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

2024

Introduction:

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

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

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

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

Concepts and terminology:

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

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

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

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

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

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

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

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

Academic program description form

University name: University of .....Baghdad.....

College/Institute: College of .....Sciences.....

Scientific Department: Department of ..... Mathematics .....

Name of the academic or professional program: Mathematics Department Academic Program.....

Name of final degree: ...PhD in Mathematics....

Academic system: semester

Description preparation date: 10/1/2023

Date of filling the file: 3/31/2024

the signature :

Name of scientific assistant:

the date :

the signature : Mohammed S. Hussein

Name of department head:

the date :

University of Baghdad - College Of Science - Department of Mathematics

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

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? nothing

5. Other external influences

nothing

6. **Program structure**				
comments *	percentage	Study unit	Number of courses	Program structure
	20%	4	2	Enterprise requirements
	nothing			College requirements
	80%	24	10	Department requirements
			both	summer training
				Other

7. Program description

Credit hours		Name of the course or course	Course or course code	Year/level
practical	theoretical			
	3	Topics in dynamic systems	MAT6101	PhD/Applied Chorus 1
	3	Topics in fluid mechanics and thermal transport	MAT6102	
	2	Topics in mathematical statistics	MAT6103	
	2	Applied linear algebra	MAT6104	
	2	Numerical optimization and inverse problems	MAT6105	
		English	UOB6100	
	3	Topics in hysteresis equations	MAT6201	PhD/Applied Chorus 2
	3	Numerical analysis	MAT6202	
	2	Reliability	MAT6203	
	2	Control theory	MAT6204	
	2	Differential equations topics	MAT6205	
	2	Integral transformations and their applications	MAT6206	
	2	Scientific research method	UOB6200	
	3	Total functions	MAT6106	Ph.D./Pure Chorus 1
	3	Sizes 1	MAT6107	
	2	Topics in functional analysis 1	MAT6108	
	2	Algebraic topology	MAT6109	
	2	Classification theory 1	MAT6110	
	2	English	UOB6100	
	3	Homological algebra	MAT6207	Ph.D./Pure

				Course 2
	3	Sizes 2	MAT6208	
	2	Topics in functional analysis 2	MAT6209	
	2	Different topology	MAT6210	
	2	Classification theory 2	MAT6211	
	2	Algebra is non-commutative	MAT6212	
	2	Effects on Hardy spaces	MAT6213	
	2	Scientific research method	UOB6200	
	3	Nodal analysis	MAT6111	Ph.D./General Chorus 1
	3	Fluid mechanics	MAT6112	
	2	Topics in statistics	MAT6113	
	2	Functional analysis topics	MAT6114	
	2	Topics in control theory, fractional differentiation and their applications	MAT6115	
	2	Topics in algebraic topology	MAT6116	
	2	The theory of univalent functions	MAT6117	
	2	English	UOB6100	
	3	Topics in dynamical systems	MAT6214	PhD/General Chorus 2
	3	Reliability	MAT6215	
	2	Integral transformations and their applications	MAT6216	
	2	Heat and mass transfer	MAT6217	
	2	Topics in perturbation theory	MAT6218	
	2	Kama sizes	MAT5219	
	2	Scientific research method	UOB6200	

8. Expected learning outcomes of the programme

Knowledge	
.The skills and experiences that a student acquires while undergoing training or a study planYou 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.	• Short exams and quizzes- Extracurricular activities • Homework- Semester and final exams for theoretical and practical subjects • Small projects within the lesson • Interaction within the lecture • Reports

9. Teaching and learning strategies

Explanation and clarification through lectures- How to display scientific materials using display devices: data shows, smart boards, and self-learning viaThe internetAnd mini projects withinLectures-Scientific visits.

10. Evaluation methods

-Short exams-Homework-Semester and final exams-Within the lesson-Interaction within the lecture-Reports

11. The teaching staff						
Faculty members						
Preparing the teaching staff		Special requirements/skills (If any)		Specialization		Scientific rank
lecturer	angel			private	general	
nothing	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. Raid Kamel Naji
				mathematics	mathematics	Mr. Dr. Bahar Hamad Ahmed
				Pure/Algebra	mathematics	Mr. Dr. Wasn 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 systems	mathematics	Mr. Dr. Azhar Abbas Majeed
				Algebra	mathematics	Mr. Dr. Alaa Abbas Aliwi
				Nodal analysis	mathematics	Mr. Dr. Qasim Abdul Hamid Jassim
				Pure/Dali analysis	mathematics	Mr. Dr. Iman Hassan Abboud
				mathematics	mathematics	Mr. Dr. Zeina Zaki is

						beautiful
				mathematics	mathematics	Mr. Dr. Hassan Fadel Reda
				Applied	mathematics	Mr. Dr. Sadiq Naji Nasser
					mathematics	A.M.D. Muhammad Ghazi inside
				Counting	mathematics	A.M.D. 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
				mathematics	mathematics	A.M.D. Hoda Abdel Sattar Abdel Aoun
				Applied	mathematics	A.M.D. Iraq Tariq Abbas
				Zarephath	mathematics	A.M.D. Ali Abed Obaid

Professional development
Orienting new faculty members
The new faculty member's familiarity with the university, its development vision, its plan towards internationalization, and its development programmes. AndHelping the new faculty member to adapt practically and psychologically and alleviating anxiety that could hinder his participation and integration into university work and activities.
Professional development for faculty members
Identifying the sources of knowledge and electronic information available to the university faculty member and providing him with the skills of searching the Internet and databases

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

مخطط مهارات البرنامج

Outputs Learning required from the program														
القيم				المهارات				المعرفة				اساسي أم اختياري	name The decision	CodeThe decision	the year / the level
C4	C3	C2	C1	B4	B3	B2	B 1	A4	A3	A2	A1				
※	※	※	※	※	※	※	※	※	※	※	※	Basic	Topics in dynamic systems	MAT6101	
※	※	※	※	※	※	※	※	※	※	※	※	Basic	Topics in fluid mechanics and thermal transport	MAT6102	
※	※	※	※	※	※	※	※	※	※	※	※	Basic	Topics in mathematical statistics	MAT6103	
※	※	※	※	※	※	※	※	※	※	※	※	Basic	Applied linear algebra	MAT6104	
※	※	※	※	※	※	※	※	※	※	※	※	Basic	Numerical optimization and inverse problems	MAT6105	
※	※	※	※	※	※	※	※	※	※	※	※	Basic	English	UOB6100	
※	※	※	※	※	※	※	※	※	※	※	※	Basic	Topics in hysteresis equations	MAT6201	
※	※	※	※	※	※	※	※	※	※	※	※	Basic	Numerical analysis	MAT6202	
													Reliability	MAT6203	

*	*	*	*	*	*	*	*	*	*	*	*	Basic	Control theory	MAT6204
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Differential equations topics	MAT6205
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Integral transformations and their applications	MAT6206
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Scientific research method	UOB6200
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Total functions	MAT6106
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Sizes 1	MAT6107
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Topics in functional analysis 1	MAT6108
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Algebraic topology	MAT6109
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Classification theory 1	MAT6110
*	*	*	*	*	*	*	*	*	*	*	*	Basic	English	UOB6100
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Homological algebra	MAT6207
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Sizes 2	MAT6208
*	*	*	*	*	*	*	*	*	*	*	*	my choice	Topics in functional analysis 2	MAT6209
*	*	*	*	*	*	*	*	*	*	*	*	my choice	Different topology	MAT6210
*	*	*	*	*	*	*	*	*	*	*	*	my choice	Classification theory 2	MAT6211
*	*	*	*	*	*	*	*	*	*	*	*	my choice	Algebra is non-commutative	MAT6212

*	*	*	*	*	*	*	*	*	*	*	*	my choice	Effects on Hardy spaces	MAT6213
*	*	*	*	*	*	*	*	*	*	*	*	my choice	Scientific research method	UOB6200
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Nodal analysis	MAT6111
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Fluid mechanics	MAT6112
*	*	*	*	*	*	*	*	*	*	*	*		Topics in statistics	MAT6113
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Functional analysis topics	MAT6114
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Topics in control theory, fractional differentiation and their applications	MAT6115
*	*	*	*	*	*	*	*	*	*	*	*	my choice	Topics in algebraic topology	MAT6116
*	*	*	*	*	*	*	*	*	*	*	*	my choice	The theory of univalent functions	MAT6117
*	*	*	*	*	*	*	*	*	*	*	*	my choice	English	UOB6100
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Topics in dynamical systems	MAT6214
*	*	*	*	*	*	*	*	*	*	*	*	Basic	Reliability	MAT6215
*	*	*	*	*	*	*	*	*	*	*	*	my choice	Integral transformations and their applications	MAT6216
*	*	*	*	*	*	*	*	*	*	*	*	my choice	Heat and mass transfer	MAT6217
*	*	*	*	*	*	*	*	*	*	*	*	my choice	Topics in	MAT6218

													perturbation theory	
※	※	※	※	※	※	※	※	※	※	※	※	my choice	Kama sizes	MAT5219
※	※	※	※	※	※	※	※	※	※	※	※	my choice	Scientific research method	UOB6200

- **Please situation Signal in Squares the interview For outputs Learning Individuality from the program Submissive For evaluation**

modelCourse description

1. Course name	
Theory of Univalent Functions (1)	
2. Course code	
MAT6117	
3. Semester/year	
Doctorate General / First Semester / 2023-2024	
4. The date this description was prepared	
10/1/2023	
5. Available attendance forms	
My presence	
6. Number of study hours (total) / number of units (total)	
2/30	
7. Name of the course administrator (if more than one name is mentioned)	
kassim.jassim@sc.uobaghdad.edu.iqEmail:	Name: A.D. Qasim Abdul Hamid Jassim
8. Course objectives	
1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	Objectives of the study subject

9. Teaching and learning strategies

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	Basic concepts	Geometric function theory	2	the first
General questions and discussion	theoretical	Basic concepts of univalent functions	Elementary theory of univalent function.	2	the second
General questions and discussion	theoretical	Theories and applications	Parametric Representation of Slit Mappings	2	the third
General questions and discussion	theoretical	Applications of Area theorems	Generalizations of the Area Principle	2	the fourth
General questions and discussion	theoretical	Theories and applications	Exponentiation of the Grunsky Inequalities	2	Fifth
General questions and discussion	theoretical	Theories and applications	Subordination	2	VI
General questions and discussion	theoretical	Theories and applications	Integral Meanings	2	Seventh
General questions and discussion	theoretical	Theories and applications	Some Special Topics	2	VIII
First semester exam	theoretical	Applications of extreme points	General Extremal Problems	2	Ninth
General questions and discussion	theoretical	Applications of coefficients	Coefficient regions	2	The tenth
General questions and discussion	theoretical	Derivative	Boundary variation	2	eleventh
General questions and	theoretical	Applications of Starlike function	Starlike function	2	twelveth

discussion					
General questions and discussion	theoretical	Applications of Covex function	Covex function	2	Thirteenth
General questions and discussion	theoretical	**Applications of Close-to-Convex Functions**	Close-to-Convex Functions	2	fourteenth
General questions and discussion	theoretical	Applications of derivatives	Unitary Matrices	2	Fifteenth

11. Course evaluation	
Monthly exam, quota and quest of 40 and final exam of 60	
12. Learning and teaching resources	
Peter Lduren, Univalent functions, New York, 1983..	Required textbooks (methodology, if any)
Univalent functions".	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. Library locations in some international universities.	Electronic references, websites

modelCourse description

1. Course name	
Algebraic topology	
2. Course code	
MAT6116	
3. Semester/year	
General Doctorate/first course/2023-2024	
4. The date this description was prepared	
10/1/2023	
5. Available attendance forms	
My presence	
6. Number of study hours (total) / number of units (total)	
2/30	
7. Name of the course administrator (if more than one name is mentioned)	
sahira.yaseen@sc.uobaghdad.edu.iq Email: afraa.sadek@sc.uobaghdad.edu.iqEmail:	Name: A.D. Sahira Mahmoud A.M.D. Afraa is satisfied
8. Course objectives	
1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to	Objectives of the study subject

develop their knowledge and educational and research skills- Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	

9. Teaching and learning strategies

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	Homotopic theory	Study of the relationship between topological equivalence	2	the first
General questions and discussion	theoretical	Contractible space	Study of spaces that can be compressed into a point	2	the second
General questions and discussion	theoretical	First homotopy group	Creation of the first homotopian group	2	the third
General questions and discussion	theoretical	Van Kamper theorem	Applications of Van Camper's theorem	2	the fourth
General questions and discussion	theoretical	Simply connected space	Give a description of the connected spaces	2	Fifth
General questions and discussion	theoretical	Quotient space	Give a geometric description of division spaces	2	VI
General questions and discussion	theoretical	Free action	Study of the free agent	2	Seventh
General questions and discussion	theoretical	Topological group	Study of topological groups	2	VIII
First semester exam	theoretical	Manifold	Definition of manifold	2	Ninth
General questions and discussion	theoretical	Read the group	Study of groups from the beginning to end	2	The tenth

General questions and discussion	theoretical	Smooth manifold	Study of the smooth manifold	2	eleventh
General questions and discussion	theoretical	Covering space	Study the concept of cover	2	twelveth
General questions and discussion	theoretical	HomotopyLifting property	Definition of homotopic lift	2	Thirteenth
General questions and discussion	theoretical	Fibration, higher homotopy group	A study of fibrication in group arithmetic	2	fourteenth
Monthly exam				2	Fifteenth

11. Course evaluation

Monthly exam, exams, quest of 40 and final of 60

12. Learning and teaching resources

Algebraic topology, William Fulton, 2019	Required textbooks (methodology, if any)
Elementary on algebraic topology, James Munkres, 2015	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. Library locations in some international universities.	Electronic references, websites

modelCourse description

1. Course name
Topics in Dali Analysis (1)
2. Course code
MAT6114
3. Semester/year
General Doctorate/first course/2023-2024
4. The date this description was prepared
10/1/2023
5. Available attendance forms
My presence
6. Number of study hours (total) / number of units (total)
2/30
7. Name of the course administrator (if more than one name is mentioned)
Name: A.D. Buthaina Abdel Hassan Email: buthaina.a@sc.uobaghdad.edu.iq Mr. Dr. Iman Hassan Abboud Email: eiman.abood@sc.uobaghdad.edu.iq
8. Course objectives
1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems.

Objectives of the study subject

4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	

9. Teaching and learning strategies

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	Banach space in Topology	Concept and examples	2	the first
General questions and discussion	theoretical	Banach space	Def. and examples	2	the second
General questions and discussion	theoretical	Finite dimensional Banach space	Theorems and application	2	the third
General questions and discussion	theoretical	infinite dimensional banach space	Def. and theorems	2	the fourth
General questions and discussion	theoretical	Study the space Lp(Ω)	Def. andremark	2	Fifth
General questions and discussion	theoretical	Linear operators, on a normalized space	Concept and examples	2	VI
General questions and discussion	theoretical	Dual space and Bidual space	Def. and remarks	2	Seventh
General questions and discussion	theoretical	Application Banach's theorem to linear equation	Def. and remarks	2	VIII
First semester exam	theoretical	Here Banach theorem with some application	Def. and properties	2	Ninth
General questions and	theoretical	Hilbertspaces	Def. and properties	2	The tenth

discussion					
General questions and discussion	theoretical	Orthonormal sets and Orthonormal basis (countable and uncountable)	Def. and properties	2	eleventh
General questions and discussion	theoretical	Linear operators, on a Banach space	Def. and properties	2	twelveth
General questions and discussion	theoretical	adjoint operator	Def. and properties	2	Thirteenth
General questions and discussion	theoretical	Spectrum of Linear operators	Def. and properties	2	fourteenth
General questions and discussion	theoretical	Open mapping theorems	Concept and examples	2	Fifteenth

11. Course evaluation

A monthly exam, a quest of 40, and a final exam of 60

12. Learning and teaching resources

Linear functional analysis with by (Rymne)2016	Required textbooks (methodology, if any)
Functional analysis by (Alexander cR Belton)2014	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. Library locations in some international universities.	Electronic references, websites

modelCourse description

1. Course name	
Nodal analysis	
2. Course code	
MAT6111	
3. Semester/year	
General Ph.D./first course/2023-2024	
4. The date this description was prepared	
10/1/2023	
5. Available attendance forms	
My presence	
6. Number of study hours (total) / number of units (total)	
3/45	
7. Name of the course administrator (if more than one name is mentioned)	
hiba.f@sc.uobaghdad.edu.iqEmail:	Name: A.M.D. Heba Fawzi Sabaa
8. Course objectives	
1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	Objectives of the study subject

9. Teaching and learning strategies

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	Analysis function	Identify analytical functions	3	the first
General questions and discussion	theoretical	Elementary functions	Learn about basic functions	3	the second
General questions and discussion	theoretical	definite integral	Learn about integration	3	the third
General questions and discussion	theoretical	Cauchy integral	Cauchy integral	3	the fourth
General questions and discussion	theoretical	Cauchy- Goursat theorem	Cauchy's theorem courses	3	Fifth
General questions and discussion	theoretical	series	Sequences	3	VI
General questions and discussion	theoretical	Cauchy Residue theorem	Cauchy's residual theorem	3	Seventh
General questions and discussion	theoretical	Application of residues	Residue applications	3	VIII
First semester exam	theoretical	Invers Laplace transforms	Learn about inverse Laplace transforms	3	Ninth
General questions and discussion	theoretical	Mapping by elementary functions	Functions preserving angles	3	The tenth
General questions and discussion	theoretical	Rieman surfaces	Identify the types of transfers	3	eleventh
General questions and discussion	theoretical	Conform mapping	Preservative functions	3	twelveth
General	theoretical	Applications of	Applications of angle	3	Thirteenth

questions and discussion		conformal mapping	preserving functions		
General questions and discussion	theoretical	The Schwarz-Chritofel transformation	Schwarz-Christoffel transform	3	fourteenth
General questions and discussion	theoretical	Integral formula of the Poisson type	Learn the truth about Poisson type integral	3	Fifteenth

11. Course evaluation

12. Learning and teaching resources

Complex variable and applications by James Ward Brown 2020	Required textbooks (methodology, if any)
Complex analysis by Alfors LV 2014 "Elementary on Complex analysis, James Brown, 2015"	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Default libraryLibrary locations in some international universities.	Electronic references, websites

modelCourse description

1. Course name

Fluid mechanics

2. Course code

MAT6112

3. Semester/year

General Ph.D./first course/2023-2024

4. The date this description was prepared

10/1/2023

5. Available attendance forms

My presence

6. Number of study hours (total) / number of units (total)

3/45

7. Name of the course administrator (if more than one name is mentioned)

ahmed.abdulhadi@sc.uobaghdad.edu.iqEmail: liqaa.hummady@sc.uobaghdad.edu.iqEmail	Name: Prof. Ahmed Mawlood Name: A.M.D. Liqaa Zaki Hammadi

8. Course objectives

1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	Objectives of the study subject

9. Teaching and learning strategies

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	Introduction	Concept and basic	3	the first
General questions and discussion	theoretical	Introduction	Concept and basic	3	the second
General questions and	theoretical	Types of fluid	Def. and theorems	3	the third

discussion					
General questions and discussion	theoretical	Types of fluid flow	Concept and examples	3	the fourth
General questions and discussion	theoretical	Acceleration	Def. and theorems	3	Fifth
General questions and discussion	theoretical	Types of forces acting on fluid flow	Concept and basic	3	VI
General questions and discussion	theoretical	Types of forces acting on fluid flow	Def. and remarks	3	Seventh
General questions and discussion	theoretical	Continuity equation	Concept and examples	3	VIII
First semester exam	theoretical	Motion equation (NS equations)	Concept and basic	3	Ninth
General questions and discussion	theoretical	Application	Concept and examples	3	The tenth
General questions and discussion	theoretical	Dimensional analysis	Def. and theorems	3	eleventh
General questions and discussion	theoretical	similarity	Concept and examples	3	twelveth
General questions and discussion	theoretical	Heat equation	Def. and theorems	3	Thirteenth
General questions and discussion	theoretical	Boundary layer	Concept and examples	3	fourteenth
Exam					Fifteenth

11. Course evaluation

A monthly exam, the pursuit of 40 and the final of 60

12. Learning and teaching resources

Fluid mechanics, Frank M. White 2019	Required textbooks (methodology, if any)
Fluid mechanics: Fundmentals and application 4th edition 2010	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)

• Discreet websites. • Virtual library.	Electronic references, websites

modelCourse description

1. Course name	
English	
2. Course code	
UOB6100	
3. Semester/year	
General Ph.D./first course/2023-2024	
4. The date this description was prepared	
10/1/2023	
5. Available attendance forms	
My presence	
6. Number of study hours (total) / number of units (total)	
2/30	
7. Name of the course administrator (if more than one name is mentioned)	
ali.abd@sc.uobaghdad.edu.iqEmail:	Name: A.M.D. Ali Abed Obaid
8. Course objectives	
1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-	Objectives of the study subject

Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	

9. Teaching and learning strategies

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	International student	Getting to know students from different parts of the world and talking to them	2	the first
General questions and discussion	theoretical	Vocabulary development	Knowledge of the development of speech vocabulary	2	the second
General questions and discussion	theoretical	Where in the world	Identify a location in the world	2	the third
General questions and discussion	theoretical	Newspaper articles	Identify articles and how to read magazines	2	the fourth
General questions and discussion	theoretical	Modern technology	Learn about the technology of his speech	2	Fifth
General questions and discussion	theoretical	Conferences and visits	Identify the style of writing in conferences	2	VI
General questions and discussion	theoretical	Science and our world	Science and our world	2	Seventh
General questions and discussion	theoretical	Writing trends	Identify the characteristics of writing	2	VIII
First semester exam	theoretical	Reading air pollution	Identify the characteristics of pollution using the reading method	2	Ninth
General questions and discussion	theoretical	Past and present	Learn about the rules of the present and past tense	2	The tenth
General	theoretical	The world of IT	Identify the basic	2	eleventh

questions and discussion			characteristics of the nature of scientific material		
General questions and discussion	theoretical	Inventions, discoveries	Identify the characteristics of breakthroughs and discoveries	2	twelveth
General questions and discussion	theoretical	Processes	Identify the basic processes of the nature of matter	2	Thirteenth
General questions and discussion	theoretical	International student, Travel and tourism	Getting to know students from different parts of the world and talking to them	2	fourteenth
Exam					Fifteenth

11. Course evaluation

Monthly exam and pursuit of 40 and final 60

12. Learning and teaching resources

New hand way:- Academic skills reading writing 2016	Required textbooks (methodology, if any)
Academic skills reading writing 20142015"	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name

Topics in statistics

2. Course code

MAT6103

3. Semester/year

General Ph.D./first course/2023-2024

4. The date this description was prepared

10/1/2023

5. Available attendance forms

My presence

6. Number of study hours (total) / number of units (total)

2/30

7. Name of the course administrator (if more than one name is mentioned)

tasnim.h@sc.uobaghdad.edu Email ali.abd@sc.uobaghdad.edu.iq Email	Name: A.M.D. Tasneem Hassan Kazem Name: A.M.D. Iraq Tariq Abbas

8. Course objectives

1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	Objectives of the study subject

9. Teaching and learning strategies

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	Some techniques of finding point estimator of parameters	Def. ,remarks and examples	2	the first

General questions and discussion	theoretical	Fisher information and Gramer-Rao inequality	Concept and some remarks	2	the second
General questions and discussion	theoretical	Baysian Estimation, prior and posterior distribution, loss function, Conjugate prior distributions, predictive distribution	Theorems and application	2	the third
General questions and discussion	theoretical	Methods of Evaluating Goodness of estimators	Def. and theorems	2	the fourth
General questions and discussion	theoretical	Unbiased estimator, relatively efficient estimator, sufficient estimator, consistent estimator	Def. andremark	2	Fifth
General questions and discussion	theoretical	Some techniques for finding interval estimators of parameters	Concept and examples	2	VI
General questions and discussion	theoretical	Test of statistical hypotheses	Def. and remarks	2	Seventh
General questions and discussion	theoretical	Regression and correlation analysis	Def. and remarks	2	VIII
First semester exam	theoretical	Analysis of variance	Def. and remarks	2	Ninth
General questions and discussion	theoretical	One-way analysis of variance with equal sample sizes	Def. and properties	2	The tenth
General questions and discussion	theoretical	One-way analysis of variance with unequal sample sizes	Def. and properties	2	eleventh
General questions and discussion	theoretical	Pair wise comparison,Tests for the Homogeneity of variances	Def. and properties	2	twelveth
General questions and discussion	theoretical	Goodness of fit Tests	Def. and properties	2	Thirteenth
General questions and discussion	theoretical	The Chi-Square testsAndContingency tables	Concept and examples	2	fourteenth
Exam					Fifteenth

11. Course evaluation

12. Learning and teaching resources	
1-hogg,RV,J,W. Mckean and AT Craig (2015): Introduction to Mathematics Statistics, Sixth Pearson Education Inc. 2- Larsen, R.J. and Marx, L. (2014): An Introduction to Mathematics Statistics and its Application. Fifth Edition, Prentice Hall.	Required textbooks (methodology, if any)
Degroot, M. H. (1986): problems and statistics, -1 Second Edition, Addison, Wesley Pub.Co. Devore JL and Berk KN (2012): modern -2 mathematics statistics with application.second Ed. Springer New York Dordrecht Heidelberg London. Mood,AM,raybill,FAbose.DC(1974): -3 Introduction to the theory of statistics.Third Edition, McGraw.Hill..	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name
Topics in control theory, fractional differentiation and their applications
2. Course code
MAT6115

3. Semester/year	
General Ph.D./first course/2023-2024	
4. The date this description was prepared	
10/1/2023	
5. Available attendance forms	
My presence	
6. Number of study hours (total) / number of units (total)	
2/30	
7. Name of the course administrator (if more than one name is mentioned)	
sadiq.n@sc.uobaghdad.edu.iqEmail:	Name: A.D. Sadiq Naji
8. Course objectives	
1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	Objectives of the study subject
9. Teaching and learning strategies	
• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy
10. Course structure	

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	Basic concepts and definitions	Identify analytical functions	2	the first
General questions and discussion	theoretical	Attainable sets and controllability	Learn about basic functions	2	the second
General questions and discussion	theoretical	Formulation of simple control models:necessary conditions and sufficient conditions	Learn about integration	2	the third
General questions and discussion	theoretical	The Linear Time Optimal Problem	Cauchy integral	2	the fourth
General questions and discussion	theoretical	Optimal control problems - special forms	Cauchy's theorem courses	2	Fifth
General questions and discussion	theoretical	The Mayer, Lagrange and Bolza problems.	Sequences	2	VI
General questions and discussion	theoretical	Pontryagins Maximum principle: Continuous time	Cauchy's residual theorem	2	Seventh
General questions and discussion	theoretical	Optimality criteria and further properties of autonomous finite and infinite horizon problems	Residue applications	2	VIII
First semester exam	theoretical	Optimal control of several variables	Learn about inverse Laplace transforms	2	Ninth
General questions and discussion	theoretical	Fractional derivatives	Functions preserving angles	2	The tenth
General questions and discussion	theoretical	The popular definitions of fractional derivatives/integrals in fractional Calculus	Identify the types of transfers	2	eleventh
General questions and discussion	theoretical	Properties of fractional derivatives	Preservative functions	2	twelveth
General questions and discussion	theoretical	Fractional optimal control problems	Applications of angle preserving functions	2	Thirteenth
General questions and	theoretical	Discrete time optimal control	Schwarz-Christoffel transform	2	fourteenth

discussion		problemsAndControl applied to biological modelsand financing model In both cases continuous time and discrete time			
Exam					Fifteenth

11. Course evaluation

A monthly exam, the pursuit is from 40, and the final exam is from 60

12. Learning and teaching resources

Leonid_T._Ashchepkov, Dmitriy_V._Dolgy, Taekyun_Kim Optimal control, 2021	Required textbooks (methodology, if any)
Wikan.A. Discrete dynamical systems with an introduction to discrete optimization problems. 2013 -1 Greg Knowles An introduction to applied optimal control 1981 -2 Podlubny I. Fractional Differential Equations.San Diego: Academic Press; 1999 -3 K. S. Miller & B. Ross. ,An Introduction to the Fractional Calculus and Fractional Differential Equations Hardcover, Wiley-Blackwell, 1993. -4	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name	
Topics in algebraic topology 1	
2. Course code	
MAT6116	
3. Semester/year	
General Ph.D./first course/2023-2024	
4. The date this description was prepared	
10/1/2023	
5. Available attendance forms	
My presence	
6. Number of study hours (total) / number of units (total)	
2/30	
7. Name of the course administrator (if more than one name is mentioned)	
sahira.yaseen@sc.uobaghdad.edu.iq afraa.sadek@sc.uobaghdad.edu.iqEmail:	Name: A.D. Sahira Mahmoud Name: A.M.D. Afraa is satisfied
8. Course objectives	
1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the	Objectives of the study subject

requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	

9. Teaching and learning strategies

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	Homotopic theory	Study of the relationship between topological equivalence	2	the first
General questions and discussion	theoretical	Contractible space	Study of spaces that can be compressed into a point	2	the second
General questions and discussion	theoretical	First homotopy group	Creation of the first homotopian group	2	the third
General questions and discussion	theoretical	Van Kamper theorem	Applications of Van Camper's theorem	2	the fourth
General questions and discussion	theoretical	Simply connected space	Give a description of the connected spaces	2	Fifth
General questions and discussion	theoretical	Quotient space	Give a geometric description of division spaces	2	VI
General questions and discussion	theoretical	Free action	Study of the free agent	2	Seventh
General questions and discussion	theoretical	Topological group	Study of topological groups	2	VIII
First semester	theoretical	Manifold	Definition of	2	Ninth

exam			manifold		
General questions and discussion	theoretical	Read the group	Study of groups from the beginning to end	2	The tenth
General questions and discussion	theoretical	Smooth manifold	Study of the smooth manifold	2	eleventh
General questions and discussion	theoretical	Covering space	Study the concept of cover	2	twelveth
General questions and discussion	theoretical	HomotopyLifting property	Definition of homotopic lift	2	Thirteenth
General questions and discussion	theoretical	Fibration, higher homotopy group	A study of fibrication in group arithmetic	2	fourteenth
Exam					Fifteenth

11. Course evaluation	
The monthly exam is 40, and the final exam is 60	
12. Learning and teaching resources	
Algebraic topology, William Fulton, 2019	Required textbooks (methodology, if any)
Elementary on algebraic topology, James Munkres, 2015	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library.	Electronic references, websites

modelCourse description

1. Course name
Reliability
2. Course code
MAT6215
3. Semester/year
General Ph.D./second course/2023-2024
4. The date this description was prepared

10/1/2023

5. Available attendance forms

My presence

6. Number of study hours (total) / number of units (total)

2/30

7. Name of the course administrator (if more than one name is mentioned)

tasnim.h@sc.uobaghdad.edu.iqEmail:	Name: A.M.D. Tasneem Hassan Kazem

8. Course objectives

1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	Objectives of the study subject

9. Teaching and learning strategies

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	State Variable, Time to Failure, Reliability Function	A detailed study of the explanation with clarification of each word	2	the first

General questions and discussion	theoretical	Some Special -1 Discrete Distributions	A detailed study of the explanation with clarification of each word	2	the second
General questions and discussion	theoretical	Poisson Process	A detailed study of the explanation with clarification of each word	2	the third
General questions and discussion	theoretical	The Homogeneous Poisson Process	A detailed study of the explanation with clarification of each word	2	the fourth
General questions and discussion	theoretical	Some Special -2 Continuous Distributions	A detailed study of the explanation with clarification of each word	2	Fifth
General questions and discussion	theoretical	Stressor-Dependent Modeling	A detailed study of the explanation with clarification of each word	2	VI
General questions and discussion	theoretical	IFR and DFR distributions	A detailed study of the explanation with clarification of each word	2	Seventh
General questions and discussion	theoretical	Structure Functions	A detailed study of the explanation with clarification of each word	2	VIII
First semester exam	theoretical	Minimal Paths and Minimal Cut Sets	A detailed study of the explanation with clarification of each word	2	Ninth
General questions and discussion	theoretical	Bounds on the Reliability Function	A detailed study of the explanation with clarification of each word	2	The tenth
General questions and discussion	theoretical	Method of Inclusion Exclusion	A detailed study of the explanation with clarification of each word	2	eleventh
General questions and discussion	theoretical	Second Method for -3 Obtaining Bounds.	A detailed study of the explanation with clarification of each word	2	twelveth
General	theoretical	Maximum Likelihood	A detailed study of	2	Thirteenth

questions and discussion		Estimation and Confidence Intervals for Complete and Censored Data	the explanation with clarification of each word		
General questions and discussion	theoretical	Bayesian Reliability Analysis and Credibility Intervals, Choice of Prior Distribution	A detailed study of the explanation with clarification of each word	2	fourteenth
Questions					Fifteenth

11. Course evaluation	
Monthly exam and pursuit of 40, 60 final exam	
12. Learning and teaching resources	
	Required textbooks (methodology, if any)
	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name
Heat and mass transfer
2. Course code
MAT6217
3. Semester/year
General Ph.D./second course/2023-2024
4. The date this description was prepared
10/1/2023
5. Available attendance forms
My presence
6. Number of study hours (total) / number of units (total)

3/45

7. Name of the course administrator (if more than one name is mentioned)

liqaa.hummady@sc.uobaghdad.edu.iqEmail:	Name: A.M.D. Meeting Zaki Hammadi

8. Course objectives

1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	Objectives of the study subject

9. Teaching and learning strategies

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	Introduction	Identify the basic characteristics of the nature of scientific material	3	the first
General questions and discussion	theoretical	Heat transfer methods	Identify the basic characteristics of the nature of scientific material	3	the second
General questions and discussion	theoretical	Heat transfer methods	Identify the basic characteristics of the nature of scientific	3	the third

			material		
General questions and discussion	theoretical	Energy equation in 1-dim	Identify the basic characteristics of the nature of scientific material	3	the fourth
General questions and discussion	theoretical	Energy equation in 2-dim	Identify the basic characteristics of the nature of scientific material	3	Fifth
General questions and discussion	theoretical	Energy equation in 3-dim	Identify the basic characteristics of the nature of scientific material	3	VI
General questions and discussion	theoretical	applications	Identify the basic characteristics of the nature of scientific material	3	Seventh
General questions and discussion	theoretical	applications	Identify the basic characteristics of the nature of scientific material	3	VIII
First semester exam	theoretical	Energy equation in 1-dim	Identify the basic characteristics of the nature of scientific material	3	Ninth
General questions and discussion	theoretical	Energy equation in 1-dim	Identify the basic characteristics of the nature of scientific material	3	The tenth
General questions and discussion	theoretical	Thermal boundary layer	Identify the basic characteristics of the nature of scientific material	3	eleventh
General questions and discussion	theoretical	Thermal boundary layer	Identify the basic characteristics of the nature of scientific material	3	twelveth
General questions and discussion	theoretical	Thermal boundary layer	Identify the basic characteristics of the nature of scientific material	3	Thirteenth
General questions and discussion	theoretical	Application thermal boundary layer	Identify the basic characteristics of the nature of scientific material	3	fourteenth
Exam					Fifteenth

11. Course evaluation

Daily and monthly exams, the final exam is 40 and the final is 60	
12. Learning and teaching resources	
Fundamentals of heat and mass transfer by Frank P. Incropera 2017	Required textbooks (methodology, if any)
Heat and mass transfer: Fundamentals & Applications by Afshin Jahanshahi and Yungus A. Cengel 2015 Heat and mass transfer: Fundamentals & Applications-McGraw-Hill 2013	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name
Topics in dynamical systems
2. Course code
MAT6214
3. Semester/year
General Ph.D./second course/2023-2024
4. The date this description was prepared
10/1/2023
5. Available attendance forms
My presence
6. Number of study hours (total) / number of units (total)
3/45
7. Name of the course administrator (if more than one name is mentioned)

raid.naji@sc.uobaghdad.edu.iqEmail:	Name: A.D. Raed Kamel Naji

8. Course objectives

1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	Objectives of the study subject

9. Teaching and learning strategies

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	Basic definitions	Identify the basic characteristics of the nature of scientific material	3	the first
General questions and discussion	theoretical	Existence and uniqueness	Identify the basic characteristics of the nature of scientific material	3	the second
General questions and discussion	theoretical	Limit set	Identify the basic characteristics of the nature of scientific material	3	the third
General questions and discussion	theoretical	Stability theory	Identify the basic characteristics of the nature of scientific	3	the fourth

			material		
General questions and discussion	theoretical	Stability theory of linear system	Identify the basic characteristics of the nature of scientific material	3	Fifth
General questions and discussion	theoretical	Stability theory of nonlinear system	Identify the basic characteristics of the nature of scientific material	3	VI
General questions and discussion	theoretical	Laypunov stability	Identify the basic characteristics of the nature of scientific material	3	Seventh
General questions and discussion	theoretical	Periodic dynamics	Identify the basic characteristics of the nature of scientific material	3	VIII
First semester exam	theoretical	Periodic dynamics	Identify the basic characteristics of the nature of scientific material	3	Ninth
General questions and discussion	theoretical	Bifurcation theory	Identify the basic characteristics of the nature of scientific material	3	The tenth
General questions and discussion	theoretical	Bifurcation theory	Identify the basic characteristics of the nature of scientific material	3	eleventh
General questions and discussion	theoretical	Bifurcation theory	Identify the basic characteristics of the nature of scientific material	3	twelveth
General questions and discussion	theoretical	Invariant folds	Identify the basic characteristics of the nature of scientific material	3	Thirteenth
General questions and discussion	theoretical	Invariant folds	Identify the basic characteristics of the nature of scientific material	3	fourteenth
Exam				3	Fifteenth

11. Course evaluation

Exam, coz, quest from 40, and final from 60

12. Learning and teaching resources

Denny Guliclc, Encounters with chaos,	Required textbooks (methodology, if any)

MCGrow Hill 2016	
Robert L. Devany, An introduction to chaotic dynamical system, second edition, Addison - wesely publishing company, Inc. 1989	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name	
Topics in sizes	
2. Course code	
MAT6217	
3. Semester/year	
General Ph.D./second course/2023-2024	
4. The date this description was prepared	
10/1/2023	
5. Available attendance forms	
My presence	
6. Number of study hours (total) / number of units (total)	
2/30	
7. Name of the course administrator (if more than one name is mentioned)	
sahira.yaseen@sc.uobaghdad.edu.iqEmail:	Name: A.D. Sahira Mahmoud
8. Course objectives	
1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are	Objectives of the study subject

compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	

9. Teaching and learning strategies

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	Definition and examples of modules, submodules.	Identify the basic characteristics of the nature of scientific material	2	the first
General questions and discussion	theoretical	Essential submodule	Identify the basic characteristics of the nature of scientific material	2	the second
General questions and discussion	theoretical	A relative complement of submodules	Identify the basic characteristics of the nature of scientific material	2	the third
General questions and discussion	theoretical	Close submodules	Identify the basic characteristics of the nature of scientific material	2	the fourth
General questions and discussion	theoretical	Simple modules	Identify the basic characteristics of the nature of scientific material	2	Fifth
General questions and discussion	theoretical	Semisimple modules The Socle of modules	Identify the basic characteristics of the nature of scientific	2	VI

			material		
General questions and discussion	theoretical	Maximal submodules	Identify the basic characteristics of the nature of scientific material	2	Seventh
General questions and discussion	theoretical	Small submodules	Identify the basic characteristics of the nature of scientific material	2	VIII
First semester exam	theoretical	The Jacobson radical of modules	Identify the basic characteristics of the nature of scientific material	2	Ninth
General questions and discussion	theoretical	Singular and Nonsingular modules	Identify the basic characteristics of the nature of scientific material	2	The tenth
General questions and discussion	theoretical	Injective modules.	Identify the basic characteristics of the nature of scientific material	2	eleventh
General questions and discussion	theoretical	Divisible modules	Identify the basic characteristics of the nature of scientific material	2	twelveth
General questions and discussion	theoretical	Injective hulls of a module	Identify the basic characteristics of the nature of scientific material	2	Thirteenth
General questions and discussion	theoretical	Projective modules	Identify the basic characteristics of the nature of scientific material	2	fourteenth
Exam					Fifteenth

11. Course evaluation

12. Learning and teaching resources

	Required textbooks (methodology, if any)
	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library.	Electronic references, websites

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modelCourse description

1. Course name	
Integral transformations and their applications	
2. Course code	
MAT6216	
3. Semester/year	
General Ph.D./first course/2023-2024	
4. The date this description was prepared	
10/1/2023	
5. Available attendance forms	
My presence	
6. Number of study hours (total) / number of units (total)	
2/30	
7. Name of the course administrator (if more than one name is mentioned)	
azhar.majeed@sc.uobaghdad.edu.iqEmail:	Name: A.D. Azhar Abbas
8. Course objectives	
1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	Objectives of the study subject

9. Teaching and learning strategies

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	Definition of infinite Fourier transform	Identify the basic characteristics of the nature of scientific material	2	the first
General questions and discussion	theoretical	sine and cosine transform, properties of Fourier transform,	Identify the basic characteristics of the nature of scientific material	2	the second
General questions and discussion	theoretical	Properties of Fourier cosine and sine transforms	Identify the basic characteristics of the nature of scientific material	2	the third
General questions and discussion	theoretical	inversion theorem (inverse of Fourier transform),	Identify the basic characteristics of the nature of scientific material	2	the fourth
General questions and discussion	theoretical	convolution theorem	Identify the basic characteristics of the nature of scientific material	2	Fifth
General questions and discussion	theoretical	general Perseval's relationship	Identify the basic characteristics of the nature of scientific material	2	VI
General questions and discussion	theoretical	Dirichlet's conditions for existence of Fourier transform	Identify the basic characteristics of the nature of scientific material	2	Seventh
General questions and discussion	theoretical	Fourier transform of derivatives	Identify the basic characteristics of the nature of scientific material	2	VIII
First semester exam	theoretical	Solving of differential equation, solution for boundary value problems	Identify the basic characteristics of the nature of scientific material	2	Ninth

General questions and discussion	theoretical	Laplace transforms and their basic properties	Identify the basic characteristics of the nature of scientific material	2	The tenth
General questions and discussion	theoretical	existence for the Laplace transform	Identify the basic characteristics of the nature of scientific material	2	eleventh
General questions and discussion	theoretical	the Convolution theorem and properties of Convolution	Identify the basic characteristics of the nature of scientific material	2	twelveth
General questions and discussion	theoretical	the inverse of Laplace transforms and examples	Identify the basic characteristics of the nature of scientific material	2	Thirteenth
General questions and discussion	theoretical	Computation of the Laplace transform inverse by partial fraction method and by convolution theorem	Identify the basic characteristics of the nature of scientific material	2	fourteenth
Exam					Fifteenth

11. Course evaluation

Daily and monthly exams, the end of the course exam is from 40, and the end-of-course exam is from 60

12. Learning and teaching resources

Lokenath Debnath and Dambaru Bhatta, "INTEGRAL TRANSFORMS AND THEIR APPLICATIONS, THIRD EDITION	Required textbooks (methodology, if any)
Lokenath Debnath and Dambaru Bhatta, "INTEGRAL TRANSFORMS AND THEIR APPLICATIONS, THIRD EDITION	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name	
Kama sizes	
2. Course code	
MAT6219	
3. Semester/year	
General Ph.D./second course/2023-2024	
4. The date this description was prepared	
10/1/2023	
5. Available attendance forms	
My presence	
6. Number of study hours (total) / number of units (total)	
2/30	
7. Name of the course administrator (if more than one name is mentioned)	
nuhad.salim@sc.uobaghdad.edu.iqEmail:	Name: A.D. Nihad Salem
8. Course objectives	
1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	Objectives of the study subject
9. Teaching and learning strategies	

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	Gamma Rings, Gamma Ideals	Concept and examples	2	the first
General questions and discussion	theoretical	Gamma Modules	Concept and some remarks	2	the second
General questions and discussion	theoretical	Gamma Submodules	Definition and remarks	2	the third
General questions and discussion	theoretical	fg Gamma Submodules	Definition and theories	2	the fourth
General questions and discussion	theoretical	Free Gamma Modules	Definition and mark	2	Fifth
General questions and discussion	theoretical	The residual Gamma Ideals	Concept and properties	2	VI
General questions and discussion	theoretical	Homomorphism Gamma Modules	Definition and remarks	2	Seventh
General questions and discussion	theoretical	The endomorphism gamma ring of Gamma Modules	Definition and remarks	2	VIII
First semester exam	theoretical	The Gamma Isomorphism in Modules	Theorems	2	Ninth
General questions and discussion	theoretical	Small and maximum Gamma Submodules	Definition and Theorems	2	The tenth
General questions and discussion	theoretical	The Jacobson Radical of Gamma Modules	Definition and properties	2	eleventh
General questions and discussion	theoretical	Pure Gamma Submodules	Definition and Theorems	2	twelveth

General questions and discussion	theoretical	Projective Gamma Modules	Definition and Theorems	2	Thirteenth
General questions and discussion	theoretical	Multiplication Gamma Modules	Definition and Theorems	2	fourteenth
Exam					Fifteenth

11. Course evaluation	
Daily and monthly exams, the pursuit of 40 and the final of 60	
12. Learning and teaching resources	
Gamma Modules (R. Ameri, R. Sadeghi) -1	Required textbooks (methodology, if any)
On TheGamma-Ringsof Nobusawa -1 Rings and Categories of Modules (Frank W. Anderson Kent R. Fuller)	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name
Scientific research method
2. Course code
UOB6200
3. Semester/year
General Ph.D./first course/2023-2024
4. The date this description was prepared
10/1/2023
5. Available attendance forms

My presence
6. Number of study hours (total) / number of units (total)
2/30
7. Name of the course administrator (if more than one name is mentioned)
Name: A.M.D. Iraq Tariq Email: iraq.t@sc.uobaghdad.edu.iq

8. Course objectives	
1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	Objectives of the study subject

9. Teaching and learning strategies	
• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	Introduction to Research Methodology (RM) Research definition and origin	Definition and Theorems	2	the first
General questions and discussion	theoretical	Basic Levels of Research	Definition and Theorems	2	the second

General questions and discussion	theoretical	Steps for Writing	Definition and Theorems	2	the third
General questions and discussion	theoretical	Scientific Research	Definition and Theorems	2	the fourth
General questions and discussion	theoretical	Main Research Parts	Definition and Theorems	2	Fifth
General questions and discussion	theoretical	First Exam Short research at the study level Undergraduate (Bachelor).	Definition and Theorems	2	VI
General questions and discussion	theoretical	Advanced Research at the Thesis Level (Master Thesis).	Definition and Theorems	2	Seventh
General questions and discussion	theoretical	Advanced Research Level Doctoral thesis.	Definition and Theorems	2	VIII
First semester exam	theoretical	Original Research	Definition and Theorems	2	Ninth
General questions and discussion	theoretical	Patented.	Definition and Theorems	2	The tenth
General questions and discussion	theoretical	Review Article.	Definition and Theorems	2	eleventh
General questions and discussion	theoretical	Steps for Writing A Scientific Research	Definition and Theorems	2	twelveth
General questions and discussion	theoretical	A Research Topic	Definition and Theorems	2	Thirteenth
General questions and discussion	theoretical	The majority of research errors and literature review	Definition and Theorems	2	fourteenth
Exam					Fifteenth

11. Course evaluation

Daily and monthly exams, pursuit of 40 and final of 60

12. Learning and teaching resources

Research Methodology: Methods And Techniques (Multi Color Edition) Paperback – December 11, 2008	Required textbooks (methodology, if any)
Research Methodology Best Practices for Rigorous, Credible, and Impactful Research Herman Aguinis-The George Washington University	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name
Topics in functional analysis 1
2. Course code
MAT6106
3. Semester/year
PhD in pure mathematics/first course/2023-2024
4. The date this description was prepared
10/1/2023
5. Available attendance forms
My presence
6. Number of study hours (total) / number of units (total)
2/30
7. Name of the course administrator (if more than one name is mentioned)
Name: A.D. Buthaina Abdel Hassan buthaina.a@sc.uobaghdad.edu.iqEmail: Name: Prof. Dr. Iman Hassan eiman.abood@sc.uobaghdad.edu.iqEmail:

8. Course objectives

1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	Objectives of the study subject

9. Teaching and learning strategies

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	Banach space in Topology	Concept and examples	2	the first
General questions and discussion	theoretical	Banach space	Def. andexamples	2	the second
General questions and discussion	theoretical	Finite dimensional Banach space	Theorems and application	2	the third
General questions and discussion	theoretical	infinite dimensional banach space	Def. and theorems	2	the fourth
General questions and discussion	theoretical	Study the space$L^p(\Omega)$	Def. andremark	2	Fifth
General	theoretical	Linear operators, on a	Concept and	2	VI

questions and discussion		normalized space	examples		
General questions and discussion	theoretical	Dual space and Bidual space	Def. and remarks	2	Seventh
General questions and discussion	theoretical	Application Banach's theorem to linear equation	Def. and remarks	2	VIII
First semester exam	theoretical	Here Banach theorem with some application	Def. and properties	2	Ninth
General questions and discussion	theoretical	Hilbertspaces	Def. and properties	2	The tenth
General questions and discussion	theoretical	Orthonormal sets and Orthonormal basis (countable and uncountable)	Def. and properties	2	eleventh
General questions and discussion	theoretical	Linear operators, on a Banach space	Def. and properties	2	twelveth
General questions and discussion	theoretical	adjoint operator	Def. and properties	2	Thirteenth
General questions and discussion	theoretical	Spectrum of Linear operators	Concept and examples	2	fourteenth
Exam					Fifteenth

11. Course evaluation

Monthly and daily exams, the pursuit of 40 and the final of 60

12. Learning and teaching resources

Linear functional analysis with by (Rymne)2016	Required textbooks (methodology, if any)
Functional analysis by (Alexander cR Belton)2014	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name	
Total functions	
2. Course code	
MAT6111	
3. Semester/year	
PhD in pure mathematics/first course/2023-2024	
4. The date this description was prepared	
10/1/2023	
5. Available attendance forms	
My presence	
6. Number of study hours (total) / number of units (total)	
3/45	
7. Name of the course administrator (if more than one name is mentioned)	
abdulrahman.majeed@sc.uobaghdad.edu.iqEmail: hiba.f@sc.uobaghdad.edu.iqEmail:	Name: A. Dr.. Abdul Rahman Hamid Name: A.M.D. Heba Fawzi Sabaa
8. Course objectives	
1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and	Objectives of the study subject

private sectors and society with all its various institutions.	

9. Teaching and learning strategies

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	Complex Functions	Identify the basic characteristics of the nature of scientific material	3	the first
General questions and discussion	theoretical	Elementary Theory of Power Series	Identify the basic characteristics of the nature of scientific material	3	the second
General questions and discussion	theoretical	Analytic Functions as Mappings	Identify the basic characteristics of the nature of scientific material	3	the third
General questions and discussion	theoretical	Complex Integration	Identify the basic characteristics of the nature of scientific material	3	the fourth
General questions and discussion	theoretical	Conformal Mapping.	Identify the basic characteristics of the nature of scientific material	3	Fifth
General questions and discussion	theoretical	Part Two (Entire Functions)	Identify the basic characteristics of the nature of scientific material	3	VI
General questions and discussion	theoretical	Growth of entire functions	Identify the basic characteristics of the nature of scientific material	3	Seventh
General questions and discussion	theoretical	Main integral formulas for analytic functions in a disk	Identify the basic characteristics of the nature of scientific material	3	VIII
First semester exam	theoretical	Some applications of the Jensen formula	Identify the basic characteristics of the	3	Ninth

			nature of scientific material		
General questions and discussion	theoretical	Factorization of entire functions of finite order	Identify the basic characteristics of the nature of scientific material	3	The tenth
General questions and discussion	theoretical	The connection between the growth of entire functions and the distribution of zeros	Identify the basic characteristics of the nature of scientific material	3	eleventh
General questions and discussion	theoretical	Subharmonic functions	Identify the basic characteristics of the nature of scientific material	3	twelveth
General questions and discussion	theoretical	Complex Functions	Identify the basic characteristics of the nature of scientific material	3	Thirteenth
General questions and discussion	theoretical	Elementary Theory of Power Series, Analytic Functions as Mappings	Identify the basic characteristics of the nature of scientific material	3	fourteenth
					Fifteenth

11. Course evaluation

Daily and monthly exam, pursuit of 40 and final exam of 60

12. Learning and teaching resources

Buterin, S.A., Freiling, G., Yurko, V.A.: Lectures on the Theory of Entire Functions, 2014.	Required textbooks (methodology, if any)
James Ward Brown, Ruel V. Churchill: Complex Variables and Applications, Eighth Edition, 2004	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name

Sizes 1

2. Course code

MAT6107
3. Semester/year
PhD in pure mathematics/first course/2023-2024
4. The date this description was prepared
10/1/2023
5. Available attendance forms
My presence
6. Number of study hours (total) / number of units (total)
3/45
7. Name of the course administrator (if more than one name is mentioned)

nuhad.salim@sc.uobaghdad.edu.iqEmail:	Name: A.D. Nihad Salem

8. Course objectives	
1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	Objectives of the study subject
9. Teaching and learning strategies	
• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy
10. Course structure	

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	**Essential submodels**	**Definition of essential partial sizes**	3	the first
General questions and discussion	theoretical	**Small submodels**	**Definition of small partial sizes**	3	the second
General questions and discussion	theoretical	**close module**	**Definition of closed partial sizes**	3	the third
General questions and discussion	theoretical	**injectective module**	**Study the internal sizes**	3	the fourth
General questions and discussion	theoretical	**Injection hull of module**	**Studying the concept and its relationship with substantive partial models**	3	Fifth
General questions and discussion	theoretical	**Hollow modules**	**Study of hollow sizes**	3	VI
General questions and discussion	theoretical	**lifting modules**	**Study of lifting sizes**	3	Seventh
General questions and discussion	theoretical	**Supplementedmodules**	**A study of sizes**To complete it	3	VIII
First semester exam	theoretical	**The socal of a module**	Study the concept of Socle	3	Ninth
General questions and discussion	theoretical	**The singular submodule**	Study of abnormal partial sizes	3	The tenth
General questions and discussion	theoretical	**Projective module**	Definition of projective sizes	3	eleventh
General questions and discussion	theoretical	**Projective cover of a module**	Definition of cover unlessFall	3	twelveth
General questions and discussion	theoretical	**Extending modules**	Definition of expansion sizes	3	Thirteenth
General questions and discussion	theoretical	**Theradical of a module**	Definition of the root of the module	3	fourteenth
Exam					Fifteenth

11. Course evaluation	
Daily and monthly exams, pursuit from 40, final from 60	
12. Learning and teaching resources	
Abstract algebra,WNCBrown published by DM Burton 2017	Required textbooks (methodology, if any)
Modules and categories, springer-verlage, Berlin, New York, 2013	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name	
Classification theory 1	
2. Course code	
MAT6110	
3. Semester/year	
PhD in pure mathematics/first course/2023-2024	
4. The date this description was prepared	
10/1/2023	
5. Available attendance forms	
My presence	
6. Number of study hours (total) / number of units (total)	
2/30	
7. Name of the course administrator (if more than one name is mentioned)	
bahar.ahmed@sc.uobaghdad.edu.iqEmail:	Name: A.D. Bahar Hamad
8. Course objectives	
1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of	Objectives of the study subject

mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	

9. Teaching and learning strategies

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	Categories and Functions.	Identify the basic characteristics of the nature of scientific material	2	the first
General questions and discussion	theoretical	Natural transformation.	Identify the basic characteristics of the nature of scientific material	2	the second
General questions and discussion	theoretical	Monic, Epic and Zero.	Identify the basic characteristics of the nature of scientific material	2	the third
General questions and discussion	theoretical	Home-Sets. Duality.	Identify the basic characteristics of the nature of scientific material	2	the fourth
General questions and discussion	theoretical	Contravariance and Opposites.	Identify the basic characteristics of the nature of scientific material	2	Fifth
General questions and	theoretical	Product of categories	Identify the basic characteristics of the	2	VI

discussion			nature of scientific material		
General questions and discussion	theoretical	The category of all categories	Identify the basic characteristics of the nature of scientific material	2	Seventh
General questions and discussion	theoretical	Universal Arrows	Identify the basic characteristics of the nature of scientific material	2	VIII
First semester exam	theoretical	The Yoneda	Identify the basic characteristics of the nature of scientific material	2	Ninth
General questions and discussion	theoretical	Coproduct and Colimits	Identify the basic characteristics of the nature of scientific material	2	The tenth
General questions and discussion	theoretical	Product and Limits	Identify the basic characteristics of the nature of scientific material	2	eleventh
General questions and discussion	theoretical	Adjunctions and examples of Adjoints.	Identify the basic characteristics of the nature of scientific material	2	twelveth
General questions and discussion	theoretical	Reflective Subcategories	Identify the basic characteristics of the nature of scientific material	2	Thirteenth
General questions and discussion	theoretical	Abelian Categories and Additive Categories	Identify the basic characteristics of the nature of scientific material	2	fourteenth
Exam					Fifteenth

11. Course evaluation

Daily and monthly exams, the final exam is 40 and the final is 60

12. Learning and teaching resources

Basic Category TheoryTom Leinster, 2014	Required textbooks (methodology, if any)
An introduction to category theory, Jill Adamek, 1990	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library.	Electronic references, websites

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modelCourse description

1. Course name	
Algebraic topology	
2. Course code	
MAT6109	
3. Semester/year	
PhD in pure mathematics/first course/2023-2024	
4. The date this description was prepared	
10/1/2023	
5. Available attendance forms	
My presence	
6. Number of study hours (total) / number of units (total)	
2/30	
7. Name of the course administrator (if more than one name is mentioned)	
sahira.yaseen@sc.uobaghdad.edu.iqEmail: afraa.sadek@sc.uobaghdad.edu.iqEmail:	Name: A.D. Sahira Mahmoud Name: A.M.D. Afraa Radi
8. Course objectives	
1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-	Objectives of the study subject

Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	

9. Teaching and learning strategies

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	Topology, some connected concepts, compact...etc.	Identify the basic characteristics of the nature of scientific material	2	the first
General questions and discussion	theoretical	Maps; continuous maps, smooth maps, quotient maps.	Identify the basic characteristics of the nature of scientific material	2	the second
General questions and discussion	theoretical	Diffeomorphism, locally homeomorphism and locally diffeomorphism	Identify the basic characteristics of the nature of scientific material	2	the third
General questions and discussion	theoretical	Chain rale, Jacobian and Liner maps	Identify the basic characteristics of the nature of scientific material	2	the fourth
General questions and discussion	theoretical	Diganarate and quadratic forms	Identify the basic characteristics of the nature of scientific material	2	Fifth
General questions and discussion	theoretical	Topolagical groups and free groups	Identify the basic characteristics of the nature of scientific material	2	VI
General questions and discussion	theoretical	View groups and groups	Identify the basic characteristics of the nature of scientific material	2	Seventh
General questions and discussion	theoretical	Tangent space in and action (free and fixed point free).R^2	Identify the basic characteristics of the nature of scientific material	2	VIII
First semester exam	theoretical	Smooth action and smooth manifold	Identify the basic characteristics of the	2	Ninth

			nature of scientific material		
General questions and discussion	theoretical	Smooth maps on manifolds	Identify the basic characteristics of the nature of scientific material	2	The tenth
General questions and discussion	theoretical	Inverse function theorem in manifolds	Identify the basic characteristics of the nature of scientific material	2	eleventh
General questions and discussion	theoretical	General preimage theorem and attaching spaces	Identify the basic characteristics of the nature of scientific material	2	twelveth
General questions and discussion	theoretical	General preimage theorem and attaching spaces	Identify the basic characteristics of the nature of scientific material	2	Thirteenth
General questions and discussion	theoretical	General preimage theorem and attaching spaces	Identify the basic characteristics of the nature of scientific material	2	fourteenth
					Fifteenth

11. Course evaluation

Monthly and daily exam, quest from 40 and final from 60

12. Learning and teaching resources

	Required textbooks (methodology, if any)
	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name

English

2. Course code

UOB6100
3. Semester/year
PhD in pure mathematics/first course/2023-2024
4. The date this description was prepared
10/1/2023
5. Available attendance forms
My presence
6. Number of study hours (total) / number of units (total)
2/30
7. Name of the course administrator (if more than one name is mentioned)
Email: Name: A.M.D.
8. Course objectives

1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	Objectives of the study subject

9. Teaching and learning strategies	
• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy
10. Course structure	

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical		Identify the basic characteristics of the nature of scientific material	2	the first
General questions and discussion	theoretical		Identify the basic characteristics of the nature of scientific material	2	the second
General questions and discussion	theoretical		Identify the basic characteristics of the nature of scientific material	2	the third
General questions and discussion	theoretical		Identify the basic characteristics of the nature of scientific material	2	the fourth
General questions and discussion	theoretical		Identify the basic characteristics of the nature of scientific material	2	Fifth
General questions and discussion	theoretical		Identify the basic characteristics of the nature of scientific material	2	VI
General questions and discussion	theoretical		Identify the basic characteristics of the nature of scientific material	2	Seventh
General questions and discussion	theoretical		Identify the basic characteristics of the nature of scientific material	2	VIII
First semester exam	theoretical		Identify the basic characteristics of the nature of scientific material	2	Ninth
General questions and discussion	theoretical		Identify the basic characteristics of the nature of scientific material	2	The tenth
General questions and discussion	theoretical		Identify the basic characteristics of the nature of scientific material	2	eleventh
General questions and	theoretical		Identify the basic characteristics of the	2	twelveth

discussion			nature of scientific material		
General questions and discussion	theoretical		Identify the basic characteristics of the nature of scientific material	2	Thirteenth
General questions and discussion	theoretical		Identify the basic characteristics of the nature of scientific material	2	fourteenth
Exam					Fifteenth

11. Course evaluation	
Monthly and daily exam, quest 40, final 60	
12. Learning and teaching resources	
	Required textbooks (methodology, if any)
	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name
Homological algebra
2. Course code
MAT6207
3. Semester/year
PhD in pure mathematics/second course/2023-2024
4. The date this description was prepared
10/1/2023
5. Available attendance forms

My presence

6. Number of study hours (total) / number of units (total)

3/45

7. Name of the course administrator (if more than one name is mentioned)

alaa.elewi@sc.uobaghdad.edu.iqEmail:	Name: A.D. Alaa Abbas

8. Course objectives

1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	Objectives of the study subject

9. Teaching and learning strategies

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	Direct sum (product) of modules	Identify the basic characteristics of the nature of scientific material	3	the first
General questions and discussion	theoretical	Free (projective) modules	Identify the basic characteristics of the nature of scientific material	3	the second

General questions and discussion	theoretical	Tensor product	Identify the basic characteristics of the nature of scientific material	3	the third
General questions and discussion	theoretical	Chain Complex	Identify the basic characteristics of the nature of scientific material	3	the fourth
General questions and discussion	theoretical	Chain transformation	Identify the basic characteristics of the nature of scientific material	3	Fifth
General questions and discussion	theoretical	n-dimentional homology	Identify the basic characteristics of the nature of scientific material	3	VI
General questions and discussion	theoretical	Shan t exact sequence at chain complexes	Identify the basic characteristics of the nature of scientific material	3	Seventh
General questions and discussion	theoretical	Projective resolution	Identify the basic characteristics of the nature of scientific material	3	VIII
First semester exam	theoretical	Injective modules	Identify the basic characteristics of the nature of scientific material	3	Ninth
General questions and discussion	theoretical	Injective resolution	Identify the basic characteristics of the nature of scientific material	3	The tenth
General questions and discussion	theoretical	Reduced projective resolution	Identify the basic characteristics of the nature of scientific material	3	eleventh
General questions and discussion	theoretical	n-dimension at co homology	Identify the basic characteristics of the nature of scientific material	3	twelveth
General questions and discussion	theoretical	university theorem for homology	Identify the basic characteristics of the nature of scientific material	3	Thirteenth
General questions and discussion	theoretical	approximation at a lower sequence	Identify the basic characteristics of the nature of scientific material	3	fourteenth
Exam				3	Fifteenth

11. Course evaluation	
Monthly and daily exams, the pursuit of 40 and the final of 60	
12. Learning and teaching resources	
Topics in Ring Theory by IN HERSTEIV 2013	Required textbooks (methodology, if any)
Auto orphisms and derivations of associative ring by Kharcheuko VK 2014	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name	
Effects on Hardy spaces	
2. Course code	
MAT6213	
3. Semester/year	
PhD in pure mathematics/second course/2023-2024	
4. The date this description was prepared	
10/1/2023	
5. Available attendance forms	
My presence	
6. Number of study hours (total) / number of units (total)	
2/30	
7. Name of the course administrator (if more than one name is mentioned)	
eiman.abood@sc.uobaghdad.edu.iqEmail:	Name: Prof. Dr. Eman Hassan
8. Course objectives	

1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	Objectives of the study subject

9. Teaching and learning strategies

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	**Analytic function theory.**	Identify the basic characteristics of the nature of scientific material	2	the first
General questions and discussion	theoretical	Taylor theorem	Identify the basic characteristics of the nature of scientific material	2	the second
General questions and discussion	theoretical	The conformal automorphisms.	Identify the basic characteristics of the nature of scientific material	2	the third
General questions and discussion	theoretical	The angular derivative of a holomorphic self-maps	Identify the basic characteristics of the nature of scientific material	2	the fourth
General questions and discussion	theoretical	The fixed points and the Denjoy-Wolff point of a holomorphic self-	Identify the basic characteristics of the nature of scientific	2	Fifth

		maps.	material		
General questions and discussion	theoretical	Hardy spaces.	Identify the basic characteristics of the nature of scientific material	2	VI
General questions and discussion	theoretical	The definition of Hardy space	Identify the basic characteristics of the nature of scientific material	2	Seventh
General questions and discussion	theoretical	The proof of the Hardy Space is a Hilbert space	Identify the basic characteristics of the nature of scientific material	2	VIII
First semester exam	theoretical	Study some of the Hardy space	Identify the basic characteristics of the nature of scientific material	2	Ninth
General questions and discussion	theoretical	The composition operator on Hardy spaces.	Identify the basic characteristics of the nature of scientific material	2	The tenth
General questions and discussion	theoretical	The definition of the composition operator on Hardy space.	Identify the basic characteristics of the nature of scientific material	2	eleventh
General questions and discussion	theoretical	Study some elements of the properties of the composition operator.	Identify the basic characteristics of the nature of scientific material	2	twelveth
General questions and discussion	theoretical	The adjoint of the composition operator.	Identify the basic characteristics of the nature of scientific material	2	Thirteenth
General questions and discussion	theoretical	The normality and compactness of the composition operator, The spectrum of the composition operator	Identify the basic characteristics of the nature of scientific material	2	fourteenth
Exam					Fifteenth

11. Course evaluation

Monthly and daily exams, the pursuit of 40 and the final of 60

12. Learning and teaching resources

An Introduction to Operators on the Hardy-Hilbert Space, Textbook, 2007,Rubén A. Martínez-Avendaño,Peter Rosenthal	Required textbooks (methodology, if any)

Hardy Operators, Function Spaces and Embeddings,2004, David E. Edmunds, •W. Desmond Evans	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name
Algebra is non-commutative
2. Course code
MAT6212
3. Semester/year
PhD in pure mathematics/second course/2023-2024
4. The date this description was prepared
10/1/2023
5. Available attendance forms
My presence
6. Number of study hours (total) / number of units (total)

2/30

7. Name of the course administrator (if more than one name is mentioned)

Name: Prof. Dr. Abdul Rahman Hamid	Email: abdulrahman.majeed@sc.uobaghdad.edu.iq

8. Course objectives

1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	Objectives of the study subject

9. Teaching and learning strategies

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	Lie and Jordan Structures	Identify the basic characteristics of the nature of scientific material	2	the first
General questions and discussion	theoretical	Jordan Simplicity of R.	Identify the basic characteristics of the nature of scientific material	2	the second
General questions and discussion	theoretical	Lie Structure of R.	Identify the basic characteristics of the nature of scientific	2	the third

			material		
General questions and discussion	theoretical	A result on rings with involution	Identify the basic characteristics of the nature of scientific material	2	the fourth
General questions and discussion	theoretical	The Lie Structures of RR][	Identify the basic characteristics of the nature of scientific material	2	Fifth
General questions and discussion	theoretical	Subrings fixed by auto orphisms	Identify the basic characteristics of the nature of scientific material	2	VI
General questions and discussion	theoretical	Involutions of the second kind	Identify the basic characteristics of the nature of scientific material	2	Seventh
General questions and discussion	theoretical	The Subring generated by The skew elements	Identify the basic characteristics of the nature of scientific material	2	VIII
First semester exam	theoretical	A theorem of . Baxter	Identify the basic characteristics of the nature of scientific material	2	Ninth
General questions and discussion	theoretical	Jordan simplicity of the symmetric elements	Identify the basic characteristics of the nature of scientific material	2	The tenth
General questions and discussion	theoretical	Lie structure of K . the skew elements	Identify the basic characteristics of the nature of scientific material	2	eleventh
General questions and discussion	theoretical	Lie structure ofK.K[]	Identify the basic characteristics of the nature of scientific material	2	twelveth
General questions and discussion	theoretical	JordanAuto orphisms sumsonto prime rings	Identify the basic characteristics of the nature of scientific material	2	Thirteenth
General questions and discussion	theoretical	n-Jordan mappings	Identify the basic characteristics of the nature of scientific material	2	fourteenth
Exam				3	Fifteenth

11. Course evaluation

Monthly and daily exams, the pursuit of 40 and the final of 60

12. Learning and teaching resources

Topics in Ring Theory by IN HERSTEIV 2013	Required textbooks (methodology, if any)
Auto orphisms and derivations of associative ring by Kharcheuko VK 2014	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites	Electronic references, websites

modelCourse description

1. Course name
Sizes 2
2. Course code
MAT6208
3. Semester/year
PhD in pure mathematics/second course/2023-2024
4. The date this description was prepared
10/1/2023
5. Available attendance forms
My presence
6. Number of study hours (total) / number of units (total)
3/45
7. Name of the course administrator (if more than one name is mentioned)

wasan.hasan@sc.uobaghdad.edu.iq Email :	Name: Prof. Dr. Wasan Khaled

8. Course objectives	
1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to	Objectives of the study subject

meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	

9. Teaching and learning strategies

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	Maximal submodules and small submodules.	Concept and examples	3	the first
General questions and discussion	theoretical	The Jacobson radical of a module	Def. andexamples	3	the second
General questions and discussion	theoretical	Projective cover of a module	Theorems and application	3	the third
General questions and discussion	theoretical	Hollow modules.	Def. and theorems	3	the fourth
General questions and discussion	theoretical	The relationship between hollow modules and projective cover	Def. andremark	3	Fifth
General questions and discussion	theoretical	Supplemented modules	Concept and examples	3	VI
General questions and	theoretical	Supplemented modules	Def. and remarks	3	Seventh

discussion					
General questions and discussion	theoretical	Weakly supplemented modules and amply supplemented	Def. and remarks	3	VIII
First semester exam	theoretical	coessential submodules	Def. and properties	3	Ninth
General questions and discussion	theoretical	coclosed submidules	Def. and properties	3	The tenth
General questions and discussion	theoretical	lifting modules	Def. and properties	3	eleventh
General questions and discussion	theoretical	Hollow lifting modules	Def. and properties	3	twelveth
General questions and discussion	theoretical	the relation ¥ on the set of submodules	Def. and properties	3	Thirteenth
General questions and discussion	theoretical	H-supplemented modules	Def. and properties	3	fourteenth
Exam				3	Fifteenth

11. Course evaluation

Monthly and daily exams, the pursuit of 40 and the final of 60

12. Learning and teaching resources

.1.R. Wisbauer, Foundation of module and ring theory, Gordon and Breach, Philadelphia, (1991). 2.F. Kasch, Modules and Rings, Acad. Press, London, (1982). 3.J.clark, N.Vanaja, R.Wisbauer, lifting modules, 2006	Required textbooks (methodology, if any)
1-.D. Keskin, On lifting modules, Comm. Algebra, 28(7)(2000), 3427-3440. 2-M. T. Kosan, and D. Keskin, H-supplemented duo modules, Journal of Algebra and its Applications, 6(6) (2007) 965-971 3-. Yongduo Wang and Dejun Wu*, A generalization of supplemented modules, Hacettepe Journal of Mathematics and Statistics Volume 45 (1) (2016), 129 – 137 4-Nil Orhan, Derya Keskin Tütüncü and Rachid	Main references (sources)

Tribak On hollow lifting modules, Taiwanese Journal of Mathematics Vol. 11, No. 2 (June 2007) , pp. 545-568	
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name	
The theory of univalent functions	
2. Course code	
MAT6211	
3. Semester/year	
PhD in pure mathematics/second course/2023-2024	
4. The date this description was prepared	
10/1/2023	
5. Available attendance forms	
My presence	
6. Number of study hours (total) / number of units (total)	
2/30	
7. Name of the course administrator (if more than one name is mentioned)	
kassim.jassim@sc.uobaghdad.edu.iqEmail:	Name: A.D. Qasim Abdel Hamid
8. Course objectives	
1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in	Objectives of the study subject

mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	

9. Teaching and learning strategies

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	Introduction to univalent functions	Definition and Basic Properties	2	the first
General questions and discussion	theoretical	Univalent Functions–the Elementary Theory, Definitions of Major Subclasses.	Definition and Basic Properties	2	the second
General questions and discussion	theoretical	Some important definitions, transformations and Fundamental lemmas	Definition and Basic Properties	2	the third
General questions and discussion	theoretical	Some Area theorems	Definition and Basic Properties	2	the fourth
General questions and discussion	theoretical	Elementary bounds for the coefficients	Definition and Basic Properties	2	Fifth
General questions and discussion	theoretical	Some theorems of power series	Definition and Basic Properties	2	VI
General questions and discussion	theoretical	Implications of the bounds on the second coefficients	Definition and Basic Properties	2	Seventh
General questions and discussion	theoretical	Functions with positive real part	Definition and Basic Properties	2	VIII

First semester exam	theoretical	Convex and starlike functions	Definition and Basic Properties	2	Ninth
General questions and discussion	theoretical	Starlike and Convex Functions of Order α	Definition and Basic Properties	2	The tenth
General questions and discussion	theoretical	Strongly Starlike and Convex Functions	Definition and Basic Properties	2	eleventh
General questions and discussion	theoretical	Typical Real functions and related topics	Definition and Basic Properties	2	twelveth
General questions and discussion	theoretical	Definitions Growth and Distortion Theorems	Definition and Basic Properties	2	Thirteenth
General questions and discussion	theoretical	Bazilevič Functions: Definition and Basic Properties	Definition and Basic Properties	2	fourteenth
Exam					Fifteenth

11. Course evaluation

Monthly and daily exams, the pursuit of 40 and the final of 60

12. Learning and teaching resources

Univalent Functions (Grundlehren der mathematics Wissenschaften 259) 1983rd Edition by PL Duren (Author)	Required textbooks (methodology, if any)
Univalent Functions: A Primer (De Gruyter Studies in Mathematics, 69) 1st Edition by Derek K. Thomas (Author), Nikola Tuneski (Author)	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name

Scientific research method

2. Course code

UOB6200
3. Semester/year
PhD in pure mathematics/second course/2023-2024
4. The date this description was prepared
10/1/2023
5. Available attendance forms
My presence
6. Number of study hours (total) / number of units (total)
2/30
7. Name of the course administrator (if more than one name is mentioned)

iraq.t@sc.uobaghdad.edu.iqEmail:	Name: A.M.D. Iraq Tariq

8. Course objectives	
1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	Objectives of the study subject
9. Teaching and learning strategies	
• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy
10. Course structure	

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	Type of writing	Scientific Articles Research papers	2	the first
General questions and discussion	theoretical	Proposals	purpose ofProposalscomponents ofProposals	2	the second
General questions and discussion	theoretical	Titles	Point to check in your own writing	2	the third
General questions and discussion	theoretical	Planning your writing	Putting your ideas in order	2	the fourth
General questions and discussion	theoretical	Paragraph writing	Placing the main idea in the paragraph	2	Fifth
General questions and discussion	theoretical	Abstract and introduction	Problems, Literature review and Referring	2	VI
General questions and discussion	theoretical	Problem statement purpose	Main objective of paper	2	Seventh
General questions and discussion	theoretical	Writing the main body	Use of illustrations General information	2	VIII
First semester exam	theoretical	Results	Summarizing what was done	2	Ninth
General questions and discussion	theoretical	Discussion	Did the research support the hypothesis	2	The tenth
General questions and discussion	theoretical	Tables and Graphs	Describing graphsDescribingTables	2	eleventh
General questions and	theoretical	Referencing	Types of references style sheets	2	twelveth

discussion					
General questions and discussion	theoretical	Format of reference	Ref. to book, article and unpublished work	2	Thirteenth
General questions and discussion	theoretical	Useful phrases	Phrases that used in research paper	2	fourteenth
Exam					Fifteenth

11. Course evaluation

Monthly and daily exams, the pursuit of 40 and the final of 60

12. Learning and teaching resources

Z. subodova, writing in English apractical handbook for scientific technical writers, Technical University Bron, 2003	Required textbooks (methodology, if any)
Z. subodova, writing in English apractical handbook for scientific technical writers, Technical University Bron, 2003. -1 A. wallwork, English for research: usage style and grammar, springer .Newyork .Headelborg Dordrecht London. -2 T.panston, Aconcise grammar for English language teachers, Ireland 2003 -3 Guidelines for writing university theses and scientific research (Issam Fadel Al-Jumaili - Zahra Mahmoud Al-Khafaji) 2009	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name

Numerical optimization and inverse problems

2. Course code

MAT6105

3. Semester/year
PhD in Applied Mathematics/first course/2023-2024
4. The date this description was prepared
10/1/2023
5. Available attendance forms
My presence
6. Number of study hours (total) / number of units (total)
2/30
7. Name of the course administrator (if more than one name is mentioned)
Name: Am..Dr. Mohamed Sabah Email: mmmsh@sc.uobaghdad.edu.iq

8. Course objectives	
1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	Objectives of the study subject

9. Teaching and learning strategies	
• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	Introduction to inverse problems	Def. ,remarks and examples	2	the first
General questions and discussion	theoretical	Preliminaries and examples	Concept and some remarks	2	the second
General questions and discussion	theoretical	Models in different problems	Theorems and application	2	the third
General questions and discussion	theoretical	Identification of the Time-dependent conductivity	Def. and theorems	2	the fourth
General questions and discussion	theoretical	Method of solution satisfactory function and Ritz-Galerkin Method	Def. andremark	2	Fifth
General questions and discussion	theoretical	Tikhonov's regularization method	Concept and examples	2	VI
General questions and discussion	theoretical	Identification of the Time-dependent conductivity of an Inhomogeneous Diffusive Material	Def. and remarks	2	Seventh
General questions and discussion	theoretical	Finding the time-dependent diffusion coefficient from an integral observation	Def. and remarks	2	VIII
First semester exam	theoretical	Exam	Def. and remarks	2	Ninth
General questions and discussion	theoretical	Determination of Time-dependent thermal conductivity and a free boundary	Def. and properties	2	The tenth
General questions and discussion	theoretical	Backward heat conduction problem	Def. and properties	2	eleventh
General questions and discussion	theoretical	Inverse heat conduction problem	Def. and properties	2	twelveth
General questions and	theoretical	Inverse source	Def. and properties	2	Thirteenth

discussion		problems			
General questions and discussion	theoretical	Inverse coefficient problems	Concept and examples	2	fourteenth
Exam					Fifteenth

11. Course evaluation

Monthly and daily exams, the pursuit of 40 and the final of 60

12. Learning and teaching resources

Petrov, Yu.P. and Sizikov, V.S. (2005) Well-posed, Ill-posed and Intermediate Problems, VSP, The Netherlands.	Required textbooks (methodology, if any)
1- Engl, H. W. and Kaltenbacher, B. (2000) Inverse Problems, Regularization Theory and Applications: an Introduction, Conference in Strobl, Austria, June 2000. 2-Denisov, AM (1999) Elements of the Theory of Inverse Problems, VSP, Utrecht, The Netherlands. 3- Beck, J.V., Blackwell, B. and St. Clair Jr., R. (1985) Inverse Heat Conduction: Ill-Posed Problems, Wiley, New York.	Main references (sources)
1.Alifanov, O. M., Artyukhin, E. A. and Rumyantsev, S. V. (1995). Extreme Methods for Solving Ill-posed Problems with Applications to Inverse Heat Transfer Problems, Begell House, New York. 2.Engl, H.W., Hanke, M. and Neubauer, A. (1996) Regularization of Inverse Problems , Kluwer Academic, Dordrecht.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name

Topics in mathematical statistics

2. Course code

MAT6103
3. Semester/year
PhD in Applied Mathematics/first course/2023-2024
4. The date this description was prepared
10/1/2023
5. Available attendance forms
My presence
6. Number of study hours (total) / number of units (total)
2/30
7. Name of the course administrator (if more than one name is mentioned)

tasnim.h@sc.uobaghdad.edu.iqEmail: iraq.t@sc.uobaghdad.edu.iqEmail:	Name: A.M.D. Tasneem Hassan Name: A.M.D. Iraq Tariq

8. Course objectives	
1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	Objectives of the study subject
9. Teaching and learning strategies	
• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical		Def. and properties	2	the first
General questions and discussion	theoretical		Def. and properties	2	the second
General questions and discussion	theoretical		Def. and properties	2	the third
General questions and discussion	theoretical		Def. and properties	2	the fourth
General questions and discussion	theoretical		Def. and properties	2	Fifth
General questions and discussion	theoretical		Def. and properties	2	VI
General questions and discussion	theoretical		Def. and properties	2	Seventh
General questions and discussion	theoretical		Def. and properties	2	VIII
First semester exam	theoretical		Def. and properties	2	Ninth
General questions and discussion	theoretical		Def. and properties	2	The tenth
General questions and discussion	theoretical		Def. and properties	2	eleventh
General questions and discussion	theoretical		Def. and properties	2	twelveth
General questions and discussion	theoretical		Def. and properties	2	Thirteenth
General questions and discussion	theoretical		Def. and properties	2	fourteenth
Exam					Fifteenth

11. Course evaluation

12. Learning and teaching resources

	Required textbooks (methodology, if any)
	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name	
Topics in dynamical systems	
2. Course code	
MAT6101	
3. Semester/year	
PhD in Applied Mathematics/first course/2023-2024	
4. The date this description was prepared	
10/1/2023	
5. Available attendance forms	
My presence	
6. Number of study hours (total) / number of units (total)	
3/45	
7. Name of the course administrator (if more than one name is mentioned)	
azhar.majeed@sc.uobaghdad.edu.iqEmail:	Name: Prof. Azhar Abbas
8. Course objectives	
1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	Objectives of the study subject
9. Teaching and learning strategies	

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	Basic definitions	Identify the basic characteristics of the nature of scientific material	3	the first
General questions and discussion	theoretical	Existence and uniqueness	Identify the basic characteristics of the nature of scientific material	3	the second
General questions and discussion	theoretical	Limit set	Identify the basic characteristics of the nature of scientific material	3	the third
General questions and discussion	theoretical	Stability theory	Identify the basic characteristics of the nature of scientific material	3	the fourth
General questions and discussion	theoretical	Stability theory of linear system	Identify the basic characteristics of the nature of scientific material	3	Fifth
General questions and discussion	theoretical	Stability theory of nonlinear system	Identify the basic characteristics of the nature of scientific material	3	VI
General questions and discussion	theoretical	Laypunov stability	Identify the basic characteristics of the nature of scientific material	3	Seventh
General questions and discussion	theoretical	Periodic dynamics	Identify the basic characteristics of the nature of scientific material	3	VIII
First semester exam	theoretical	Periodic dynamics	Identify the basic characteristics of the nature of scientific material	3	Ninth
General questions and	theoretical	Bifurcation theory	Identify the basic characteristics of the	3	The tenth

discussion			nature of scientific material		
General questions and discussion	theoretical	Bifurcation theory	Identify the basic characteristics of the nature of scientific material	3	eleventh
General questions and discussion	theoretical	Bifurcation theory	Identify the basic characteristics of the nature of scientific material	3	twelveth
General questions and discussion	theoretical	Invariant folds	Identify the basic characteristics of the nature of scientific material	3	Thirteenth
General questions and discussion	theoretical	Invariant folds	Identify the basic characteristics of the nature of scientific material	3	fourteenth
Exam					Fifteenth

11. Course evaluation	
Daily and monthly exam, quest from 40 and final from 60	
12. Learning and teaching resources	
Denny Guliclc, Encounters with chaos, MCGrow Hill 2016	Required textbooks (methodology, if any)
Robert L. Devany, An introduction to chaotic dynamical system, second edition, Addison - wesely publishing company, Inc. 1989	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name
Applied linear algebra
2. Course code
MAT6104

3. Semester/year	
PhD in Applied Mathematics/first course/2023-2024	
4. The date this description was prepared	
10/1/2023	
5. Available attendance forms	
My presence	
6. Number of study hours (total) / number of units (total)	
2/30	
7. Name of the course administrator (if more than one name is mentioned)	
huda.oun@sc.uobaghdad.edu.iqEmail:	Name: A.M.D. Hoda Abdel Sattar
8. Course objectives	
1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	Objectives of the study subject
9. Teaching and learning strategies	
• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy
10. Course structure	

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	Basic Concepts ;Vector space - subspace- Linear combination-linear dependent and linear independent- basis- span	Def. and properties	2	the first
General questions and discussion	theoretical	Basic concepts of matrix ; Properties of arithmetic matrix – inverse matrix	Def. and properties	2	the second
General questions and discussion	theoretical	Linear algebra solution;Solution- Gaussian elimination- regular case- pivoting and permutations –	Def. and properties	2	the third
General questions and discussion	theoretical	General Linear system;homogenous system- Determine	Def. and properties	2	the fourth
General questions and discussion	theoretical	Matrices of linear maps;Algebra of linear maps	Def. and properties	2	Fifth
General questions and discussion	theoretical	Application of linear algebra	Def. and properties	2	VI
General questions and discussion	theoretical	Minimization and least square	Def. and properties	2	Seventh
General questions and discussion	theoretical	Exam	Def. and properties	2	VIII
First semester exam	theoretical	Some theorem about applied linear algebra	Def. and properties	2	Ninth
General questions and discussion	theoretical	Dynamics: Basic solution techniques existence and uniqueness	Def. and properties	2	The tenth
General questions and discussion	theoretical	Stability of linear systems- two dim. systems	Def. and properties	2	eleventh
General questions and discussion	theoretical	Dynamic of structures	Def. and properties	2	twelveth
General questions and discussion	theoretical	Application of linear Algebra	Def. and properties	2	Thirteenth
General questions and discussion	theoretical	Iteration; linear iterative system		2	fourteenth

Exam					Fifteenth

11. Course evaluation

12. Learning and teaching resources

	Required textbooks (methodology, if any)
	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name

Fluid mechanics and heat transfer

2. Course code

MAT6102

3. Semester/year

General Ph.D./first course/2023-2024

4. The date this description was prepared

10/1/2023

5. Available attendance forms

My presence

6. Number of study hours (total) / number of units (total)

3/45

7. Name of the course administrator (if more than one name is mentioned)

Name: A.D. Ahmed Mawlud
Name: A.M.D. Meet
Email: ahmed.abdulhadi@sc.uobaghdad.edu.iq
liqaa. hummady@sc.uobaghdad.edu.iq

	Zaki

8. Course objectives

1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	Objectives of the study subject

9. Teaching and learning strategies

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	Introduction	Def. and properties	3	the first
General questions and discussion	theoretical	Heat transfer methods	Def. and properties	3	the second
General questions and discussion	theoretical	Heat transfer methods	Def. and properties	3	the third
General questions and discussion	theoretical	Energy equation in 1-dim	Def. and properties	3	the fourth
General questions and discussion	theoretical	Energy equation in 2-dim	Def. and properties	3	Fifth

General questions and discussion	theoretical	Energy equation in 3-dim	Def. and properties	3	VI
General questions and discussion	theoretical	applications	Def. and properties	3	Seventh
General questions and discussion	theoretical	applications	Def. and properties	3	VIII
First semester exam	theoretical	Energy equation in 1-dim	Def. and properties	3	Ninth
General questions and discussion	theoretical	Energy equation in 1-dim	Def. and properties	3	The tenth
General questions and discussion	theoretical	Thermal boundary layer	Def. and properties	3	eleventh
General questions and discussion	theoretical	Thermal boundary layer	Def. and properties	3	twelveth
General questions and discussion	theoretical	Thermal boundary layer	Def. and properties	3	Thirteenth
General questions and discussion	theoretical	Application thermal boundary layer	Def. and properties	3	fourteenth
Exam				3	Fifteenth

11. Course evaluation

Daily and monthly exam, quest from 40 and final from 60

12. Learning and teaching resources

Fundamentals of heat and mass transfer by Frank P. Incropera 2017	Required textbooks (methodology, if any)
Heat and mass transfer: Fundamentals & Applications by Afshin Jahanshahi and Yungus A. Cengel 2015	Main references (sources)
Heat and mass transfer: Fundamentals & Applications- McGraw-Hill 2013	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name

English
2. Course code
UOB6100
3. Semester/year
PhD in Applied Mathematics/first course/2023-2024
4. The date this description was prepared
10/1/2023
5. Available attendance forms
My presence
6. Number of study hours (total) / number of units (total)
2/30
7. Name of the course administrator (if more than one name is mentioned)
Name: A.M.D. Ali Abed Obaid — Email: ali.abd@sc.uobaghdad.edu.iq

8. Course objectives	
1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	Objectives of the study subject

9. Teaching and learning strategies	
• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures.	The strategy

• Graduation projectsAndaFor scientific visits.	

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical			2	the first
General questions and discussion	theoretical			2	the second
General questions and discussion	theoretical			2	the third
General questions and discussion	theoretical			2	the fourth
General questions and discussion	theoretical			2	Fifth
General questions and discussion	theoretical			2	VI
General questions and discussion	theoretical			2	Seventh
General questions and discussion	theoretical			2	VIII
First semester exam	theoretical			2	Ninth
General questions and discussion	theoretical			2	The tenth
General questions and discussion	theoretical			2	eleventh
General questions and discussion	theoretical			2	twelveth
General questions and discussion	theoretical			2	Thirteenth
General questions and discussion	theoretical			2	fourteenth
Exam					Fifteenth

11. Course evaluation	
Daily and monthly exam, the pursuit is 40, and the final is 60	
12. Learning and teaching resources	
	Required textbooks (methodology, if any)
	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name	
Numerical analysis	
2. Course code	
MAT6202	
3. Semester/year	
PhD in Applied Mathematics/Second Course/2023-2024	
4. The date this description was prepared	
10/1/2023	
5. Available attendance forms	
My presence	
6. Number of study hours (total) / number of units (total)	
3/45	
7. Name of the course administrator (if more than one name is mentioned)	
mmmsh@sc.uobaghdad.edu.iqEmail:	Name: A.M. Dr. Muhammad Sabah
8. Course objectives	
1. Encouraging and developing scientific research in the field of mathematics in general.	Objectives of the

2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	study subject

9. Teaching and learning strategies

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	**1- Polynomial Interpolation** Preliminaries; Lagrange interpolation; differentiation. Newton divided differences; properties; construction; differentiation.	Learn about the basic principles of Lacrange polynomials and finite differences	3	the first
General questions and discussion	theoretical	Interpolation error; rounding error; Runge phenomenon; optimal node distribution. Approximation; norms; best approximation; Weierstrass' theorem; Bernstein polynomials. Examples: Polynomial Interpolation	Calculating and analyzing errors, as well as identifying the Ring phenomenon. Approximation and optimal approximation	3	the second
General questions and discussion	theoretical	2-Minimax Approximation Minimax approximation; ad hoc linear and quadratic best approximations.	Smallest magnifications and least squares approximation	3	the third
General questions and discussion	theoretical	Theorems of de la Vall´ee-Poussin and Chebyshev; Remes algorithm; Chebyshev polynomials.	De La Ville-Poisson theorem, Jebyshev polynomials, and the importance of Remez's algorithm	3	the fourth
General questions	theoretical	Chebyshev Approximation Chebyshev least-squares	Jebyshev polynomials and their applications, the	3	Fifth

and discussion		approximations Decay of Fourier coefficients; near-minimax approximation Chebyshev interpolation; minimum-norm of monic polynomials; minimum Lagrange error.	theory of optimal approximation, learning about the calculation of polynomials with fluctuations, and the approximation of instantaneous coefficients.		
General questions and discussion	theoretical	Forced oscillation of the Chebyshev error; approximate Fourier coefficients. Spectrally accurate calculation of Fourier coefficients. Examples: Lp Norms and Minimax Approximation	Learn about calculating fluctuating polynomials and approximating instantaneous coefficients	3	VI
General questions and discussion	theoretical	**Finite-Difference Operators** − Finite differences in 1-D; accuracy and order. − Finite-difference operators for 1st derivatives.	End differences	3	Seventh
General questions and discussion	theoretical	Examples: Chebyshev Approximation and Interpolation Finite-difference operators for higher derivatives.	High-order finite differences	3	VIII
First semester exam	theoretical	Mehrstellenverfahren: compact molecules − FD formulae in 2-D; Laplacian operator; molecules, stencils. − Higher-order FD approximations; error via Mehrstellen reduction verfahren	Finite differences for two-dimensional problems	3	Ninth
General questions and discussion	theoretical	Matrix norms and Gerschgorin disks − Matrix norms; spectral radius; diagonal dominance; eigenvalue theorems; sparse systems. Examples: Finite-Difference Operators	Methods for solving linear systems	3	The tenth
General questions and discussion	theoretical	Toeplitz matrices and Cholesky decomposition − Cholesky factorization; Jacobi, Gauss-Seidel & SOR iterative schemes.	Methods for solving linear systems	3	eleventh
General questions and discussion	theoretical	Iteration matrices and convergence rates − Convergence of iterative schemes; optimum SOR parameter.	Solve linear systems iteratively	3	twelveth
General questions and discussion	theoretical	Theoretical optimum SOR parameter for 2-cyclic matrices. 2-D Elliptic Dirichlet BVPs; permuting finite-difference matrices into 2-cyclic form.	Calculating the solution of incomplete differential equation problems with Dirichlet conditions.	3	Thirteenth
General questions and discussion	theoretical	Examples: Solution of Linear Algebraic Equations 2-D Elliptic Neumann and Robin BVPs; Richardson extrapolation	Practical examples	3	fourteenth
Exam			Exam		Fifteenth

11. Course evaluation

Daily and monthly exam, the pursuit is 40, and the final is 60	
12. Learning and teaching resources	
Numerical Analysis NINTH EDITION, Richard L. Burden Youngstown State University J. Douglas Faires Youngstown State University, 2011	Required textbooks (methodology, if any)
Introduction to Numerical Analysis S. Baskar,2013	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name	
Control theory	
2. Course code	
MAT6204	
3. Semester/year	
PhD in Applied Mathematics/Second Course/2023-2024	
4. The date this description was prepared	
10/1/2023	
5. Available attendance forms	
My presence	
6. Number of study hours (total) / number of units (total)	
2/30	
7. Name of the course administrator (if more than one name is mentioned)	
sadiq.n@sc.uobaghdad.edu.iqEmail:	Name: Prof. Dr. Sadiq Naji
8. Course objectives	
1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of	Objectives of the study subject

mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	

9. Teaching and learning strategies

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	1- Basic Concepts, Definitions and examples: Attainable sets and controllability	Def. and properties	2	the first
General questions and discussion	theoretical	2- The necessary conditions and sufficient conditions for optimality	Def. and properties	2	the second
General questions and discussion	theoretical	3- The Mayer, Lagrange and Bolza problems.	Def. and properties	2	the third
General questions and discussion	theoretical	4- Continuous time problems.	Def. and properties	2	the fourth
General questions and discussion	theoretical	5- Properties of finite autonomy and infinite horizon problems.	Def. and properties	2	Fifth
General questions and discussion	theoretical	6- Existence Theorems with Convexity Assumptions.	Def. and properties	2	VI
General questions and discussion	theoretical	7- The linear quadratic problem.	Def. and properties	2	Seventh

General questions and discussion	theoretical	8- The interpretation of the adjoint variables.	Def. and properties	2	VIII
First semester exam	theoretical	9- State conditions at the final time, states with fixed endpoints and bounded controls.	Def. and properties	2	Ninth
General questions and discussion	theoretical	10- Linear dependence on the control, and Bang-Bang controls.	Def. and properties	2	The tenth
General questions and discussion	theoretical	11- Discrete-Time Optimal Control Problems (discrete Maximum Principle).	Def. and properties	2	eleventh
General questions and discussion	theoretical	12- Control Applied to Biological Models and Financing model in both cases continuous time and discrete time.	Def. and properties	2	twelveth
General questions and discussion	theoretical	13- Optimal control of several variables.	Def. and properties	2	Thirteenth
General questions and discussion	theoretical	14- Other properties on the optimal control solutions with applications.	Def. and properties	2	fourteenth
Exam					Fifteenth

11. Course evaluation

Daily and monthly exam, the pursuit is 40, and the final is 60

12. Learning and teaching resources

	Required textbooks (methodology, if any)
	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name

Topics in partial differential equations
2. Course code
MAT6205
3. Semester/year
PhD in Applied Mathematics/Second Course/2023-2024
4. The date this description was prepared
10/1/2023
5. Available attendance forms
My presence
6. Number of study hours (total) / number of units (total)
2/30
7. Name of the course administrator (if more than one name is mentioned)

Name: A.D. Ahmed Mawlud	Email: ahmed.abdulhadi@sc.uobaghdad.edu.iq

8. Course objectives	
1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	Objectives of the study subject
9. Teaching and learning strategies	
• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures.	The strategy

• Graduation projectsAndaFor scientific visits.	

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	1- Classifications of PDE	Def. and properties	3	the first
General questions and discussion	theoretical	2- Canonical forms 3- Canonical models for hyperbolic equation 4- Canonical forms for parabolic equation 5- Canonical forms for elliptic equation	Def. and properties	3	the second
General questions and discussion	theoretical	6- Elliptic differential equations	Def. and properties	3	the third
General questions and discussion	theoretical	7- Dirichlet problem for a rectangle	Def. and properties	3	the fourth
General questions and discussion	theoretical	8- Neumann problem for a circle	Def. and properties	3	Fifth
General questions and discussion	theoretical	9- Exterior Canonical problem forms a circle 10- Interior canonical problem forms a circle	Def. and properties	3	VI
General questions and discussion	theoretical	11- Parabolic differential equations	Def. and properties	3	Seventh
General questions and discussion	theoretical	12- Hyperbolic differential equations	Def. and properties	3	VIII
First semester exam	theoretical	13-Green's function	Def. and properties	3	Ninth
General questions and discussion	theoretical	14- Laplace transform methods	Def. and properties	3	The tenth
General questions and discussion	theoretical	15- Solution of diffusion equation 16- Solution of wave equation	Def. and properties	3	eleventh
General questions and discussion	theoretical	17- Fourier transform methods	Def. and properties	3	twelveth
General questions and	theoretical	18- Solution of diffusion equation	Def. and properties	3	Thirteenth

discussion		19- Solution of wave equation			
General questions and discussion	theoretical	20- Solution of diffusion equation 21- Solution of wave equation	Def. and properties	3	fourteenth
Exam				3	Fifteenth

11. Course evaluation	
Daily and monthly exam, quest from 40 and final from 60	
12. Learning and teaching resources	
	Required textbooks (methodology, if any)
	Main references (sources)
	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name
Topics in hysteresis differential equations
2. Course code
MAT6205
3. Semester/year
PhD in Applied Mathematics/Second Course/2023-2024

4. The date this description was prepared

10/1/2023

5. Available attendance forms

My presence

6. Number of study hours (total) / number of units (total)

3/45

7. Name of the course administrator (if more than one name is mentioned)

hassan.fadhil.r@sc.uobaghdad.edu.iq Email:	Name: A. Dahsan Fadel

8. Course objectives

1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	Objectives of the study subject

9. Teaching and learning strategies

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	Delay Differential Equations.	Def. and properties	3	the first

General questions and discussion	theoretical	Types of Delay Differential Equation and its Applications.	Def. and properties	3	the second
General questions and discussion	theoretical	Linear Delay Differential Equations (LDDEs).	Def. and properties	3	the third
General questions and discussion	theoretical	Basic Mathematical properties of DDEs.	Def. and properties	3	the fourth
General questions and discussion	theoretical	Uniqueness and Existence of DDEs.	Def. and properties	3	Fifth
General questions and discussion	theoretical	Methods and methodology for solving LDDE.	Def. and properties	3	VI
General questions and discussion	theoretical	The analytical solution of DDEs.	Def. and properties	3	Seventh
General questions and discussion	theoretical	The Delayed Logistic Model.	Def. and properties	3	VIII
First semester exam	theoretical	Delayed SIR Model.	Def. and properties	3	Ninth
General questions and discussion	theoretical	Stability and Bifurcation for DDEs.	Def. and properties	3	The tenth
General questions and discussion	theoretical	Linearization of DDEs.	Def. and properties	3	eleventh
General questions and discussion	theoretical	DDE with one discrete delays.	Def. and properties	3	twelveth
General questions and discussion	theoretical	DDE with multiple discrete delays.	Def. and properties	3	Thirteenth
General questions and discussion	theoretical	First order Neutral delay equation, Characteristic roots of delayed systems	Def. and properties	3	fourteenth
Exam					Fifteenth

11. Course evaluation

Daily and monthly exam, the pursuit is 40, and the final is 60

12. Learning and teaching resources

	Required textbooks (methodology, if any)
	Main references (sources)

The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name
Reliability
2. Course code
MAT203
3. Semester/year
PhD in Applied Mathematics/Second Course/2023-2024
4. The date this description was prepared
10/1/2023
5. Available attendance forms
My presence
6. Number of study hours (total) / number of units (total)
2/30
7. Name of the course administrator (if more than one name is mentioned)
tasnim.h@sc.uobaghdad.edu.iq Email: Name: A.M.D. Tasneem Hassan
8. Course objectives

1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired	Objectives of the study subject

knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	

9. Teaching and learning strategies

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	Ch.1 Failure Models: State Variable, Time to Failure, Reliability Function, Failure Rate Function	Def. ,remarks and examples	2	the first
General questions and discussion	theoretical	Mean Time to Failure, Median Life and Mode, Mean Residual Life	Concept and some remarks	2	the second
General questions and discussion	theoretical	Ch. 2 General Models for Reliability Data: The Binomial and Geometric Distributions, The Exponential Distribution	Theorems and application	2	the third
General questions and discussion	theoretical	The Homogeneous Poisson Process	Def. and theorems	2	the fourth
General questions and discussion	theoretical	The Gamma and related Distributions, The Weibull Distribution	Def. andremark	2	Fifth
General questions and discussion	theoretical	The Normal Distribution, The Lognormal Distribution	Concept and examples	2	VI
General questions and discussion	theoretical	The Inverse Gaussian Distribution	Def. and remarks	2	Seventh
General questions and discussion	theoretical	The Extreme Value Distributions: The Gumble Distribution of the Smallest Extreme, The Gumble Distribution of the Largest Extreme, The Weibull Distribution of the Smallest Extreme	Def. and remarks	2	VIII
First semester exam	theoretical	Stressor-Dependent Modeling, IFR and DFR Distributions	Def. and remarks	2	Ninth
General	theoretical	IFRA and DFRA	Def. and properties	2	The tenth

questions and discussion		Distributions, NBU and NWU Distributions, NBUE and NWUE Distributions			
General questions and discussion	theoretical	Ch.3 Structure Functions: The Series Structure, The Parallel Structure, The k out of n Structure	Def. and properties	2	eleventh
General questions and discussion	theoretical	Minimal Path and Minimal Cut Sets, Examples	Def. and properties	2	twelveth
General questions and discussion	theoretical	Mid-Term Exam	Def. and properties	2	Thirteenth
General questions and discussion	theoretical	Reliability of Systems of Independent Components: Series System	Def. and properties	2	fourteenth
Exam					Fifteenth

11. Course evaluation

Daily and monthly exam, the pursuit is 40, and the final is 60

12. Learning and teaching resources

Lawless JF (2017) Statistical Models and Methods of Life Time Data; John Wiley. -Meeker,W.Q. and Escobar,L. (2012): Statistical Methods for Reliability Data. New York: Wiley. -Rausand, M. and Hoyland, A. (2015): System Reliability Theory: Models and Statistical Methods. Second Edition, John Wiley & Sons Inc	Required textbooks (methodology, if any)
-Barlow RE and Proschan F. (1985). Statistical Theory of Reliability and Life Testing; Holt, Rinehart and Winston. -Bain LJ and Engelhardt (1991) Statistical Analysis of Reliability and Life Testing Models; Marcel Dekker. -Nelson, W. (1982) Applied Life Data analysis; John Wiley. -Zacks S. Reliability Theory, Springer.	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name	
Integral transformations and their applications	
2. Course code	
MAT6206	
3. Semester/year	
PhD in Applied Mathematics/Second Course/2023-2024	
4. The date this description was prepared	
10/1/2023	
5. Available attendance forms	
My presence	
6. Number of study hours (total) / number of units (total)	
2/30	
7. Name of the course administrator (if more than one name is mentioned)	
azhar.majeed@sc.uobaghdad.edu.iqEmail:	Name: Prof. Dr. Azhar Abbas
8. Course objectives	
1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	Objectives of the study subject

9. Teaching and learning strategies

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
General questions and discussion	theoretical	Definition of infinite Fourier transform	Def. and properties	2	the first
General questions and discussion	theoretical	sine and cosine transform, properties of Fourier transform, properties of Fourier cosine and sine transforms	Def. and properties	2	the second
General questions and discussion	theoretical	inversion theorem (inverse of Fourier transform), convolution theorem, algebraic properties of convolution theorem	Def. and properties	2	the third
General questions and discussion	theoretical	Perseval's identity, general Perseval's relationship, finite Fourier sine and cosine transform, Dirichlet's conditions for existence of Fourier transform	Def. and properties	2	the fourth
General questions and discussion	theoretical	Fourier transform of derivatives, application of Fourier transform (evaluation of integrals	Def. and properties	2	Fifth
General questions and discussion	theoretical	, Solving of deferential equation, solution for boundary value problems	Def. and properties	2	VI
General questions and discussion	theoretical	Laplace transforms and their basic properties	Def. and properties	2	Seventh
General questions and discussion	theoretical	Definition of the Laplace transform and examples	Def. and properties	2	VIII
First semester exam	theoretical	existence for the Laplace transform	Def. and properties	2	Ninth
General questions and discussion	theoretical	basic properties of the Laplace transforms with proofs and examples	Def. and properties	2	The tenth
General	theoretical	Laplace transform of derivatives	Def. and properties	2	eleventh

questions and discussion					
General questions and discussion	theoretical	the Convolution theorem and properties of Convolution	Def. and properties	2	twelveth
General questions and discussion	theoretical	the inverse of Laplace transforms and examples	Def. and properties	2	Thirteenth
General questions and discussion	theoretical	Computation of the Laplace transform inverse by partial fraction method	Def. and properties	2	fourteenth
Exam					Fifteenth

11. Course evaluation

Daily and monthly exam, the pursuit is 40, and the final is 60

12. Learning and teaching resources

Lokenath Debnath and Dambaru Bhatta, "INTEGRAL TRANSFORMS AND THEIR APPLICATIONS, THIRD EDITION	Required textbooks (methodology, if any)
	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites

modelCourse description

1. Course name

Scientific research method

2. Course code

UOB200

3. Semester/year

PhD in Applied Mathematics/Second Course/2023-2024

4. The date this description was prepared

10/1/2023

5. Available attendance forms

My presence

6. Number of study hours (total) / number of units (total)

30

7. Name of the course administrator (if more than one name is mentioned)

iraq.t@sc.uobaghdad.edu.iqEmail:

Name: A.M. Daaraq Tariq

8. Course objectives

1. Encouraging and developing scientific research in the field of mathematics in general. 2. Providing distinguished academic programs in the field of mathematics, both morphological and applied, so that they are compatible with international standards of academic quality to meet the needs of the education sector with highly qualified cadres. 3. Preparing and qualifying specialist students to meet the requirements of work in the private and public sectors in mathematical sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-world problems. 4. Encouraging research programs and participating in scientific conferences and seminars. 5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills-Building and developing partnerships with the governmental and private sectors and society with all its various institutions.	Objectives of the study subject

9. Teaching and learning strategies

• Explanation and clarification through lectures. • How to display scientific materials using display devices: data shows, smart boards • Self-learning through homework and mini-projects within lectures. • Graduation projectsAndaFor scientific visits.	The strategy

10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week

General questions and discussion	theoretical	1- Introduction to Research Methodology (RM) Research definition and origin.	Def. and properties	2	the first
General questions and discussion	theoretical	2- Basic Levels of Research.	Def. and properties	2	the second
General questions and discussion	theoretical	3- Steps for Writing.	Def. and properties	2	the third
General questions and discussion	theoretical	4-Scientific Research.	Def. and properties	2	the fourth
General questions and discussion	theoretical	5- Main Research Parts.	Def. and properties	2	Fifth
General questions and discussion	theoretical	6- First Exam Short research at the study level Undergraduate (Bachelor).	Def. and properties	2	VI
General questions and discussion	theoretical	7- Advanced Research at the Thesis Level (Master Thesis).	Def. and properties	2	Seventh
General questions and discussion	theoretical	8- Advanced Research Level Doctoral thesis.	Def. and properties	2	VIII
First semester exam	theoretical	9- Original Research.	Def. and properties	2	Ninth
General questions and discussion	theoretical	10- Patented.	Def. and properties	2	The tenth
General questions and discussion	theoretical	11- Review Article.	Def. and properties	2	eleventh
General questions and discussion	theoretical	12- Steps for Writing A Scientific Research.	Def. and properties	2	twelveth
General questions and discussion	theoretical	13- A Research Topic.	Def. and properties	2	Thirteenth
General questions and discussion	theoretical	14- The majority of research errors.	Def. and properties	2	fourteenth
Exam		15- Literature review.			Fifteenth

11. Course evaluation

Daily and monthly exam, the pursuit is 40, and the final is 60

12. Learning and teaching resources

	Required textbooks (methodology, if any)
	Main references (sources)
The most important books and special sources on the foundations of mathematics are in the central library, the science library, and the department.	Recommended supporting books and references (scientific journals, reports....)
• Discreet websites. • Virtual library. .	Electronic references, websites