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

4 - 4 5

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.

<u>Course Description</u>: 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.

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

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

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

<u>**Curriculum Structure:</u>** 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.</u>

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.

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

Academic program description form

University name: University ofBaghdad..... College/Institute: College ofSciences..... Scientific Department: Department of Mathematics..... Name of the academic or professional program: Mathematics Department Academic Program Name of final degree:Bachelor of Mathematics...... Academic system: semester Description preparation date: 10/1/2023 Date of filling the file: 3/28/2024

the signature : Nav

Name of scientific assistant: the date :

the signature : Horammod S. Hussein Name of department head: the date :



Check the file before **Division of Quality Assurance and University Performance** Name of the Director of the Quality Assurance and University Performance **Division:**

the date the signature Istan

Authentication of the Dean

1. Program Vision

Raising the level of graduates of the Mathematics Department to contribute to the scientific and technical development of the country and to be among the ranks of distinguished and pioneering educational departments in academic achievement.

2. Program Mission

Enhancing the educational process in the Mathematics Department to reach the highest level of quality to graduate qualified students who are able to think logically and possess scientific research skills to meet the needs of the labor market.

3. Program Objectives

- Improving the quality of education to keep pace with the current technical development in international universities.
- Developing study plans at the bachelor's degree level to keep pace with scientific developments and the latest developments of the times.
- Qualifying cadres capable of dealing with advanced technologies and modern changes with all effectiveness and flexibility.
- Promoting scientific research in the field of mathematics, studying mathematical and statistical problems, and carrying out scientific research to find appropriate solutions to them, meeting the curricula needs of other departments in the college and universities.

4. Program accreditation

Does the program have program accreditation? From which side? both

5. Other external influences

Is there a sponsor for the program: No

6. Program st	ructure			
comments *	percentage	Study unit	Number of courses	Program structure
	13.20	12	7	Enterprise requirements
				College requirements
	86.80	137	46	Department requirements
			1	summer training
				Other

7. Program	n descriptio	on		
Cred	it hours	Name of the course or course	Course or course code	Year/level
	4	Advanced calculus	MA201	The second phase
		and integration		Chorus 1
	4	Number theory	MA202	
	4	Blurry	MA204	
	4	Linear algebra 1	MA203	
	4	Statistics and probability 1	MA205	
	4	Computer (3)	MA206	
2	4	M. Computer (3)		
	1	English	MAEL2	
	1	Crimes of the former Baath Party	UoB2105	
	4 Statistics and probability 2	Statistics and probability 2	MA211	The second phase Chorus 2
	4	Linear algebra 2	MA209	
	4	Linear Programming(2)	MA210	
	4	Statement theory	MA208	
2	4	Computer(4)	MA212	
		M. Computer(4)		
	4	Solutions of differential equations	MA207	
2	4	Numerical Analysis (1)	MA301	
	4	M. Numerical analysis (1)		
	4	Mathematical Analysis (1)	MA303	
	4	Partial differential equations	MA302	
	2	Mathematical	MA304	

		statistics (1)		
	4	Optimization	MA305	
	4	Gebrzmer	MA306	
	1	English language3	MAEL3	
	4	Numerical analysis	MA307	third level
2	4	(2)		Chorus 2
	4	M. Numerical analysis (2)		
	4	Mathematical Analysis (2)	MA309	
	4	Chaos Theory	MA308	
	4	Mathematical statistics (2)	MA310	
	4	Arithmetic groups	MA311	
	4	Episodes1	MA312	
	4	Episodes (2)	MA401	The fourth stage Chorus 1
	4	Theory of differential equations	MA402	
	4	Topology (1)	MA404	
2	3	Encryption	MA405	
	2	English	EN407	
	2	M. Encryption	LMA405	
	2	The project	PMA406	
		Student activity	PHE408	
	4	Nodal analysis(2)	MA406	The fourth stage Chorus 2

4	Mathematical modeling	MA410	
4	Topology (2)	MA407	
4	Functional analysis	MA408	
4	Mechanics of connections	MA409	
2	The project	РМА	
	Student activity	PHE	

8. Expected learning outcomes of the program	me
Knowledge	
.The skills and experiences that a student acquires while undergoing training or a study plan You certainly know that the skills added to the student are through the efforts of the teacher, who sets the goals for each lesson and uses methods to achieve these goals, thus honing the student's skill.	A1- Developing his analytical capabilities to reach logical solutions to various problems A2- His ability to evaluate the academic program A3- Creating and organizing statistical tables A4- Identifying the basic characteristics of the nature of scientific material
Skills	
The student chooses activities and tasks according to his inclinations and preparations for Achieving these goals Active cooperation between the student and the faculty member within the framework of Subsequent to the intended outcomes Self-evaluation and developing performance first and foremost in light of the rules a specific clear	 B1 - The ability to listen effectively and contribute constructively to the discussion B2 - The ability to make decisions and bear responsibility B3 - The ability to self-discipline and the spirit of motivation B4- The ability to collect information from various sources
Value	
aLearning outcomes help to know what the student should learn and what he can do after completing the academic program he is enrolled in.	 D1 - Developing the student's ability to dialogue and discuss. D2 - Developing the student's ability to deal with the Internet. D3 - Developing the student's ability to deal with multiple media. D4 - Developing the student's ability to deal with technical means

9. Teaching and learning strategies

strategicallyTAnd the teaching and learning methods adopted in implementing the program in general.

10. Evaluation methods

How to display scientific materials on projectors: Data Show, Explanation and clarification by the lecturer, via The internet And mini projects within Lectures-

11. The teaching staff

Faculty	membe	rs							
Preparing teaching s		Special requirements/skills (If any)	Specialization	Specialization					
lecturer	angel		private	general					
nothing	thing 52		Inverse problems	mathematics	A.M.D. Muhammad Sabah Hussein				
			Pure/Algebra	mathematics	Mr. Dr. Abdul Rahman Hamid Majeed				
			Applied/Fluid Mechanics	mathematics	Mr. Dr. Ahmed Mouloud Abdel Hadi				
			Applied	mathematics	Mr. Dr. Raed Kamel Naji				
			mathematics	mathematics	Mr. Dr. Bahar Hamad Ahmed				
			Pure/Algebra	mathematics	Mr. Dr. And Khaled Hassan				
			Pure/Algebra	mathematics	Mr. Dr. Sahira Mahmoud Yassin				
			Pure/Algebra	mathematics	Mr. Dr. Nihad Salem Al- Muzaffar				
			mathematics	mathematics	Mr. Dr. Buthaina				

		Abdel Hassan
		Ahmed
Applied/dynamic	mathematics	Mr. Dr. Azhar
systems	mathematics	Abbas Majeed
Algebra	mathematics	Mr. Dr. Alaa
Algebra	mainematics	Abbas Aliwi
Nodel enelysis	mathematics	
Nodal analysis	mainematics	Mr. Dr. Qasim Abdul Hamid
		Jassim
Pure/Dali	mathematics	
	mathematics	
analysis		Hassan
	.1	Abboud
Dali analysis	mathematics	Mr. Dr. Zeina
		Zaki is
		beautiful
Dynamic	mathematics	Mr. Dr.
systems		Hassan Fadel
		Reda
Applied	mathematics	Mr. Dr. Sadiq
		Naji Nasser
Algebraic	mathematics	A.M.D.
topology		Muhammad
		Ghazi inside
Counting	mathematics	
		Tasneem
		Hassan
		Kazem
Zarephath	mathematics	A.M.D. Afraa
		Radi Sadiq
Nodal analysis	mathematics	A.M.D. Heba
		Fawzi Sabaa
mathematics	mathematics	A.M.D. Iman
		Ali is torment
mathematics	mathematics	A.M.D.
		Meeting Zaki
		Hammadi
Applied	mathematics	A.M.D. Dalia
		Khaled
		Bahloul
mathematics	mathematics	A.M.D. Hoda
		Abdel Sattar
		Abdel Aoun

	mathematics	mathematics	A.M.D. Heba Abdullah Ibrahim
	Applied/ Operations research	mathematics	A.M.D. Iraq Tariq Abbas
	Zarephath	mathematics	A.M.D. Ali Abed Obaid
	Dynamic systems	mathematics	A.M.D. Sherine Rasoul Jawad
	Applied	mathematics	A.M.D. Rehab Nouri Shaalan
	Applied	mathematics	A.M.D. Ghadeer Jassim Mohammed
	Algebra	mathematics	A.M.D. Duraid Hamdi bracelets
	Dynamic systems	mathematics	M.D. Meet Jamil Khalil
	mathematics	mathematics	M.D. Sondos Badr Habib
	Zarephath	mathematics	M.D. Alaa Hussein Lafta
	Applied	mathematics	M.D. Saad Muhammad Ali Taher
	mathematics	mathematics	M.D. Rana Adnan Muhammad
	Applied	mathematics	M.D. Saima Abdel Sattar
	Applied	mathematics	M.D. Muhammad Alaa Abdel Amir
	Zarephath	mathematics	M.D. Heba Abdullah Ahmed

	Applied	mathematics	M.D. Hasna
			Faisal
			Muhammad
			Hussein
	Applied	mathematics	M.D. The
			banks of
			Raysan Faisal
		mathematics	M.D. Qasim
			Kazem Hamid
	Applied	mathematics	M.D. Farah
			Alaa Adnan
	Zarephath	mathematics	M.D. The time
			of Adel
			Rashid
	Applied	mathematics	M. Dina Sultan
			Ibrahim
	Zarephath	mathematics	M. Souad Naji
			Kazem
	Applied	mathematics	M. Saja Ghazi
			Muhammad
	Applied	mathematics	M. Alaa Walid
			Saleh
	Zarephath	mathematics	millimeter.
			Alia Aqeel
			Majeed
	Applied	mathematics	millimeter. Ali
			Abdel Kazem
			Rahima
	Zarephath	mathematics	millimeter.
			The banks of
			Fadel Majeed
	Applied	mathematics	millimeter.
			Zainab
			Muhammad
			Gouda

Professional development

Orienting new faculty members

Briefly describes the process used to orient new, visiting, full-time, and part-time

faculty at the institution and department levels.

Professional development for faculty members

Briefly describe the academic and professional development plan and arrangements

for faculty members such as teaching and learning strategies, assessment of

learning outcomes, professional development, etc..

12. Acceptance criterion

It is required for the student applying for admission to the master's programMust have a bachelor's degree or its equivalent from an accredited university

13. The most important sources of information about the program

Direct guidance through workshops in the Department of Quality Assurance and University Performance at the university and college, and the information available in the description form with its explanations attached by the university.-Websites of Iraqi and foreign universities -Workshops held by the Ministry of Higher Education in addition to the Ministry's standards

14. Program development plan

Following up on scientific development through scientific research and contacting international, Arab and local universities with the corresponding specialization via the Internet

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			-	ıts Learni ogram	ng requ	iired fro	om								
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C4	C3	C2	C1	B4	B3	B2	B 1	A4	AS	AZ	A1			decision	level
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Calculus (1)	MAT1101	
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Foundations of mathematics (1)	MAT1102	
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Finite mathematics	MAT1103	
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Physical Mathematics (1)	MAT1104	
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Computer 1	UoB1101	
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Arabic	UoB1102	
*	*	*	*	*	*	*	*	*	*	*	*				
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Calculus (2)	MAT1215	
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Foundations of mathematics (2)	MAT1216	
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Financial Mathematics	MAT1217	
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Physical Mathematics (2)	MAT1218	
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Democracy and human rights	UoB1203	
*	*	*	*	*	*	*	*	*	*	*	*	Basic	English language (1)	UoB1204	
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Advanced calculus and integration	MA201	
*	*	*	*	*	*	*	*	*	*	*	*	my choice	Number theory	MA202	
*	*	*	*	*	*	*	*	*	*	*	*	my choice	Blurry	MA204	

												Basic		
*	*	*	*	*	*	*	*	*	*	*	*		Linear algebra 1	MA203
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Statistics and	MA205
													probability 1	
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Computer topics (3)	MA206
*	*	*	*	*	*	*	*	*	*	*	*	Basic	English	MAEL2
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Statistics and	MA211
													probability 2	
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Linear algebra 2	MA209
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Linear Programming(2)	MA210
*	*	*	*	*	*	*	*	*	*	*	*	my choice	Statement theory	A208
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Computer(4)	MA212
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Ordinary differential	MA207
													equations	
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Numerical Analysis (1)	MA301
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Mathematical Analysis	MA303
													(1)	
*	*	*	*	*	*	*	*	*	*	*	*	my choice	Partial differential	MA302
													equations	
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Mathematical statistics	MA304
													(1)	
*	*	*	*	*	*	*	*	*	*	*	*	my choice	Optimization	MA305
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Algebrasmar	MA306
*	*	*	*	*	*	*	*	*	*	*	*	Basic	English language3	MAEL3

*	*	*	*	*	*	*	*	*	*	*	*	Basic	Numerical Arabisis (2)	N4A207
*	*	*	*			*	*	*	*	*	*		Numerical Analysis (2)	MA307
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Mathematical Analysis (2)	MA309
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Chaos Theory	MA308
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Mathematical statistics (2)	MA310
*	*	*	*	*	*	*	*	*	*	*	*	my choice	Arithmetic groups	LMA311
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Episodes1	MA312
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Episodes (2)	MA402
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Nodal analysis(1)	MA401
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Episodes (2)	MA402
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Ordinary differential equations	MA403
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Topology (1)	MA404
*	*	*	*	*	*	*	*	*	*	*	*	my choice	Encryption	MA405
*	*	*	*	*	*	*	*	*	*	*	*	Basic	English	EN407
*	*	*	*	*	*	*	*	*	*	*	*	my choice	Student activity	1PHE
*	*	*	*	*	*	*	*	*	*	*	*	Basic	The project	PMA406
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Nodal analysis(2)	MA406
*	*	*	*	*	*	*	*	*	*	*	*	my choice	Mathematical modeling	MA410
*	*	*	*	*	*	*	*	*	*	*	*	my choice	Student activity	2PHE

*	*	*	*	*	*	*	*	*	*	*	*	Basic	Topology (2)	MA407
*	*	*	*	*	*	*	*	*	*	*	*	my choice	Functional analysis	MA408
*	*	*	*	*	*	*	*	*	*	*	*	my choice	Mechanics of connections	MA409

• Please situation Signal in Squares the interview For outputs Learning Individuality from the program Submissive To strengthen

7

Course description model

nameTh	ne decision					.1
		Advanc	ed Calcul	us		
CodeT	he decision					۲.
		Ν	1A201			
the chapte	r / the year					۳.
		First semes	ster/2023-	-2024		
Preparatio	n dateThis descrip	otion				.٤
		10/	1/2023			
5. shapes th	ne audience Availa	ble				
6 number he	ure Acadamia (tat		presence	otal)		
o.number ho	ours Academic (tot	(ai)/inuilider ($\frac{\text{of units (t)}}{4/60}$	otal)		
7. Name o	f the course ad	ministrator(If	more than	n one name is mentic	oned)	
	ZakiEmail: <u>iqaa.h</u>					
	ia KhaledEmail	: <u>dahlia.khaled@</u>	<pre>@sc.uobagh</pre>	dad.edu.iq		
هداف المقرر						
Encouraging res	earch programs and ferences and semin	d participating	المادة الدراسيا	اهداف		
	ty and academic ad					
	-					
1 1	٩. استراتيجيات ا		.1 •	<u> </u>		
0	g the lecture in a w g the student some	•	•	ance of time	اتيجية	الماستر
	and electronic class		into a			
١٠. بنية المقرر						
طريقة التقييم	طريقة التعلم	دة او الموضوع	اسم الوحد	مخرجات التعلم المطلوبة	الساعات	الأسبوع
General	Lectures		-dimension	Three-dimension	4	the first
questions and discussion		coordii	nate system	coordinate system		
General	Lectures	Equation of lines in two or three dimensions		Equation of lines	4	the
questions and discussion		three	aimensions			second
General	Lectures	The vectors	and dot	The vectors	4	the third
questions and discussion			product			
General	Lectures	The vectors	of cross	The vectors	4	the fourth

questions and		product			
discussion		I ·····			
General	Lectures	The equation of planes in	The equation of planes	4	Fifth
questions and		3 dim.			
discussion					
General	Lectures	The quadrinate surfaces in	The square surface	4	VI
questions and		three dim. With	_		
discussion		application			
General	Lectures	Definitions of function of	Functions of several	4	Seventh
questions and		sveral variables and some	variables		
discussion		examples			
Annie's test	Lectures	The vector function	The vector function	4	VIII
General	Lectures	Limits, continuous	Functions of several	4	Ninth
questions and			variables		
discussion					
Monthly exam	Lectures	Interpretations of partial	Partial derivative	4	The tenth
		derivatives			
General	Lectures	Higher order partial	Partial derivative	4	eleventh
questions and		derivatives			
discussion					
General	Lectures	Tangent planes and linear	Application of Partial	4	twelveth
questions and		approximations and	derivative		
discussion		normal lines			
General	Lectures	Relative minimum of	Application of Partial	4	Thirteenth
questions and		maximum points	derivative		
discussion					
General	Lectures	Double integral of Triple	Multiple integrals	4	fourteenth
questions and		integrals over general			
discussion		regions			
General	Lectures	Exam		4	Fifteenth
questions and					
discussion					

distribution Class from 011 on according to mission Assigned With it requester like Preparation Daily And exams Daily And oral And monthly

And editorial And reports etc

مصادر التعلم والتدريس ١٢.	
Calculus and analytic geometry (Thomas) 2018 Advanced Calculus Schaum Series 2017	
Calculus (Anton, Bivens, Davis)	المراجع الرئيسة (المصادر)
The most important books and special sources on advanced calculus available in the central library, the science library, and the department.	السب والمراجع المعالماة القي يوصلى بها (المجات المعنية)
 Discreet websites. Virtual library. Library locations in some international universities 	المراجع الإلكترونية ، مواقع الانترنيت

I	
nameThe decision	.1
Number theory	
CodeThe decision	۲.
MA202	
the chapter / the year	.۳
First semester/2023-2024	4
Preparation date This description	. ٤
10/1/2023	
5. shapes the audience Available	
My presence	
6.number hours Academic (total)/Number of units (total) 2/60	
2/80	
7. Name of the course administrator(If more than one	e name is mentioned)
Name: Dr. Ali Abed ObaidEmail:	· · · · · · · · · · · · · · · · · · ·
	<u>ali.abd@sc.uobaghdad.edu.i</u>
aName: Dr. Saima Abdel Sattar Email:	
seemaa.a@sc.uobaghdad.edu.iq	
scemaa.a@sc.u0bagnuad.cuu.iq	
 ٨. اهداف المقرر 	
هداف المادة الدراسية Πρεπαρινγγραδυατεσ σπεχιαλιζεδ ιν ματηεματιχ	١
σ το χοντριβυτε το τηε δεσελοπμεντ οφ τηε χουντ ρψ•	
Μεετινγ τηε νεεδσ οφ τηε εδυχατιον σεχτορ ωιτη	
ηιγηλψ θυαλιφιεδ χαδρεσ	
Ενχουραγινγ διστινγυισηεδ πεοπλε το ωορκ ιν τηε δεπαρτμεντ•	
Encouraging research programs and participating in scientific conferences and seminars	
Achieving quality and academic accreditation•	
 ٩. استراتيجيات التعليم والتعلم 	
• Managing the lecture in a way that indicates the importance of	of time الااستراتيجية
• Assigning the student some group assignments	
Websites and electronic classes	
5 N 5 + N	
٠١. بنية المقرر	

طريقة التقييم	طريقة التعلم	اسم الوحدة او الموضوع	مخرجات التعلم المطلوبة	الساعات	الأسبوع
General questions and discussion	Lectures	Properties of integral numbers, ordering principle, partially ordered set and well-ordered set		4	the first
General questions and discussion	Lectures	Theorems and examples	First principle of mathematical induction and second principle of mathematical induction	4	the second
General questions and discussion	Lectures	Bascal Rule, Binomial Theorem	The binomial coefficants	4	the third
General questions and discussion	Lectures	The division algorithm	Fibbonacci numbers	4	the fourth
General questions and discussion	Lectures	Least common multiple and their applications		4	Fifth
General questions and discussion	Lectures	Theorems and examples	The Euclidean Algorithm	4	VI
General questions and discussion	Lectures	Back substitution, blankship method		4	Seventh
Annie's test	Lectures	Concepts of diophantin equations and examples		4	VIII
General questions and discussion	Lectures	Composite numbers		4	Ninth
Monthly exam	Lectures	Applications and their properties	Fundemental theorem of Arithmatic	4	The tenth
General questions and discussion	Lectures	Grible eratosthen lemma of prime numbers	Euclid's theorem	4	eleventh
General questions and discussion	Lectures	Fermat method	Fermat and merchant numbers	4	twelveth
General questions and discussion	Lectures	Theorems of congruent numbers	e	4	Thirteenth
General questions and discussion	Lectures	Some ofcongruent numbers		4	fourteenth
General questions and discussion	Lectures	Euler theoem, Fermat theorem	Chinese Remainder theorem	4	Fifteenth

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مصادر التعلم والتدريس ١٢.	
KH Rosen, Elementary Number Theory and its Applications, 8th edition, Addison-Wesley, 2015.	الكتب المقررة المطلوبة (المنهجية أن وجدت)
Introduction to Number Theory - Professor Dr. Faleh Al-Dosari - First Edition 2007	
The most important books and special sources on number theory available in the central library, the science library, and the department.	4
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General	Lectures	Definitions of crisp sets,	The Crisp sets	4	the first
questions and	20000005	intersection, union,	ine ensp sets	•	
discussion		complement sets			
General	Lectures	Directed and undirected	Fuzzy set theory	4	the
questions and	Lectures	graph	i uzzy set theory		second
discussion		gruph			second
General	Lectures	Definitions and examples	Fuzzy set theory	4	the third
questions and	Lectures	Definitions and examples	I uzzy set meory	т	the time
discussion					
General	Lectures	Expanding concepts of	Fuzzy set theory	4	the fourth
questions and	Lectures	fuzzy sets	ruzzy set meory	-	the routin
discussion		Iuzzy sets			
General	Lectures	Basic set – theoretic	Fuzzy set theory	4	Fifth
questions and	Lectures	operations for fuzzy sets	ruzzy set meory	4	1 IIIII
discussion		operations for fuzzy sets			
General	Lectures	Convex fuzzy coto	Fuzzy oot theory	4	VI
questions and	Lectures	Convex fuzzy sets	Fuzzy set theory	4	V I
discussion					
General	Lectures	Condinality of fuggy cotd	Eugen est theory	4	Seventh
	Lectures	Cardinality of fuzzy setd	Fuzzy set theory	4	Seventii
questions and					
discussion	T		Energy and the serve	4	VIII
Annie's test	Lectures	Expansion of fuzzy sets	Fuzzy set theory	4	VIII
General	Lectures	Fuzzy relation on setsFuzz	•	4	Ninth
questions and			composition		
discussion					
Monthly exam	Lectures	Fuzzy matrixFuzz	y relation and composition	4	The tenth
General	Lectures	Operations on fuzzyFuzz	y relation and	4	eleventh
questions and		matrices	composition		
discussion					
General	Lectures	Fuzzy relation matrix Fuzz	y relation and	4	twelveth
questions and			composition		
discussion					
General	Lectures	Operation of fuzzyFuzz		4	Thirteenth
questions and		relation	composition		
discussion			_		
General	Lectures	Fuzz	y relation and	4	fourteenth
questions and		Composition of fuzzy	composition		
discussion		relation	1		
General	Lectures	Properties of fuzzyFuzz	y relation and	4	Fifteenth
questions and		relation	composition		
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مصادر التعلم والتدريس .17

Fuzzy Sets and Fuzzy Techniques by Joakim Lindblad (الكتب المقررة المطلوبة (المنهجية أن وجدت) 2017 Dubois and Henri Prade (2015), Fuzzy Sets and Systems: Theory and Applications Reading MA Systems: Theory and Applications, Reading, MA:

Addison-Wesley.	
The most important books and special sources on chaos theory located in the central library, the science library, and the department.	السب والمراجع الفائدة التي يوضعى بها (المجت العقية)
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General	Lectures	The properties vectors	Vectors in the plane and	4 the first

questions and		operations on vector,	in 3-space		
discussion		vectors in a space			
General	Lectures	The properties of a cross	Cross product	4	the
questions and		product and some			second
discussion		applications			
General	Lectures	The properties of a dot	Dot product	4	the third
questions and		product and some			
discussion		applications			
General	Lectures	Triangle inequality	Cauchy Schwarz	4	the fourth
questions and		theorem with applications			
discussion					
General	Lectures	Definitions with some	Vector spaces	4	Fifth
questions and		applications	-		
discussion					
General	Lectures	Definitions with some	Subspaces	4	VI
questions and		applications	-		
discussion					
General	Lectures	Definitions and theories	Linearly independence	4	Seventh
questions and					
discussion					
Annie's test	Lectures	Definitions and theories	Linearly dependence	4	VIII
General	Lectures	Definitions and theories		4	Ninth
questions and		deals with basis			
discussion					
Monthly exam	Lectures	Definitions and theories	dimension	4	The tenth
5		deals with dimension			
General	Lectures	Definitions with some of	The Rank of a matrix	4	eleventh
questions and		theorems			
discussion					
General	Lectures	Definitions and examples	Homogeneous Systems	4	twelveth
questions and			e i		
discussion					
General	Lectures	Definitions and theories	Orthogonal basis and	4	Thirteenth
questions and			orthonormal basis		
discussion					
General	Lectures	Definitions of linear	Linear transformations	4	fourteenth
questions and		transformations and their			
discussion		examples,			
General	Lectures		exam	4	Fifteenth
questions and				-	
discussion					

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مصادر التعلم والتدريس ١٢.

Elementary Linear Algebra with Applications by (جدت) Bernard Colman and David R.Hill (9th edition) by	الكتب المقررة المطلوبة (المنهجبة أن و
Bernard Colman and David R.Hill (9th edition) by	
2017	
صادر) Introduction to Linear Algebra / written by Bernard Coleman2010	المراجع الرئيسة (الم
Coleman2010	,

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General	Lectures	Some basic concepts	The object-oriented	(2)	the first

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questions and			approach and who to use		
discussion			the		
				(2)	
				Practical	
General	Lectures	Application of C++	C++ programming	(2)	the
questions and		11		Theoretic	second
discussion				al	second
discussion					
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General	Lectures	Application of C++	Integer variables		the third
questions and				Theoretic	
discussion				al	
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General	Lectures	Application of C++	Character variable		the fourth
	Lectures	Application of C++		(2) Theoretic	
questions and					
discussion				al	
				(2)	
				Practical	
General	Lectures	Application of C++	Type float, String	(2)	Fifth
questions and		**	• •	Theoretic	
discussion				al	
discussion				(2)	
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General	Lectures	Application of C++			VI
questions and			Arithmetic operators	Theoretic	
discussion				al	
				(2)	
				Practical	
General	Lectures	Application of C++	Increment and		Seventh
questions and	Lectures	ripplication of C++	decrement operators,		
discussion			Relational		
discussion			Kelational		
				(2)	
				Practical	
Annie's test	Lectures	Application of C++	Loops: The for loop;	(2)	VIII
			Multiple statements in	Theoretic	
			loop		
				(2)	
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C	T a stan was a	A multiplication of Char	The if statements		NL: 41
General	Lectures	Application of C++		· · /	Ninth
questions and			Multiple statements		
discussion				al	
				(2)	
				Practical	
Monthly exam	Lectures	Application of C++	Nesting ifs inside loops;		The tenth
, , , , , , , , , , , , , , , , , , ,		rr control of the	Library function exit		
				al	
				(2)	
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General	Lectures	Application of C++	Function;	. ,	eleventh
questions and				Theoretic	
discussion				al	
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General	Lectures	Application of C++	SimpleFunction;	(2)	twelveth
questions and			_	Theoretic	
discussion				al	
				(2)	
				Practical	
General	Lectures	Application of C++	The function definition	(2)	Thirteenth
questions and				Theoretic	
discussion				al	
				(2)	
				Practical	
General	Lectures		Function; Returning	(2)	fourteenth
questions and			values from the	Theoretic	
discussion		Application of C++	functions	al	
				(2)	
				Practical	
General	Lectures	Application of C++	Arrays in C++	(2)	Fifteenth
questions and			programming (1)	Theoretic	
discussion				al	
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An introduction to computing Turbo C++, Sanford	الكتب المقررة المطلوبة (المنهجية أن وجدت)
Lesstma and Larry Nyhaff.2018	
An introduction to object-oriented design in C++, Jo	
Ellen Perry and Harold D. Levin.2015	
Object-oriented programming in turbo C++ by Robert	المراجع الرئيسة (المصادر)
Lafore.2013	
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General	Lectures	International student	Getting to know students	s 1	the first

quastions and			from different ports of		
questions and discussion			from different parts of the world and chatting		
uiscussion			U		
0 1	T 4		with them	1	
General	Lectures	Vocabulary	knowledge	1	the
questions and		development	Development of speech		second
discussion			vocabulary		
General	Lectures	Where in the world	Identify a location in the	1	the third
questions and			world		
discussion					
General	Lectures	Newspaper articles	Identify articles and how	1	the fourth
questions and			to read magazines		
discussion			_		
General	Lectures	Modern technology	Learn about the	1	Fifth
questions and			technology of his speech		
discussion					
General	Lectures	Conferences and visits	Identify the style of	1	VI
questions and	Loctures	Conferences and visits	writing in conferences	-	
discussion			writing in conterences		
General	Lectures	Science and our world	Science and our world	1	Seventh
questions and	Lectures	Science and our world	Science and our world	1	Sevenui
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discussion	T		Literatifies the	1	N/III
Annie's test	Lectures	Writing trends		1	VIII
~ 1	-		characteristics of writing		
General	Lectures	Reading air pollution		1	Ninth
questions and			characteristics of		
discussion			pollution using the		
			reading method		
Monthly exam	Lectures	Past and present	Learn about the rules of	1	The tenth
			the present and past		
			tense		
General	Lectures	The world of IT	Identify the basic	1	eleventh
questions and			characteristics of the		
discussion			nature of scientific		
			material		
General	Lectures	Inventions, discoveries		1	twelveth
questions and	Loctures	mventions, discoveries	characteristics of	-	ett ett ett
discussion			breakthroughs and		
alseassion			discoveries		
General	Lectures	Processes		1	Thirteentl
	Lectures	Processes	processes of the nature	1	1 mileenti
questions and			-		
discussion	T .		of matter	1	
General	Lectures	Travel and tourism	Learn about tourism and	1	fourteentl
questions and			travel		
discussion					
General	Lectures	Exam	4	1	Fifteenth
questions and					
discussion					

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General	Lectures	Linear equations	First order differential	1 4	the first			

questions and			equations		
discussion			*		
General	Lectures	Separable equations	First order differential	4	the
questions and			equations		second
discussion			*		
General	Lectures	Exact equations and	First order differential	4	the third
questions and		integration			
discussion			*		
General	Lectures	Factors	First order differential	4	the fourth
questions and			equations		
discussion			*		
General	Lectures	Homogeneous equations	First order differential	4	Fifth
questions and			equations		
discussion			*		
General	Lectures	Some of examples	First order differential	4	VI
questions and		-	equations		
discussion			*		
General	Lectures	Second order equations	Higher order linear	4	Seventh
questions and		reducible to first order	equations		
discussion			-		
Annie's test	Lectures	Higher order linear	Higher order linear	4	VIII
		equations with constant	equations		
		coefficients	-		
General	Lectures	Some of examples	Higher order linear	4	Ninth
questions and		-	equations		
discussion			-		
Monthly exam	Lectures	The method of	Higher order linear	4	The tenth
		undermined coefficients	equations		
General	Lectures	The method of variation of	Higher order linear	4	eleventh
questions and		parameters	equations		
discussion					
General	Lectures	Some of examples	Higher order linear	4	twelveth
questions and			equations		
discussion					
General	Lectures	Series solution near an	Series solution of second	4	Thirteenth
questions and		ordinary point	order linear equations		
discussion					
General	Lectures		Series solution of second	4	fourteenth
questions and		Regular singular points	order linear equations		
discussion					
General	Lectures	Some of examples	Series solution of second	4	Fifteenth
questions and			order linear equations		
discussion					

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مصادر التعلم والتدريس ١٢.

Hairer, Ernst; Norsett, Paul Syvert; Wanner, Gerhard (الكتب المقررة المطلوبة (المنهجية أن وجدت) (2013), Solving ordinary differential equations I: Nonstiff problems, Berlin, New York

Zill, Dennis GA First Course in Differential Equations 2016	المراجع الرئيسة (المصادر)
The most important books and special sources on ordinary differential equations available in the central library, the science library, and the department	الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير)
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7. Name of the course administrator (If more than one name is mentioned)	
Name: Dr. Duraid braceletsEmail: <u>asawer.d@sc.uobaghdad.edu.iq</u>	
 ٨. اهداف المقرر 	
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۱۰. بنية المقرر							
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General	Lectures	Graph, order, size and	· · ·	4	the first		
questions and		simple, Multiple graph,					
discussion	.	and subgroup			.1		
General	Lectures	Directed and undirected	1 1	4	the		
questions and		graph			second		
discussion	T former	Companya of allowed		4	1 1 1		
General	Lectures	· · ·	Adjacent vertex, degree		the third		
questions and discussion		vertex and degree of					
discussion		vertex with some examples					
General	Lectures	Some of its application		4	the fourth		
questions and	Lectures	Some onts application	graph	4			
discussion			graph				
General	Lectures	Some of its application and	Degree sequences	4	Fifth		
questions and	Lectures	theorems of degree	e 1	4	1 II ui		
discussion		theorems of degree					
General	Lectures	Intersection of graphs,	Operations on the graph	4	VI		
questions and	Lectures	complement of graph			• •		
discussion							
General	Lectures	Product of graphs.	Operations on the graph	4	Seventh		
questions and		composition of graphs					
discussion							
Annie's test	Lectures	Definitions, theorems and	Path, connected,	4	VIII		
		examples					
			weakly connected				
			graphs				
General	Lectures	Definitions, theorems and	· · · · ·	4	Ninth		
questions and		examples	· ·				
discussion			graph				
Monthly exam	Lectures	Definition of walk, open		4	The tenth		
		and closed walk, cycle					
	T .	path		4	1 1		
General	Lectures	Some important matrix,		4	eleventh		
questions and		adjacent matrix, path	4				

discussion		matrix and incidence matrix			
General questions and discussion	Lectures	Definitions, theorems and examples	Bipartite graph and complete		twelveth
General questions and discussion	Lectures	Definitions and some of its applications	Loop and circuits and circuit matrix		Thirteenth
General questions and discussion	Lectures	Eulerian path, Eulerian circuit, Eulerian graph and Eulerian cycle	Eulerian	4	fourteenth
General questions and discussion	Lectures	Some theorems of trees and its applications	Trees	4	Fifteenth

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مصادر التعلم والتدريس ١٢.

الكتب المقررة المطلوبة (المنهجية أن وجدت) Graph Theory by H. K. Taluja and D. Bhardwaj2016

]	Harry, Frank(2010), Graph Theory, Reading, MA:	المراجع الرئيسة (المصادر)
	Addison-Wesley.	
	The most important books and special sources on the	الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية،
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General	Lectures	Definitions, theorems and	The eigen values and the	4	the first		

questions and		some examples	eigen vectors		
discussion					
General	Lectures	Definitions and examples		4	the
questions and			polynomial		second
discussion					
General	Lectures	Definitions and examples	The characteristic	4	the third
questions and			equation		
discussion					
General	Lectures	Some of examples	Similar matrices	4	the fourth
questions and					
discussion					
General	Lectures	Some of examples	Diagonalizable	4	Fifth
questions and		-	, , , , , , , , , , , , , , , , , , ,		
discussion					
General	Lectures	Several examples	Theorems of	4	VI
questions and			diagonalizable		
discussion			C .		
General	Lectures	Definitions and its	Diagonalizable of	4	Seventh
questions and		properties	U		
discussion		1 1	5		
Annie's test	Lectures	Some of examples	Orthogonal matrix	4	VIII
		-	properties		
General	Lectures	Theorems with some	Linear programming	4	Ninth
questions and		examples			
discussion					
Monthly exam	Lectures	Several examples	Geometric solution	4	The tenth
General	Lectures	Definitions, theorems and	Simplex methods to	4	eleventh
questions and			solve the problem of		
discussion		1	linear program		
General	Lectures	Some of examples		4	twelveth
questions and		1	1		
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General	Lectures	Some of examples	Quadratic equations	4	Thirteent
questions and		F	C		
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General	Lectures		Planes	4	fourteentl
questions and		Definitions, theories and	1	-	
discussion		some examples	\$ 		
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questions and	Lectures	Some of example	The equations of a plane	т	1 incontin
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مصادر التعلم والتدريس ١٢.

Abstract and linear algebra by D. Burton 2018 (المنهجية أن وجدت)

Introduction to Linear Algebra / written by Bernard	المراجع الرئيسة (المصادر)
Coleman 2012	

The most important books and special sources on linear algebra available in the central library, the science library, and the department.	الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير)
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General questions and	Lectures	Definitions, some of Bas theorems and examples	sic of operation Research	4 the first

discussion					
General	Lectures	Some of its application	Linear programming	4	the
questions and			model		second
discussion					
General	Lectures	Some of its application	Construction of LP.	4	the third
questions and			model		
discussion					
General	Lectures	Some of its application	Solutions of LP. model	4	the fourth
questions and					
discussion					
General	Lectures	Some of its application	Graphical LP. solution	4	Fifth
questions and			1		
discussion					
General	Lectures	Some of its application	Solutions of	4	VI
questions and			maximization model		
discussion					
General	Lectures	Some of its application	Some exceptional cases	4	Seventh
questions and		11	1 I		
discussion					
Annie's test	Lectures	Some of its application	Slack, Surplus and	4	VIII
		11	unrestricted variables		
General	Lectures	Some of its application		4	Ninth
questions and					
discussion					
Monthly exam	Lectures	Definitions, some of	Determination of basic	4	The tenth
2		theorems and examples			
General	Lectures	Some of its application	The simplex method	4	eleventh
questions and					
discussion					
General	Lectures	Some of its application	The Big M-method	4	twelveth
questions and			<u> </u>		
discussion					
General	Lectures	Some of its application	The two-phase method	4	Thirteenth
questions and			I I		
discussion					
General	Lectures		Puality of LP.	4	fourteenth
questions and		Definitions, some of	2		
discussion		theorems and examples			
General	Lectures	Definitions, some of	Dual problem where the	4	Fifteenth
questions and			primal is in standard		
discussion		······································	form		

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مصادر التعلم والتدريس ١٢.

المقررة المطلوبة (المنهجية أن وجدت) Operation research, Gupta and Hira2016
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Operation research, Hamdy Taha 2017	7	المصادر)	الرئيسة (المراجع
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The most important books and special sources on linear programming available in the central library, the science library, and the department.	الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير)
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Name: Dr.	Rehab NouriEn	nail: <u>rehab.s</u>	shallan@sc.	uobaghdad.edu.	iq	
<mark>the name</mark>	: Dr. Ghadeei	: Jassim En	nail: <u>ghadee</u>	r.j@sc.uobaghda	ad.edu.iq	
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General questions and	Lectures	Definition, e		Random variable probability distrib	and 4 oution	the first

discussion					
General questions and discussion	Lectures	distribution function		4	the second
General questions and discussion	Lectures	Theorem, properties of cumulative distribution function		4	the third
General questions and discussion	Lectures	Definitions and several examples	Probability distribution function	4	the fourth
General questions and discussion	Lectures	Definitions with some examples		4	Fifth
General questions and discussion	Lectures	Relation between distribution function and probability density function definitions, and examples		4	VI
General questions and discussion	Lectures	Expectaion, The variant, definitions, Examples Moments	Expectation	4	Seventh
Annie's test	Lectures	The Median Moment generating function, Characteristic function		4	VIII
General questions and discussion	Lectures	Uniform Distribution Binomial distribution Bernoli distribution		4	Ninth
Monthly exam	Lectures	Negative Bernoli distribution Poisson Distribution Hyper geometric distribution		4	The tenth
General questions and discussion	Lectures	Uniform and Normal Distribution moments	Continuous Distribution	4	eleventh
General questions and discussion	Lectures	Gamma function, Gamma distribution		4	twelveth
General questions and discussion	Lectures	Join marginal Discrete joint distribution		4	Thirteenth
General questions and discussion	Lectures	Join probability density functions Marginal distribution	Function	4	fourteenth
General questions and discussion	Lectures	Expectation of sum of a random variable Covariance and correlation coefficient	Conditional Distribution	4	Fifteenth

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مصادر التعلم والتدريس ١٢.						
Introduction to statics by Degroote2015	الكتب المقررة المطلوبة (المنهجية أن وجدت)					
	المراجع الرئيسة (المصادر)					
The most important books and special sources on statistics and probability available in the central	الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية،					
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General	Lectures	The	object-oriented	Some basic concepts	(2)	the first		

questions and		approach and who to use		Theoretic	
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General	Lectures	C++ programming basics	Application of C++		the
questions and	Lectures	er i programming busies	ripplication of C++	Theoretic	
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General	Lectures	Integer variables	Application of C++		the third
questions and		6	II ······	Theoretic	
discussion				al	
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General	Lectures	Character variable	Application of C++		the fourth
questions and				Theoretic	
discussion				al	
				(2)	
				Practical	
General	Lectures	Type float, String	Application of C++		Fifth
questions and		constants		Theoretic	
discussion				al	
				(2)	
				Practical	
General	Lectures	Type of conversion,	Application of C++	(2)	VI
questions and		Arithmetic operators	**	Theoretic	
discussion				al	
				(2)	
				Practical	
General	Lectures	Increment and decrement	Application of C++	(2)	Seventh
questions and		operators, Relational		Theoretic	
discussion				al	
				(2)	
				Practical	
Annie's test	Lectures	Loops: The for loop;	Application of C++		VIII
		Multiple statements in		Theoretic	
		loop		al	
				(2)	
				Practical	
General	Lectures	The if statement; Multiple	Application of C++		Ninth
questions and		statements		Theoretic	
discussion				al	
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Monthly exam	Lectures	Nesting ifs inside loops;	Application of C++		The tenth
		Library function exit		Theoretic	
				al	
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General	Lectures	Function;	Application of C++		eleventh
questions and discussion				Theoretic	
discussion				al	
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General	Lectures	SimpleFunction;	Application of C++	(2)	twelveth
questions and				Theoretic	
discussion				al	
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General	Lectures	The function definition	Application of C++	(2)	Thirteenth
questions and				Theoretic	
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General	Lectures	Function; Returning		(2)	fourteenth
questions and		values from the functions		Theoretic	
discussion			Application of C++	al	
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questions and		programming (1)		Theoretic	
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مصادر التعلم والتدريس ١٢.				
An introduction to computing Turbo C++, Sanford Lesstma and Larry Nyhaff.2018				
Object-oriented programming in turbo Č++ by Robert (المصادر) المراجع الرئيسة المراجع الرئيسة المراجع الرئيسة المصادر)				
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General	Lectures	Several	variables	Review some concepts	1	the first

questions and discussion		calculator	in calculus		
General questions and discussion	Lectures		Review some concepts in calculus	1	the second
General questions and discussion	Lectures	Implicit differentiation	Review some concepts in calculus	1	the third
General questions and discussion	Lectures	Charge of variables	Review some concepts in calculus	1	the fourth
General questions and discussion	Lectures	Stationary points	Calculate quadratic formulas and eigenvalues	1	Fifth
General questions and discussion	Lectures	Quadratic forms and eigenvalues	Learn some points	1	VI
General questions and discussion	Lectures	Piscipleminor test	accountPMT	1	Seventh
Annie's test	Lectures	Uuconstrained optimization	The concept of optimization is unrestricted	1	VIII
General questions and discussion	Lectures	Local extrema	Local points	1	Ninth
Monthly exam	Lectures	Cobb-Douglas production function	Cobb-Duclas production function	1	The tenth
General questions and discussion	Lectures	Constrained	Learn about some of the equations used	1	eleventh
General questions and discussion	Lectures	Lagrange multiplier and Bordered Hessian	Learn about some important concepts	1	twelveth
General questions and discussion	Lectures	maximization with	The concept of constrained optimization using inequality	1	Thirteenth
General questions and discussion	Lectures	Kuhn-Tucker theory	Learn about Khan Tucker theory	1	fourteenth
General questions and discussion	Lectures	Exam		1	Fifteenth

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CPSimon, L Blume, Mathematics for economists, WW Nort, 2014	الكتب المقررة المطلوبة (المنهجية أن وجدت)
Alpha C.Charge, Fundamental Methods of Mathematics Economics,McGraw-Hill,1984. D.Baily, Mathematics in economics, McGraw- Hill, 1988. A.Ostazewski, Mathematics in economics models, Blackwell, 1993.	المراجع الرئيسة (المصادر)
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	4/60			
7. Name of the course administrato	r(If more tha	n one name is mentic	oned)	
Name: Dr. Mohamed SabahEmail: <u>m</u>	<u>mmsh@sc.u</u>	obaghdad.edu.iq		
Name: Dr. Alaa Hussein Email:	alaa.h@sc.u	obaghdad.edu.iq		
 ٨. اهداف المقرر 	1			
Πρεπαρινγγραδυατεσ σπεχιαλιζεδινματηεμα		اهداف ا		
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Encouraging research programs and participat	ng			
in scientific conferences and seminars				
Achieving quality and academic accreditation ٩. استر اتيجيات التعليم و التعلم				
	entres the impor	tance of time		
 Managing the lecture in a way that indicates the importance of time Assigning the student some group assignments 				
Websites and electronic classes				
 بنية المقرر 				
الموضوع طريقة التعلم طريقة التقييم	اسم الوحدة او	مخرجات التعلم المطلوبة	الأسبوع الساعات	

General	Lectures	The concept of numerical	Elementary <i>numerical</i>	4	the first
questions and	Lectures	analysis	-	-	the mot
discussion					
General	Lectures	Absolute error, Relative	The numerical error	4	the
questions and		errors			second
discussion			J I I		
General	Lectures	Rounding errors	Resource of errors	4	the third
questions and					
discussion					
General	Lectures	Truncation errors, Human	Resource of errors	4	the fourth
questions and		errors			
discussion					
General	Lectures	Examples	Floating point arithmetic	4	Fifth
questions and	20000000		- round bound menune	•	
discussion					
General	Lectures	Bisection method, Newton	Numerical solution of	4	VI
questions and	Leetures	Raphson		•	• •
discussion		method,Secantmethod	-		
General	Lectures		Numerical solution of	4	Seventh
questions and	Leetures	(Definition, fixed point		•	Seventii
discussion		(Definition, fixed point theorem)	-		
Annie's test	Lectures	Error analysis for iterative		4	VIII
i mine s test	Lectures	methods (order of		т	V 111
		convergence)	noniniear equation		
General	Lectures	Direct methods, iterative	Numerical solution of	4	Ninth
questions and	Lectures	methods, error analysis		-	1 (IIIII
discussion			systems		
Monthly exam	Lectures	Convergent and stability		4	The tenth
Wollding exam	Lectures	of the methods		-	
		of the methods	systems		
General	Lectures	Interpolation and		4	eleventh
questions and	Lectures	extrapolation	-	•	ele ventil
discussion		extrapolation			
General	Lectures	Lagrange polynomial,	Interpolation methods	4	twelveth
questions and	Lectures	Lugrunge porynomiu,	interpolation methods	•	twerveur
discussion					
General	Lectures	Interpolation with	Interpolation methods	4	Thirteentl
questions and	Lectures	differences (finit and	<u>^</u>	-	1 militeenti
discussion		divided) polynomials,			
discussion		error analysis			
General	Lectures	Interpolation with cubic		4	fourteentl
questions and	Loctures	plain	-	т	
discussion		pian			
General	Lectures	Examples and theories	Approximation with	4	Fifteenth
questions and	Lectures		least square method	-	1 meenul
discussion			icasi square metilou		
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مصادر التعلم والتدريس ١٢.

1. Froberg CE, Introduction to Numerical Analysis,	الكتب المقررة المطلوبة (المنهجية أن وجدت)
2018.	
2. Hildebrand. FB, WH, Introduction to numerical	
analysis, 2017.	
Ali Muhammad Sadiq and Ibtisam Kamal Al-	
Din3.	
, 1986. University of Baghdad, Principles of Numerical Analysis	
Kazem Muhammad Hussein Al-Lami,Introduction to numerical analysis. University of Basra, 1987	المراجع الرئيسة (المصادر)
The most important books and sources on numerical fraud available in the central library,	الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية،
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7. Name of the course administrator(If more than one name is mentione	d)
Name: Saja Ghazi	
Ali Abdel Kazem	
Mohamed Salam	
Zainab Mohammed Maryam KhudairEmail:	
المقرر. ٨. اهداف المقرر	
Πρεπαρινγ γραδυατεσ σπεχιαλιζεδ ιν ματηεματιχ اهداف المادة الدراسية	
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Achieving quality and academic accreditation•	
 ٩. استراتيجيات التعليم والتعلم 	
Managing the lecture in a way that indicates the importance of time	الماستراتيجية
Assigning the student some group assignments	
Websites and electronic classes	

 ١٠. بنية المقرر طريقة التقييم 	طريقة التعلم	اسم الوحدة او الموضوع	مخرجات التعلم المطلوبة	الساعات	الأسبوع
General questions and discussion	Lectures	Elementary numerical analysis	numerical analysis	2	the first
General questions and discussion	Lectures	The numerical error types	errors	2	the second
General questions and discussion	Lectures	Resource of errors	C	2	the third
General questions and discussion	Lectures	Resource of errors	Truncation errors, Human errors	2	the fourth
General questions and discussion	Lectures	Floating point arithmetic	Examples	2	Fifth
General questions and discussion	Lectures	Numerical solution of nonlinear equation	Bisection method, Newton Raphson method,Secantmethod	2	VI
General questions and discussion	Lectures		Fixed pointiteration (Definition, fixed point theorem)	2	Seventh
Annie's test	Lectures		Error analysis for iterative methods (order of convergence)	2	VIII
General questions and discussion	Lectures	Numerical solution of linear and nonlinear systems		2	Ninth
Monthly exam	Lectures	Numerical solution of linear and nonlinear systems		2	The tenth
General questions and discussion	Lectures	Interpolation methods	Interpolation and extrapolation	2	eleventh
General questions and discussion	Lectures	Interpolation methods	Lagrange polynomial,	2	twelveth
General questions and discussion	Lectures		Interpolation with differences (finit and divided) polynomials, error analysis	2	Thirteenth
General questions and discussion	Lectures	Interpolation methods	Interpolation with cubic plain	2	fourteenth
General questions and discussion	Lectures	Approximation with least square method	-	2	Fifteenth

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1. Froberg CE, Introduction to Numerical Analysis,	الكتب المقررة المطلوبة (المنهجية أن وجدت)
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Kamal Al-Din3.	
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7. Name of the course administrator (If more than one name is mentioned)	
Name: Dr. Alaa AbbasEmail: <u>alaa.elewi@sc.uobaghdad.edu.iq</u>	
Name:: Dr. Iman via email: <u>iman.athab@sc.uobaghdad.edu.iq</u>	

هداف المقرر	1.4						
Πρεπαρινγ γραδυατεσ σπεχιαλιζεδ וא ματηεματιχ اهداف المادة الدراسية σ το χοντριβυτε το τηε δεσελοπμεντ οφ τηε χουντ ρψ•							
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 ١٠. بنية المقرر طريقة التقييم 	طريقة التعلم	ة او الموضوع	اسم الوحد	جات التعلم المطلوبة	مخر	الساعات	الأسبوع
General questions and discussion	Lectures		Ring	Definition elementary propertion	and	4	the first
General questions and discussion	Lectures		Ring	Examples of	rings	4	the second
General questions and discussion	Lectures		Ring	Zero divisor, ider sub	ntity, rings	4	the third
General questions and discussion	Lectures	Integral domai	n and fields	Definition, prope and exan		4	the fourth
General questions and discussion	Lectures	Ring hom	omorphism	Definition, prope and exan		4	Fifth
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discussion					
General	Lectures	Isomorphisms theory of	Definition, properties	4	VI
questions and		rings	and examples		
discussion					
General	Lectures	Ideals	Definition, properties	4	Seventh
questions and			and examples		
discussion					
Annie's test	Lectures	Certain special ideals	Definition, properties	4	VIII
			and examples		
General	Lectures	Maximal ideals	Examplesand Theorems	4	Ninth
questions and					
discussion					
Monthly exam	Lectures	Prime ideals	Examplesand Theorems	4	The tenth
General	Lectures	The relationship between	Theorems and examples	4	eleventh
questions and		prime ideal and a maximal			

discussion		ideal		
General questions and	Lectures	The quoient ringsDefinition, properties and examples	4	twelveth
discussion		and examples		
General	Lectures	The Boolean ring properties and examples	4	Thirteenth
questions and discussion				
General	Lectures	The principal idealDefinition, properties	4	fourteenth
questions and		domain and examples		
discussion				
General	Lectures	The internal direct sum, properties and examples	4	Fifteenth
questions and		the external direct product		
discussion				

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	A first course in Rings and ideals –David M.	المراجع الرئيسة (المصادر)
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		,	an one name is menti	oned)
Name: L	Dr. Sun KhaledEma	ail: <u>wasan.hasan@sc.</u>	uobaghdad.edu.iq	
Name:	Dr. Rana Adnai	n Email:rana.a@sc.u	obaghdad.edu.iq	
Name:	Dr. Rana Adnar	n Email: <u>rana.a@sc.u</u>	obaghdad.edu.iq	
		n Email: <u>rana.a@sc.u</u>	obaghdad.edu.iq	
هداف المقرر	۸. ۱			
هداف المقرر Πρεπαρινγγραδι	Ι .Λ υατεσ σπεχιαλιζεδ	ادة الدر اسياً ιν ματηεματιχ		
هداف المقرر Πρεπαρινγγραδι	۸. ۱	ادة الدر اسياً ιν ματηεματιχ		
هداف المقرر Πρεπαρινγ γραδι το χοντριβυτε οψ•	Ι .Λ υατεσ σπεχιαλιζεδ	ادة الدر اسية ιν ματηεματιχ τοφ τηε χουντ		
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General questions and	Lectures	Real numbers and rational numbers		4	the first
-		numbers	<u>Equal sets, Subsets</u>		
discussion General	Lastanas	The velotionship hotoroom	Duanan aat amuta aat	4	<u>41- a</u>
	Lectures	The relationship between		4	the
questions and		the field of rational			second
discussion		numbers and the field of			
<u> </u>	*	real numbers			
General	Lectures	The density of rational		4	the third
questions and		(irrational) numbers	Disjoint set, Symmetric		
discussion	-		difference		
General	Lectures	Sequence of real numbers		4	the fourth
questions and			set, Algebra of sets		
discussion					
General	Lectures		Compound statements,	4	Fifth
questions and		divergence of sequence			
discussion			Bio-condition statement		
General	Lectures	Monotonic and bounded	0,,	4	VI
questions and		sequence	Contradiction and		
discussion			Arguments		
General	Lectures	Cauchy sequence	Open sentence,	4	Seventh
questions and			Quantified statements		
discussion					
Annie's test	Lectures	Infinite series	Cartesian product,	4	VIII
			Relations		
General	Lectures	Convergence test	Symmetric relation	4	Ninth
questions and		_	-		
discussion					
Monthly exam	Lectures	Metric space	Transitive relation -	4	The tenth
General	Lectures	Basic principals in	Equivalence relation,	4	eleventh
questions and		Topology	Partition of the set		
discussion					
General	Lectures	Convergence sequence in	Partially ordered set	4	twelveth
questions and		a metric space	-		
discussion		-			
General	Lectures	Cauchy sequence in a	Totally ordered set	4	Thirteenth
questions and		matric space			
discussion					
General	Lectures	Complete metric space	Domain and Co-domain	4	fourteenth
questions and			of the function		
discussion					
General	Lectures	Compact metric space	Algebra of functions	4	Fifteenth
questions and		r		•	
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مصادر التعلم والتدريس ١٢.

Real analysis, Royden, New York, 2018. الكتب المقررة المطلوبة (المنهجية أن وجدت). Principles of Mathematical Analysis, Rudin, 2000.

Introduction of Mathematical	المراجع الرئيسة (المصادر)
analysis,WilliamR.2017. Introduction to Mathematical Analysis, written by:	
Professor Dr. Adel Ghassan Naoum2000 The most important books and special sources on	
mathematical analysis located in the central library,	الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية،
the science library, and the department.	التقارير)
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General questions and	Lectures	Sampling d	istribution theory	Definition and exa	amples	4 the first

discussion					
General	Lectures	Transformations of	The distribution function	4	the
questions and		random variables	s technique		second
discussion					
General	Lectures	Transformations of	Change of variable	4	the third
questions and		random variables	s technique		
discussion					
General	Lectures	Transformations of	f mgf technique	4	the fourth
questions and		random variables	s		
discussion					
General	Lectures	The Beta and t	Definition, properties	4	Fifth
questions and		distribution	and examples		
discussion			_		
General	Lectures	The F-distribution	Definition, properties	4	VI
questions and			and examples		
discussion			_		
General	Lectures	The distribution of and	Definition, properties	4	Seventh
questions and		(normal case) $\overline{X} \frac{(n-1)s^2}{\sigma^2}$			
discussion		$(\text{Hormat Case}) = \frac{1}{\sigma^2}$	-		
Annie's test	Lectures	Distribution of orde	Definition, properties	4	VIII
		statistics			
General	Lectures	Limiting distributions	Definition and examples	4	Ninth
questions and		C C			
discussion					
Monthly exam	Lectures	The central limit theorem	Definition, properties and examples	4	The tenth
General	Lectures	Methods of poin	-	4	eleventh
questions and	Looturos	estimation		•	ere venun
discussion					
General	Lectures	Methods of maximum	Some of examples	4	twelveth
questions and		likelihood	1	•	
discussion					
General	Lectures	Properties of estimator	r Unbiasedness,	4	Thirteent
questions and			Minimum MSE	•	
discussion					
General	Lectures	Consistency, Sufficiency	Definition, properties	4	fourteent
questions and	Lectures	Source, Surreicher	and examples	•	1001teent
discussion			und examples		
General	Lectures	The Rao-Blackwel	Completeness and	4	Fifteenth
questions and	Locturos	theorem	-	т	
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مصادر التعلم والتدريس ١٢.

Degroot, M.H., "Probability and Statistics" Third Ed.,	الكتب المقررة المطلوبة (المنهجية أن وجدت
2002, Addison Wesley. Hogg, R. and Craig, A., "Introduction to Mathematical Statistics" 1995, New York.	

Mood, A. M., et al, "Introduction to the theory of statistics" 1974, Tokyo.	المراجع الرئيسة (المصادر)
The most important books and special sources on mathematical analysis located in the central library, the science library, and the department.	الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير)
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General questions and	Lectures		Group	Definition and examp	ples 4 the first

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General	Lectures	Subgroup	Definition and examples	4	the
questions and					second
discussion					
General	Lectures	Cyclic group	Definition, properties	4	the third
questions and			and examples		
discussion			Ĩ		
General	Lectures	Finitely generated group	Definition, properties	4	the fourth
questions and			and examples		
discussion			1		
General	Lectures	Center of a group	Definition, properties	4	Fifth
questions and			and examples	-	
discussion					
General	Lectures	Normal subgroup	Definition, properties	4	VI
questions and			and examples	•	
discussion			und chumpies		
General	Lectures	quotient groups	Definition, properties	4	Seventh
questions and	Lectures	quotient group	and examples		Sevenar
discussion			and examples		
Annie's test	Lectures	Homomorphism	Definition, properties	4	VIII
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General	Lectures	The isomorphism theory	Properties and examples	4	Ninth
questions and	2000000		roperios and enampres	•	1 (11101
discussion					
Monthly exam	Lectures	The internal direct sun	Definition, properties	4	The tenth
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General	Lectures	The external direc	tDefinition, properties	4	eleventh
questions and		produc	t and examples		
discussion		*			
General	Lectures	The p-group	Definition, properties	4	twelveth
questions and			and examples		
discussion					
General	Lectures	The Barnsid's Theorm	properties and examples	4	Thirteentl
questions and					
discussion					
General	Lectures	The Sylow's subgroup	Definition, properties	4	fourteenth
questions and		,	and examples		
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Abstract and linear algebra by D. Burton 2017	الكتب المقررة المطلوبة (المنهجية أن وجدت)
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. Group theory written by Dr. Basil Atta Al- المراجع الرئيسة (المصادر) المراجع الرئيسة المصادر) المراجع الرئيسة المصادر (المصادر)	

The most important books and special sources on group theory available in the central library, the science library, and the department.	الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير)
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		Partial differential eq	uations				
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General questions and discussion	Lectures	Partial Differential	Definitions of the partial differential		the first		

General questions and discussion	Lectures	Claaification second order PDF	Solution of partial differential equation	4	the second
General questions and discussion	Lectures	The general form of the PDE of first order	Some of examples	4	the third
General questions and discussion	Lectures	Lagrange's Equation	Linear Partial differential equations	4	the fourth
General questions and discussion	Lectures	Nonlinear partial differential equation	differential equations of the form $f(p,q)=0$, f(z,p,q)=0, f1(x,p)=f2(y,q)	4	Fifth
General questions and discussion	Lectures	Clairout extended PDE	General form of linear PDES	4	VI
General questions and discussion	Lectures	Clairout extended PDE	Partial differential operator	4	Seventh
Annie's test	Lectures	Inverse of the partial differential operator	Some of examples	4	VIII
General questions and discussion	Lectures	Linear PDEs with homogeneous and constant coefficients	Some of examples	4	Ninth
Monthly exam	Lectures	Linear PDEs with constant coefficients and nonhomogeneous terms	Some of examples	4	The tenth
General questions and discussion	Lectures	Reducible PDEs, irreducible PDEs	Some of examples	4	eleventh
General questions and discussion	Lectures	Cauchy's linear PDE	Some of examples	4	twelveth
General questions and discussion	Lectures	Method of separation of variables	Some of examples	4	Thirteenth
General questions and discussion	Lectures	Fourier series	Half range Fourier series	4	fourteenth
General questions and discussion	Lectures	Integral transform	Laplace transform and application laplace transform, Fourier transforms and application	4	Fifteenth

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الكتب المقررة المطلوبة (المنهجية أن وجدت) Integral transformation and their applications. 2015

Solving partial differential equations and their	
applications - Dr. Nouri Farhan.2018	
Partial Differential Equations (Atallah Thamer).2010	المراجع الرئيسة (المصادر)
The most important books and special sources on partial differential equations available in the central	الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية،
library, the science library, and the department.	التقارير)
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7. Name of the course administrator(If more than one name is mentioned)	
Name: Dr. Sherine RasoulEmail: shireen.jawad@sc.uobaghdad.edu.iq	
Name: Dina Sultan Email: <u>dina.s@sc.uobaghdad.edu.iq</u>	
 ٨. اهداف المقرر 	
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Achieving quality and academic accreditation•	
 ٩. استر اتيجيات التعليم و التعلم 	
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General	Lectures	Iterates of functions	Fixed points, examples	4	the first
questions and					
discussion					
General	Lectures	Iterates of functions	Graphical analysis of the	4	the
questions and			orbit, examples,		second
discussion					
General	Lectures		Attracting fixed points,	4	the third
questions and			repelling fixed points		
discussion			with examples,		
General	Lectures	Iterates of functions	-	4	the fourth
questions and			eventually fixed point		
discussion					
General	Lectures	Tent function	· · ·	4	Fifth
questions and			attracting periodic points		
discussion					
General	Lectures	Tent function		4	VI
questions and			points, families of		
discussion			functions, quadratic		
			family		
General	Lectures	Bifurcation diagram of the	Period-doubling	4	Seventh
questions and		family fµ	bifurcation		
discussion					
Annie's test	Lectures	Bi furcation diagram of		4	VIII
		the family $f\mu$			
General	Lectures	Bi furcation diagram of	Period-3 points, Li-	4	Ninth
questions and		the family fu	yorke theorem,		
discussion					
Monthly exam	Lectures	Bifurcation diagram of the	Schwarzian derivative	4	The tenth
		family fµ			
General	Lectures	One-dimensional chaos	Similar matrices,	4	eleventh
questions and			Dynamics of linear		
discussion			function [theorems and		
			examples]		
General	Lectures	One-dimensional chaos	Invariant set, nonlinear	4	twelveth
questions and			maps, area-contracting		
discussion			map, area expanding		

						map		
General questions and discussion	Lectures	Stable	and manifold	unstable theorem	V 1	d point	4	Thirteenth
General questions and discussion	Lectures	Stable	and manifold		Non-hyperbolic	fixed point	4	fourteenth
General questions and discussion	Lectures	Stable	and manifold	unstable theorem		n Maps	4	Fifteenth

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مصادر التعلم والتدريس .17

Encounters with chaos Denny Gulicle 2014-Micraw- Hill.	
Peinke, J., Parisi, J., Rossler, Otto E., Stoop, R., Encounter With Chaos: Self-Organized Hierarchical Complexity in Semiconductor Experiments2018	
The most important books and special sources on chaos theory located in the central library, the science library, and the department.	الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير)
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General	Lectures	International student	Getting to know	1	the first

questions and discussion			students from different parts of the world and		
<u> </u>	-	· · · · · ·	talking to them		
General questions and discussion	Lectures	Vocabulary development	Knowledge of the development of speech vocabulary	1	the second
General questions and discussion	Lectures	Where in the world	Identify a location in the world	1	the third
General questions and discussion	Lectures		Identify articles and how to read magazines	1	the fourth
General questions and discussion	Lectures	Modern technology	Learn about the technology of his speech	1	Fifth
General questions and discussion	Lectures	Conferences and visits	Identify the style of writing in conferences	1	VI
General questions and discussion	Lectures	Science and our world	Science and our world	1	Seventh
Monthly exam	Lectures	Writing trends	Identify the characteristics of writing	1	VIII
General questions and discussion	Lectures	Reading air pollution	Identify the characteristics of pollution using the reading method	1	Ninth
General questions and discussion	Lectures	-	Learn about the rules of the present and past tense	1	The tenth
General questions and discussion	Lectures		Identify the basic characteristics of the nature of scientific material	1	eleventh
General questions and discussion	Lectures	Inventions, discoveries	Identify the characteristics of breakthroughs and discoveries	1	twelveth
General questions and discussion	Lectures	Processes	Identify the basic processes of the nature of matter	1	Thirteenth
General questions and discussion	Lectures	Travel and tourism	Learn about tourism and travel	1	fourteenth
General questions and discussion	Lectures	Exam		1	Fifteenth

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مصادر التعلم والتدريس ١٢.

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Name:	Dr. Rana Adna	n Email: <u>rana.a@sc.uo</u>	<u>baghdad.edu.iq</u>		
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General questions and discussion	Lectures	Continuity	Definition and Examples	4	the first
General	Lectures	Uniformly continuous	Definition and	4	the
questions and			Examples		second
discussion					
General	Lectures	Intermediate value	Property and application	4	the third
questions and discussion					
General	Lectures	The sequence and series	Definition and	4	the fourth
questions and	Lectures	of functions		•	ine rourul
discussion					
General	Lectures	Uniformly convergence	Property and examples	4	Fifth
questions and		and point wise			
discussion		convergence			
General	Lectures	Power series	Interval of convergence	4	VI
questions and			of power series		
discussion					

General questions and discussion	Lectures	Riemann integration	Definition and examples	4	Seventh
Monthly exam	Lectures	Continuous functions and Riamann integration	Definitions and examples	4	VIII
General questions and discussion	Lectures	Monotonic functions and Riamann integration	Definitions and examples	4	Ninth
General questions and discussion	Lectures	Lebesgue Theory of Integration	Definitions and examples	4	The tenth
General questions and discussion	Lectures	Lebesgue Theory of Integration	Some properties of Lebesgue integration	4	eleventh
General questions and discussion	Lectures	Convergence Linear space of Riemann integration function	Definitions and examples	4	twelveth
General questions and discussion	Lectures	Measurable function and Lebesgue integration	Definitions and examples	4	Thirteenth
General questions and discussion	Lectures	Continuity of Lebesgue integration	Definitions and examples	4	fourteenth
General questions and discussion	Lectures	Functions of bounded variations	Definitions and examples	4	Fifteenth

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library, the science library, and the department.	التقارير)
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Library locations in some international	
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		Numerical Analysi	s (2)	
CodeT	he decision			۲.
		MA307		
the chapter	r / the year			۳.
		Second semester/202	3-2024	
Preparatio	n dateThis descrij	otion		. ٤
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	60) theoretical and 30 pr	ractical/4	
7. Name o	f the course ad	ministrator(If more thar	n one name is mention	ned)
		hEmail: <u>mmmsh@sc.uc</u>		,
Name:	Dr. Alaa Husse	ein Email: <u>alaa.h@sc.uc</u>	baghdad.edu.iq	
هداف المقرر	٨. ١			
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	e	group assignments		
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General	Lectures	Numerical differentiation	A A	4	the first
questions and		of higher numerical			
discussion		differentiation			
General	Lectures	Numerical differentiation	Non equispaced Bata,	4	the
questions and		of higher numerical	errors analysis		second
discussion		differentiation			
General	Lectures	Numerical integration	Numerical integration	4	the third
questions and		C C	for equispaced		
discussion			nodes, Trapezoidal		
			method		
General	Lectures	Numerical integration	Simpson method,	4	the fourth
questions and		6	Romberg integration		
discussion					
General	Lectures	Newton cots methods and	Gaussquadrature	4	Fifth
questions and	Lectures	Gaussian quadrature	1	т	1 mui
discussion		Gaussian quadrature			
General	Lectures	Newton cots methods and	Gauss Lagandra mathod	4	VI
questions and	Lectures	Gaussian quadrature	-	4	V I
discussion		Gaussian quadrature			
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General	Lectures	Newton cots methods and	5	4	Seventh
questions and		Gaussian quadrature			
discussion	T .				
Monthly exam	Lectures		Theorems and examples	4	VIII
		integration and error			
		analysis			
General	Lectures	Numerical solution of		4	Ninth
questions and		ordinary differential			
discussion		equations (single step			
		methods, multistep			
		mmethod)			
General	Lectures	Numerical solution of	5	4	The tenth
questions and		ordinary differential	<u> </u>		
discussion		equations (single step			
		methods, multistep			
		mmethod)			
General	Lectures	Numerical solution of	0	4	eleventh
questions and		ordinary differential	two		
discussion		equations (single step			
		methods, multistep			
		mmethod)			
General	Lectures	Numerical solution of	Runge-Kutta of order	4	twelveth
questions and		ordinary differential	four		
discussion		equations (single step			
		methods, multistep			
		mmethod)			
General	Lectures	· · · · · · · · · · · · · · · · · · ·	Theorems and examples	4	Thirteent
questions and		(explicit and implicit	-		
discussion		(enpirent and implicit methods)			
General	Lectures	Predictor-corretor		4	fourteent
questions and	Loctarob	methods		•	
discussion		memous	equations		
General	Lectures	Predictor-corretor	<u>^</u>	4	Fifteenth
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General questions and discussion	Lectures	Numerical differentiation of higher numerical differentiation		practical	the first
General questions and discussion	Lectures	Numerical differentiation of higher numerical differentiation	errors analysis		the second
General questions and discussion	Lectures	Numerical integration	for equispaced nodes,Trapezoidal method	practical	
General questions and discussion	Lectures	Numerical integration	Romberg integration		
General questions and discussion	Lectures	Newton cots methods and Gaussian quadrature	1	2 practical	Fifth
General questions and discussion	Lectures	Newton cots methods and Gaussian quadrature		2 practical	VI
General questions and discussion	Lectures	Newton cots methods and Gaussian quadrature	5	2 practical	Seventh
Monthly exam	Lectures	Multiplier numerical integration and error analysis	Theorems and examples	2 practical	VIII
General questions and discussion	Lectures	Numerical solution of ordinary differential equations (single step methods, multistep mmethod)		practical	
General questions and discussion	Lectures	Numerical solution of ordinary differential equations (single step methods, multistep mmethod)	higher order Tylor method	practical	The tenth
General questions and discussion	Lectures	Numerical solution of ordinary differential equations (single step methods, multistep mmethod)	two	practical	
General questions and discussion	Lectures	Numerical solution of ordinary differential equations (single step methods, multistep mmethod)	four	practical	
General questions and discussion	Lectures	Multistep methods (explicit and implicit methods)	Theorems and examples	2 practical	Thirteenth
General questions and discussion	Lectures	Predictor-corretor methods		practical	fourteenth
General questions and discussion	Lectures	Predictor-corretor methods	5	practical	Fifteenth

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numerical fraud available in the central library,	التقارير)
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Arithmetic groups	
CodeThe decision	۰۲
MA311	
the chapter / the year	۳.
Second semester/2023-2024	
Preparation date This description	.٤
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5. shapes the audience Available	
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60/4 7. Name of the course administrator(If more than one name is mentioned)	
Name: Dr. Ali Abed ObaidEmail: <u>ali.abd@sc.uobaghdad.edu.iq</u>	
 ٨. اهداف المقرر 	
Πρεπαρινγ γραδυατεσ σπεχιαλιζεδ ιν ματηεματιχ اهداف المادة الدر اسياً σ το χοντριβυτε το τηε δεσελοπμεντ οφ τηε χουντ ρψ•	
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General	Lectures	Historical background on	Definitions and	4	the first
questions and	Lectures	0	examples	Т	the mst
discussion		groups	examples		
General	Lectures		GapWhat is the	4	the
questions and	Lectures	applications	dap what is the	-	second
discussion		applications			second
General	Lectures	Computer applications	Definitions and	4	the third
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discussion			examples		
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questions and discussion			examples		
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General	Lectures	Overview	What is itgroup Action	4	Fifth
questions and					
discussion	-				* **
General	Lectures	Computer applications	Definitions and	4	VI
questions and			examples		
discussion	-	~			~
General	Lectures	Computer applications	Algorithm 1	4	Seventh
questions and					
discussion					
Monthly exam	Lectures		Algorithm 2	4	VIII
General	Lectures	Computer applications	Algorithm 3	4	Ninth
questions and					
discussion					
General	Lectures	Computer applications	Algorithm 4	4	The tenth
questions and					
discussion					
General	Lectures	Overview	Applications in group	4	eleventh
questions and			theory		
discussion					
General	Lectures	Computer applications	Definitions and	4	twelveth
questions and			examples		
discussion					
General	Lectures	Implementation of	Problems in groups 1	4	Thirteenth
questions and		programs			
discussion					
General	Lectures	Computer applications	Definitions and	4	fourteenth
questions and			examples		
discussion					
General	Lectures	Implementing computer	Full review	4	Fifteenth
questions and		programs and applications			
discussion					

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computer group theory available in the central	
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modelCourse description

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Mathematical statistics (2)

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		Email: <u>sadiq.n@sc.uol</u>			
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General questions and	Lectures	the Rao-Cramer	Definition and examples	4	ule first
discussion	-	Inequality	7		-
General questions and	Lectures	Efficiency, Exponential class of pdf's	-	4	the second
discussion		class of put s	x		second
General	Lectures	Random intervals	Definition and examples	4	the third

questions and discussion					
General questions and discussion	Lectures	Confidence intervals for of two means	Definition and examples	4	the fourth
General questions and discussion	Lectures	Confidence intervals for difference of two means	Definition and examples	4	Fifth
General questions and discussion	Lectures	Confidence intervals for variances		4	VI
General questions and discussion	Lectures	Confidence intervals for the ratio of two variances	,	4	Seventh
Monthly exam	Lectures	Confidence intervals for the difference for proportions	and examples	4	VIII
General questions and discussion	Lectures	Confidence intervals for the difference of two proportions	examples	4	Ninth
General questions and discussion	Lectures	Testing statistical hypotheses	General concepts	4	The tenth
General questions and discussion	Lectures	Best critical region	Definition, properties and examples	4	eleventh
General questions and discussion	Lectures	Nyman-Pearson theorem	Some of examples	4	twelveth
General questions and discussion	Lectures	Uniformly most powerful test		4	Thirteenth
General questions and discussion	Lectures	Likelihood ratio test	Definition, properties and examples	4	fourteenth
General questions and discussion	Lectures	The swquential probability ratio test	-	4	Fifteenth

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statistics" 2015, Tokyo.	

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Nodal analysis (1)	
CodeThe decision	.۲
MA401	
the chapter / the year	.۳
First semester/2023-2	024
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6.number hours Academic (total)/Number of units (tot	al)
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7. Name of the course administrator(If more than of	one name is mentioned)
Name: Dr. Heba FawziEmail: hiba.f@sc.uobaghda Name: Dr. Qasim Abdel Hamid Email: <u>kassim.</u>	-
 ٨. اهداف المقرر 	
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General questions and discussion	Lectures	Com	plex	number, complex plane		the first and the second
General questions and discussion	Lectures	Powers and roots			4	Third and fourth
General questions and discussion	Lectures	Functions, limits and continuity		4	Fifth and sixth	
General questions and discussion	Lectures	Analytic and Har	mon	ic functions, elementary functions	4	Seventh and eighth
General questions and discussion	Lectures			Mid-term	4	The ninth and tenth
General questions and discussion	Lectures	Cauc	hy r	iemann integral theorem	4	Eleventh and twelfth
General questions and discussion	Lectures	Cauchy integral fo	ormu	las and its consequences sequences	4	thirteenth and fourteenth
General questions and discussion	Lectures	Maximum and	min	imum modulus theorem	4	Fifteenth

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Complex analysis by Alfors L.V 2018	الكتب المقررة المطلوبة (المنهجية أن وجدت)
Complex variable and applications by James's ward Brown2018	المراجع الرئيسة (المصادر)
The most important books and special sources on mathematical statistics available in the central library,	الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية،
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CodeThe decision	۰۲.
MA406	
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Second semester/2023-2024	
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Name:	Dr. Qasım Abo	del Hamid Email: <u>kassin</u>	n.jassim@sc.uobagh	idad.edu	<u>.10</u>
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General	Lectures	Harmonic functions	4	Ninth
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General	Lectures	Elementary Functions	4	The tenth
questions and				
discussion				
General	Lectures	Complex integration	4	eleventh
questions and				
discussion				
General	Lectures	Cauchy integral theorem	4	twelveth
questions and				
discussion				
General	Lectures	Cauchy integral formulas	4	Thirteenth
questions and				
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General	Lectures	Maximum modulus theorem	4	fourteenth
questions and				
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General	Lectures	Minimum modulus theorem	4	Fifteenth
questions and				
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مصادر التعلم والتدريس ١٢.	
Functions of complex variable, John B. Conway2017	
Complex variable and applications by James's ward Brown	المراجع الرئيسة (المصادر)
The most important books and special sources on mathematical statistics available in the central library, the science library, and the department.	الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير)
 Discreet websites. Virtual library. Library locations in some international universities. 	المراجع الإلكترونية ، مواقع الانترنيت

nameThe decision	.1
Modeling	
CodeThe decision	.۲
MA410	
the chapter / the year	۳.
Second semester/2023-2024	
Preparation date This description	.٤
10/1/2023	
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7. Name of the course administrator(If more than one name is mentioned)	
Name: Dr. Raed KamelEmail: <u>raid.naji@sc.uobaghdad.edu.iq</u>	
Name: Dr. Hoda Abdel Sattar Email: <u>huda.oun@sc.uobaghdad.edu.iq</u>	
 ٨. اهداف المقرر 	
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General	Lectures	-		Learn about	4	the first
questions and discussion			Ĩ	mathematical modeling		
General questions and discussion	Lectures		d examples	The ability to understand and comprehend scientific vocabularyThrough examples	4	the second
General questions and discussion	Lectures		d examples ical system model		4	the third
General questions and discussion	Lectures		v	SolutionDynamic system model	4	the fourth
General questions and discussion	Lectures		·	Points of existence for the dynamical system model	4	Fifth
General questions and discussion	Lectures		uations and	The ability to understand the system of differential equations	4	VI
General questions and discussion	Lectures		e epidemic d examples	Identify modelsEpidemiological	4	Seventh
Monthly exam	Lectures	The concept o DE a		The ability to understand and comprehend vocabulary and examples	4	VIII
General questions and discussion	Lectures			Mid-term	4	Ninth
General questions and discussion	Lectures		nd unstable equilibrium	Knowing stability or instability	4	The tenth
General questions and discussion	Lectures	of linear sy	stem of DE	The ability to understand differential equations	4	eleventh
General questions and discussion	Lectures			Definitions and examples of a nonlinear system	4	twelveth

General questions and discussion	Lectures	Describe the pre-predator model and stability		4	Thirteenth
General questions and discussion	Lectures	Describe model of epidemiology example	Description of a disease- containing model	4	fourteenth
General questions and discussion	Lectures	Exam		4	Fifteenth

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مصادر التعلم والتدريس ١٢.	
The qualitative theory of ordinary differential equations by Fred Breuer 2018	
A first course in mathematical modeling, 2014	المراجع الرئيسة (المصادر)
The most important books and special sources on mathematical statistics available in the central library, the saionea library, and the department	الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير)
the science library, and the department.Discreet websites.	المراجع الإلكترونية ، مواقع الانترنيت
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Communication mechanics	
CodeThe decision	.۲
MA409	
the chapter / the year	۳.
Second semester/2023-2024	

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هداف المقرر	٨. ١					
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discussion						
General	Lectures	Tensors, Summation	Conv	ention, Dummy Indices,	4	the
questions and				Free Indices		second
discussion				* *		
General	Lectures	Te		a Linear transformation,	4	the third
questions and discussion				Components of a Tensor		
General	Lectures		ח	yadic Product of Vectors	4	the fourth
questions and	LUCIUIES		D.	Orthogonal Tensors	-	
discussion				Ormogoliai Telisois		
General	Lectures	Transformation Matri	x Be	tween Two Rectangular	4	Fifth
questions and				sian Coordinate Systems		

discussion				
General questions and discussion	Lectures	Symmetric And Antisymmetric Tensors	4	VI
General questions and discussion	Lectures	Defining Tensor by Transformation Laws	4	Seventh
Monthly exam	Lectures	Tensor-Valued Functions of a Scalar	4	VIII
General questions and discussion	Lectures	Vector Field and Gradient of a Vector Function	4	Ninth
General questions and discussion	Lectures	Curl Of A Vector Field	4	The tenth
General questions and discussion	Lectures	Kinematics Of a Continuum	4	eleventh
General questions and discussion	Lectures	Material Derivative Kinematic Equation for Rigid Body Motion Geometrical Meaning of The Components of The Infinitesimal Strain Tensor	4	twelveth
General questions and discussion	Lectures	Principal Strain, The Rate of Deformation Tensor, The Spin Tensor and The Angular Velocity Vector	4	Thirteenth
General questions and discussion	Lectures	Equation Of Conservation of Mass	4	fourteenth
General questions and discussion	Lectures	Stress,Boundary Condition For The Stress Tensor	4	Fifteenth

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مصادر التعلم والتدريس ١٢.

	الكتب المقررة المطلوبة (المنهجية أن وجدت)
Introduction continuum Mechanics Fourth Edition,	المراجع الرئيسة (المصادر)
(W. Michael Lai, David Rubin, Erhard Krempl)	
January 2017	
The most important books and special sources on mathematical statistics available in the central library,	الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية،
the science library, and the department.	التقارير)
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• Virtual library.	
Library locations in some international	
universities.	

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Topology (1)	
CodeThe decision	.۲
MA404	
the chapter / the year	۳.
First semester/2023-2024	
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7. Name of the course administrator(If more than one name is mentioned)	
Name: Dr. Afraa is satisfiedEmail: <u>afraa.sadek@sc.uobaghdad.edu.iq</u>	
Name: Dr. Iman Hassan Email: <u>eiman.abood@sc.uobaghdad.edu.iq</u>	
 ٨. اهداف المقرر 	
Πρεπαρινγ γραδυατεσ σπεχιαλιζεδ ιν ματηεματιχ اهداف المادة الدراسيا	
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acouraging research programs and participating scientific conferences and seminars
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• Managing the lecture in a way that indicates the importance of time

• Assigning the student some group assignments

الاستراتيجية

• Websites and electronic classes

بنية المقرر

طريقة التقييم	طريقة التعلم	اسم الوحدة او الموضوع	مخرجات التعلم المطلوبة	الساعات	الأسبوع
General questions and discussion	Lectures	Set theory, equivalence relations, metric space, examples, theorem		4	the first and the second
General questions and discussion	Lectures	Topological space[definit	ions,examples,theorems]	4	Third and fourth
General questions and discussion	Lectures	Cofinit topological, closed set, examples		4	Fifth and sixth
General questions and discussion	Lectures	Continuous functions, homomorphism, open map		4	Seventh and eighth
General questions and discussion	Lectures	Interior, limit and b	oundary points,dence set	4	The ninth and tenth
General questions and discussion	Lectures	Subspace topology,Euclidean top. connected space,definitionsexamples		4	Eleventh and twelfth
General questions and discussion	Lectures	Topological pro	perty theorems, pathwise connected space		thirteenth and fourteenth
General questions and discussion	Lectures		Exam		Fifteenth

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مصادر التعلم والتدريس ١٢.	
	الكتب المقررة المطلوبة (المنهجية أن وجدت)
General topology by Stephen W. 2011	المراجع الرئيسة (المصادر)
The most important books and special sources on mathematical statistics available in the central library,	الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية،
the science library, and the department.	التقارير)

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discussion				
General	Lectures	1-Fixed point property	4	The tenth
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General	Lectures	2-Fixed point property	4	eleventh
questions and				
discussion				
General	Lectures	Algebraic topology	4	twelveth
questions and				
discussion				
General	Lectures	homotopy equivalent	4	Thirteenth
questions and				
discussion				
General	Lectures	Homotopy group	4	fourteenth
questions and				
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General	Lectures	Simply connected and contractible spaces	4	Fifteenth
questions and				
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distribution Class from 011 on according to mission Assigned With it requester like Preparation Daily And exams Daily And oral And monthly And editorialAnd reports etc

مصادر التعلم والتدريس ١٢.	
Introduction to topology Bert M., 2012	
General topology by Stephen W. 2011	المراجع الرئيسة (المصادر)
The most important books and special sources on computer group theory available in the central	الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية،
library, the science library, and the department.	التقارير)
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Library locations in some international	
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7. Name of the course administrator (If more than one name is mentioned)				
Name: Dr. Iman HassanEmail: <u>eiman.abood@sc.uobaghdad.edu.iq</u>				
 ٨. اهداف المقرر 				
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General questions and discussion	Lectures	Vector	spaces with some spaces.	4	the first
General questions and discussion	Lectures	Normal	spaces with some spaces.	4	the second
General questions and discussion	Lectures		Equivalent norms.	4	the third
General questions and discussion	Lectures	The connection between normed spaces and metric spaces		4	the fourth
General questions and discussion	Lectures	The convergence sequence and Cauchy sequence in normed spaces.		4	Fifth
General questions and discussion	Lectures	Banach	spaces with some spaces.	4	VI
General questions and discussion	Lectures	The connection between normed spaces and Banach spaces.		4	Seventh
Monthly exam	Lectures	The bounded linear tr	ansformation on normed spaces.	4	VIII
General questions and discussion	Lectures	The quotient spaces. The transform	4	Ninth	
General questions and discussion	Lectures	The isomorphic normalized spaces. 4 The ter			The tenth
General questions and discussion	Lectures	The inner product spaces with some spaces. 4 ele			eleventh
General questions and discussion	Lectures	The connection between	normed spaces and inner product spaces.	4	twelveth
General questions and discussion	Lectures	-	e spaces. The connection paces and Banach spaces		Thirteenth
General	Lectures	The orthonormal seq	uences in Hilbert spaces.	4	fourteenth

questions and discussion			
General	Lectures	The bounded linear operator and bounded linear	Fifteenth
questions and discussion		functional on Hilbert spaces	

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مصادر التعلم والتدريس ١٢.			
Introduction to functional analysis Erwin K. 2014	الكتب المقررة المطلوبة (المنهجية أن وجدت)		
A course in functional analysis Join BC 2000	المراجع الرئيسة (المصادر)		
The most important books and special sources on computer group theory available in the central library, the science library, and the department.			
 Discreet websites. Virtual library. Library locations in some international universities. 	المراجع الإلكترونية ، مواقع الانترنيت		

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7. Name o	f the course adr	ministrator(If more that	n one name is mentio	oned)		
		ail: <u>alaa.elewi@sc.uob</u>				
Name:	Dr. Rana Adna	n Email: <u>rana.a@sc.uo</u>	<u>baghdad.edu.iq</u>			
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General questions and discussion	Lectures	Certain special id	eals, the radicals of ideal	4	the first and the second	
General questions and discussion	Lectures	The nil, the prime and the Jacobson radical of rings 4 Third		Third and fourth		
General questions and discussion	Lectures	1 5 1		Fifth and sixth		

General questions and	Lectures	The ring homomorphism	4	Seventh and eighth
discussion				
General	Lectures	Mid-term	4	Ninth
questions and				
discussion				
General	Lectures	The divisibility theory, the prime and irreducible	4	The tenth
questions and		element		and
discussion				eleventh
General	Lectures	The unique factorization domain, the Euclidean	4	Twelfth
questions and		domain, the polynomial ring		and
discussion		,the division algorithm theorem		thirteenth
General	Lectures	The remainder theorem, extensions of fields,	4	fourteenth
questions and		kroneckers theorem and the Boo lean rings		
discussion				
Monthly exam	Lectures	Exam	4	Fifteenth

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And editorialAnd reports etc

مصادر التعلم والتدريس ١٢.

Modules and rings, academic press, New York, 2017 I.Kaplansky	
Abstract algebra, WNCBrown publisher, 1988 by D M. Burton	المراجع الرئيسة (المصادر)
The most important books and special sources on computer group theory available in the central library, the science library, and the department.	الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير)
Discreet websites.	المراجع الإلكترونية ، مواقع الانترنيت
• Virtual library.	
Library locations in some international	
universities.	

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5. shapes the audience Available	
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6.number hours Academic (total)/Number of units (total)	
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Name of the course administrator (If more than one name is mentioned)	
Name: Dr. Saad MohammadEmail: <u>saad.m@sc.uobaghdad.edu.iq</u>	
Name: Dr. Muhammad Alaa Email: mohammed.alaa@sc.uobaghdad.edu.iq	
 ٨. اهداف المقرر 	
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General questions and discussion	Lectures		What is cryptography	3	the first
General questions and discussion	Lectures	Conventional sys	tem, transposition cipher	3	the second
General questions and discussion	Lectures	Substitution	ı cipher, monoalphabetic	3	the third
General questions and discussion	Lectures	Homoph	nonic (Beal-higher order)	3	the fourth
General questions and discussion	Lectures	Polygraphic one-time pads		3	Fifth
General questions and discussion	Lectures	Classification of cryptanalytic attacks		3	VI
General questions and discussion	Lectures	Cryptanalysis of transposition		3	Seventh
Annie's test	Lectures	the first exam		3	VIII
General questions and discussion	Lectures	Diffusion and condition		3	Ninth
Monthly exam	Lectures		Frequency test	3	The tenth
General questions and discussion	Lectures	One time pad, synchronous stream ciphers			eleventh
General questions and discussion	Lectures	Feedback shift registers 3 t		twelveth	
General questions and discussion	Lectures	Exclusive-or-algorithm		3	Thirteenth
General questions and discussion	Lectures	Geff's algorithm 3		fourteenth	
General questions and discussion	Lectures	final exam 3 Fiftee		Fifteenth	

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And oral And monthly	
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مصادر التعلم والتدريس ١٢.	
H.Beker and F.Piper, Cipher systems. Northwood	
boos, London, 1982	
boos, London, 1982	
D.Welsh, Codes and Cryptography. Clarendon press,	المراجع الرئيسة (المصادر)
Oxford, 1988	
DRStinson, Crytography-theory and practice. CRC	
Press, Boca Raton 1995	
Douglas Stinson, cryptography: theory and practice,	
	الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية،
second edition, CRC/C&H, 2002	
	التقارير)
Discreet websites.	المراجع الإلكترونية ، مواقع الانترنيت
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Theory of differential equations	
CodeThe decision	۰۲.
MA403	

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