105	2	2	3	Mathematical analysis 2	MAT306
MAT302	2	2	3	Partial differential equations 2	MAT307
MAT303	2	2	3	Algebra of rings 2	MAT308
MAT304	2	2	3	Possibility 2	MAT309
	2	2	3	Numerical analysis 2	MAT310
	2	2	3	Complex analysis 1	MAT401
	2	2	3	Topology 1	MAT402
MAT309	2	2	3	Mathematical statistics 1	MAT403
	2	2	3	Functional analysis 1	MAT404
	2	2	3	Module 1	MAT405
	2	2	3	Complex analysis 2	MAT406
	2	2	3	Topology 2	MAT407
MAT309	2	2	3	Mathematical statistics 2	MAT408

	2	2	3	Functional analysis 2	MAT409
	2	2	3	Module 2	MAT410
	72	74	110	Title	

First Class

Introduction	Weekly hours			Course title	Course code
	Practice	theory	Credit units		
	2	3	4	Differentiation and integration 1	MAT105
	2	2	3	Mathematics foundations 1	MAT106
	2	2	3	Linear algebra 1	MAT107
	2	1	2	Computers 1	UOA141
	2	1	2	Physics 1	PHY105
	2	3	4	Differentiation and integration 2	MAT113
	2	2	3	Mathematics foundations 2	MAT114
	2	2	3	Linear algebra 2	MAT115
	2	1	2	Advanced computers 1	UOA142
	2	1	2	Physics 2	PHY110
	-	2	2	Educational psychology	EPS101
	-	2	2	Foundations of education	EPS120
	-	2	2	Arabic Language	UOA137
	-	2	2	English language1	UOA140
	-	1	1	human rights	UOA135
	-	2	2	Freedom and democracy	UOA136
	20	29	39	the total	

Second Class

Introduction	Weekly hours			Course title	Course code
	Practice	theory	Credit units		
	2	2	3	Advanced differentiation 1	MAT201
	2	2	3	Ordinary differential equations 1	MAT202
	2	2	3	Group algebra 1	MAT203
	2	2	3	Geomatry 1	MAT204
	2	2	3	Computers 2	MAT205
	2	2	3	Advanced differentiation 2	MAT206
	2	2	3	Ordinary differential equations 2	MAT207
	2	2	3	Group algebra 2	MAT208
	2	2	3	Geomatry 2	MAT209
	2	2	3	Advanced computers 2	MAT210
		2	2	Scientific research method	EPS 211
		2	2	Childhood psychology	EPS 202
		2	2	Educational administration	EPS 201
		2	2	English language 2	UOA240
	20	28	38	the total	

Third Class

Introduction	Weekly hours			Course title	Course code
	Practice	theory	Credit units		
	2	2	3	Mathematical analysis 1	MAT301
	2	2	3	Partial differential equations 1	MAT302
	2	2	3	Algebra of rings 1	MAT303
	2	2	3	Probability 1	MAT304
	2	2	3	Numerical analysis 1	MAT305
	2	2	3	Mathematical analysis 2	MAT306
	2	2	3	Partial differential equations 2	MAT307
	2	2	3	Algebra of rings 2	MAT308
	2	2	3	Probability 2	MAT309

	2	2	3	Numerical analysis 2	MAT310
	2	2	3	Curricula and teaching methods	EPS 311
		2	2	Counseling and mental health	EPS 312
		2	2	English language 3	UOA340
	22	26	37	the total	

Fourth Class

Introduction	Weekly hours			Course title	Course code
	Practice	theory	Credit units		
	2	2	3	Complex analysis 1	MAT401
	2	2	3	Topology 1	MAT402
	2	2	3	Mathematical statistics 1	MAT403
	2	2	3	Functional analysis 1	MAT404
	2	2	3	Module 1	MAT405
	2	2	3	Complex analysis 2	MAT406
	2	2	3	Topology 2	MAT407
	2	2	3	Mathematical statistics 2	MAT408
	2	2	3	Functional analysis 2	MAT409
	2	2	3	Module 2	MAT410
		2	2	Measurement and evaluation	EPS411
		2	2	Teaching applications	EPS412
	4		2	School applications	EPS413
		2	2	Graduation Project	EPS414
		2	2	English language 4	UOA440
	24	28	40	the total	

7. Teaching and Learning Strategies

1. The method of listening and thinking deeply in order to understand the problem in order to solve it.
2. The method of scientific discussion and purposeful dialogue.
3. Adopting the method of monthly and final examinations and submitting weekly reports.

8. Evaluation methods

1. Treatment method using final grades.
2. Random and surprise tests.
3. Educational tasks in virtual classrooms.

9. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
professor	Math	Complex Analysis			√	
professor	Math	Mathematical Statistics			√	
Assistant Professor	Math	Mathematical Statistics			√	
Assistant Professor	Math	General Topology			√	
Assistant Professor	Math	Numerical Analysis			√	
Assistant Professor	Math	Differential Equations			√	
Assistant Professor	Math	Approximation Theory			√	
Assistant Professor	Math	Module			√	
Assistant Professor	Math	General Topology			√	
Lecturer	Math	Computer Sciences			√	

Lecturer	Math	Computer Sciences			√	
Lecturer	Math	Topology			√	
Lecturer	Math	Module			√	
Lecturer	Math	Partial Equation			√	
Lecturer	Math	Partial Equation			√	
assistant teacher	Math	Mathematics			√	
Lecturer	Math	Pure sciences			√	
assistant Lecturer	Math	Pure sciences			√	
assistant Lecturer	Math	Pure sciences			√	
assistant Lecturer	Math	Pure sciences			√	
assistant Lecturer	Math	Pure sciences			√	
assistant Lecturer	Math	Pure sciences			√	
assistant Lecturer	Math	Pure sciences			√	
assistant Lecturer	Math	Pure sciences			√	
assistant Lecturer	Math	Pure sciences			√	
assistant Lecturer	Math	Pure sciences			√	
assistant Lecturer	Math	Pure sciences			√	
assistant Lecturer	Math	Pure sciences			√	
assistant Lecturer	Math	Pure sciences			√	
assistant Lecturer	Math	Pure sciences			√	
assistant Lecturer	Math	Pure sciences			√	
assistant Lecturer	Math	Pure sciences			√	
assistant Lecturer	Math	Pure sciences			√	

Professional Development

Mentoring new faculty members

Orienting new faculty members

Professional development of faculty members

1. That the student benefits from learning and embodying this in his personal and professional development.
2. That the student can employ the knowledge he receives during the study stage.

3. That the student benefits from theoretical knowledge in employing the teaching profession and mastering it in a manner based on the basic concepts in teaching life sciences.
4. Skills of modern technologies in communications, documentation and communication.

10. Acceptance Criterion

1. Acceptance according to the general and central average system.
2. Admission to departments according to the student's desire and modified.
3. The condition must be for graduates of preparatory studies and the scientific stream exclusively."
4. The accepted student's personal and mental safety and freedom from physical disabilities

11. The most important sources of information about the program

1. Methodological books approved by the sectoral committee for colleges of education for pure sciences.
2. Helping books.
3. Books and archaeological sources / sources in English.
4. Additional sources from the Internet.
5. Training courses held by the university on e-learning platforms.

12. Program Development Plan

1. Using modern scientific sources.
2. Using high-speed communication networks to transfer information, such as the Internet.
3. Visits and practical practices in service laboratories.
4. Acquiring modern scientific expertise and skills in the field of modern technical communication

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	MAT105	Differentiation and integration 1	Basic	√	√	√		√				√	√		
	MAT106	Mathematics foundations 1	Basic	√	√	√		√				√	√		
	MAT107	Linear algebra 1	my choice		√	√		√	√				√		
	UOA141	Calculators 1	Basic				√				√			√	
	PHY105	Physics 1	my choice		√				√						
	MAT113	Differentiation and integration 2	Basic				√			√				√	
	MAT114	Mathematics foundations 2	Basic				√			√					
	MAT115	Linear algebra 2	Basic	√	√	√		√				√	√		
	UOA142	Calculators 2	Basic	√	√	√		√				√	√		
	PHY110	Physics 2	my choice		√	√		√	√				√		
	EDU101	Educational psychology	Basic		√						√			√	
	EDU120	Foundations of education	Basic		√		√				√				√
	UOA135	Arabic Language	Basic				√			√				√	
	UOA140	English language	Basic				√			√				√	
Second	MAT201	Advanced differentiation 1	Basic	√	√	√		√				√	√		
	MAT202	Ordinary differential equations 1	Basic	√	√	√		√				√	√		
	MAT203	Group algebra 1	Basic	√	√	√		√				√	√		
	MAT204	Engineering 1	Basic	√	√	√		√				√	√		
	MAT205	Advanced computers 1	my choice				√		√				√		
	MAT206	Advanced differentiation 2	Basic				√			√		√			
	MAT207	Ordinary differential equations 2	Basic		√						√				√
	MAT208	Group algebra 2	Basic	√	√	√		√				√	√		
	MAT209	Engineering 2	Basic	√	√	√		√				√	√		
	MAT210	Advanced computers 2	my choice	√	√	√		√				√	√		
	EDU 211	Scientific research method	Basic	√	√	√		√				√	√		
	EDU 202	Childhood psychology	my choice	√	√	√		√	√				√		
	EDU 201	Educational administration	Basic				√			√		√			√

Third	MAT301	Mathematical analysis 1	Basic	√	√	√		√	√			√	√		
	MAT302	Partial differential equations 1	Basic	√	√	√		√	√			√	√		
	MAT303	Algebra of rings 1	Basic	√	√	√		√	√			√	√		
	MAT304	Probability 1	Basic	√	√	√		√	√			√	√		
	MAT305	Numerical analysis 1	Basic	√	√	√		√	√			√	√		
	MAT306	Mathematical analysis 2	Basic	√	√	√		√	√			√	√		
	MAT307	Partial differential equations 2	Basic				√			√	√			√	√
	MAT308	Algebra of rings 2	Basic	√	√	√		√	√			√	√		
	MAT309	Possibility 2	Basic	√	√	√		√	√			√	√		
	MAT310	Numerical analysis 2	Basic	√	√	√		√	√			√	√		
	EDU 311	Curricula and teaching methods	Basic	√	√	√		√	√			√	√		
	EDU 312	Counseling and mental health	Basic	√	√	√		√	√			√	√		
	UOA140	English	Basic		√						√				√
Fourth	MAT401	Complex analysis 1	Basic	√	√	√		√	√			√	√		
	MAT402	Topology 1	Basic	√	√	√		√	√			√	√		
	MAT403	Mathematical statistics 1	Basic	√	√	√		√	√			√	√		
	MAT404	Functional analysis 1	Basic	√	√	√		√	√			√	√		
	MAT405	Module 1	Basic	√	√	√		√	√			√	√		
	MAT406	Complex analysis 2	Basic				√								
	MAT407	Topology 2	Basic				√			√	√			√	√
	MAT408	Mathematical statistics 2	Basic		√						√				√
	MAT409	Functional analysis 2	Basic	√	√	√		√	√			√	√		
	MAT410	Module 2	Basic	√	√	√		√	√			√	√		
	EPS411	Measurement and evaluation	Basic	√	√	√		√	√			√	√		
	EPS412	Teaching applications	Basic	√	√	√		√	√			√	√		
	UOA140	English	Basic	√	√	√		√	√			√	√		
	EPS413	School applications	my choice				√			√	√			√	√
	EPS414	Graduation Project	Basic		√	√		√					√	√	

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

Course Description Form

1. Course Name:	
Probability Theory 1	
2. Course Code:	
MAT305	
3. Semester / Year:	
first semester/2023-2024	
4. Description Preparation Date:	
12/11/2023	
5. Available Attendance Forms:	
Daily, at the time specified in the schedule, and at full time	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hr./ 3Unit	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Feras Shaker Mahmood **Email: ferashaker2001@uoanbar.edu.iq**	
8. Course Objectives	
Course Objectives	**This course aims to convey a general idea about:** **1-The student must be able to teach and learn the subject of probability** **2-The student should be familiar with the concept of a random variable** **3- That the student understands the types of random variables** **4- That the student understands the concepts of probability in the case of two variables** **5- That the student understands how to use probability theory in daily life**
9. Teaching and Learning Strategies	
Strategy	**Learning outcomes, teaching, learning and assessment methods** **. A- Cognitive objectives** **1- Extrapolation** **2- Analysis** **3- Conclusion** **4-The lecture** **5-Empowerment** **B - The skills objectives of the course.** **B1 - Developing the skill in knowing the distribution of random variables and using them in the practical aspect** **B2 - Developing the skill of how to calculate the distribution of a function in terms of its random variables** **B3 - Developing the skill of employing the properties of random distributions for use in the practical aspect of life** **C- Emotional and value goals** **C1- Thinking that explores the truth through (question and answer)** **C2- Managing societal problems by finding appropriate solutions to them through academic concepts** **C3- Spreading the spirit of interaction and attraction among students through academic competition**

	C4- Urging students to employ what they have learned in public life **D - Transferable general and qualifying skills (other skills related to employability and personal development).** **D1-The skill of calculating number methods** **D2- The skill of calculating the probability of certain events** **D3- The skill of knowing the degree of correlation between variables** **D4- The skill of self-development by giving him information that will benefit him in the academic future** **D5- It enables the student to use what he has learned to develop himself**

10. Course structure

Evaluation method	Teaching method	Name of unit/course or subject	Required learning outcomes	Hours	Week
an in-person lecture, and motivational questions.	**Blackboard and data show**	**methods and concepts of permutations and combinations,**	**Understand the lecture topic**	**2 Theoretical + 2 practical**	**1**
motivational questions	**Blackboard and data show**	**Basic concepts in probability theory,**	**Understand the lecture topic**	**2 Theoretical + 2 practical**	**2**
motivational questions	**Blackboard and data show**	**Conditional probability. An in-person lecture and motivational questions.**	**Understand the lecture topic**	**2 Theoretical + 2 practical**	**3**
motivational questions	**Blackboard and data show**	**its discrete and continuous form is a random variable**	**Understand the lecture topic**	**2 Theoretical + 2 practical**	**4**
motivational questions	**Blackboard and data show**	**Expectation and variance.**	**Understand the lecture topic**	**2 Theoretical + 2 practical**	**5**
motivational questions	**Blackboard and data show**	**The distributive function.**	**Understand the lecture topic**	**2 Theoretical + 2 practical**	**6**
motivational	**Blackboar**	**A comprehensive**	**Understand the**	**2 Theoretical**	**7**

questions	d and data show	review	lecture topic	+ 2 practical	
motivational questions	Blackboard and data show	The expectation and variance of discrete variables	Understand the lecture topic	2 Theoretical + 2 practical	8
motivational questions	Blackboard and data show	understanding of what has been studied by taking the lecture, grade	Understand the lecture topic	2 Theoretical + 2 practical	9
motivational questions	Blackboard and data show	continuous variables:	Understand the lecture topic	2 Theoretical + 2 practical	10
motivational questions	Blackboard and data show	Expectation and conditional variance.	Understand the lecture topic	2 Theoretical + 2 practical	11
motivational questions	Blackboard and data show	The properties of expectation,	Understand the lecture topic	2 Theoretical + 2 practical	12
motivational questions.	Blackboard and data show	Solve the questions and assignments that were given	Understand the lecture topic	2 Theoretical + 2 practical	13
motivational questions.	Blackboard and data show	standing increases through enriching examples and questions	Understand the lecture topic	2 Theoretical + 2 practical	14
motivational questions with the grade	Blackboard and data show		Understand the lecture topic	2 Theoretical + 2 practical	15

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 (curricu	1- امير حنا، الاحصاء الرياضي، دار نشر جامعه الموصل،

books, if any)	العراق. 2- خاشع الراوي، مدخل الى علم الاحصاء ، دار نشر جامعة الموصل، العراق.الكيمياء اللاعضوية العصرية د.باسم السعدي
Main references (sources)	3- Mathematical Statistics with Applications, Dennis D. Wackerly, William Mendenhall III and Richard L. Scheaffer, SEVENTH EDITION, 2008, USA. 4- Probability and statistics, Morris H. Degroot and Mark J. Schervish, Fourth Edition,2012.
Recommended books and references (scientific journals, reports...)	A first course in probability , Sheldon Ross, Ninth Editi 2014
Electronic References, Websites	https://www.uoanbar.edu.iq/staff-page.php?ID=1105

Course Description Form

1. Course Name:	
Probability Theory 2	
2. Course Code:	
MAT309	
3. Semester / Year:	
Second semester/2023-2024	
4. Description Preparation Date:	
1/2/2024	
5. Available Attendance Forms:	
Daily, at the time specified in the schedule, and at full time	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hr./ 3Unit	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Feras Shaker Mahmood **Email: ferashaker2001@uoanbar.edu.iq**	
8. Course Objectives	
Course Objectives	**This course aims to convey a general idea about:** **1-The student must be able to teach and learn the subject of probability** **2-The student should be familiar with the concept of a random variable** **3- That the student understands the types of random variables** **4- That the student understands the concepts of probability in the case of two variables**

	5- That the student understands how to use probability theory in daily life

9. Teaching and Learning Strategies

Strategy	**Learning outcomes, teaching, learning and assessment methods** **. A- Cognitive objectives** **1- Extrapolation** **2- Analysis** **3- Conclusion** **4-The lecture** **5-Empowerment** **B - The skills objectives of the course.** **B1 - Developing the skill in knowing the distribution of random variables and using them in the practical aspect** **B2 - Developing the skill of how to calculate the distribution of a function in terms of its random variables** **B3 - Developing the skill of employing the properties of random distributions for use in the practical aspect of life** **C- Emotional and value goals** **C1- Thinking that explores the truth through (question and answer)** **C2- Managing societal problems by finding appropriate solutions to them through academic concepts** **C3- Spreading the spirit of interaction and attraction among students through academic competition** **C4- Urging students to employ what they have learned in public life** **D - Transferable general and qualifying skills (other skills related to employability and personal development).** **D1-The skill of calculating number methods** **D2- The skill of calculating the probability of certain events** **D3- The skill of knowing the degree of correlation between variables** **D4- The skill of self-development by giving him information that will benefit him in the academic future** **D5- It enables the student to use what he has learned to develop himself**

10. Course structure

Evaluation method	Teaching method	Name of unit/course or subject	Required learning outcomes	Hours	Week
an in-person lecture, and motivational questions.	**Blackboard and data show**	**Uniform and Bernoulli Distributions**	**Understand the lecture topic**	**2 Theoretical + 2 practical**	1
motivational questions	**Blackboard and data show**	**Binomail Distribution**	**Understand the lecture topic**	**2 Theoretical + 2 practical**	2
motivational	**Blackboar**	**hyperbolic geometric and**	**Understand the**	**2 Theoretical**	3

questions	**d and data show**	**Negative binary distributions**	**lecture topic**	**+ 2 practical**	
motivational questions	**Blackboard and data show**	**Poisson distribution**	**Understand the lecture topic**	**2 Theoretical + 2 practical**	4
motivational questions	**Blackboard and data show**	**a comprehensive review**	**Understand the lecture topic**	**2 Theoretical + 2 practical**	5
motivational questions	**Blackboard and data show**	**Continues Uniform Distribution**	**Understand the lecture topic**	**2 Theoretical + 2 practical**	6
motivational questions	**Blackboard and data show**	**Normal Distribution**	**Understand the lecture topic**	**2 Theoretical + 2 practical**	7
motivational questions	**Blackboard and data show**	**Gamma distribution**	**Understand the lecture topic**	**2 Theoretical + 2 practical**	8
motivational questions	**Blackboard and data show**	**Beta distributions**	**Understand the lecture topic**	**2 Theoretical + 2 practical**	9
motivational questions	**Blackboard and data show**	**Exponential**	**Understand the lecture topic**	**2 Theoretical + 2 practical**	10
motivational questions	**Blackboard and data show**	**conducting a monthly examination**	**Understand the lecture topic**	**2 Theoretical + 2 practical**	11
motivational questions	**Blackboard and data show**	**chi-square distributions**	**Understand the lecture topic**	**2 Theoretical + 2 practical**	12
motivational questions.	**Blackboard and data show**	**T-student and Fisher distributions**	**Understand the lecture topic**	**2 Theoretical + 2 practical**	13

motivational questions.	Blackboard and data show	a comprehensive review of the subject, with the third month's exam	Understand the lecture topic	2 Theoretical + 2 practical	14
motivational questions with the grade	Blackboard and data show	the final evaluation is an in-person lecture, and the grade	Understand the lecture topic	2 Theoretical + 2 practical	15

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)	**5- امير حنا، الاحصاء الرياضي، دار نشر جامعه الموصل، العراق.** **6- خاشع الراوي، مدخل الى علم الاحصاء ، دار نشر جامعة الموصل، العراق.الكيمياء اللاعضوية العصرية د.باسم السعدي**
Main references (sources)	**7- Mathematical Statistics with Applications, Dennis D. Wackerly, William Mendenhall III and Richard L. Scheaffer, SEVENTH EDITION, 2008, USA.** **8- Probability and statistics, Morris H. Degroot and Mark J. Schervish, Fourth Edition,2012.**
Recommended books and references (scientific journals, reports...)	**A first course in probability , Sheldon Ross, Ninth Editi 2014**
Electronic References, Websites	**https://www.uoanbar.edu.iq/staff-page.php?ID=1105**

Course Description Form

1. Course Name:	
Complex Analysis 1	
2. Course Code:	
MAT401	
3. Semester / Year:	
first semester/2023-2024	
4. Description Preparation Date:	
12/11/2023	
5. Available Attendance Forms:	
Daily, at the time specified in the schedule, and at full time	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hr./ 3Unit	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Abdulrahman Salman Jumi **Email: eps.abdulrahman.juma@uoanbar.edu.iq**	
8. Course Objectives	
Course Objectives	**This course aims to convey a general idea about:** **1-The student must be able to teach and learn the religious subject** **2- The student will be familiar with the concept of complex numbers.** **3- That the student understands the types of logarithmic functions** **4- That the student understands the concepts of Riemann and Cauchy integration** **5- That the student understands how to use complex numbers daily life**
9. Teaching and Learning Strategies	
Strategy	**Learning outcomes, teaching, learning and assessment methods** **. A- Cognitive objectives** **1- Extrapolation** **2- Analysis** **3- Conclusion** **4-The lecture** **5-Empowerment** **B - The skills objectives of the course.** **B1 - Developing the skill in knowing the distribution of random variables and using them in the practical aspect** **B2 - Developing the skill of how to calculate the distribution of a function in terms of its random variables**

	B3 - Developing the skill of employing the properties of random distributions for use in the practical aspect of life **C- Emotional and value goals** **C1- Thinking that explores the truth through (question and answer)** **C2- Managing societal problems by finding appropriate solutions to them through academic concepts** **C3- Spreading the spirit of interaction and attraction among students through academic competition** **C4- Urging students to employ what they have learned in public life** **D - Transferable general and qualifying skills (other skills related to employability and personal development).** **D1-The skill of calculating number methods** **D2- The skill of calculating the probability of certain events** **D3- The skill of knowing the degree of correlation between variables** **D4- The skill of self-development by giving him information that will benefit him in the academic future** **D5- It enables the student to use what he has learned to develop himself**

10. Course structure

Evaluation method	Teaching method	Name of unit/course or subject	Required learning outcomes	Hours	Week
an in-person lecture, and motivational questions.	Blackboard and data show	Definitions: Complex number Operations on complex numbers Characteristics of complex	Understand the lecture topic	2 Theoretical + 2 practical	1
motivational questions	Blackboard and data show	Accompaniment Algebraic properties	Understand the lecture topic	2 Theoretical + 2 practical	2
motivational questions	Blackboard and data show	The absolute value of a complex number	Understand the lecture topic	2 Theoretical + 2 practical	3
motivational questions	Blackboard and data show	Definition: The modulus or absolute value of a complex number	Understand the lecture topic	2 Theoretical + 2 practical	4
motivational	Blackboar	Geometric	Understand the	2 Theoretical	5

questions	d and data show	representation of complex numbers	lecture topic	+ 2 practical	
motivational questions	Blackboard and data show	Polar coordinates	Understand the lecture topic	2 Theoretical + 2 practical	6
motivational questions	Blackboard and data show	De Movier's theorem	Understand the lecture topic	2 Theoretical + 2 practical	7
motivational questions	Blackboard and data show	Euler's formula	Understand the lecture topic	2 Theoretical + 2 practical	8
motivational questions	Blackboard and data show	Full review continuity Derivatives Differentiation formulas	Understand the lecture topic	2 Theoretical + 2 practical	9
motivational questions	Blackboard and data show	Review the subject and conduct a monthly exam	Understand the lecture topic	2 Theoretical + 2 practical	10
motivational questions	Blackboard and data show	Cauchy-Riemann equations in polar forms	Understand the lecture topic	2 Theoretical + 2 practical	11
motivational questions	Blackboard and data show	Analytical function	Understand the lecture topic	2 Theoretical + 2 practical	12
motivational questions.	Blackboard and data show	Harmonic function	Understand the lecture topic	2 Theoretical + 2 practical	13
motivational questions.	Blackboard and data show	Solve the questions and assignments that were given	Understand the lecture topic	2 Theoretical + 2 practical	14

motivational questions with the grade	**Blackboard and data show**	**A comprehensive review of the material with the second month exam**	**Understand the lecture topic**	**2 Theoretical + 2 practical**	**15**

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 any)	1- سمير بشير حديد، الدوال المعقدة، طبع بمطابع مديرية دار الكتب للطباعة والنشر\جامعة الموصل ،1980. 1- جي.براون، المتغيرات المعقدة وتطبيقاتها، مديرية مطبعة الجامعة\الموصل،1983.
Main references (sources)	**1- R. V. Churchill, J. W. Brown and R. F. Verhey, "Complex Variables and Applications," 3rd Edition, McGraw Hill, New York, 1976.** **2- S. Ponnusamy, Herb Silverman, Complex Variables with Applications, Birkhäuser Boston, MA, USA, 2006.**
Recommended books and references (scientific journals, reports...)	**S. Ponnusamy, Herb Silverman, Complex Variables w Applications, Birkhäuser Boston, MA, USA, 2006.**
Electronic References, Websites	**https://www.uoanbar.edu.iq/staff-page.php?ID=1107**

Course Description Form

1. Course Name:	
Complex Analysis 2	
2. Course Code:	
MAT405	
3. Semester / Year:	
Second semester/2023-2024	
4. Description Preparation Date:	
1/2/2024	
5. Available Attendance Forms:	
Daily, at the time specified in the schedule, and at full time	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hr./ 3Unit	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Abdulrahman Salman Jumi **Email: eps.abdulrahman.juma@uoanbar.edu.iq**	
8. Course Objectives	
Course Objectives	**This course aims to convey a general idea about:** **1-The student must be able to teach and learn the religious subject** **2- The student will be familiar with the concept of complex numbers.** **3- That the student understands the types of logarithmic functions** **4- That the student understands the concepts of Riemann and Cauchy integration** **5- That the student understands how to use complex numbers daily life**
9. Teaching and Learning Strategies	
Strategy	**Learning outcomes, teaching, learning and assessment methods** **. A- Cognitive objectives** **1- Extrapolation** **2- Analysis** **3- Conclusion** **4-The lecture** **5-Empowerment** **B - The skills objectives of the course.** **B1 - Developing the skill in knowing the distribution of random variables and using them in the practical aspect** **B2 - Developing the skill of how to calculate the distribution of a function in terms of its random variables** **B3 - Developing the skill of employing the properties of random distributions for use in the practical aspect of life**

	C- Emotional and value goals **C1- Thinking that explores the truth through (question and answer)** **C2- Managing societal problems by finding appropriate solutions to them through academic concepts** **C3- Spreading the spirit of interaction and attraction among students through academic competition** **C4- Urging students to employ what they have learned in public life** **D - Transferable general and qualifying skills (other skills related to employability and personal development).** **D1-The skill of calculating number methods** **D2- The skill of calculating the probability of certain events** **D3- The skill of knowing the degree of correlation between variables** **D4- The skill of self-development by giving him information that will benefit him in the academic future** **D5- It enables the student to use what he has learned to develop himself**

10. Course structure

Evaluation method	Teaching method	Name of unit/course or subject	Required learning outcomes	Hours	Week
an in-person lecture, and motivational questions.	Blackboard and data show	The real and imaginary parts Logarithmic functions	Understand the lecture topic	2 Theoretical + 2 practical	1
motivational questions	Blackboard and data show	The bow and its types	Understand the lecture topic	2 Theoretical + 2 practical	2
motivational questions	Blackboard and data show	The curve and its types	Understand the lecture topic	2 Theoretical + 2 practical	3
motivational questions	Blackboard and data show	Full review	Understand the lecture topic	2 Theoretical + 2 practical	4
motivational questions	Blackboard and data show	a comprehensive review	Understand the lecture topic	2 Theoretical + 2 practical	5
motivational questions	Blackboard and data	First month exam	Understand the lecture topic	2 Theoretical + 2 practical	6

	show				
motivational questions	Blackboard and data show	Types of functions of complex numbers Gordon curve	Understand the lecture topic	2 Theoretical + 2 practical	7
motivational questions	Blackboard and data show	theorem for a simple path Positively directed path	Understand the lecture topic	2 Theoretical + 2 practical	8
motivational questions	Blackboard and data show	Properties of complex integration Cauchy's integral formulas Cauchy distribution	Understand the lecture topic	2 Theoretical + 2 practical	9
motivational questions	Blackboard and data show	Review the subject and conduct a monthly exam	Understand the lecture topic	2 Theoretical + 2 practical	10
motivational questions	Blackboard and data show	conducting a monthly examination	Understand the lecture topic	2 Theoretical + 2 practical	11
motivational questions	Blackboard and data show	Singularity method Sediment method	Understand the lecture topic	2 Theoretical + 2 practical	12
motivational questions.	Blackboard and data show	Cauchy's method and formulas	Understand the lecture topic	2 Theoretical + 2 practical	13
motivational questions.	Blackboard and data show	a comprehensive review of the subject, with the third month's exam	Understand the lecture topic	2 Theoretical + 2 practical	14

motivational questions with the grade	Blackboard and data show	the final evaluation is an in-person lecture, and the grade	Understand the lecture topic	2 Theoretical + 2 practical	15

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)	1- سمير بشير حديد، الدوال المعقدة، طبع بمطابع مديرية دارالكتب للطباعة والنشر\جامعة الموصل ،1980. 2- جي.براون، المتغيرات المعقدة وتطبيقاتها، مديرية مطبعة الجامعة\الموصل،1983.
Main references (sources)	1. R. V. Churchill, J. W. Brown and R. F. Verhey, "Complex Variables and Applications," 3rd Edition, McGraw Hill, New York, 1976. 2. S. Ponnusamy, Herb Silverman, Complex Variables with Applications, Birkhäuser Boston, MA, USA, 2006.
Recommended books and references (scientific journals, reports...)	S. Ponnusamy, Herb Silverman, Complex Variables w Applications, Birkhäuser Boston, MA, USA, 2006.
Electronic References, Websites	https://www.uoanbar.edu.iq/staff-page.php?ID=1107

Course Description Form

1. Course Name:	
Partial differential equations 1	
2. Course Code:	
MAT202	
3. Semester / Year:	
first semester/2023-2024	
4. Description Preparation Date:	
12/11/2023	
5. Available Attendance Forms:	
Daily, at the time specified in the schedule, and at full time	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hr./ 3Unit	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Ali Abed Mutlag **Email: eps.aliabd.mutlik@uoanbar.edu.iq**	
8. Course Objectives	
Course Objectives	**This course aims to convey a general idea about:** **1- That the student is familiar with the definition and concept of partial differential equations and how to form them.** **2- For the student to become familiar with the classification of partial differential equations in terms of degree and rank.** **3- Identify the applications of partial differential equations various fields.**
9. Teaching and Learning Strategies	
Strategy	**A-Knowledge and understanding** **A1- Identify the methods and rules for finding solutions to different partial differential equations of the first and second order with initial and limit values.** **A2- The ability to use partial differential equations to solve mathematical problems.** **A3- Understanding the links between differential equations and mathematical analysis and highlighting the importance of equations in various different sciences.** **A4- Training the student to solve higher order linear equations using Laplace transformations and other methods.** **B - The program's skill objectives** **B1- Scientific reports** **B 2- Graduation research** **C- Thinking skills** **C 1- Developing the student's ability to work on performing assignments and submitting them on the scheduled date.** **C 2- The ability to think scientifically.** **C 3- The ability to participate effectively in semester activities.**

	C 4- Skill in carrying out research activities and using useful sources to support the main idea required **D - General and rehabilitative transferable skills** **D 1- Developing the student's ability to use differential equations to solve problems in mathematics.** **D 2- Developing the student's ability to identify and solve examples with deductive and deductive ideas.** **D 3- Developing the student's ability to deal with others by participating in scientific discussions.** **D 4- Developing the student's ability to analyze and synthesize.**

10. Course structure

Evaluation method	Teaching method	Name of unit/course or subject	Required learning outcomes	Hours	Week
an in-person lecture, and motivational questions.	Blackboard and data show	Chapter one	Introduction to partial differential equations	4	1
motivational questions	Blackboard and data show	Chapter one	How to get the equation	4	2
motivational questions	Blackboard and data show	Chapter Two	Methods for solving first-order and first-order equations	4	3
motivational questions	Blackboard and data show	Chapter Two	Nonlinear partial differential equations of the first order	4	4
motivational questions	Blackboard and data show	Chapter Two	Review and test	4	5
motivational questions	Blackboard and data show	Chapter Two	Using some transformations to solve first-	4	6

			order partial differential equations.		
motivational questions	Blackboard and data show	Chapter Two	Garbit method	4	7
motivational questions	Blackboard and data show	Chapter Two	Adjustable equations method	4	8
motivational questions	Blackboard and data show	Chapter Three	Method of Characterestics	4	9
motivational questions	Blackboard and data show	Chapter Three	Review and test	4	10
motivational questions	Blackboard and data show	Chapter Three	Direct integration method	4	11
motivational questions	Blackboard and data show	Chapter Four	Linear partial differential equations with homogeneous terms and constant higher-order coefficients	4	12
motivational questions.	Blackboard and data show	Chapter Four	Linear partial differential equations with homogeneous terms and non-homogeneous	4	13

			constant coefficients of higher order		
motivational questions.	Blackboard and data show	Chapter Four	Linear partial differential equations with homogeneous terms and non-homogeneous constant coefficients of higher order	4	14
motivational questions with the grade	Blackboard and data show	Chapter Four	Review and test	4	15

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 any)	1- المعادلات التفاضلية الجزئية للكليات العلمية والهندسية / ترجمة د.عطا الله ثامر العاني 1989 2- المعادلات التفاضلية الجزئية / د.عطا الله ثامر العاني 3-مقدمة إلى المعادلات التفاضلية الجزئية / د.عطا الله ثامر العاني
Main references (sources)	1- المعادلات التفاضلية الجزئية للكليات العلمية والهندسية / ترجمة د.عطا الله ثامر العاني 1989 2- المعادلات التفاضلية الجزئية / د.عطا الله ثامر العاني 3- مقدمة إلى المعادلات التفاضلية الجزئية / د.عطا الله ثامر العاني 4- Jhon.F. / Partial differential Equations
Recommended books and references (scientific journals, reports...)	معادلات التفاضلية الجزئية للكليات العلمية والهندسية / ترجمة د.عطا الله ثامر العاني
Electronic References, Websites	https://www.uoanbar.edu.iq/staff-page.php?ID=1062

Course Description Form

1. Course Name:	
Partial differential equations 2	
2. Course Code:	
MAT302	
3. Semester / Year:	
Second semester/2023-2024	
4. Description Preparation Date:	
1/2/2024	
5. Available Attendance Forms:	
Daily, at the time specified in the schedule, and at full time	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hr./ 3Unit	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Ali Abed Mutlag Email: **eps.aliabd.mutlik@uoanbar.edu.iq**	
8. Course Objectives	
Course Objectives	**This course aims to convey a general idea about:** **1- That the student is familiar with the definition and concept of partial differential equations and how to form them.** **2- For the student to become familiar with the classification of partial differential equations in terms of degree and rank.** **3- Identify the applications of partial differential equations in various fields.**
9. Teaching and Learning Strategies	
Strategy	**A-Knowledge and understanding** **A1- Identify the methods and rules for finding solutions to different partial differential equations of the first and second order with initial and limit values.** **A2- The ability to use partial differential equations to solve mathematical problems.** **A3- Understanding the links between differential equations and mathematical analysis and highlighting the importance of equations in various different sciences.** **A4- Training the student to solve higher order linear equations using Laplace transformations and other methods.** **B - The program's skill objectives** **B1- Scientific reports** **B 2- Graduation research** **C- Thinking skills** **C 1- Developing the student's ability to work on performing assignments and submitting them on the scheduled date.** **C 2- The ability to think scientifically.** **C 3- The ability to participate effectively in semester activities.** **C 4- Skill in carrying out research activities and using useful sources to support the main idea required**

	D - General and rehabilitative transferable skills **D 1- Developing the student's ability to use differential equations to solve problems in mathematics.** **D 2- Developing the student's ability to identify and solve examples with deductive and deductive ideas.** **D 3- Developing the student's ability to deal with others by participating in scientific discussions.** **D 4- Developing the student's ability to analyze and synthesize.**

10. Course structure

Evaluation method	Teaching method	Name of unit/course or subject	Required learning outcomes	Hours	Week
an in-person lecture, and motivational questions.	Blackboard and data show	Chapter Four	Partial differential equations with non-homogeneous terms and constant coefficients	4	1
motivational questions	Blackboard and data show	Chapter Four	Irreducible partial differential equations	4	2
motivational questions	Blackboard and data show	Chapter Five	Second-order linear partial differential equations with variable coefficients	4	3
motivational questions	Blackboard and data show	Chapter Five	Cauchy's linear partial differential equation	4	4
motivational questions	Blackboard and data show	Chapter Five	Review and test	4	5
motivational questions	Blackboard and data show	Chapter six	Separation of variables	4	6
motivational questions	Blackboard and data show	Chapter six	Fourier series	4	7

motivational questions	Blackboard and data show	Chapter six	Fourier series	4	8
motivational questions	Blackboard and data show	Chapter six	Review and test	4	9
motivational questions	Blackboard and data show	Chapter six	Heat equation	4	10
motivational questions	Blackboard and data show	Chapter six	wave equation	4	11
motivational questions	Blackboard and data show	Chapter six	Laplace equation	4	12
motivational questions.	Blackboard and data show	Chapter six	Laplace transforms	4	13
motivational questions.	Blackboard and data show	Chapter six	Solving partial differential equations using Laplace transforms	4	14
motivational questions with the grade	Blackboard and data show	Chapter six	Review and test	4	15

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 any)	**1-المعادلات التفاضلية الجزئية للكليات العلمية والهندسية / ترجمة د.عطا الله ثامر العاني 1989** **2-المعادلات التفاضلية الجزئية / د.عطا الله ثامر العاني**

	3-مقدمة إلى المعادلات التفاضلية الجزئية / د.عطا الله ثامر العاني
Main references (sources)	1-المعادلات التفاضلية الجزئية للكليات العلمية والهندسية / ترجمة د.عطا الله ثامر العاني 1989 2-المعادلات التفاضلية الجزئية / د.عطا الله ثامر العاني 3-مقدمة إلى المعادلات التفاضلية الجزئية / د.عطا الله ثامر العاني 4- Jhon.F. / Partial differential Equations
Recommended books and references (scientific journals, reports...)	المعادلات التفاضلية الجزئية للكليات العلمية والهندسية / ترجمة د.عطا الله ثامر العاني
Electronic References, Websites	https://www.uoanbar.edu.iq/staff-page.php?ID=1062

Course Description Form

1. Course Name:	
Geometry 1	
2. Course Code:	
MAT204	
3. Semester / Year:	
First semester/2023-2024	
4. Description Preparation Date:	
12/11/2023	
5. Available Attendance Forms:	
Daily, at the time specified in the schedule, and at full time	
6. Number of Credit Hours (Total) / Number of Units (Total)	
64 hr./ 3Unit	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Mustafa Ibrahim Hameed **Email: mustafa8095@uoanbar.edu.iq**	
8. Course Objectives	
Course Objectives	**This course aims to convey a general idea about:** **This course aims to study non-Euclidean geometry and its axioms, the concept of Hathloul and elliptical geometry and their axioms, the concept of projective, synthetic and analytical geometry, and the geometry of transformations and their axioms in harmonic groups.**
9. Teaching and Learning Strategies	
Strategy	**Learning outcomes, teaching, learning and assessment methods** **A-Knowledge and understanding** **1- The student will be familiar with the concept of non-Euclidean geometry.** **2- For the student to become familiar with the concept of Hathloul geometry.** **3- That the student understands what is meant by elliptical geometry.** **4- That the student knows the meaning of synthetic and analytical projective**

	geometry and how to use geometry in our practical life **5- That the student understands what is meant by Bach's axioms** **6- That the student knows the meaning of exterior angles and right angles** **7- That the student knows how to use engineering in our practical life** **B - The skills objectives of the course.** **1- That the student can distinguish between the projective plane and the damaged plane** **2- That the student can distinguish between the Fano and Young systems.** **3- That the student can distinguish between the intuitive systems he studies** **4- That the student possesses the necessary skill to find relationships between the types of geometry he studies, which are Euclidean geometry and non-Euclidean geometry, which includes Hathloulian geometry and elliptical geometry.** **C- Emotional and value goals** **C1- Enabling students to solve problems related to the intellectual framework of advanced mathematics.** **C2- For the student to understand and differentiate between the basic concepts through different questions with diverse concepts and linking them together.** **D - Transferable general and qualifying skills (other skills related to employability and personal development).** **D1- The student acquires the skills to establish mathematics in terms of language, symbols, information, and methods** **Thinking.** **D2- Follow up on scientific development by contacting international universities via the Internet.** **D3- Participation in scientific conferences inside and outside the country.** **D4- Participation in scientific seminars inside and outside the country.**

10. Course structure

Evaluation method	Teaching method	Name of unit/course or subject	Required learning outcomes	Hours	Week
an in-person lecture, and motivational questions.	Blackboard and data show	Non-Euclidean geometry	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	1
motivational questions	Blackboard and data show	projective and convolutional	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	2
motivational questions	Blackboard and data show	planes, Young and Fano systems	Understand the subject matter correctly and	2 Theoretical + 2 practical	3

			know its applications in other sciences		
motivational questions	Blackboard and data show	Euclid's system/the most important	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	4
motivational questions	Blackboard and data show	hypotheses, axioms, and some flaws in this system	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	5
motivational questions	Blackboard and data show	Foundations of engineering	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	6
motivational questions	Blackboard and data show	The axioms of occurrence and existence	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	7
motivational questions	Blackboard and data show	The axioms of order, Bach's axioms	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	8
motivational questions	Blackboard and data show	Convex sets/triangles and angles	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	9
motivational questions	Blackboard and data show	Matching and comparison	Understand the subject matter correctly and	2 Theoretical + 2 practical	10

			know its applications in other sciences		
motivational questions	Blackboard and data show	Congruence of triangles by comparing line segments	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	11
motivational questions	Blackboard and data show	Adding, subtracting, and comparing angles	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	12
motivational questions.	Blackboard and data show	Elementary geometry, its definition and most important axioms	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	13
motivational questions.	Blackboard and data show	External angles, uprights and constructions	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	14
motivational questions with the grade	Blackboard and data show	Monthly exam	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	15

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 any)	**1- Basic concepts in engineering** **2- Principles of modern Euclidean and non-Euclidean geometry**

Main references (sources)	**Euclidean and Non-Euclidean Geometries: Development and History**
Recommended books and references (scientific journals, reports...)	**Lecture notes of mathematics 1, MIT**
Electronic References, Websites	**www. mathwords.com** **https://www.uoanbar.edu.iq/staff-page.php?ID=1715**

Course Description Form

1. Course Name:	
Geometry 2	
2. Course Code:	
MAT209	
3. Semester / Year:	
Second semester/2023-2024	
4. Description Preparation Date:	
1/2/2024	
5. Available Attendance Forms:	
Daily, at the time specified in the schedule, and at full time	
6. Number of Credit Hours (Total) / Number of Units (Total)	
64 hr./ 3Unit	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Mustafa Ibrahim Hameed Email: mustafa8095@uoanbar.edu.iq	
8. Course Objectives	
Course Objectives	**This course aims to convey a general idea about:** **This course aims to study non-Euclidean geometry and its axioms, the concept of Hathloul and elliptical geometry and their axioms, the concept of projective, synthetic and analytical geometry, and the geometry of transformations and their axioms in harmonic groups.**
9. Teaching and Learning Strategies	
Strategy	**Learning outcomes, teaching, learning and assessment methods** **A-Knowledge and understanding** **1- The student will be familiar with the concept of non-Euclidean geometry.** **2- For the student to become familiar with the concept of Hathloul geometry.** **3- That the student understands what is meant by elliptical geometry.** **4- That the student knows the meaning of synthetic and analytical projective geometry and how to use geometry in our practical life** **5- That the student understands what is meant by Bach's axioms** **6- That the student knows the meaning of exterior angles and right angles** **7- That the student knows how to use engineering in our practical life**

	B - The skills objectives of the course. **1- That the student can distinguish between the projective plane and the damaged plane** **2- That the student can distinguish between the Fano and Young systems.** **3- That the student can distinguish between the intuitive systems he studies** **4- That the student possesses the necessary skill to find relationships between the types of geometry he studies, which are Euclidean geometry and non-Euclidean geometry, which includes Hathloulian geometry and elliptical geometry.** **C- Emotional and value goals** **C1- Enabling students to solve problems related to the intellectual framework of advanced mathematics.** **C2- For the student to understand and differentiate between the basic concepts through different questions with diverse concepts and linking them together.** **D - Transferable general and qualifying skills (other skills related to employability and personal development).** **D1- The student acquires the skills to establish mathematics in terms of language, symbols, information, and methods** **Thinking.** **D2- Follow up on scientific development by contacting international universities via the Internet.** **D3- Participation in scientific conferences inside and outside the country.** **D4- Participation in scientific seminars inside and outside the country.**

10. Course structure

Evaluation method	Teaching method	Name of unit/course or subject	Required learning outcomes	Hours	Week
an in-person lecture, and motivational questions.	Blackboard and data show	Non-Euclidean geometry	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	1
motivational questions	Blackboardand data show	projective and convolutional	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	2
motivational questions	Blackboard and data show	planes, Young and Fano systems	Understand the subject matter correctly and know its applications in	2 Theoretical + 2 practical	3

			other sciences		
motivational questions	Blackboard and data show	Euclid's system/the most important	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	4
motivational questions	Blackboard and data show	hypotheses, axioms, and some flaws in this system	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	5
motivational questions	Blackboard and data show	Foundations of engineering	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	6
motivational questions	Blackboard and data show	The axioms of occurrence and existence	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	7
motivational questions	Blackboard and data show	The axioms of order, Bach's axioms	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	8
motivational questions	Blackboard and data show	Convex sets/triangles and angles	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	9
motivational	Blackboar	Matching and	Understand the	2 Theoretical	10

questions	d and data show	comparison	subject matter correctly and know its applications in other sciences	+ 2 practical	
motivational questions	Blackboard and data show	Congruence of triangles by comparing line segments	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	11
motivational questions	Blackboard and data show	Adding, subtracting, and comparing angles	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	12
motivational questions.	Blackboard and data show	Elementary geometry, its definition and most important axioms	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	13
motivational questions.	Blackboard and data show	External angles, uprights and constructions	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	14
motivational questions with the grade	Blackboard and data show	Monthly exam	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	15

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 any)	1- Basic concepts in engineering 2- Principles of modern Euclidean and non-Euclidean geometry
Main references (sources)	Euclidean and Non-Euclidean Geometries: Development and History
Recommended books and references (scientific journals, reports...)	Lecture notes of mathematics 1, MIT
Electronic References, Websites	www. mathwords.com https://www.uoanbar.edu.iq/staff-page.php?ID=1715

Course Description Form

1. Course Name:	
Module Theory 1	
2. Course Code:	
MAT405	
3. Semester / Year:	
first semester/2023-2024	
4. Description Preparation Date:	
17/11/2023	
5. Available Attendance Forms:	
Daily, at the time specified in the schedule, and at full time	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hr./ 3Unit	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Majid Mohammed Abed Email: majid_math@uoanbar.edu.iq Name: Assistant teacher: Abdulsalam Faeq Talak Email: abd19u2007@uoanbar.edu.iq	
8. Course Objectives	
Course Objectives	This course aims to convey a general idea about: 1-The student must be able to teach and learn the subject of module 2-The student should be familiar with the concept of a cyclic module 3- That the student understands the types of submodules 4- That the student understands the concepts of types modules 5- That the student understands how to use module theory in algebra
9. Teaching and Learning Strategies	
Strategy	Learning outcomes, teaching, learning and assessment methods . A- Cognitive objectives

	1- Extrapolation **2- Analysis** **3- Conclusion** **4-The lecture** **5-Empowerment** **B - The skills objectives of the course.** **B1 - Developing the skill in knowing the module theory** **B2 - Developing the skill of how to study submodules** **B3 - Developing the skill of employing the properties of cyclic modules** **C- Emotional and value goals** **C1- Thinking that explores the truth through (question and answer)** **C2- Managing societal problems by finding appropriate solutions to them through academic concepts** **C3- Spreading the spirit of interaction and attraction among students through academic competition** **C4- Urging students to employ what they have learned in public life** **D - Transferable general and qualifying skills (other skills related to employability and personal development).** **D1-The skill of study modules** **D2- The skill of other modules** **D3- The skill of knowing the more modules** **D4- The skill of self-development by giving him information that will benefit him in the academic future** **D5- It enables the student to use what he has learned to develop himself**

10. Course structure

Evaluation method	Teaching method	Name of unit/course or subject	Required learning outcomes	Hours	Week
an in-person lecture, and motivational questions.	Blackboard and data show	Definition of the modules	Understand the lecture topic	2 Theoretical + 2 practical	1
motivational questions	Blackboard and data show	submodules,	Understand the lecture topic	2 Theoretical + 2 practical	2
motivational questions	Blackboard and data show	Cyclic modules	Understand the lecture topic	2 Theoretical + 2 practical	3
motivational questions	Blackboard and data	Maximal submodules	Understand the lecture topic	2 Theoretical + 2 practical	4

	show				
motivational questions	Blackboard and data show	Minimal submodules	Understand the lecture topic	2 Theoretical + 2 practical	5
motivational questions	Blackboard and data show	Test.	Understand the lecture topic	2 Theoretical + 2 practical	6
motivational questions	Blackboard and data show	A comprehensive review	Understand the lecture topic	2 Theoretical + 2 practical	7
motivational questions	Blackboard and data show	Finitely generated module	Understand the lecture topic	2 Theoretical + 2 practical	8
motivational questions	Blackboard and data show	Indecomposable modules	Understand the lecture topic	2 Theoretical + 2 practical	9
motivational questions	Blackboard and data show	Small submodules	Understand the lecture topic	2 Theoretical + 2 practical	10
motivational questions	Blackboard and data show	Intersection and union submodules	Understand the lecture topic	2 Theoretical + 2 practical	11
motivational questions	Blackboard and data show	Quotient modules	Understand the lecture topic	2 Theoretical + 2 practical	12
motivational questions.	Blackboard and data show	Solve the questions and assignments that were given	Understand the lecture topic	2 Theoretical + 2 practical	13
motivational questions.	Blackboard and data show	Co-finitely generated module	Understand the lecture topic	2 Theoretical + 2 practical	14

motivational questions with the grade	Blackboard and data show		Understand the lecture topic	2 Theoretical + 2 practical	15

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)	9- مقدمة الى نظرية المقاسات – تأليف أستاذ دكتور انعام هادي
Main references (sources)	1- A First Course in Abstract Algebra By J.B.F.raleigh. 2- Foundation in ring theory : by Wisbaur .p.
Recommended books and references (scientific journals, reports...)	Foundation in ring theory : by Wisbaur .p.1991
Electronic References, Websites	https://www.math.uni-duesseldorf.de/~wisbauer/book.pdf https://www.uoanbar.edu.iq/staff-page.php?ID=1153

Course Description Form

1. Course Name:
Module Theory 2
2. Course Code:
MAT405
3. Semester / Year:
Second semester/2023-2024
4. Description Preparation Date:
10/2/2024
5. Available Attendance Forms:
Daily, at the time specified in the schedule, and at full time
6. Number of Credit Hours (Total) / Number of Units (Total)
60 hr./ 3Unit
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Majid Mohammed Abed Email: majid_math@uoanbar.edu.iq Name: Assistant teacher: Abdulsalam Faeq Talak Email: abd19u2007@uoanbar.edu.iq
8. Course Objectives

Course Objectives	This course aims to convey a general idea about: 1-The student must be able to teach and learn the subject of more modules 2-The student should be familiar with the concept of a homomorphism module 3- That the student understands the types of homomorphisms 4- That the student understands the concepts of free module 5- That the student understands how to use module theory in algebra

9. Teaching and Learning Strategies

Strategy	Learning outcomes, teaching, learning and assessment methods . A- Cognitive objectives 1- Extrapolation 2- Analysis 3- Conclusion 4-The lecture 5-Empowerment B - The skills objectives of the course. B1 - Developing the skill in knowing the homomorphism theorems B2 - Developing the skill of how to define other concepts in module theory B3 - Developing the skill of employing the properties more modules C- Emotional and value goals C1- Thinking that explores the truth through (question and answer) C2- Managing societal problems by finding appropriate solutions to them through academic concepts C3- Spreading the spirit of interaction and attraction among students through academic competition C4- Urging students to employ what they have learned in public life D - Transferable general and qualifying skills (other skills related to employability and personal development). D1-The skill of projective module D2- The skill of define injective modules D3- The skill of knowing the divisible and injective modules D4- The skill of self-development by giving him information that will benefit him in the other subjects D5- It enables the student to use what he has learned to develop himself

10. Course structure

Evaluation method	Teaching method	Name of unit/course or subject	Required learning outcomes	Hours	Week
an in-person lecture, and motivational questions.	Blackboard and data show	One to one homomorphism	Understand the lecture topic	2 Theoretical + 2 practical	1

motivational questions	Blackboard and data show	Onto homomorphism	Understand the lecture topic	2 Theoretical + 2 practical	2
motivational questions	Blackboard and data show	Projective module	Understand the lecture topic	2 Theoretical + 2 practical	3
motivational questions	Blackboard and data show	Free module	Understand the lecture topic	2 Theoretical + 2 practical	4
motivational questions	Blackboard and data show	Torsion free module	Understand the lecture topic	2 Theoretical + 2 practical	5
motivational questions	Blackboard and data show	Quotient module	Understand the lecture topic	2 Theoretical + 2 practical	6
motivational questions	Blackboard and data show	Injective module	Understand the lecture topic	2 Theoretical + 2 practical	7
motivational questions	Blackboard and data show	Solve more questions	Understand the lecture topic	2 Theoretical + 2 practical	8
motivational questions	Blackboard and data show	Review for the topics	Understand the lecture topic	2 Theoretical + 2 practical	9
motivational questions	Blackboard and data show	More examples	Understand the lecture topic	2 Theoretical + 2 practical	10
motivational questions	Blackboard and data show	Test 2	Understand the lecture topic	2 Theoretical + 2 practical	11
motivational questions	Blackboard and data	Solve test 2	Understand the lecture topic	2 Theoretical + 2 practical	12

	show				
motivational questions.	Blackboard and data show	General review	Understand the lecture topic	2 Theoretical + 2 practical	13
motivational questions.	Blackboard and data show	More questions for all topic	Understand the lecture topic	2 Theoretical + 2 practical	14
motivational questions with the grade	Blackboard and data show	the final evaluation is an in-person lecture, and the grade	Understand the lecture topic	2 Theoretical + 2 practical	15

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)	**1- مقدمة الى نظرية المقاسات – تأليف أستاذ دكتور انعام هادي**
Main references (sources)	**3- A First Course in Abstract Algebra By J.B.F.raleigh.** **4- Foundation in ring theory : by Wisbaur .p.**
Recommended books and references (scientific journals, reports...)	**Foundation in ring theory : by Wisbaur .p.1991**
Electronic References, Websites	**https://www.math.uni-duesseldorf.de/~wisbauer/book.pd** **https://www.uoanbar.edu.iq/staff-page.php?ID=1153**

Course Description Form

1. Course Name:	
Mathematical statistics 1	
2. Course Code:	
MAT403	
3. Semester / Year:	
first semester/2023-2024	
4. Description Preparation Date:	
1/9/2023	
5. Available Attendance Forms:	
Daily, at the time specified in the schedule, and at full time	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hr./ 3Unit	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Mustafa Ismaeel Naif **Email: eps.mustafa.ismaeel@uoanbar.edu.iq** **Name: Assistant teacher: Muthanna Khaleefah Mishlish** **Email: muthana.kh.m@uoanbar.edu.iq**	
8. Course Objectives	
Course Objectives	**This course aims to convey a general idea about:** **The student acquires the necessary skills to know the importance distributions and how to infer their parameters through the concept sampling.**
9. Teaching and Learning Strategies	
Strategy	**Learning outcomes, teaching, learning and assessment methods** **. A- Cognitive objectives** **1- Extrapolation** **2- Analysis** **3- Conclusion** **4-The lecture** **5-Empowerment** **B - The skills objectives of the course.** **B1 - Developing the skill in knowing the inference of the parameter in practice** **B2 - Developing the skill of how to estimate parameters** **B3 - Developing the skill of employing the characteristics of a good estimator for use in the practical side of life** **C- Emotional and value goals** **C1- The student should listen carefully to the explanation** **C2- The student must participate in subject activities** **C3- To respect the knowledgeable value that he has** **C4- To organize data to solve problems in the subject** **D - Transferable general and qualifying skills (other skills related to employability and personal development).** **D1- The skill of calculating the properties of distributions** **D2- The skill of calculating capabilities** **D3- The skill of knowing the characteristics of good capabilities** **D4- The skill of self-development by giving him information that will benefit him**

	in the practical aspect **D5- It enables the student to use what he has learned to develop himself**

10. Course structure

Evaluation method	Teaching method	Name of unit/course or subject	Required learning outcomes	Hours	Week
an in-person lecture, and motivational questions.	Blackboard and data show	Some discrete and continuous probability random distributions	The student learns the basic principles of probability distributions and reviews them	4	1
motivational questions	Blackboard and data show	Sampling distributions	The student learns non-parametric distributions such as chi-square, chi-square, and chi-square	4	2
motivational questions	Blackboard and data show	Sampling theory	The student learns methods of inference for the distribution function of random variables (cumulative function).	4	3
motivational questions	Blackboard and data show	Sampling theory	The student will learn to deduce distributions using the function generating the moments	4	4
motivational questions	Blackboard and data show	ordered statistics	The student will be familiar with ordered statistics and the distributions of their functions	4	5
motivational questions	Blackboard and data show	Review the subject and conduct a monthly exam	The student learns how to do a comprehensive review of the subject, and the student notices the extent of his understanding of what has been studied by taking the first month's exam.	4	6

motivational questions	Blackboard and data show	Estimation theory	The student will learn the concept of estimation theory, the estimator and its properties	4	7
motivational questions	Blackboard and data show	Estimation theory	The student will learn the concept of an unbiased and least variable estimator	4	8
motivational questions	Blackboard and data show	Point estimation	That the student learns the concept of sufficient and efficient estimator	4	9
motivational questions	Blackboard and data show	Point estimation	The student learns the concept of an approximately biased change estimator	4	10
motivational questions	Blackboard and data show	Point estimation	The student will learn the concept of methods for finding estimators (maximum potential function and moment method).	4	11
motivational questions	Blackboard and data show	Point estimation	The student will learn the concept of methods for finding the estimator (Bayasion method).	4	12
motivational questions.	Blackboard and data show	Solve the questions and assignments that have been given	The student learns how to know what has been studied	4	13
motivational questions.	Blackboard and data show	A comprehensive review of the material with the second month exam	To increase the student's awareness through enrichment examples and questions along with an evaluation exam	4	14

motivational questions.	Blackboard and data show	A comprehensive review of the material	To increase the student's awareness through enrichment examples	4	15

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)	10- امير حنا، الاحصاء الرياضي، دار نشر جامعه الموصل، العراق. 11- خاشع الراوي، مدخل الى علم الاحصاء ، دار نشر جامعة الموصل، العراق.الكيمياء اللاعضوية العصرية د.باسم السعدي
Main references (sources)	1- **Introduction in Mathematical Statistics., Hogg, R. , McKean, J. and Craig, A., , Pearson Education , USA.** 2- **Probability and Statistical Inference, Hogg, R. , Tanis, E., and Zimmerman, D., Pearson Education , USA.** 3- **Mathematical Statistics with Applications, Dennis D. Wackerly, William Mendenhall III and Richard L. Scheaffer, SEVENTH EDITION, 2008, USA**
Recommended books and references (scientific journals, reports...)	**A first course in probability , Sheldon Ross, Ninth Edition, 2014**
Electronic References, Websites	**https://ocw.mit.edu/courses/18-655-mathematical-statistic spring-2016/pages/lecture-notes/** **https://www.uoanbar.edu.iq/staff-page.php?ID=1104**

Course Description Form

1. Course Name:
Mathematical statistics 2
2. Course Code:
MAT403
3. Semester / Year:
Second semester/2023-2024
4. Description Preparation Date:
1/2/2024
5. Available Attendance Forms:
Daily, at the time specified in the schedule, and at full time
6. Number of Credit Hours (Total) / Number of Units (Total)
60 hr./ 3Unit
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Mustafa Ismaeel Naif **Email: eps.mustafa.ismaeel@uoanbar.edu.iq** **Name: Assistant teacher: Muthanna Khaleefah Mishlish** **Email: muthana.kh.m@uoanbar.edu.iq**

8. Course Objectives	
Course Objectives	**This course aims to convey a general idea about:** **The student acquires the necessary skills to know the importance distributions and how to infer their parameters through the conc of sampling.**
9. Teaching and Learning Strategies	
Strategy	**Learning outcomes, teaching, learning and assessment methods** **. A- Cognitive objectives** **1- Extrapolation** **2- Analysis** **3- Conclusion** **4-The lecture** **5-Empowerment** **B - The skills objectives of the course.** **B1 - Developing the skill in knowing the inference of the parameter in practice.** **B2 - Developing the skill of how to make a decision to accept or reject the null hypothesis of parameters** **B3 - Developing the skill of employing the best rejection test area for use in the practical side of life** **C- Emotional and value goals** **C1- The student should listen carefully to the explanation** **C2- The student must participate in subject activities** **C3- To respect the knowledgeable value that he has** **C4- To organize data to solve problems in the subject** **D - Transferable general and qualifying skills (other skills related to employability and personal development).** **D1- The skill of conducting hypothesis testing for the parameter.** **D2- The skill of calculating the rejection area**

	D3- The skill of knowing the most powerful rejection area test **D4- The skill of self-development by giving him information that will benefit him in the practical aspect** **D5- It enables the student to use what he has learned to develop himself**

10. Course structure

Evaluation method	Teaching method	Name of unit/course or subject	Required learning outcomes	Hours	Week
an in-person lecture, and motivational questions.	Blackboard and data show	The concept of hypothesis testing	The student learns the basic principles of hypothesis testing	4	1
motivational questions	Blackboard and data show	The concept of hypothesis testing	The student will learn the types of hypotheses	4	2
motivational questions	Blackboard and data show	Determine the rejection region	The student learns the concept of the rejection region and how to deduce it	4	3
motivational questions	Blackboard and data show	Test the rejection region	The student should know how to determine the type of test (likelihood ratio test)	4	4
motivational questions	Blackboard and data show	Review the subject and conduct a monthly exam	The student learns how to do a comprehensive review of the subject, and the student notices the extent of his understanding of what has been studied by taking the first month's exam.	4	5
motivational questions	Blackboard and data show	Calculating the rejection region	The student will learn to use Neyman-Pearson theory and determine the most robust regular test using the rank probability ratio	4	6

motivational questions	Blackboard and data show	Most puwerful test	Determine the strongest area of regular rejection	4	7
motivational questions	Blackboard and data show	Uniformly most puwerful test	The student learns to determine the most powerful regular test using the exponential family	4	8
motivational questions	Blackboard and data show	Uniformly most puwerful test	The student will learn to use the sequential probability proportional test	4	9
motivational questions	Blackboard and data show	Uniformly most puwerful test	The student learns to use the Roe's score test	4	10
motivational questions	Blackboard and data show	Final evaluation	The student learns the extent of his understanding of the material through a comprehensive review	4	11

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 boo if any)	-1 امير حنا، الاحصاء الرياضي، دار نشر جامعه الموصل، العراق. -2 خاشع الراوي، مدخل الى علم الاحصاء ، دار نشر جامعة الموصل، العراق.الكيمياء اللاعضوية العصرية د.باسم السعدي
Main references (sources)	1- Introduction in Mathematical Statistics., Hogg, R. , McKean, J. and Craig, A., , Pearson Education , USA. 2- Probability and Statistical Inference, Hogg, R. , Tanis, E., and Zimmerman, D., Pearson Education , USA. 3- Mathematical Statistics with Applications, Dennis D. Wackerly, William Mendenhall III and Richard L. Scheaffer, SEVENTH EDITION, 2008, USA
Recommended books and references (scientific journals, reports...)	A first course in probability , Sheldon Ross, Ninth Edition, 2014
Electronic References, Websites	https://ocw.mit.edu/courses/18-655-mathematical-statistics-sprin 2016/pages/lecture-notes/ https://www.uoanbar.edu.iq/staff-page.php?ID=1104

Course Description Form

1. Course Name:	
Computer 1	
2. Course Code:	
MAT210	
3. Semester / Year:	
First Semester/2023-2024	
4. Description Preparation Date:	
12/11/2023	
5. Available Attendance Forms:	
Daily, at the time specified in the schedule, and at full time	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hr./ 3Unit	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Doreyed Muhammed Ahmed Al-Kerboly **Email: : doreyedm@uoanbar.edu.iq** **Name: MSc. Falah Amer Abdulazeez Alkubaisi** **Email: : falah.amer.azeez@uoanbar.edu.iq**	
8. Course Objectives	
Course Objectives	**This course aims to convey a general idea about:** **Teach the student the history of computers and the extent of their developm over the years with operating systems**
9. Teaching and Learning Strategies	
Strategy	**1- Cognitive objectives** **2Learn about computer generations.** **3. Learn about the types of computers.** **4. Identify numerical systems.** **5- Identify algorithms.** **6- Learn Word & Excel** **B - The skills objectives of the course.** **B1 - Developing the skill in knowing the distribution of random variables and usin them in the practical aspect** **B2 - Developing the skill of how to calculate the distribution of a function in terms its random variables** **B3 - Developing the skill of employing the properties of random distributions for u in the practical aspect of life** **C- Emotional and value goals** **C1 - Critical Thinking (Question and Answer)** **C2- Organization skill** **C3- Interaction skill** **C4- Work skill** **D - Transferable general and qualifying skills (other skills related to employability and personal development).** **D1- The student participates in intellectual problems and finds the solution to thes problems** **D2. Assignments in addition to questions during the lecture**

10. Course structure

Evaluation method	Teaching method	Name of unit/course or subject	Required learning outcomes	Hours	Week
Attendance and motivational questions	In-person lecture	Computer Fundamentals	understand some of the basics of computer fundamentals	2 Theoretical *2Practical*	1
Attendance and motivational questions	In-person lecture	Defining the Computer	Define the computer and its stages of development	2 Theoretical *2Practical*	2
Attendance and motivational questions	In-person lecture	Computer Components	Computer components	2 Theoretical *2Practical*	3
Attendance and motivational questions	In-person lecture	Hardware and Software Components	Identify and distinguish between hardware and software components	2 Theoretical *2Practical*	4
Attendance and motivational questions	In-person lecture	Number Systems	Number systems	2 Theoretical *2Practical*	5
Attendance and motivational questions	In-person lecture	Conversion between Number Systems	Conversion between number systems	2 Theoretical *2Practical*	6

Attendance and motivational questions	**In-person lecture**	**Arithmetic Operations in the Binary System**	**Arithmetic operations in the binary system**	**2 Theoretical *2Practical***	**7**
Grade	**In-person lecture**		**First exam**	**2 Theoretical *2Practical***	**8**
Attendance and motivational questions	**In-person lecture**	**Programming Language**	**What is the meaning Programming Language**	**2 Theoretical *2Practical***	**9**
Attendance and motivational questions	**In-person lecture**	**Algorithms**	**Introduction to algorithms and their types**	**2 Theoretical *2Practical***	**10**
Attendance and motivational questions	**In-person lecture**	**Examples of Algorithms**	**Examples of algorithms**	**2 Theoretical *2Practical***	**11**
Attendance and motivational questions	**In-person lecture**	**While Loop**	**While loop**	**2 Theoretical *2Practical***	**12**
Attendance and motivational questions	**In-person lecture**	**For Loop**	**For loop**	**2 Theoretical *2Practical***	**13**
Grade		**Examples of Loop**	**Examples of Loop**	**2 Theoretical *2Practical***	**14**

Grade			**Second exam**	**2 Theoretical** *2Practical*	**15**

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 (curricu books, if any)	مبادئ الحاسب الألي مقرر وزارة التعليم العالي لمبادئ الحاسبات
Main references (sources)	**[1] G. O. Regan, A brief History computing.** **[2] T. Edition, Computer Basics.** **[3] "Digital_Logic_And_Computer_Design.pdf."** **[4] B. J. Lameres, "Introduction to Logic Circuits & Logic Design with Verilog".** **[5] S. Scargall, Programming Persistent Memory.** **[6] J. Lambert, Microsoft Word 2019: Step by Step.** **[7] S. A. Jones, "The Word 2007 / 2010 Equation Editor Contents," pp. 1–11, 2013.** **[8] "A Concise User's Guide to".** **[9] "LINE OF MICROSOFT WINDOWS OPERATING SYSTEMS".**
Recommended books and references (scientific journals, reports...)	
Electronic Reference	**https://www.uoanbar.edu.iq/staff-page.php?ID=1142**

Course Description Form

1. Course Name:	
Computer 1	
2. Course Code:	
UOA142	
3. Semester / Year:	
Second Semester/2023-2024	
4. Description Preparation Date:	
1/2/2024	
5. Available Attendance Forms:	
Daily, at the time specified in the schedule, and at full time	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hr./ 3Unit	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Doreyed Muhammed Ahmed Al-Kerboly **Email: : doreyedm@uoanbar.edu.iq** **Name: MSc. Falah Amer Abdulazeez Alkubaisi** **Email: : falah.amer.azeez@uoanbar.edu.iq**	
8. Course Objectives	
Course Objectives	**This course aims to convey a general idea about:** **A course concerned with teaching the student the art of programming, basics of programming, taking into account some concepts of the C++ langu so that it becomes an introduction to the expansion of this language next year**
9. Teaching and Learning Strategies	
Strategy	**A- Cognitive objectives** **1 Learn how to solve problems using a calculator.** **2. Issue analysis.** **3. Practical examples** **B - The skills objectives of the course.** **The student participates in intellectual issues and finds solutions to these issues for use in the practical side of life** **C- Emotional and value goals** **C1- Critical Thinking (Question and Answer)** **C2- Organization skill** **C3- Interaction skill** **C4- Work skill** **D - Transferable general and qualifying skills (other skills related to employability and personal development).** **D1: The student participates in intellectual problems and finds the solution to these problems** **D2. Assignments in addition to questions during the lecture**

10.Course structure

Evaluation method	Teaching method	Name of unit/course or subject	Required learning outcomes	Hours	Week
Attendance and motivational questions	In-person lecture	Algorithms	algorithms to establish an introduction to understanding programmer thinking	2 Theoretical *2Practical*	1
Attendance and motivational questions	In-person lecture	Algorithm Description Method	How to describe algorithms	2 Theoretical *2Practical*	2
Attendance and motivational questions	In-person lecture	Flowcharts	Introduction to the flowchart	2 Theoretical *2Practical*	3
Attendance and motivational questions	In-person lecture	Program flowchart	Introduction to the program flowchart	2 Theoretical *2Practical*	4
Attendance and motivational questions	In-person lecture	Simple sequence maps, branching maps	Introduction to the types of flowcharts	2 Theoretical *2Practical*	5
Attendance and motivational questions	In-person lecture	Single loop maps, multi-loop maps	Introduction to the rest of the types of flowcharts	2 Theoretical *2Practical*	6
Attendance and	In-person lecture	Arrays	Arrays and how to represent	2 Theoretical *2Practical*	7

motivational questions			**them programmatically**		
		Holiday break		**2 Theoretical** ***2Practical***	**8**
Attendance and motivational questions	**In-person lecture**	**Two-dimensional arrays**	**Two-dimensional arrays and how to represent them programmatically**	**2 Theoretical** ***2Practical***	**9**
Grade			**First exam**	**2 Theoretical** ***2Practical***	**10**
Attendance and motivational questions	**In-person lecture**	**Introduction to C++**	**Understand the significance of this programming language and how to convert the algorithms we have learned into a C++ program**	**2 Theoretical** ***2Practical***	**11**
Attendance and motivational questions	**In-person lecture**	**Reading and printing in C++**	**Reading and printing in C++**	**2 Theoretical** ***2Practical***	**12**
Attendance and motivational	**In-person lecture**	**Variables and their declaration**	**Introduction to variables and the difference**	**2 Theoretical** ***2Practical***	**13**

questions			**between a variable from a mathematical perspective from a programming perspective**		
Attendance and motivational questions with grade	**In-person lecture**	**Arithmetic operations in the C++ language**	**Simple examples of arithmetic operations in the C++ language**	**2 Theoretical *2Practical***	**14**
Grade			**Second exam**	**2 Theoretical *2Practical***	**15**

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 any)	**1–** مبادئ الخوارزميات 2- تحليل المسائل باستخدام الحاسب
Main references (sources)	**[1] P. Language, Modern C ++ for Absolute Beginners.** **[2] J. Souli, "C ++ Language Tutorial," 2007.** **[3] S. Scargall, Programming Persistent Memory.** **[4] D. Rassokhin, "The C ++ programming language in cheminformatics and computational chemistry," J. Cheminform., pp. 1–16, 2020, doi: 10.1186/s13321-020-0415-y.** **[5] "**الدليل السريع **- c++.pdf."** **[6] Microsoft Excel 2019 Krok po kroku**
Recommended books and references (scientific journals, reports...)	
Electronic Reference	**https://www.uoanbar.edu.iq/staff-page.php?ID=1142**

Course Description Form

1. Course Name:	
Functional analysis 1	
2. Course Code:	
MAT404	
3. Semester / Year:	
first semester/2023-2024	
4. Description Preparation Date:	
12/11/2023	
5. Available Attendance Forms:	
Daily, at the time specified in the schedule, and at full time	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hr./ 3Unit	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Alaa Adnan Auad **Email: alaa.adnan.auad@uoanbar.edu.iq**	
8. Course Objectives	
Course Objectives	**The course aims to study the main topics:** **1-The student must be able to teach and learn Dali1** **2- The student will be familiar with the concept of metric and metaphorical spaces** **3- That the student understands the types of sequences and their comparison** **4- That the student understands the basic concepts related to Euclidean space** **5- That the student understands how to use proofs of theorems and link them concepts related to the topic**
9. Teaching and Learning Strategies	
Strategy	**A- Cognitive objectives** **1- Teaching the student how to think about solving engineering problems** **2- Analysis** **3- Conclusion** **4-The lecture** **5-Empowerment** **B - The skills objectives of the course.** **B1 - It makes students skilled by giving abbreviations to prove problems and solve them in a simple way** **B2 Gaining the ability to interact in society.** **B3 - Raising the student's ability to express his ideas through dialogue or writing and how to solve problems in artistic ways.** **C- Emotional and value goals** **C1- Thinking that explores the truth through (question and answer)** **C2- Managing societal problems by finding appropriate solutions to them through academic concepts** **C3- Spreading the spirit of interaction and attraction among students through**

	academic competition **C4- Urging students to employ what they have learned in public life** **D - General and qualifying transferable skills (other skills related to employability and personal development).** **D1--The student's response to the main goal of the course, which is to develop his four skills.** **D2- That the student understands and differentiates between various basic concepts, links them together, and benefits from them socially.** **D3- Enhancing the student's self-confidence by distinguishing the different topics that were dealt with in the course and choosing those that suit his personality and society.** **D4- The skill of self-development by giving him information that will benefit him in the academic future** **D5- It enables the student to use what he has learned to develop himself**

10. Course structure

Evaluation method	Teaching method	Name of unit/course or subject	Required learning outcomes	Hours	Week
an in-person lecture, and motivational questions.	Blackboard and data show	Teaching students the definitions of metric spaces	Understand the lecture topic	2 Theoretical + 2 practical	1
motivational questions	Blackboard and data show	Applications of metric spaces,	Understand the lecture topic	2 Theoretical + 2 practical	2
motivational questions	Blackboard and data show	Convergent sequences, metric space, theory of public debates	Understand the lecture topic	2 Theoretical + 2 practical	3
motivational questions	Blackboard and data show	Types of convergent sequences, metric space, theory of public discussions	Understand the lecture topic	2 Theoretical + 2 practical	4
motivational questions	Blackboard and data show	Perfect spaces, metric space, theory of public	Understand the lecture topic	2 Theoretical + 2 practical	5

		debates			
motivational questions	**Blackboard and data show**	**Applications to metric spaces**	**Understand the lecture topic**	**2 Theoretical + 2 practical**	**6**
motivational questions	**Blackboard and data show**	**Definitions of normed spaces**	**Understand the lecture topic**	**2 Theoretical + 2 practical**	**7**
motivational questions	**Blackboard and data show**	**Applications to normed spaces**	**Understand the lecture topic**	**2 Theoretical + 2 practical**	**8**
motivational questions	**Blackboard and data show**	**Banach spaces and their applications, normative space, theory of public discussions**	**Understand the lecture topic**	**2 Theoretical + 2 practical**	**9**
motivational questions	**Blackboard and data show**	**Finite dimensional spaces**	**Understand the lecture topic**	**2 Theoretical + 2 practical**	**10**
motivational questions	**Blackboard and data show**	**Compact spaces.**	**Understand the lecture topic**	**2 Theoretical + 2 practical**	**11**
motivational questions	**Blackboard and data show**	**Linear operators**	**Understand the lecture topic**	**2 Theoretical + 2 practical**	**12**
motivational questions.	**Blackboard and data show**	**Applications of linear operators**	**Understand the lecture topic**	**2 Theoretical + 2 practical**	**13**
motivational questions.	**Blackboard and data**	**Pre-final exam**	**Understand the lecture topic**	**2 Theoretical + 2 practical**	**14**

	show	metric space			
motivational questions with the grade	Blackboard and data show	Teaching students the method of discussions of metric spaces	Understand the lecture topic	2 Theoretical + 2 practical	15

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 any)	12- مدخل في التحليل الدالي وتطبيقاته
Main references (sources)	2-Introductory of functional analysis with Applications 3-Topics in functional analysis 4.Functional Analysis Problems with Solutions
Recommended books and references (scientific journals, reports...)	Functional analysis notes
Electronic References, Websites	https://www.uoanbar.edu.iq/staff-page.php?ID=1117

Course Description Form

1. Course Name:	
Functional analysis 2	
2. Course Code:	
MAT409	
3. Semester / Year:	
Second semester/2023-2024	
4. Description Preparation Date:	
1/2/2024	
5. Available Attendance Forms:	
Daily, at the time specified in the schedule, and at full time	
6. Number of Credit Hours (Total) / Number of Units (Total)	
44 hr./ 3Unit	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Alaa Adnan Auad Email: alaa.adnan.auad@uoanbar.edu.iq	
8. Course Objectives	
Course Objectives	The course aims to study the main topics: 1-The student must be able to teach and learn Dali1

	2- The student will be familiar with the concept of metric and metaphorical spaces **3- That the student understands the types of sequences and their comparison** **4- That the student understands the basic concepts related to Euclidean space** **5- That the student understands how to use proofs of theorems and link them concepts related to the topic**
9. Teaching and Learning Strategies	
Strategy	**Learning outcomes, teaching, learning and assessment methods** **. A- Cognitive objectives** **1-Teaching the student how to think about solving engineering** **2- Analysis** **3- Conclusion** **4-The lecture** **5-Empowerment** **B - The skills objectives of the course.** **B1 - Developing the skill in knowing the distribution of random variables and using them in the practical aspect** **B2 - Developing the skill of how to calculate the distribution of a function in terms of its random variables** **B3 - Developing the skill of employing the properties of random distributions for use in the practical aspect of life** **C- Emotional and value goals** **C1- Thinking that explores the truth through (question and answer)** **C2- Managing societal problems by finding appropriate solutions to them through academic concepts** **C3- Spreading the spirit of interaction and attraction among students through academic competition** **C4- Urging students to employ what they have learned in public life** **D - Transferable general and qualifying skills (other skills related to employability and personal development).** **D1-The skill of calculating number methods** **D2- The skill of calculating the probability of certain events** **D3- The skill of knowing the degree of correlation between variables** **D4- The skill of self-development by giving him information that will benefit him in the academic future** **D5- It enables the student to use what he has learned to develop himself**

10. Course structure

Evaluation method	Teaching method	Name of unit/course or subject	Required learning outcomes	Hours	Week
an in-person lecture, and motivational questions.	Blackboard and data show	Definitions of an inner product spaces	Understand the lecture topic	2 Theoretical + 2 practical	1
motivational questions	Blackboard and data show	Applications on an inner product space	Understand the lecture topic	2 Theoretical + 2 practical	2
motivational questions	Blackboard and data show	Exercises related to inside hitting	Understand the lecture topic	2 Theoretical + 2 practical	3
motivational questions	Blackboard and data show	Definitions of Hilbert spaces	Understand the lecture topic	2 Theoretical + 2 practical	4
motivational questions	Blackboard and data show	Applications to Hilbert spaces	Understand the lecture topic	2 Theoretical + 2 practical	5
motivational questions	Blackboard and data show	Monthly exam and discussions on previous topics	Understand the lecture topic	2 Theoretical + 2 practical	6
motivational questions	Blackboard and data show	Orthogonality in Hilbert spaces	Understand the lecture topic	2 Theoretical + 2 practical	7
motivational questions	Blackboard and data show	Parallelogram rule in Hilbert spaces	Understand the lecture topic	2 Theoretical + 2 practical	8
motivational questions	Blackboard and data show	Properties of orthogonality in Hilbert spaces	Understand the lecture topic	2 Theoretical + 2 practical	9

motivational questions	Blackboard and data show	Parallelogram rule in Hilbert spaces	Understand the lecture topic	2 Theoretical + 2 practical	10
motivational questions	Blackboard and data show	Some theorems of orthogonality in Hilbert space	Understand the lecture topic	2 Theoretical + 2 practical	11

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 any)	1- مدخل في التحليل الدالي وتطبيقاته
Main references (sources)	2-Introductory of functional analysis with Applications 3-Topics in functional analysis 4.Functional Analysis Problems with Solutions
Recommended books and references (scientific journals, reports...)	Functional analysis notes
Electronic References, Websites	https://www.uoanbar.edu.iq/staff-page.php?ID=1117

Course Description Form

1. Course Name:
General Topology -1
2. Course Code:
MAT402
3. Semester / Year:
first semester/2023-2024
4. Description Preparation Date:
12/11/2023
5. Available Attendance Forms:
Daily, at the time specified in the schedule, and at full time
6. Number of Credit Hours (Total) / Number of Units (Total)

64 hr./ 4Unit	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Alaa Mahmood Farhan **Email: eps.alaamahmood.farhan@uoanbar.edu.iq** **Name: Teaching assistant: Teba Rzaij Sabah** **Email: teba.r.sabah@uoanbar.edu.iq**	
8. Course Objectives	
Course Objectives	**1- Emphasizing the importance of the topic of topological spaces in relation to other sciences..** **2- For students to become familiar with the types of topological spaces** **3-Informing students about topological spaces, the axioms of separation, and compact spaces.** **4-To show students the most important applications of topological spaces**
9. Teaching and Learning Strategies	
Strategy	**Learning outcomes, teaching, learning and assessment methods** **. A- Cognitive objectives** **1- Extrapolation** **2- Analysis** **3- Conclusion** **4-The lecture** **5-Empowerment** **B - The skills objectives of the course.** **B1 - That the student understands what is meant by topological space** **B2 - The student should distinguish between types of topological spaces** **B3 - For the student to recognize the relationship between continuous functions and isomorphism** **B4 – For the student to become familiar with the types of separation axioms** **B5 - For the student to become familiar with the concept of compact spaces and interconnected spaces and their applications** **C- Emotional and value goals** **C1- Thinking that explores the truth through (question and answer)** **C2- Managing societal problems by finding appropriate solutions to them through academic concepts** **C3- Spreading the spirit of interaction and attraction among students through academic competition** **C4- Urging students to employ what they have learned in public life** **D - Transferable general and qualifying skills (other skills related to employability and personal development).** **D1- That the student can distinguish between different topological spaces** **D2- That the student can distinguish between continuous, open, and closed functions** **D3- That the student can distinguish between the axioms of separation and reach the relationships between these spaces** **D4- The student must have the necessary skill to solve problems using basic concepts** **D5- That the student is able to understand compact and interconnected spaces a their** connections to other spaces

10.Course structure

Evaluation method	Teaching method	Name of unit/course or subject	Required learning outcomes	Hours	Week
Exams and daily activities	Blackboard and data show	1-Definition (Examples) of a Topological Space. 2- Types (Examples) of Topological Spaces.	Understand the prescribed material correctly and know its applications	16	4
Exams and daily activities	Blackboard and data show	1- Definition of a closed subsets of a topological spaces - Examples – Intersection and union of a closed sets 2-Neighborhoods: Definition of a neighborhood - Definition of a neighborhood system – Examples- Properties neighborhood - Characterizations of open sets.	Understand the prescribed material correctly and know its applications	16	4
Exams and daily activities	Blackboard and data show	1-Closure of a Set: Definition – Examples - Properties of closure of a set.	Understand the prescribed material correctly and know its applications	16	4
Exams and daily activities	Blackboard and data show	1-Interior of a Set: Definition – Examples – Theorems.	Understand the prescribed material correctly and know its applications	16	4

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)	1- د. سمير بشير حديد (مقدمة في التبولوجيا العامة) مديرية دار الكتب للطباعة والنشرز 1988

	13- 2- وليام بيرفن ((أساسيات التبولوجيا العامة)). ترجمة الدكتور عطا الله ثامر. 1975.
Main references (sources)	**1- General topology, by: R. S. Aggarwal, A Text Book on Topology, 1996. 2- G. S. Guptt, S. S. Guptt, Topology, Tenth Edition, 2000**
Recommended books and references (scientific journals, reports...)	**1- General topology, by: J.L., Kelley's. 2-General topology, by: Bourbaki's. 3-Willard's. W., General Topology–Addison Wesley, eading , mass , (1970) .**
Electronic References, Websites	**https://www.uoanbar.edu.iq/staff-page.php?ID=1118**

Course Description Form

1. Course Name:	
General Topology -2	
2. Course Code:	
MAT407	
3. Semester / Year:	
first semester/2023-2024	
4. Description Preparation Date:	
12/11/2023	
5. Available Attendance Forms:	
Daily, at the time specified in the schedule, and at full time	
6. Number of Credit Hours (Total) / Number of Units (Total)	
64 hr./ 4Unit	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Alaa Mahmood Farhan Email: eps.alaamahmood.farhan@uoanbar.edu.iq Name: Teaching assistant: Teba Rzaij Sabah Email: teba.r.sabah@uoanbar.edu.iq	
8. Course Objectives	
Course Objectiv	**1- Emphasizing the importance of the topic of topological spaces in relation to other sciences.. 2- For students to become familiar with the types of topological spaces 3-Informing students about topological spaces, the axioms of separation, and compact spaces. 4-To show students the most important applications of topological spaces**
9. Teaching and Learning Strategies	
	Learning outcomes, teaching, learning and assessment methods . A- Cognitive objectives 1- Extrapolation 2- Analysis 3- Conclusion 4-The lecture

Strategy	**5-Empowerment** **B - The skills objectives of the course.** **B1 - That the student understands what is meant by topological space** **B2 - The student should distinguish between types of topological spaces** **B3 - For the student to recognize the relationship between continuous functions and isomorphism** **B4 – For the student to become familiar with the types of separation axioms** **B5 - For the student to become familiar with the concept of compact spaces and interconnected spaces and their applications** **C- Emotional and value goals** **C1- Thinking that explores the truth through (question and answer)** **C2- Managing societal problems by finding appropriate solutions to them through academic concepts** **C3- Spreading the spirit of interaction and attraction among students through academic competition** **C4- Urging students to employ what they have learned in public life** **D - Transferable general and qualifying skills (other skills related to employability and personal development).** **D1- That the student can distinguish between different topological spaces** **D2- That the student can distinguish between continuous, open, and closed functions** **D3- That the student can distinguish between the axioms of separation and reach the relationships between these spaces** **D4- The student must have the necessary skill to solve problems using basic concepts** **D5- That the student is able to understand compact and interconnected spaces a their connections to other spaces**

10.Course structure

Evaluation method	Teaching method	Name of unit/course or subject	Required learning outcomes	Hours	Week
Exams and daily activities	**Blackboard and data show**	**1-Definition (Examples) of a Topological Space. 2- Types (Examples) of Topological Spaces.**	**Successfully completing the application period and benefiting from this period and applying the largest number of information that the student acquired during the study period**	**16**	**4**
		1- Open and Closed mappings: Examples- Results on open & closed mappings.		**16**	**4**

Exams and daily activities	**Blackboard and data show**	**2- omeomorphisms: Examples- Results 3- omeomorphisms Topological and Hereditary Property: Definition – Examples – Theorems.**	**Understand the prescribed material correctly and know its applications**		
Exams and daily activities	**Blackboard and data show**	**1- Separation Axioms: T_0- Property, T_1 - Property and T_2 – Property: Definitions – Examples – and study relationships between them. 2-Regular Space and T_3 - Property and Normal Space and T_4- Property: Definitions – Examples – and study relationships between them.**	**Understand the prescribed material correctly and know its applications**	**16**	**4**
Exams and daily activities	**Blackboard and data show**	**1- Compact Spaces: Definitions of a cover of a set – Open cover – Finite cover – Subcover with examples. 2-Definition of a compact space – Examples - Properties of compactness. 3-Connected Spaces: Separated sets – Properties of separated sets – Connected spaces- Definitions, examples and properties about connected spaces. 4-Theorems and properties about connected spaces.**	**Understand the prescribed material correctly and know its applications**	**16**	**4**

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, any)	**1- د. سمير بشير حديد (مقدمة في التبولوجيا العامة) مديرية دار الكتب للطباعة والنشرز 1988** 14- **2- وليام بيرفن ((أساسيات التبولوجيا العامة)). ترجمة الدكتور عطا الله ثامر. 1975.**
Main references (sources)	**1- General topology, by: R. S. Aggarwal, A Text Book on Topology, 1996. 2- G. S. Guptt, S. S. Guptt, Topology, Tenth Edition, 2000**
Recommended books and references (scientific journals, reports...)	**1- General topology, by: J.L., Kelley's. 2-General topology, by: Bourbaki's. 3-Willard's. W., General Topology–Addison Wesley,**

	eading , mass , (1970) .
Electronic References, Websites	**https://www.uoanbar.edu.iq/staff-page.php?ID=1118**

Course Description Form

13.Course Name:
Numerical analysis 1
14.Course Code:
MAT305
15. Semester / Year:
first semester/2023-2024
16. Description Preparation Date:
12/11/2023
17. Available Attendance Forms:
Daily, at the time specified in the schedule, and at full time
18. Number of Credit Hours (Total) / Number of Units (Total)
60 hr./ 3Unit
19. Course administrator's name (mention all, if more than one name)
Name: Dr. Mohammed Yousif Turki **Email: moh9883@uoanbar.edu.iq**
20.Course Objectives

Course Objectives	**This course aims to convey a general idea about:** **• The need of most researchers in various branches of knowledge, especially those who deal with approximate measurements and calculations in their research.** **• The importance of approximation is extremely important, as many topics depend on it, such as various statistics on population numbers. Temperatures and humidity levels** **Devise approximate means and methods for addressing solutions to a numl of problems**
21.Teaching and Learning Strategies	
Strategy	**Learning outcomes, teaching, learning and assessment methods** **. A- Cognitive objectives** **1-The student will gain a simple overview of errors in numerical calculations and how they accumulate.** **2-The student acquires the concept of a numerical solution when arriving at the exact solution is more or less difficult** **Sometimes impossible.** **3-The student obtains experience in dealing with numerical methods and common algorithms and analyzing them** **4-Giving the student experience in dealing with solutions of nonlinear equations and linear systems, as well as inclusion and interpolation**

10-Course structure

Evaluation method	Teaching method	Name of the unit/course or subject	Required learning outcomes	Hours	The Week
General questions and discussion	Theoretical + practical	Elementary numerical analysis	0The concept of Numerical analysis	2theoretical + 2 practical	the first
General questions and discussion	Theoretical + practical	The numerical error types	Absalute error, Relative errors + operation of error	2theoretical + 2 practical	the second
General questions and discussion	Theoretical + practical	Numerical solution of Nonlinear equation	Half interval method	2theoretical + 2 practical	the third
General questions and discussion	Theoretical + practical	Numerical solution of Nonlinear equation	False position method	2theoretical + 2 practical	the fourth
General questions and discussion	Theoretical + practical	Numerical solution of Nonlinear equation	secant mrthod	2theoretical + 2 practical	Fifth
General questions and discussion	Theoretical + practical	Numerical solution of Nonlinear equation	Newton_raphson method	2theoretical + 2 practical	Seventh
General questions and discussion	Theoretical + practical	Numerical solution of Nonlinear equation	Fixed point method	2theoretical + 2 practical	eighth
			Test first		Ninth
General questions and discussion	Theoretical + practical	Numerical Solution of System of Linear equations	The concept of system linear equation	2theoretical + 2 practical	The tenth
General questions and discussion	Theoretical + practical	Numerical Solution of System of Linear equations	Gaussian Elimination method	2theoretical + 2 practical	eleventh
General questions and discussion	Theoretical + practical	Numerical Solution of System of Linear equations	Gauss-Jordan Reduced Method	2theoretical + 2 practical	twelveth
General questions and discussion	Theoretical + practical	Numerical Solution of System of Linear equations	Jacobi Method	2theoretical + 2 practical	Thirteenth
General questions and discussion	Theoretical + practical	Numerical Solution of System of Linear equations	Gauss-Seidel Method	2theoretical + 2 practical	fourteenth
General questions and discussion	Theoretical + practical	Numerical Solution of System of Linear equations	Eigenvalue : The Power Method	2theoretical + 2 practical	Fifteenth
	Theoretical + practical		Second test		sixteen

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	
11.Learning and Teaching Resources	
Required textbooks (curricular books any)	Introduction to numerical analysis S . Baskar 2010 Introduction To Numerical Analysis Froberg C. E 1969
Main references (sources)	Follow up on electronic references and the Internet
Recommended books and references (scientific journals, reports...)	• Discreet websites- • Virtual library- -Library locations in some international universities
Electronic References, Websites	https://www.uoanbar.edu.iq/staff-page.php?ID=1105

Course Description Form

1. Course Name:	
Numerical analysis 2	
2. Course Code:	
MAT315	
3. Semester / Year:	
second semester/2023-2024	
4. Description Preparation Date:	
17/3/2024	
5. Available Attendance Forms:	
Daily, at the time specified in the schedule, and at full time	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hr./ 3Unit	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Mohammed Yousif Turki Email: moh9883@uoanbar.edu.iq	
8. Course Objectives	
Course Objectives	This course aims to convey a general idea about: • The need of most researchers in various branches of knowledge, especially those who deal with approximate measurements and calculations in their research. • The importance of approximation is extremely important, as many topics depend on it, such as various statistics on population numbers. Temperatures and humidity levels Devise approximate means and methods for addressing solutions to a numl of problems
9. Teaching and Learning Strategies	
Strategy	Learning outcomes, teaching, learning and assessment methods . A- Cognitive objectives 1-The student will gain a simple overview of errors in numerical calculations and how they accumulate.

	2-The student acquires the concept of a numerical solution when arriving at the exact solution is more or less difficult **Sometimes impossible.** **3-The student obtains experience in dealing with numerical methods and common algorithms and analyzing them** **4-Giving the student experience in dealing with solutions of nonlinear equations and linear systems, as well as inclusion and interpolation**

10-Course structure

Evaluation method	Teaching method	Name of the unit/course or subject	Required learning outcomes	Hours	The Week
General questions and discussion	Theoretical + practical	Interpolation and Polynomial Approximation	Concept of interpolation and approximation	2 theoretical + 2 practical	the first
General questions and discussion	Theoretical + practical	Interpolation method	Interpolation and the Lagrange polynomial	2 theoretical + 2 practical	the second
General questions and discussion	Theoretical + practical	Interpolation method	Divided Difference	2 theoretical + 2 practical	the third
General questions and discussion	Theoretical + practical	Interpolation method	Newton Forward divided difference	2 theoretical + 2 practical	the fourth
General questions and discussion	Theoretical + practical	Interpolation method	Newton Backward divided difference	2 theoretical + 2 practical	Fifth
General questions and discussion	Theoretical + practical	Interpolation method	Center divided difference	2 theoretical + 2 practical	Seventh
General questions and discussion	Theoretical + practical	Approximation with least square method	Simple linear relation Quadrature relation	2 theoretical + 2 practical	eighth
General questions and discussion	Theoretical + practical	Approximation with least square method	Multi linear relation	2 theoretical + 2 practical	Ninth
			First test		The tenth

General questions and discussion	Theoretical + practical	Numerical Differentiation Methods	Methods based on finite difference operators	2 theoretical + 2 practical	eleventh
General questions and discussion	Theoretical + practical	Numerical Differentiation Methods	Methods based on Interpolation, undetermined coefficients	2 theoretical + 2 practical	twelveth
General questions and discussion	Theoretical + practical	Numerical integral Methods	Rectangular method Trapezoidal method	2 theoretical + 2 practical	Thirteenth
General questions and discussion	Theoretical + practical	Numerical integral Methods	Simpson rule	2 theoretical + 2 practical	fourteenth
General questions and discussion	Theoretical + practical	Numerical integral Methods	Gaussian rule	2 theoretical + 2 practical	Fifteenth
			Second test		sixteen

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 any)	Introduction to numerical analysis S . Baskar 2010 Introduction To Numerical Analysis Froberg C. E 1969

Course Description Form

22. Course Name:
Computer Advanced 1
23. Course Code:
MAT220
24. Semester / Year:
First Semester/2023-2024
25. Description Preparation Date:
12/11/2023
26. Available Attendance Forms:
Daily, at the time specified in the schedule, and at full time
27. Number of Credit Hours (Total) / Number of Units (Total)
60 hr./ 4Unit
28. Course administrator's name (mention all, if more than one name)

Name: Abdul Sttar Ismail Wdaa
Email: : sttarwdaa2019@uoanbar.edu.iq

29. Course Objectives	
Course Objectives	**This course aims to convey a general idea about:** **Teach the student A course concerned with teaching the student the art programming using a languageC++ in addition to MATLAB**
30. Teaching and Learning Strategies	
Strategy	**1- Cognitive objectives** **1. Identify on How Dealing with Matrices** **2. Processes different on Matrices.** **3. Solution Functions** **B - Objectives Marathi Private By decision.** **sharing requester With issues Intellectual with finding the solution For this matters from Include it Derived And integration .** **C- Emotional and value goals** **C1 - Critical Thinking (Question and Answer)** **C2- Organization skill** **C3- Interaction skill** **C4- Work skill** **D - Transferable general and qualifying skills (other skills related to employability and personal development).** **D1- The student participates in intellectual problems and finds the solution to thes problems** **D2. Assignments in addition to questions during the lecture**

31. Course structure

Evaluation method	Teaching method	Name of unit/course or subject	Required learning outcomes	Hours	Week
Attendance and motivational questions	In-person lecture	C++	Arrays	2 Theoretical	1
Attendance and motivational questions	In-person lecture	C++	One dimensional array	2 applying	2
Attendance and motivational questions	In-person lecture	C++	Two dimensional array	2 Theoretical	3
Attendance and motivational questions	In-person lecture	C++	operations of array	2 applying	4
Attendance and motivational questions	In-person lecture	C++	Special matrix	2 Theoretical	5
Attendance and motivational questions	In-person lecture	C++	Function	2 applying	6
Attendance and motivational questions	In-person lecture	C++	Standard function	2 Theoretical	7
Grade	In-person lecture	C++	User defined function	2 applying	8
Attendance and motivational questions	In-person lecture	C++	matlab	2 Theoretical	9
Attendance	In-person	C++	Introduction	2 applying	10

and motivational questions	lecture				
Attendance and motivational questions	In-person lecture	C++	Fundamental definition	2 Theoretical	11
Attendance and motivational questions	In-person lecture	C++	Standard function	2 applying	12
Attendance and motivational questions	In-person lecture	C++	One dimension	2 Theoretical	13
Grade		C++	Two dimension	2 applying	14
Grade		C++	One dimension	2 Theoretical	15

32. 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	
33. Learning and Teaching Resources	
Required textbooks (curricular books, any)	➢ **Programming skills usingC++** ➢ **Learn a languagec++ for beginners** ➢ **Fundamental of c++**
Main references (sources)	**[1] G. O. Regan, A brief History computing.** **[2] T. Edition, Computer Basics.** **[3] "Digital_Logic_And_Computer_Design.pdf."** **[4] B. J. Lameres, "Introduction to Logic Circuits & Logic Design with Verilog".** **[5] S. Scargall, Programming Persistent Memory.** **[6] J. Lambert, Microsoft Word 2019: Step by Step.** **[7] S. A. Jones, "The Word 2007 / 2010 Equation Editor Contents," pp. 1–11, 2013.** **[8] "A Concise User's Guide to".** **[9] "LINE OF MICROSOFT WINDOWS OPERATING SYSTEMS".**
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	**https://www.uoanbar.edu.iq/staff-page.php?ID=1128**

Course Description Form

13. Course Name:	
Computer Advanced 1	
14. Course Code:	
UOA220	
15. Semester / Year:	
Second Semester/2023-2024	
16. Description Preparation Date:	
1/2/2024	
17. Available Attendance Forms:	
Daily, at the time specified in the schedule, and at full time	
18. Number of Credit Hours (Total) / Number of Units (Total)	
60 hr./ 3Unit	
19. Course administrator's name (mention all, if more than one name)	
Name: Abdul Sttar Ismail Wdaa **Email: : sttarwdaa2019@uoanbar.edu.iq**	
20. Course Objectives	
Course Objectives	**This course aims to convey a general idea about:** **Teach the student A course concerned with teaching the student the art programming using a languageC++ in addition to MATLAB**
21. Teaching and Learning Strategies	
Strategy	**A- Cognitive objectives** **1 Identify on How Dealing with Matrices** **2. Processes different on Matrices.** **3. Solution Functions** **B - Objectives Marathi Private By decision.** **sharing requester With issues Intellectual with finding the solution For this matters from Include it Derived And integration .** **C- Emotional and value goals** **C1- Critical Thinking (Question and Answer)** **C2- Organization skill** **C3- Interaction skill** **C4- Work skill** **D - Transferable general and qualifying skills (other skills related to employability and personal development).** **D1: The student participates in intellectual problems and finds the solution to these problems** **D2. Assignments in addition to questions during the lecture**

22. Course structure

Evaluation method	Teaching method	Name of unit/course or subject	Required learning outcomes	Hours	Week
Attendance and motivational questions	In-person lecture	C++	Function	2 Theoretical	1
Attendance and motivational questions	In-person lecture	C++	Standard function	2 applying	2
Attendance and motivational questions	In-person lecture	C++	User defined function	2 Theoretical	3
Attendance and motivational questions	In-person lecture	C++	matlab	2 applying	4
Attendance and motivational questions	In-person lecture	C++	Introduction	2 Theoretical	5
Attendance and motivational questions	In-person lecture	C++	Fundamental definition	2 applying	6
Attendance and motivational questions	In-person lecture	C++	Standard function	2 Theoretical	7
		C++	User defined function	2 applying	8
Attendance and motivational questions	In-person lecture	C++	matlab	2 Theoretical	9
Grade		C++	Introduction	2 applying	10

Attendance and motivational questions	**In-person lecture**	**C++**	**Fundamental definition**	**2 Theoretical**	**11**
Attendance and motivational questions	**In-person lecture**	**C++**	**Standard function**	**2 applying**	**12**
Attendance and motivational questions	**In-person lecture**	**C++**	**One dimension**	**2 Theoretical**	**13**
Attendance and motivational questions with grade	**In-person lecture**	**C++**	**Two dimension**	**2 applying**	**14**
Grade			**One dimension**	**2 Theoretical**	**15**

23. 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

24. Learning and Teaching Resources

Required textbooks (curricular books, any)	**1- Programming skills usingC++** **2- Learn a languagec++ for beginners** **3- Fundamental of c++** **4- Matlab**
Main references (sources)	**[1] P. Language, Modern C ++ for Absolute Beginners.** **[2] J. Souli, "C ++ Language Tutorial," 2007.** **[3] S. Scargall, Programming Persistent Memory.** **[4] D. Rassokhin, "The C ++ programming language in cheminformatics and computational chemistry," J. Cheminform., pp. 1–16, 2020, doi: 10.1186/s13321-020-0415-.** **[5] "الدليل السريع - c++.pdf."**

	[6] matlab 2019 Krok po kroku
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	**https://www.uoanbar.edu.iq/staff-page.php?ID=1128**

Course Description Form

34. Course Name:
Ordinary Differential Equations/1
35. Course Code:
MAT202
36. Semester / Year:
first semester/2023-2024
37. Description Preparation Date:
12/11/2023
38. Available Attendance Forms:
Daily, at the time specified in the schedule, and at full time
39. Number of Credit Hours (Total) / Number of Units (Total)
60 hr./ 3Unit
40. Course administrator's name (mention all, if more than one name)
Name: Asst. Prof. Dr. Osama Yousif Mohammed **Email: ibrsul_2019@uoanbar.edu.iq** **Name: Assistant teacher. Montaser ismael adwan** **Email: Montaser.ismael@uoanbar.edu.iq**
41. Course Objectives

Course Objectives	**This course aims to convey a general idea about:** **Introducing the student to what a differential equation is and how to form arise, as well as the types of differential equations, types of solutions and th practical applications.**

42. Teaching and Learning Strategies	
Strategy	**Learning outcomes, teaching, learning and assessment methods** **. A- Cognitive objectives** **1- Extrapolation** **2- Analysis** **3- Conclusion** **4-The lecture** **5-Empowerment** **B - The skills objectives of the course.** **B1 - Developing the skill in knowing the ordinary differential equation** **B2 - Developing the skill of how to calculate the particular and general solutions of ODEs.** **B3 - Developing the skill of employing the properties of ODEs.** **C- Emotional and value goals** **C1- Thinking that explores the truth through (question and answer)** **C2- Managing societal problems by finding appropriate solutions to them**

	through academic concepts **C3- Spreading the spirit of interaction and attraction among students through academic competition** **C4- Urging students to employ what they have learned in public life** **D - Transferable general and qualifying skills (other skills related to employability and personal development).** **D1-The skill of calculating number methods** **D2- The skill of calculating the particular and general solutions of ODEs** **D3- The skill of knowing the degree and order of ODEs** **D4- The skill of self-development by giving him information that will benefit him in the academic future** **D5- It enables the student to use what he has learned to develop himself**
43. 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	
44. Learning and Teaching Resources	
Required textbooks (curricular books any)	**Methods to solve differential equations/ Khalid Ahmed Alsameraai.**
Main references (sources)	▪ **Differential Equations , Frank Ayres JR, McGRAW-Hill book company 1952.** ▪ **ODEs Lecture Notes, Erich Miersemann, Dep. Of Math, Leipzig University,version Oct. 2012.** **ODEs lecture notes, B.Neta, Department of Mathematics, Naval Postgraduate School, Monterey, California 93943, October 10, 2002.**
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	**https://www.uoanbar.edu.iq/staff-page.php?ID=1131**

Course Description Form

25. Course Name:
Ordinary differential equations/2
26. Course Code:
MAT-207
27. Semester / Year:
Second semester/2023-2024
28. Description Preparation Date:
1/2/2024
29. Available Attendance Forms:
Daily, at the time specified in the schedule, and at full time
30. Number of Credit Hours (Total) / Number of Units (Total)

60 hr./ 3Unit
31. Course administrator's name (mention all, if more than one name)
Name: Asst. Prof. Dr. Osama Yousif Mohammed **Email: ibrsul_2019@uoanbar.edu.iq** **Name: Assistant teacher. Montaser ismael adwan** **Email: Montaser.ismael@uoanbar.edu.iq**
32. Course Objectives

Course Objectives	**Introducing the student to higher-order differential equations and presenting multiple methods for solving them for different functions, as well as introducing the student to the Laplace transform**

33. Teaching and Learning Strategies	
Strategy	**Learning outcomes, teaching, learning and assessment methods** **. A- Cognitive objectives** **1- Extrapolation** **2- Analysis** **3- Conclusion** **4-The lecture** **5-Empowerment** **B - The skills objectives of the course.** **B1 - Developing the skill in knowing the Solving higher-order differential equations and finding their complementary solution and their own solution** **B2 - Developing the skill of how to calculate Laplace transforms for different functions such as the constant, exponential, trigonometric, and other functions.** **B3 - Developing the skill of employing the method of unknown coefficients for different functions, such as a constant, polynomial, exponential, or triangular function, as well as using the method of changing parameters, changing the median, and the differential operator for the same functions** **C- Emotional and value goals** **C1- Thinking that explores the truth through (question and answer)** **C2- Managing societal problems by finding appropriate solutions to them through academic concepts** **C3- Spreading the spirit of interaction and attraction among students through academic competition** **C4- Urging students to employ what they have learned in public life** **D - Transferable general and qualifying skills (other skills related to employability and personal development).** **D1-The skill of calculating particular and complementary solution** **D2- The skill of calculating the general solution** **D3- The skill of knowing the degree of correlation between depended and un depended variables.** **D4- The skill of self-development by giving him information that will benefit him in the academic future** **D5- It enables the student to use what he has learned to develop himself**

34. Course structure

Evaluation method	Teaching method	Name of unit/course or subject	Required learning outcomes	Hours	Week
an in-person lecture, and motivational questions.	Blackboard and data show	ODEs of order n and solutions	Understand the lecture topic	2 Theoretical + 2 practical	1
motivational questions	Blackboard and data show	Complementary , particular and general solutions	Understand the lecture topic	2 Theoretical + 2 practical	2
motivational questions	Blackboard and data show	Different forms of Complementary soultions depends on types of roots.	Understand the lecture topic	2 Theoretical + 2 practical	3
motivational questions	Blackboard and data show	Undetermined coefficient method.	Understand the lecture topic	2 Theoretical + 2 practical	4
motivational questions	Blackboard and data show	Variation constant method Differential operator method (case A,B)	Understand the lecture topic	2 Theoretical + 2 practical	5
motivational questions	Blackboard and data show	Differential operator method (case C,D,E)	Understand the lecture topic	2 Theoretical + 2 practical	6
motivational questions	Blackboard and data show	ODEs of order n with variables coefficients	Understand the lecture topic	2 Theoretical + 2 practical	7
motivational questions	Blackboard and data show	Test I	General Review& test 1.	2 Theoretical + 2 practical	8

motivational questions	Blackboard and data show	Laplace Transformations	Understand the lecture topic	2 Theoretical + 2 practical	9
motivational questions	Blackboard and data show	Inverse of Laplace Transformations	Understand the lecture topic	2 Theoretical + 2 practical	10
motivational questions	Blackboard and data show	Use of Laplace Transformations to solve ODEs	Understand the lecture topic	2 Theoretical + 2 practical	11
motivational questions	Blackboard and data show	Solve of ODEs by power series.	Understand the lecture topic	2 Theoretical + 2 practical	12
motivational questions.	Blackboard and data show	Solve of ODEs by Maclaurin series.	Understand the lecture topic	2 Theoretical + 2 practical	13
motivational questions.	Blackboard and data show	Applications	Understand the lecture topic	2 Theoretical + 2 practical	14
motivational questions with the grade	Blackboard and data show	Test II.	General Review and Test II.	2 Theoretical + 2 practical	15

35. 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

36. Learning and Teaching Resources

Required textbooks (curricular books, any)	**Methods to solve differential equations/ Khalid Ahmed Alsameraai.**
Main references (sources)	▪ **Differential Equations , Frank Ayres JR, McGRAW-Hill book company 1952.** ▪ **ODEs Lecture Notes, Erich Miersemann, Dep. Of Math, Leipzig University,version Oct. 2012.** **ODEs lecture notes, B.Neta, Department of Mathematics, Naval Postgraduate School, Monterey, California 93943, October 10, 2002.**

Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	**https://www.uoanbar.edu.iq/staff-page.php?ID=1131**

Course Description Form

45.Course Name:	
Measurement and evaluation	
46.Course Code:	
47.Semester / Year:	
First semester/2023-2024	
48.Description Preparation Date:	
10-9-2023	
49.Available Attendance Forms:	
Daily, at the time specified in the schedule, and at full time	
50.Number of Credit Hours (Total) / Number of Units (Total)	
30 hr./ 2Unit	
51.Course administrator's name (mention all, if more than one name)	
Name: assistant lecturer. Elaf Ghnee Khaleel **Email: elafghneekhaleel@uoanbar.edu.iq**	
52.Course Objectives	
Course Objectives	**A. terminology in measurement and evaluation and their role in the . educational process** **B. competencies and how Introducing the student teacher to educational and psychomotor goals and set questions Testing ,affective ,to set cognitive . interpreting its results and using it as feedback ,Standardized testing** **C. Training them through flipped learning on the skill of analyzing wledge and evaluating contentmathematical kno.** **D. . they are trained to use teaching skills ,Through flipped learning** **E. Distinguishing between different types of evaluation and their .relationship to measurement and testing** **F. Explaining the role of the teacher in the evaluation process in objective/essay ,achievement tests and their various types/ ,performance indicating the methods of constructing them and diagnosing the most ,their application important weaknesses and strengths in them through along with explaining the most important ways to address them and improve .their use** **G. Introducing students to the most important steps in formulating test while specifying the most important ,items according to their instructions a for selecting them by constructing a table of specifications that criteri balances behavioral objectives and academic content to achieve the required good test validity by conducting various exploratory experiments to reach**

	.the approved basic experiment ,Introducing students to the most important specifications of a good test as well as to the second ,including its types and how to apply it ,and how to conduct ,which is reliability of its various types ,characteristic ication of statistical methodsapply and achieve it through the appl.
53. Teaching and Learning Strategies	
Strategy	**A. :Cognitive objectives** **1. The student should remember the information and laws . given in the course** **2. That the student understands the course topics and .related issues** **3. The student should be able to apply what he has learned to solve mathematical problems.** **4. The student should be able to analyze the text of the question and arrange the information to benefit from it .in the solution and obtain correct results** **5. hould create problems related to the The student s course topics and then arrive at a correct solution.** **6. The student must have ideas about the course material .and know how to devise appropriate laws to solve it**
	B. :Skills objectives for the course **1. demonstrate vocabulary related to The student must .the course** **2. The student should use the appropriate laws to solve .each problem** **3. The student must be proficient in linking topics that can .be linked within the course vocabulary** **4. ation to Linking the concepts of measurement and evalu our daily lives through the types of achievement tests ,and methods of constructing and applying them .especially in our educational institutions** **5. The student should distinguish between using different .est itemsstatistical methods to calculate achievement t** **.Teaching and learning methods** **1. .Lecture style** **2. .Use brainstorming** **3. and guided discovery method.** **4. .Discussion and dialogue style** **5. Video lectures on the teacher's YouTube channel included in electronic classes(Google Classroom)** **Evaluation methods**

	1. . Only daily and monthly attendance tests 2. Assigning the student to academic tasks for which he . will be rewarded 3. Assigning the student to make reports on mathematics . topics 4. is duties and Assigning the student to analys determining the types of objectives used in teaching in the future and in the student's life process (Teacher
	C. : based goals -Emotional and value 1. The student should show interest in the explanation the through the video teacher provides of the subject . uploaded to YouTube 2. The student must have sufficient conviction about the . importance of the material he is receiving 3. That the student is able to organize his data to benefit from the measurement subject in the rest of the . ubjectsscientific s 4. That the student is able to organize his data to benefit from the measurement subject in his practical life while . working in education or any other field 5. Developing the student's productive inclination towards . methods mathematics and its teaching : Teaching and learning methods 1. . Use methods appropriate to the topic 2. . Education using modern electronic means 3. . Use effective education 4. Using flipped learning to strengthen the student teacher . himself 5. . Use of blended learning 6. Learning by making the student a teacher to enhance . confidence-his self 7. .Learning through brainstorming among students Evaluation methods 1. The method of discussion and dialogue between the . student and the teacher 2. . style 3. .Exams 4. . Evaluation in collaborative teams among students 5. Measuring different capabilities
	D. other skills related to)General and qualifying transferable skills (employability and personal development

	1. . Using the acquired information in the field of life 2. Personal development through linking traditional .learning-education and e 3. Building the personality of a competent mathematics teacher who can transfer his experiences to students in .the future 4. Preparing the student scientifically and educationally . ing to solid scientific foundationsaccord 5. solving skills -Develops student flexibility in problem and classroom situations

54. Course structure

Evaluation method	Teaching method	Name of unit/course or subject	Required learning outcomes	Hours	Week
+Exam activity	Blackboard and data show	The importance of talking about measurement and evaluation	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	1
+Exam activity	Blackboard and data show	What do we ?measure	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	2
+Exam activity	Blackboard and data show	Features	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	3
+Exam activity	Blackboard and data	Multiple traits or abilities	Understand the subject matter	2 Theoretical	4

		show		correctly and know its applications in other sciences		
	+Exam activity	Blackboard and data show	the scale	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	5
	+Exam activity	Blackboard and data show	the test	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	6
	+Exam activity	Blackboard and data show	Measurement levels	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	7
	+Exam activity	Blackboard and data show	Calendar	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	8
	+Exam activity	Blackboard and data show	Evaluation	Understand the subject matter correctly and know its	2 Theoretical	9

				applications in other sciences		
	+Exam activity	Blackboard and data show	Types of calendar	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	10
	+Exam activity	Blackboard and data show	Variables	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	11
	+Exam activity	Blackboard and data show	Types of variables	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	12
	+Exam activity	Blackboard and data show	The role of evaluation in improving the educational process	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	13
	+Exam activity	Blackboard and data show	Achievement test	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	14

	+Exam activity	Blackboard and data show	Statistical analysis of test items	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	15

56. Course Evaluation	
such as daily ,the tasks assigned to the student Distribution of the grade according to etc ,reports ,written exams ,monthly ,oral ,daily ,preparation.	
57. Learning and Teaching Resources	
Required textbooks (curricular books any)	prepared by the assistant Lectures (Elaf Ghnee Khaleel Al-Mashhadani)
Main references (sources)	Measurement and :1882 ,Ahmed Suleiman ,Odeh Evaluation in the Teaching Process, .Amal -Dar Al ,Irbid Evaluation and ,1881 ,Mustafa and others ,Imam . Hekma Press-Dar Al ,Baghdad ,Measurement Fundamentals of ,2334Musa ,Nabhan-Al Amman ,Measurement in Behavioral Sciences, .Shorouk-Dar Al
Recommended books and references (scientific journals, reports...)	All sources related to the topic are in libraries and electroni the circumstances depending on ,libraries
Electronic References, Websites	Measurement and evaluation in psychology https://www.noor-book.com Saleh)and psychological measurement and evaluation (Lam .Din Mahmoud A-al 9870 :Product codeb Skn https://ketabpedia.com Amin -Mohamed Al)measurement and evaluation (Khatib-Mustafa Al https://arabpsychology.com/kb/

Course Description Form

1. Course Name:
Foundations of education
2. Course Code:
3. Semester / Year:
First semester/2023-2024
4. Description Preparation Date:
10-9-2023
5. Available Attendance Forms:
Daily, at the time specified in the schedule, and at full time
6. Number of Credit Hours (Total) / Number of Units (Total)
30 hr./ 2Unit
7. Course administrator's name (mention all, if more than one name)
Name: assistant lecturer. Elaf Ghnee Khaleel **Email: elafghneekhaleel@uoanbar.edu.iq**
8. Course Objectives

Course Objectives	**A. The student should know the principles of generaleducation** **B. .That the student is able to know the foundations of education** **C. For the student to be able to know the schools of education .throughout the ages** **D. D.That the student is able to apply the principles of education he has .learned**
9. Teaching and Learning Strategies	
Strategy	**A. :Cognitive objectives** **1. The student should remember the information and laws . given in the course** **2. course topics and That the student understands the .related issues** **3. The student should be able to apply what he has learned to solve mathematical problems.** **4. The student should be able to analyze the text of the question and arrange the information to benefit from it .ain correct resultsin the solution and obt** **5. The student should create problems related to the course topics and then arrive at a correct solution.** **6. The student must have ideas about the course material .and know how to devise appropriate laws to solve it**
	B. :the course Skills objectives for **1. The student must demonstrate vocabulary related to .the course** **2. The student should use the appropriate laws to solve**

	.each problem 3. The student must be proficient in linking topics that can .be linked within the course vocabulary 4. epts of measurement and evaluation to Linking the conc our daily lives through the types of achievement tests ,and methods of constructing and applying them .especially in our educational institutions 5. The student should distinguish between using different .ds to calculate achievement test itemsstatistical metho .Teaching and learning methods 1. .Lecture style 2. .Use brainstorming 3. and guided discovery method. 4. .Discussion and dialogue style 5. Video lectures on the teacher's YouTube channel included in electronic classes(Google Classroom) Evaluation methods 1. . Only daily and monthly attendance tests 2. Assigning the student to academic tasks for which he . will be rewarded 3. tudent to make reports on mathematics Assigning the s . topics 4. Assigning the student to analysis duties and determining the types of objectives used in teaching in the future and in the student's life process (Teacher
	C. : based goals -Emotional and value 1. should show interest in the explanation the The student teacher provides of the subject through the video . uploaded to YouTube 2. The student must have sufficient conviction about the . importance of the material he is receiving 3. data to benefit That the student is able to organize his from the measurement subject in the rest of the . scientific subjects 4. That the student is able to organize his data to benefit from the measurement subject in his practical life while . working in education or any other field 5. student's productive inclination towards Developing the . mathematics and its teaching methods : Teaching and learning methods 1. . Use methods appropriate to the topic

	2. . Education using modern electronic means 3. . Use effective education 4. learning to strengthen the student teacher Using flipped . himself 5. . Use of blended learning 6. Learning by making the student a teacher to enhance . confidence-his self 7. .Learning through brainstorming among students **Evaluation methods** 1. discussion and dialogue between the The method of . student and the teacher 2. . style 3. .Exams 4. . Evaluation in collaborative teams among students 5. Measuring different capabilities
	D. other skills related to)General and qualifying transferable skills (employability and personal development 1. . Using the acquired information in the field of life 2. Personal development through linking traditional .learning-education and e 3. personality of a competent mathematics Building the teacher who can transfer his experiences to students in .the future 4. Preparing the student scientifically and educationally . according to solid scientific foundations 5. kills solving s -Develops student flexibility in problem and classroom situations

10. Course structure

Evaluation method	Teaching method	Name of unit/course or subject	Required learning outcomes	Hours	Week
+Exam activity	Blackboard and data show	The meaning and goals of education	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	1
+Exam	Blackboar	Educational	Understand the	2 Theoretical	2

	activity	d and data show	necessities	subject matter correctly and know its applications in other sciences		
	+Exam activity	Blackboard and data show	Educational theories	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	3
	+Exam activity	Blackboard and data show	Education jobs	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	4
	+Exam activity	Blackboard and data show	Characteristics of education	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	5
	+Exam activity	Blackboard and data show	Historical foundations of education	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	6
	+Exam activity	Blackboard and data show	Education in ancient :civilizations	Understand the subject matter correctly and	2 Theoretical	7

			Education in Mesopotamia	know its applications in other sciences		
	+Exam activity	Blackboard and data show	Education among the ancient Egyptians	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	8
	+Exam activity	Blackboard and data show	Chinese education	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	9
	+Exam activity	Blackboard and data show	Indian education	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	10
	+Exam activity	Blackboard and data show	Greek education	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	11
	+Exam activity	Blackboard and data show	Islamic education	Understand the subject matter correctly and know its applications in	2 Theoretical	12

				other sciences		
	+Exam activity	Blackboard and data show	Education in the Middle Ages	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	13
	+ Exam activity	Blackboard and data show	Modern education	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	14
	+Exam activity	Blackboard and data show	Modern educational applications	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	15

12. Course Evaluation	
such as daily ,assigned to the student Distribution of the grade according to the tasks etc ,reports ,written exams ,monthly ,oral ,daily ,preparation.	
13. Learning and Teaching Resources	
Required textbooks (curricular books any)	prepared by the assistant Lectures (Elaf Ghnee Khaleel Al-Mashhadani)
Main references (sources)	▪ ..Dr ,Foundations and principles of education . Shuwaili-Faisal Abd Munshid Al . Other
Recommended books and references (scientific journals, reports...)	All sources related to the topic are in libraries and electron depending on the circumstances ,libraries
Electronic References, Websites	

Course Description Form

1. Course Name:	
Teaching methods	
2. Course Code:	
3. Semester / Year:	
First semester/2023-2024	
4. Description Preparation Date:	
10-9-2023	
5. Available Attendance Forms:	
Daily, at the time specified in the schedule, and at full time	
6. Number of Credit Hours (Total) / Number of Units (Total)	
30 hr./ 2Unit	
7. Course administrator's name (mention all, if more than one name)	
Name: assistant lecturer. Elaf Ghnee Khaleel **Email: elafghneekhaleel@uoanbar.edu.iq**	
8. Course Objectives	
Course Objectives	**A. The student should know general teaching methods** **B. That the student is able to know teaching methods** **C. For the student to be able to know the schools of education .throughout the ages** **D. That the student is able to apply what he has studied**
9. Teaching and Learning Strategies	
Strategy	**A. :Cognitive objectives** **1. student should remember the information and laws The . given in the course** **2. That the student understands the course topics and .related issues** **3. The student should be able to apply what he has learned to solve mathematical problems.** **4. o analyze the text of the The student should be able t question and arrange the information to benefit from it .in the solution and obtain correct results** **5. The student should create problems related to the course topics and then arrive at a correct solution.** **6. s about the course material The student must have idea .and know how to devise appropriate laws to solve it**
	B. :Skills objectives for the course **1. The student must demonstrate vocabulary related to .the course** **2. The student should use the appropriate laws to solve**

	.each problem 3. student must be proficient in linking topics that can The .be linked within the course vocabulary 4. Linking the concepts of measurement and evaluation to our daily lives through the types of achievement tests ,and methods of constructing and applying them .ally in our educational institutionsespeci 5. The student should distinguish between using different .statistical methods to calculate achievement test items .Teaching and learning methods 1. .Lecture style 2. .Use brainstorming 3. uided discovery methodand g. 4. .Discussion and dialogue style 5. Video lectures on the teacher's YouTube channel included in electronic classes(Google Classroom) Evaluation methods 1. . Only daily and monthly attendance tests 2. academic tasks for which he Assigning the student to . will be rewarded 3. Assigning the student to make reports on mathematics . topics 4. Assigning the student to analysis duties and determining the types of objectives used in teaching in the future and in the student's life process (Teacher
	C. : based goals -Emotional and value 1. The student should show interest in the explanation the teacher provides of the subject through the video . uploaded to YouTube 2. The student must have sufficient conviction about the . he is receiving importance of the material 3. That the student is able to organize his data to benefit from the measurement subject in the rest of the . scientific subjects 4. That the student is able to organize his data to benefit ile from the measurement subject in his practical life wh . working in education or any other field 5. Developing the student's productive inclination towards . mathematics and its teaching methods : Teaching and learning methods 1. . Use methods appropriate to the topic

	2. . electronic means Education using modern 3. . Use effective education 4. Using flipped learning to strengthen the student teacher . himself 5. . Use of blended learning 6. Learning by making the student a teacher to enhance . confidence-his self 7. .sLearning through brainstorming among student **Evaluation methods** 1. The method of discussion and dialogue between the . student and the teacher 2. . style 3. .Exams 4. . Evaluation in collaborative teams among students 5. Measuring different capabilities
	D. other skills related to)General and qualifying transferable skills (employability and personal development 1. . Using the acquired information in the field of life 2. Personal development through linking traditional .learning-education and e 3. personality of a competent mathematics Building the teacher who can transfer his experiences to students in .the future 4. Preparing the student scientifically and educationally . according to solid scientific foundations 5. kills solving s -Develops student flexibility in problem and classroom situations

10. Course structure

Evaluation method	Teaching method	Name of unit/course or subject	Required learning outcomes	Hours	Week
+Exam activity	Blackboard and data show	The concept of curriculum	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	1
+ Exam	Blackboar	Foundations of	Understand the	2 Theoretical	2

	activity	d and data show	curriculum construction	subject matter correctly and know its applications in other sciences		
	+Exam activity	Blackboard and data show	Methods of organizing the curriculum	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	3
	+Exam activity	Blackboard and data show	Types of curricula	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	4
	+Exam activity	Blackboard and data show	Elements or components of the curriculum	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	5
	+Exam activity	Blackboard and data show	Standards of educational objectives and their characteristics	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	6
	+Exam activity	Blackboard and data show	Levels of educational objectives	Understand the subject matter correctly and	2 Theoretical	7

				know its applications in other sciences		
	+Exam activity	Blackboard and data show	Content	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	8
	+Exam activity	Blackboard and data show	Teaching aids and teaching methods	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	9
	+Exam activity	Blackboard and data show	Technical means in the era of globalization	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	10
	+Exam activity	Blackboard and data show	Teaching	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	11
	+Exam activity	Blackboard and data show	Teaching strategy	Understand the subject matter correctly and know its applications in	2 Theoretical	12

				other sciences		
	+Exam activity	Blackboard and data show	Classification of teaching methods	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	13
	+Exam activity	Blackboard and data show	Blended learning	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	14
	+Exam activity	Blackboard and data show	Cooperative learning	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical	15

12. Course Evaluation	
such as daily ,Distribution of the grade according to the tasks assigned to the student etc ,reports ,written exams ,monthly ,oral ,daily ,preparation.	
13. Learning and Teaching Resources	
Required textbooks (curricular books any)	prepared by the assistant Lectures (Elaf Ghnee Khaleel Al-Mashhadani)
Main references (sources)	curriculum and teaching methods ,Course book
Recommended books and references (scientific journals, reports...)	electronic All sources related to the topic are in libraries ar depending on the circumstances ,libraries
Electronic References, Websites	https://www.uoanbar.edu.iq/staff-page.php?ID=1970

Course Description Form

58. Course Name:
Advanced differentiation and integration1
59. Course Code:
MAT201
60. Semester / Year:
first semester/2023-2024
61. Description Preparation Date:
2/9/2023
62. Available Attendance Forms:
Daily, at the time specified in the schedule, and at full time
63. Number of Credit Hours (Total) / Number of Units (Total)
75 hr./ 4Unit
64. Course administrator's name (mention all, if more than one name)
Name: Dr. Alaa Adnan Auad & M.r. Maemoon Ismaeal **Email: alaa.adnan.auad@uoanbar.edu.iq** **Name: Assistant teacher: Mimoon Ibrahim Ismael** **Email: mimoon.ismael@uoanbar.edu.iq**
65. Course Objectives

Course Objectives	**The course aims to study the main topics:** **1- Understanding the types of conic sections, how to derive equations for rotating axes.** **2- Understanding the meaning of polar coordinates, how to draw polar equations, finding areas and the length of their curves, as well as understanding sequences (series) .** **3- Knowing when sequences (series) are convergent or divergent, with knowledge of the two most famous series, which are Taylor and McLaurin prepared these topics for use in the third grade.** **4- The most famous Taylor.2- The student will be familiar with the concept of metric and metaphorical spaces.**

66. Teaching and Learning Strategies

Strategy	**A- Cognitive objectives** **1- Teaching the student how to think about solving engineering problems** **2- Analysis** **3- Conclusion** **4-The lecture** **5-Empowerment** **B - The skills objectives of the course.** **B1 - It makes students skilled by giving abbreviations to prove problems and solve them in a simple way** **B2 Gaining the ability to interact in society.** **B3 - Raising the student's ability to express his ideas through dialogue or writing and how to solve problems in artistic ways.** **C- Emotional and value goals** **C1- Thinking that explores the truth through (question and answer)**

	C2- Managing societal problems by finding appropriate solutions to them through academic concepts **C3- Spreading the spirit of interaction and attraction among students through academic competition** **C4- Urging students to employ what they have learned in public life** **D - General and qualifying transferable skills (other skills related to employability and personal development).** **D1--The student's response to the main goal of the course, which is to develop his four skills.** **D2- That the student understands and differentiates between various basic concepts, links them together, and benefits from them socially.** **D3- Enhancing the student's self-confidence by distinguishing the different topics that were dealt with in the course and choosing those that suit his personality and society.** **D4- The skill of self-development by giving him information that will benefit him in the academic future** **D5- It enables the student to use what he has learned to develop himself**

67. Course structure

Evaluation method	Teaching method	Name of unit/course or subject	Required learning outcomes	Hours	Week
an in-person lecture, and motivational questions.	Blackboard and data show	Definitions of quadratic equations in the plane	Understand the lecture topic	2 Theoretical + 2 practical	1
motivational questions	Blackboard and data show	Sectional equations	Understand the lecture topic	2 Theoretical + 2 practical	2
motivational questions	Blackboard and data show	Sectional equations	Understand the lecture topic	2 Theoretical + 3 practical	3
motivational questions	Blackboard and data show	Sectional equations	Understand the lecture topic	2 Theoretical + 3 practical	4
motivational questions	Blackboard and data show	Sectional equations	Understand the lecture topic	2 Theoretical + 3 practical	5
motivational	Blackboar	Polar coordinates	Understand the	2 Theoretical	6

questions	**d and data show**		**lecture topic**	**+ 3 practical**	
motivational questions	**Blackboard and data show**	**Polar coordinates**	**Understand the lecture topic**	**2 Theoretical + 3 practical**	**7**
motivational questions	**Blackboard and data show**	**Polar coordinates**	**Understand the lecture topic**	**2 Theoretical + 3 practical**	**8**
motivational questions	**Blackboard and data show**	**Polar coordinates**	**Understand the lecture topic**	**2 Theoretical + 3 practical**	**9**
motivational questions	**Blackboard and data show**	**Follow-ups**	**Understand the lecture topic**	**2 Theoretical + 3 practical**	**10**
motivational questions	**Blackboard and data show**	**Sequences**	**Understand the lecture topic**	**2 Theoretical + 3 practical**	**11**
motivational questions	**Blackboard and data show**	**finite series**	**Understand the lecture topic**	**2 Theoretical + 3 practical**	**12**
motivational questions.	**Blackboard and data show**	**finite series**	**Understand the lecture topic**	**2 Theoretical + 3 practical**	**13**
motivational questions.	**Blackboard and data show**	**exams, questions and answers**	**Understand the lecture topic**	**2 Theoretical + 3 practical**	**14**
motivational questions with the grade	**Blackboard and data show**	**Definitions of quadratic equations in the plane**	**Understand the lecture topic**	**2 Theoretical + 3 practical**	**15**

68. 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

69. Learning and Teaching Resources	
Required textbooks (curricular books any)	التفاضل والتكامل المتقدم لطلبة العلوم والهندسة -15
Main references (sources)	Schaum's Abstracts Series: Theories and Problems in Calculus, Frank Eiser, Cairo, 1990.
Recommended books and references (scientific journals, reports...)	Calculus with analytical geometry, i.e. J. Persal, Part Tv translated by Ali Azizo Yahya Abd Saeed, second editi Baghdad, 1983.
Electronic References, Websites	https://www.uoanbar.edu.iq/staff-page.php?ID=1117

Course Description Form

37.Course Name:	
Advanced differentiation and integration-2	
38.Course Code:	
MAT206	
39.Semester / Year:	
Second semester/2023-2024	
40.Description Preparation Date:	
1/2/2024	
41.Available Attendance Forms:	
Daily, at the time specified in the schedule, and at full time	
42.Number of Credit Hours (Total) / Number of Units (Total)	
75 hr./ 4Unit	
43.Course administrator's name (mention all, if more than one name)	
Name: Dr. Alaa Adnan Auad & M.r. Maemoon Ismaeal Email: alaa.adnan.auad@uoanbar.edu.iq Name: Assistant teacher: Mimoon Ibrahim Ismael Email: mimoon.ismael@uoanbar.edu.iq	
44. Course Objectives	
Course Objectives	The course aims to study the main topics: 1- The student's understanding of functions that depend on more than one variable, understanding the concept of their objective and their partial derivatives. 2- Their applications, understanding double and triple integrals and their applications such as areas and volumes, benefiting from what he learned in the first stage and applying them to the secon 3- subject, as well as studying cylindrical and spherical coordinates and studying integration on Path and Crane's theory and its applications.
45. Teaching and Learning Strategies	
Strategy	Learning outcomes, teaching, learning and assessment methods . A- Cognitive objectives

	1-Teaching the student how to think about solving engineering **2- Analysis** **3- Conclusion** **4-The lecture** **5-Empowerment** **B - The skills objectives of the course.** **B1 - Developing the skill in knowing the distribution of random variables and using them in the practical aspect** **B2 - Developing the skill of how to calculate the distribution of a function in terms of its random variables** **B3 - Developing the skill of employing the properties of random distributions for use in the practical aspect of life** **C- Emotional and value goals** **C1- Thinking that explores the truth through (question and answer)** **C2- Managing societal problems by finding appropriate solutions to them through academic concepts** **C3- Spreading the spirit of interaction and attraction among students through academic competition** **C4- Urging students to employ what they have learned in public life** **D - Transferable general and qualifying skills (other skills related to employability and personal development).** **D1-The skill of calculating number methods** **D2- The skill of calculating the probability of certain events** **D3- The skill of knowing the degree of correlation between variables** **D4- The skill of self-development by giving him information that will benefit him in the academic future** **D5- It enables the student to use what he has learned to develop himself**

46. Course structure

Evaluation method	Teaching method	Name of unit/course or subject	Required learning outcomes	Hours	Week
an in-person lecture, and motivational questions.	Blackboard and data show	Definition of parametric equations in the Cartesian plane	Understand the lecture topic	2 Theoretical + 2 practical	1
motivational questions	Blackboard and data show	Definition of vectors in the plane and operations on them	Understand the lecture topic	2 Theoretical + 2 practical	2
motivational questions	Blackboard and data	Definition of vectors in	Understand the lecture topic	2 Theoretical + 2 practical	3

	show	triangular space and their properties in triangular space			
motivational questions	Blackboard and data show	How to calculate vector multiplication numerically and directionally	Understand the lecture topic	2 Theoretical + 2 practical	4
motivational questions	Blackboard and data show	Calculating the equation of the parallel line of a vector in a triangular space	Understand the lecture topic	2 Theoretical + 2 practical	5
motivational questions	Blackboard and data show	Calculating the equation of the parallel plane of a vector in a triangular space	Understand the lecture topic	2 Theoretical + 2 practical	6
motivational questions	Blackboard and data show	Definition of continuity and limits of functions with two variables	Understand the lecture topic	2 Theoretical + 2 practical	7
motivational questions	Blackboard and data show	Definition of continuity and limits for functions of three variables	Understand the lecture topic	2 Theoretical + 3 practical	8
motivational questions	Blackboard and data show	Calculate the partial derivatives of functions with two or more variables using the definition	Understand the lecture topic	2 Theoretical + 3 practical	9

motivational questions	Blackboard and data show	Partial derivatives	Understand the lecture topic	2 Theoretical + 3 practical	10
motivational questions	Blackboard and data show	Double integrals	Understand the lecture topic	2 Theoretical + 3 practical	11
motivational questions	Blackboard and data show	Understand the lecture topic	Calculating double integrals for functions with two variables	2 Theoretical + 3 practical	12
motivational questions	Blackboard and data show	Understand the lecture topic	Calculating double integrals for functions of three variables	2 Theoretical + 3 practical	13
motivational questions	Blackboard and data show	Understand the lecture topic	Monthly exams	2 Theoretical + 3 practical	15

47. 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	
48. Learning and Teaching Resources	
Required textbooks (curricular books if any)	-1 التفاضل والتكامل المتقدم لطلبة العلوم والهندسة
Main references (sources)	Schaum's Abstracts Series: Theories and Problems in Calculus, Frank Eiser, Cairo, 1990.
Recommended books and references (scientific journals, reports...)	Calculus with analytical geometry, i.e. J. Persal, Part T translated by Ali Azizo Yahya Abd Saeed, second editi Baghdad, 1983.
Electronic References, Websites	https://www.uoanbar.edu.iq/staff-page.php?ID=1117

Course Description Form

70. Course Name:
Group Algebra 1
71. Course Code:
MAT203
72. Semester / Year:
First semester/2023-2024
73. Description Preparation Date:
12/11/2023
74. Available Attendance Forms:
Daily, at the time specified in the schedule, and at full time
75. Number of Credit Hours (Total) / Number of Units (Total)
64 hr./ 3Unit
76. Course administrator's name (mention all, if more than one name)
Name: Dr. Firas Shaker Fandi **Email: Firassh@uoanbar.edu.iq**
77. Course Objectives

Course Objectives	**his course aims to study the concept of group, the concept of subgroups, as well as periodic and regular gr**
78. Teaching and Learning Strategies	
Strategy	**Learning outcomes, teaching, learning and assessment methods** **A-Knowledge and understanding** **1- The student will be familiar with the concept of definition of group** **2- For the student to become familiar with the concept of subgroup** **3- That the student understands what is meant by normal subgroup .** **4- That the student knows the meaning of** **5- That the student understands what is meant by normal subgroup** **B - The skills objectives of the course.** **1- The skill of knowing the use of algebra in his scientific life through knowledge of the laws** **3- That the student can distinguish between the types of systems he studies**

79. Course structure

Evaluation method	Teaching method	Name of unit/course or subject	Required learning outcomes	Hours	Week
an in-person lecture, and motivational questions.	Blackboard and data show	Binary operation	Understand the subject matter correctly and know its applications in	2 Theoretical + 2 practical	1

			other sciences		
motivational questions	Blackboard and data show	The group and its conditions	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	2
motivational questions	Blackboard and data show	Various examples of groups	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	3
motivational questions	Blackboard and data show	Subgroups	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	4
motivational questions	Blackboard and data show	Various examples of subgroups	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	5
motivational questions	Blackboard and data show	Group rank and element rank	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	6
motivational	Blackboar	Various examples	Understand the	2 Theoretical	7

	questions	d and data show	and some theorems on rank	subject matter correctly and know its applications in other sciences	+ 2 practical	
	motivational questions	Blackboard and data show	The axioms of order, The center of the group	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	8
	motivational questions	Blackboard and data show	cyclic group	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	9
	motivational questions	Blackboard and data show	Various examples and some theorems on rank	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	10
	motivational questions	Blackboard and data show	The normal group	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	11
	motivational questions	Blackboard and data show	Adding, subtracting, and comparing angles	Understand the subject matter correctly and	2 Theoretical + 2 practical	12

			know its applications in other sciences		
motivational questions.	Blackboard and data show	Various examples and some theorems on rank	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	13
motivational questions.	Blackboard and data show	division groups	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	14
motivational questions with the grade	Blackboard and data show	Monthly exam	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	15

80. 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	
81. Learning and Teaching Resources	
Required textbooks (curricular books any)	1Basic concepts in algebra 2 Modern abstract algebra
Main references (sources)	GROUP THEOREM
Electronic References, Websites	www. mathwords.com https://www.uoanbar.edu.iq/staff-page.php?ID=1715

Course Description Form

13. Course Name:	
Group Algebra-2	
14. Course Code:	
MAT208	
15. Semester / Year:	
Second semester/2023-2024	
16. Description Preparation Date:	
1/2/2024	
17. Available Attendance Forms:	
Daily, at the time specified in the schedule, and at full time	
18. Number of Credit Hours (Total) / Number of Units (Total)	
64 hr./ 3Unit	
19. Course administrator's name (mention all, if more than one name)	
Name: Dr. Firassh@uoanbar.edu.iq **Email: Firassh@uoanbar.edu.iq**	
20. Course Objectives	
Course Objectives	**This course aims to convey a general idea about:** **This course aims to study This course aims to study homomorphism , isomorphism, and many theorems.**
21. Teaching and Learning Strategies	
Strategy	**Learning outcomes, teaching, learning and assessment methods** **A-Knowledge and understanding** **1- The student will be familiar with the concept of homomorphism.** **2- For the student to become familiar with the concept of isomorphism .** **3- That the student understands what is meant kernal of f.** **4- That the student knows the meaning of a homomorphism and find the kernel of f .** **5- That the student understands what is meant The first fundamental theorem of isomorphism** **6- That the student knows the meaning he second basic theorem of isomorphism** **7- That the student knows how to use Distinguish between homomorphism and isomorphism>** **B - The skills objectives of the course.**

22. Course structure

Evaluation method	Teaching method	Name of unit/course or subject	Required learning outcomes	Hours	Week
an in-person lecture, and motivational questions.	Blackboard and data show	Definition of homomorphism and some examples	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	1
motivational questions	Blackboard and data show	The relationship of groups between a domain and the codomain	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	2
motivational questions	Blackboard and data show	Definition of the kernel and some examples. An in-person lecture	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	3
motivational questions	Blackboard and data show	some theorems of isomorphism	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	4
motivational questions	Blackboard and data show	hypotheses, axioms, and some flaws in this system	Understand the subject matter correctly and know its	2 Theoretical + 2 practical	5

			applications in other sciences		
motivational questions	Blackboard and data show	Homomorphisms and isomorphims set	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	6
motivational questions	Blackboard and data show	The first theorem of homomorphism	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	7
motivational questions	Blackboard and data show	The second theorem of isomorphism	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	8
motivational questions	Blackboard and data show	The third theorem of isomorphism	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	9
motivational questions	Blackboard and data show	First exam	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	10

motivational questions	Blackboard and data show	Cayley theorem	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	11
motivational questions	Blackboard and data show	The commutator between the two elements	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	12
motivational questions.	Blackboard and data show	Simple groups	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	13
motivational questions.	Blackboard and data show	External angles, uprights and constructions	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	14
motivational questions with the grade	Blackboard and data show	Monthly exam	Understand the subject matter correctly and know its applications in other sciences	2 Theoretical + 2 practical	15

23. 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

24. Learning and Teaching Resources

Required textbooks (curricular books any)	**1- Basic concepts in algebra**
Main references (sources)	**Modern abstract algebra**
Recommended books and references (scientific journals, reports...)	**GROUP THEOREM**
Electronic References, Websites	**www. mathwords.com** **https://www.uoanbar.edu.iq/staff-page.php?ID=1715**

Course Description Form

82. Course Name:	
Mathematical Analysis 1	
83. Course Code:	
MAT301	
84. Semester / Year:	
first semester/2023-2024	
85. Description Preparation Date:	
12/11/2023	
86. Available Attendance Forms:	
Daily, at the time specified in the schedule, and at full time	
87. Number of Credit Hours (Total) / Number of Units (Total)	
60 hr./ 3Unit	
88. Course administrator's name (mention all, if more than one name)	
Name: Dr. Nadia Ali Nadhim **Email: mad772918@uoanbar.edu.iq** **Name: Assistant teacher: AHMED MOHAMMED MUSTAFA** **Email: ahmed78m@uoanbar.edu.iq**	
89. Course Objectives	
Course Objectives	**This course aims to convey a general idea about:** **1-Identify real numbers and their mathematical properties** **2-Identify applications of real numbers in different fields** **3-To learn about sequences and some of their different types** **4-Identify real sequences and calculate their limits** **5-To verify the convergence of a convergent sequence** **6-To recognize the convergence of series and their different periods of convergence** **7-The ability to deal with some concepts in real analysis, such as sequenc limits, and complete dusty spaces life**
90. Teaching and Learning Strategies	
Strategy	**Learning outcomes, teaching, learning and assessment methods** **. A- Cognitive objectives** **1- Extrapolation** **2- Analysis** **3- Conclusion** **4-The lecture** **5-Empowerment**

	B - The skills objectives of the course. **B1-Managing the lecture in an applied manner linked to the reality of daily life to attract the student to the topic of the lesson without.** **B2-straying from the core of the topic so that the material is flexible and amenable to understanding and analysis** **B3-Assigning the student to some group activities and duties** **B4-Allocate a percentage of the grade to daily assignments and tests** **B5-Manage the lecture in a way that makes time feel important** **C- Emotional and value goals** **C1-Active participation in class is evidence of the student's commitment and responsibility** **C2-Commitment to the deadline for submitting assignments and research** **C3-Semester and final exams express commitment and cognitive and skill** **D - Transferable general and qualifying skills (other skills related to employability and personal development).** **D1-Developing the student's ability to recognize types of groups** **D2-Developing the student's ability to deal with the Internet** **D3-Developing the student's ability to find solutions and evidence** **D4-Developing the student's ability to dialogue and discuss** **D5-Developing the student's ability to recognize types of functions**

91. Course structure

Evaluation method	Teaching method	Name of unit/course or subject	Required learning outcomes	Hours	Week
an in-person lecture, and motivational questions.	Blackboard and data show	Axioms of arithmetic - axioms of order - axioms of perfection with examples.	Axioms of real numbers	2 Theoretical + 2 practical	1
motivational questions	Blackboard and data show	Definition - examples - some theorems - trigonometric inequality	absolute value	2 Theoretical + 2 practical	2
motivational questions	Blackboard and data show	The highest constraint - the smallest top constraint - the bottom constraint -	Restrictions	2 Theoretical + 2 practical	3

		the largest bottom constraint - examples - theories .			
motivational questions	**Blackboard and data show**	**Definition with examples and basic theories**	**Rational numbers and irrational numbers**	**2 Theoretical + 2 practical**	**4**
motivational questions	**Blackboard and data show**	**---------**	**Exam**	**----------**	**5**
motivational questions	**Blackboard and data show**	**Its definition and examples - semi-dusty spaces - Euclidean spaces - equivalent metric spaces**	**Metric spaces**	**2 Theoretical + 2 practical**	**6**
motivational questions	**Blackboard and data show**	**Definitions - examples - union and intersection of a finite or infinite number of such groups**	**Open and closed groups**	**2 Theoretical + 2 practical**	**7**
motivational questions	**Blackboard and data show**	**Some basic principles in topology and its relationship to metric space, with examples and theories.**	**Metric and biological space**	**2 Theoretical + 2 practical**	**8**
motivational questions	**Blackboard and data**	**Definitions with examples- Derived**	**Points of purpose and**	**2 Theoretical + 2 practical**	**9**

	show	and closed sets and the relationship between them	closure		
motivational questions	Blackboard and data show	Stacked groups - examples - some important theorems in stacking	Lined spaces	2 Theoretical + 2 practical	10
motivational questions	Blackboard and data show	Its definition, examples, and some special infinite series, harmonic-geometric-alternating series - the concept of convergence - examples - theorems.	Infinite series and convergence	2 Theoretical + 2 practical	11
motivational questions	Blackboard and data show	Comparison test - P test - Root comparison test - Ratio test - Root test - Definition of number - Basic theorems about the number E	Series test - number e	2 Theoretical + 2 practical	12
motivational questions.	Blackboard and data show	Definitions - examples and some theorems to clarify the relationship between them	Absolute convergence and conditional convergence	2 Theoretical + 2 practical	13
motivational questions.	Blackboard and data	Definition - examples and basic	Multiplying Series - Power	2 Theoretical + 2 practical	14

	show	theorems	Series		
motivational questions with the grade	Blackboard and data show		Understand the lecture topic	2 Theoretical + 2 practical	15

92. 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	
93. Learning and Teaching Resources	
Required textbooks (curricular books any)	1-عادل غسان نعوم "مقدمة في التحليل الرياضي" جامعة بغداد- العراق ١٩٨٦ الطبعة الأولى . 2-انواربدرانة واخرون :مقدمة في التحليل الحقيقي" دار الأول في النشر والتوزيع الأردن ١٩٩٢.
Main references (sources)	1- 3-Apostol. T.M., "Mathematical Analaysis"2nd, 1974, London. 2- 4-Ash, R. B. ,"Real analysis and probability", 1972. New York.
Recommended books and references (scientific journals, reports...)	- 5-Royden. H. L.,"Real Analysis", 1988. London..
Electronic References, Websites	https://www.uoanbar.edu.iq/staff-page.php?ID=1160

Course Description Form

49. Course Name:
Mathematical Analysis 2
50. Course Code:
MAT306
51. Semester / Year:
Second semester/2023-2024
52. Description Preparation Date:
1/2/2024
53. Available Attendance Forms:
Daily, at the time specified in the schedule, and at full time
54. Number of Credit Hours (Total) / Number of Units (Total)
60 hr./ 3Unit
55. Course administrator's name (mention all, if more than one name)
Name: Dr. Nadia Ali Nadhim Email: mad772918@uoanbar.edu.iq

Name: Assistant teacher: AHMED MOHAMMED MUSTAFA **Email: ahmed78m@uoanbar.edu.iq**	
56. Course Objectives	
Course Objectives	**This course aims to convey a general idea about:** **1-Identify the basic concepts of the derivative and how to find them using the definition and its applications** **2-Learn about the Riemann integral of functions and how to find them using the definition and its properties** **3-Identify function sequences, their dotted and regular convergence, and how to replace limits with integration** **4-The identifier for measuring subsets of the set of real numbers** **5-Identify measurable functions and their properties** **6-Identify the Riemann-Estelle's integral and compare it with the Riemann integral** **7-Identify the Riemann integral and its most important properties and comp it with the Riemann integral. Life**
57. Teaching and Learning Strategies	
Strategy	**Learning outcomes, teaching, learning and assessment methods** **. A- Cognitive objectives** **1- Extrapolation** **2- Analysis** **3- Conclusion** **4-The lecture** **5-Empowerment** **B - The skills objectives of the course.** **B1-Gaining experience and knowledge in sports analysis** **B2-Linking the different topics of mathematics and their relationship to each other, where each topic is considered complementary to the other.** **B3-Teaching the student to master the skills acquired over time and to have sound intuitive perception to a reasonable extent** **C- Emotional and value goals** **C1-Developing the student's ability to work on performing assignments and submitting them on the scheduled date** **C2-To think logically and mathematically in finding solutions to problems** **C3-Analyze the problem, solve it mathematically, and find solutions using the available information and theorems** **C4- Developing the student's ability to dialogue and discussC4- Urging students to employ what they have learned in public life** **D - Transferable general and qualifying skills (other skills related to employability and personal development).** **D1-Developing the student's ability to recognize types of groups** **D2-Developing the student's ability to deal with the Internet** **D3-Developing the student's ability to find solutions and evidence** **D4-Developing the student's ability to dialogue and discuss** **D5-Developing the student's ability to recognize types of functions**

58. Course structure

Evaluation method	Teaching method	Name of unit/course or subject	Required learning outcomes	Hours	Week
an in-person lecture, and motivational questions.	Blackboard and data show	Axioms of arithmetic - axioms of order - axioms of perfection with examples.	Continuity	2 Theoretical + 2 practical	1
motivational questions	Blackboard and data show	Definition - examples - some theorems - trigonometric inequality	Continuity	2 Theoretical + 2 practical	2
motivational questions	Blackboard and data show	The highest constraint - the smallest top constraint - the bottom constraint - the largest bottom constraint - examples - theories .	Derived	2 Theoretical + 2 practical	3
motivational questions	Blackboard and data show	Definition with examples and basic theories	Derived	2 Theoretical + 2 practical	4
motivational questions	Blackboard and data show	Definition with examples and basic theories	Riemann integral	2 Theoretical + 2 practical	5
motivational questions	Blackboard and data show	Its definition and examples - semi-dusty spaces -	Riemann integral	2 Theoretical + 2 practical	6

		Euclidean spaces - equivalent metric spaces			
motivational questions	**Blackboard and data show**	**Definitions - examples - union and intersection of a finite or infinite number of such groups.**	**Riemann integral**	**2 Theoretical + 2 practical**	**7**
motivational questions	**Blackboard and data show**	**Some basic principles in topology and its relationship to metric space, with examples and theories**	**Riemann integral**	**2 Theoretical + 2 practical**	**8**
motivational questions	**Blackboard and data show**	**Definitions with examples- Derived and closed sets and the relationship between them**	**Introduction to measurement theory**	**2 Theoretical + 2 practical**	**9**
motivational questions	**Blackboard and data show**	**Stacked groups - examples - some important theorems in stacking**	**Measurable functions**	**2 Theoretical + 2 practical**	**10**
motivational questions	**Blackboard and data show**	**Its definition, examples, and some special infinite series, harmonic-geometric-alternating series - the concept of**	**Integration of Lebegue**	**2 Theoretical + 2 practical**	**11**

		convergence - examples - theorems.			
motivational questions	Blackboard and data show	Comparison test - P test - Root comparison test - Ratio test - Root test - Definition of number - Basic theorems about the number E	Integration of Lebegue	2 Theoretical + 2 practical	12
motivational questions.	Blackboard and data show	Definitions - examples and some theorems to clarify the relationship between them	Integration of Lebegue	2 Theoretical + 2 practical	13
motivational questions.	Blackboard and data show	Definition - examples and basic theorems	Functions are covariance bound	2 Theoretical + 2 practical	14
motivational questions with the grade	Blackboard and data show	the final evaluation is an in-person lecture, and the grade	Understand the lecture topic	2 Theoretical + 2 practical	15

59. 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

60. Learning and Teaching Resources

Required textbooks (curricular books, if any)	**1- عادل غسان نعوم "مقدمة في التحليل الرياضي" جامعة بغداد- العراق ١٩٨٦ الطبعة الأولى .** **2- 2-انواربدرانة واخرون :مقدمة في التحليل الحقيقي" دار الأول في النشر والتوزيع الأردن ١٩٩٢.**

Main references (sources)	**1- 3-Apostol. T.M., "Mathematical Analaysis"2nd, 1974, London.** **2- 4-Ash, R. B. ,"Real analysis and probability", 1972. New York.**
Recommended books and references (scientific journals, reports...)	**Royden. H. L.,"Real Analysis", 1988. London**
Electronic References, Websites	**https://www.uoanbar.edu.iq/staff-page.php?ID=1160**