

**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

2026

Introduction:

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

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

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

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

Concepts and terminology:

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

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

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

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

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

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

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

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

Academic Program Description Form

University Name: Al-Qadisiyah University

Faculty/Institute: Collage of Science

Scientific Department: Mathematics

Academic or Professional Program Name: Undergraduate Program of Science
in Mathematics

Final Certificate Name: Bachelor of Science in mathematics

Academic System: Bologna Track

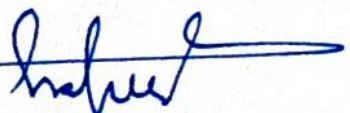
Description Preparation Date: 3/24/2026

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Signature: 

Assis.Prof.Dr. Qusuay Alqifiary

Date:

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Prof.Dr. Habeeb Shuber

Date:

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date:

Signature: 

Yaser Majid Dahdouh



Approval of the Dean

Prof.Dr. Salwan Ali Abed

1. Program Vision

To enhance the level of graduates from the Department of Mathematics, contributing to the scientific and technological advancement of the country, and to be among the distinguished and pioneering educational departments in academic achievement.

2. Program Mission

To advance the educational process in the Department of Mathematics to the highest level of quality, graduating students who are qualified, capable of logical thinking, and possess scientific research skills to meet the needs of the job market.

3. Program Objectives

The department aims to:

1. Plant a love for mathematics in the hearts of the students and demonstrate its importance and applications in various fields of life.
2. Prepare students to pursue higher education and obtain master's and doctoral degrees, addressing the country's severe shortage in this area.
3. Improve the quality of education to keep pace with the current technological advancements in global universities.
4. Graduate students with high levels of scientific competence to meet the demands of the job market in the country.
5. Graduate students with high levels of scientific competence to work as teachers in secondary education.
6. Develop the undergraduate curriculum to keep up with scientific developments and modern advancements.
7. Train cadres capable of handling advanced technologies and modern changes effectively and flexibly.
8. Develop students' skills, scientific capabilities, and ability to compete locally and globally in the field of specialization.
9. Enhance scientific research in mathematics, study mathematical and statistical problems, and conduct research to find appropriate solutions.
10. Participate in prestigious local and international conferences.
11. Encourage students to stay updated on scientific research, technological advancements, and innovative teaching methods.

12. Meet the needs of other departments in the college and universities with relevant coursework.

4. Program Accreditation

NO

5. Other external influences

NO

MODULE DESCRIPTION FORM

Course description form

Study subject information				
Module Delivery		Calculus 1		Course title
☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		Core		Course type
		MAT11001		Course Code
		8		number of units
		200		The number of hours
1	Semester of Delivery		UGx11 1	Course level
Type College Code		College	Type Dept. Code	Administering Department
E-mail		e-mail	Name	Module Leader
Ph.D.	Module Leader's Qualification		Professor	Module Leader's Acad. Title
E-mail		e-mail	Name (if available)	Module Tutor
E-mail		e-mail	Name	Peer Reviewer Name
1.0	Version Number		01/06/2023	Scientific Committee Approval Date

Relationship with other academic subjects			
	Semester	-	Grader
	Semester	-	Joint rapporteur

Subject objectives, learning outcomes and indicative contents	
- Learn about the basic concepts of calculus. - Identify the connection of functions and its relationship to limits. - Identify the differentiability of functions, the integration of various functions, and its	Objectives of the study subject

relationship to continuity. - Knowledge of applications of calculus in various sciences. - The ability to use calculus to solve mathematical problems.	
A-Knowledge and understanding A1- Gaining experience and knowledge in drawing functions Mathematics A2- Solutions of differential equations A3- Finding areas under the curve and its applications in other sciences A4- Calculating the surface areas and volumes of geometric shapes B--Subject-specific skills B1-summer training B2-Scientific reports B3-Graduation research C-thinking skills C1-Developing the student's ability to work on performing assignments and submitting them on the scheduled date. C2-Logical and mathematical thinking in finding solutions to problems C3-Developing the student's ability to dialogue and discuss.	Learning outcomes for the subject
	Indicative contents

Learning and teaching strategies	
● Managing the lecture in a way that makes time feel important. ● Encouraging correct answers and discussing wrong answers instead of punishing them. ● Assigning the student to some group activities and duties. ● Allocate a percentage of the grade to group activities. ● Use an appropriate method related to this course. ● Active participation in the classroom is evidence of the student's commitment and responsibility. ● Commitment to the deadline for submitting assignments	Strategies

and research. Tests are real-time, Semester and final studies on commitment and cognitive and skill achievement.	
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The student's study load is calculated for 15 weeks			
Structured SWL (h/sem) The student's regular academic load during the semester	60	Structured SWL (h/w) The student's regular academic load per week	4
Unstructured SWL (h/sem) Irregular study load for the student during the semester	90	Unstructured SWL (h/w) The student's irregular academic load per week	7
Total SWL (h/sem) The student's total academic load during the semester	150		

ModuleEvaluation					
Evaluation of the academic subject					
Learning outcome	week	Weight (grade)	Time/number		
LO #1, #2 and #10, #11	5 and 10	10% (10)	2	Tests	Formative assessment
LO #3, #4 and #6, #7	2 and 12	10% (10)	2	Tasks	
All	Continuous	10% (10)	1	Projects	
LO #5, #8 and #10	13	10% (10)	1	a report	
LO #1 - #7	7	10% (10)	2hr	Classroom test	Summary evaluation
All	16	50% (50)	3hr	Final test	
		100% (100 Marks)	Total assessment		

Delivery Plan (Weekly Syllabus)	
The theoretical weekly curriculum	
Material Covered	
Real numbers and their properties, arithmetic operations.	the first
Definition of the function, domain, corresponding domain, and range of the	the second

function, operations on functions, synthesis of functions, drawing of functions, and the quick method.	
Goals and continuity: (definition of goals and theories related to them), continuity and its theories.	the third
Derivation (definition and theories related to it), the relationship between derivation and continuity.	the fourth
Rolle's theorem (text and proof with examples), mean value theorem (text, proof, examples).	Fifth
Derivative applications	VI
Definition of definite integral and its geometric interpretation, examples, applications (area calculation).	Seventh
Definition of indefinite integral and its relationship to the derivative (integration of functions whose derivative is available).	VIII
Transcendental functions: their ends/derivatives.	Ninth
Transcendental functions: their integrals	The tenth
Basic laws of integration, integration by division	eleventh
Integration by trigonometric substitutions	twelveth
Integration by fraction division method	Thirteenth
Applications on integration	fourteenth
Impaired integrals and methods of calculating them.	Fifteenth

Delivery Plan (Weekly Lab. Syllabus) The weekly laboratory curriculum	
Material Covered	
	Week 1
	Week 2
	Week 3
	Week 4
	Week 5
	Week 6
	Week 7

Learning and Teaching Resources Learning and teaching resources		
Available in the library	Text	
Yes	Thomas. GB, Calculus and Analytic Geomaty, -1 4th, 1984.	Required sources

Yes	Durfee. WH, Calculus and Analytic Geometric, New York, 1971.	Recommended sources
www. Freescience.info/math		Online link

Grading Scheme Grading chart				
Group	Grade	Appreciation	Marks%	Definition
Success Group (50 - 100)	A - Excellent	Excellence	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	Deposit (in process)	(45-49)	More work required but credit awarded
	F - Fail	Failed	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Study subject information				
Module Delivery		Foundations of mathematics 1		Course title
☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		Core		Course type
		MAT11002		Course Code
		6		number of units
		150		The number of hours
1	Semester of Delivery		U	Course level
Type College Code		College	Type Dept. Code	Administering Department

Appendix No. 4 (Description of the academic subject) Department of Mathematics - College of Science – University of Al-Qadisiyah

E-mail		e-mail	Name		Module Leader
Ph.D.	Module Leader's Qualification		Professor	Module Leader's Acad. Title	
E-mail		e-mail	Name (if available)		Module Tutor
E-mail		e-mail	Name	Peer Reviewer Name	
1.0		Version Number	01/06/2023	Scientific Committee Approval Date	

Relationship with other academic subjects			
	Semester	-	Grader
	Semester	-	Joint rapporteur

Subject objectives, learning outcomes and indicative contents	
1- The student acquires the concept of expressions, mathematical logic, and ways to deal with them algebraically. 2- Clarifying the concept of groups, relationships, applications, their types, and theories related to them. 3- Giving the student experience in dealing with basic numbers	Objectives of the study subject
a-Knowledge and understanding -Gaining the ability and skill to recognize and deal with mathematical expressions and sentences. -Acquire the skill of distinguishing between relationships and functions and linking them. -Working with arrays. -Use counting principles. B-thinking skills -Developing the student's ability to work on performing assignments and submitting them on the scheduled date. -Analyze the problem statistically and mathematically and find solutions based on the expected results -Developing the student's ability to dialogue and discuss.	Learning outcomes for the subject
-Developing the student's ability to deal with technical means. -Developing the student's ability to deal with the Internet. -Developing the student's ability to deal with multiple media. -Developing the student's ability to dialogue and discuss.	Indicative contents

Learning and teaching strategies	
-Continuous daily and weekly surprise tests. -Exercises and activities in the classroom. -Directing students to some websites to benefit from them. -Participation in the classroom. -Provide activities -Semester and final tests and activities.	Strategies

The student's study load is calculated for 15 weeks			
Structured SWL (h/sem) The student's regular academic load during the semester	60	Structured SWL (h/w) The student's regular academic load per week	4
Unstructured SWL (h/sem) Irregular study load for the student during the semester	90	Unstructured SWL (h/w) The student's irregular academic load per week	6
Total SWL (h/sem) The student's total academic load during the semester	150		

ModuleEvaluation					
Evaluation of the academic subject					
Learning outcome	week	Weight (grade)	Time/number		
LO #1, #2 and #10, #11	5 and 10	10% (10)	2	Tests	Formative assessment
LO #3, #4 and #6, #7	2 and 12	10% (10)	2	Tasks	
All	Continuous	10% (10)	1	Projects	
LO #5, #8 and #10	13	10% (10)	1	a report	
LO #1 - #7	7	10% (10)	2hr	Classroom test	Summary evaluation
All	16	50% (50)	3hr	Final test	
		100% (100 Marks)	Total assessment		

Delivery Plan (Weekly Syllabus) The theoretical weekly curriculum	
Material Covered	
Compound, conditional, and biconditional expressions, summation, contradictions, and arguments	the first
Open sentences, closed phrases, argumentative forms, Methods of mathematical proof.	the second
The concept of group, equality of groups, partial groups, complement of the group,	the third
Operations on sets (intersection and union of sets, distributive law, etc.),	the fourth
De Morgan's laws, Cartesian product of sets	Fifth
Relationships and their types: reflexive, symmetrical, transitive, and equivalence relations	VI
Equivalence relations and division set	Seventh
Set segmentation, partially ordered and fully ordered sets.	VIII
Applications, (definitions and examples, application statement, comprehensive, differentiated and contrasting applications)	Ninth
Types of applications (abbreviation of the application)	The tenth
Application installation and features, peer application	eleventh
Images and counterpart images (reverse) induced by applications	twelveth
Prime numbers, infinite groups	Thirteenth
Countable sets, arithmetic of basic numbers.	fourteenth
Examples on the topic	Fifteenth

Delivery Plan (Weekly Lab. Syllabus) The weekly laboratory curriculum	
Material Covered	
	Week 1
	Week 2
	Week 3
	Week 4
	Week 5
	Week 6
	Week 7

Learning and Teaching Resources Learning and teaching resources
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Available in the library	Text	
Yes	(1) Introduction to the foundation of 1965, New York. ,2nd mathematics, Wildel R.	Required sources
Yes	(1) Foundations of Mathematics*, Hadi Jaber Mustafa and others Parts one and two 1983 University of Basra, Iraq (2) Introduction to the Foundations of Mathematics*, Adel Ghassan Naoum and Basil Atta Al-Hashimi ,1 (2000)universityBaghdad, Iraq	Recommended sources
www. Freescience.info/math		Online link

Grading Scheme Grading chart				
Group	Grade	Appreciation	Marks%	Definition
Success Group (50 - 100)	A - Excellent	Excellence	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D – Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	Deposit (in process)	(45-49)	More work required but credit awarded
	F - Fail	Failed	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Study subject information		
Module Delivery	Finite mathematics	Course title
☒ Theory ☒ Lecture ☐ Lab	Core	Course type
	MAT11003	Course Code

Appendix No. 4 (Description of the academic subject) Department of Mathematics - College of Science – University of Al-Qadisiyah

☒ Tutorial ☐ Practical ☐ Seminar		7		number of units
		175		The number of hours
1	Semester of Delivery		UGx11 1	Course level
Type College Code		College	Type Dept. Code	Administering Department
E-mail		e-mail	Name	Module Leader
Ph.D.	Module Leader's Qualification		Professor	Module Leader's Acad. Title
E-mail		e-mail	Name (if available)	Module Tutor
E-mail		e-mail	Name	Peer Reviewer Name
1.0	Version Number		01/06/2023	Scientific Committee Approval Date

Relationship with other academic subjects			
	Semester	-	Grader
	Semester	-	Joint rapporteur

Subject objectives, learning outcomes and indicative contents	
- The student acquires the concept of expressions, mathematical logic, and ways to deal with them algebraically. - Clarifying the concept of sets, relationships, functions, the links between them, and the theories related to them. - - Giving the student experience in dealing with all types of matrices and performing various operations on them	a Objectives of the study subject
a-Knowledge and understanding -Gaining the ability and skill to recognize and deal with mathematical expressions and sentences. -Acquire the skill of distinguishing between relationships and functions and linking them. -Working with arrays. -Use counting principles. B-Subject-specific skills B1 –summer training B2 –Graduation research	Learning outcomes for the subject

B3 –Scientific reports	
	Indicative contents

Learning and teaching strategies	
-Continuous daily and weekly surprise tests. -Exercises and activities in the classroom. -Directing students to some websites to benefit from them. -Managing the lecture in an applied manner linked to the reality of daily life to attract the student to... The topic of the lesson without straying from the core of the topic so that the material is flexible and understandable And analysis. -Assigning the student to some group activities and duties. -Allocate a percentage of the grade to daily assignments and tests.	Strategies

The student's study load is calculated for 15 weeks			
Structured SWL (h/sem) The student's regular academic load during the semester	60	Structured SWL (h/w) The student's regular academic load per week	4
Unstructured SWL (h/sem) Irregular study load for the student during the semester	90	Unstructured SWL (h/w) The student's irregular academic load per week	6
Total SWL (h/sem) The student's total academic load during the semester	150		

ModuleEvaluation					
Evaluation of the academic subject					
Learning outcome	week	Weight (grade)	Time/number		
LO #1, #2 and #10, #11	5 and 10	10% (10)	2	Tests	Formative

Appendix No. 4 (Description of the academic subject) Department of Mathematics - College of Science – University of Al-Qadisiyah

LO #3, #4 and #6, #7	2 and 12	10% (10)	2	Tasks	assessment
All	Continuous	10% (10)	1	Projects	
LO #5, #8 and #10	13	10% (10)	1	a report	
LO #1 - #7	7	10% (10)	2hr	Classroom test	Summary
All	16	50% (50)	3hr	Final test	evaluation
		100% (100 Marks)	Total assessment		

Delivery Plan (Weekly Syllabus) The theoretical weekly curriculum	
Material Covered	
(Expressions, compound expressions, propositions and truth tables, conditional and binary expressions)	the first
Suitability and equivalence, dialogues, passages	the second
The concept of belonging, operations on groups	the third
Algebra of sets, ordered pairs and Cartesian quotient	the fourth
Definitions, types of relationships	Fifth
Installing relationships, Theorems related to relationships	VI
Definition of functions, Installing functions	Seventh
Properties of functions, algebraic operations on functions	VIII
Row and column vectors, vector multiplication	Ninth
Definitions, matrix algebra, matrix inverse	The tenth
Determinants and their properties, determinants and complementary factors	eleventh
Solving linear equations with determinants (Cramer's method)	twelveth
Principles of counting, permutations and combinations, binomial coefficients	Thirteenth
Examples	fourteenth
Examples	Fifteenth

Delivery Plan (Weekly Lab. Syllabus) The weekly laboratory curriculum	
Material Covered	
	Week 1
	Week 2
	Week 3

	Week 4
	Week 5
	Week 6
	Week 7

Learning and Teaching Resources		
Learning and teaching resources		
Available in the library	Text	
Yes	(1) Introduction to Finite Mathematics, Mustafa Ahmed et al., first edition 1991 University of Technology - Iraq	Required sources
Yes	(1) Introduction to linear algebra with applications, Bernard Coleman, translated by Adel Ghassan Naoum and Basil Atta Al-Hashimi, first edition 1990 University of Baghdad-Iraq (2) Matrices, Adel Zainal Al-Bayati, first edition 1978 Al-Mustansiriya University - Iraq	Recommended sources
www. Freescience.info/math		Online link

Grading Scheme				
Grading chart				
Group	Grade	Appreciation	Marks%	Definition
Success Group (50 - 100)	A - Excellent	Excellence	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	Deposit (in process)	(45-49)	More work required but credit awarded
	F - Fail	Failed	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Study subject information				
Module Delivery		Calculus 2		Course title
☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		Core		Course type
		MAT12107		Course Code
		7		number of units
		175		The number of hours
2	Semester of Delivery		UGx11 1	Course level
Type College Code		College	Type Dept. Code	Administering Department
E-mail		e-mail	Name	Module Leader
Ph.D.	Module Leader's Qualification		Professor	Module Leader's Acad. Title
E-mail		e-mail	Name (if available)	Module Tutor
E-mail		e-mail	Name	Peer Reviewer Name
1.0	Version Number		01/06/2023	Scientific Committee Approval Date

Relationship with other academic subjects			
the first	Semester	MAT11001	Grader
	Semester	-	Joint rapporteur

Subject objectives, learning outcomes and indicative contents	
- The student acquires the skill of dealing with segments and polar, Cartesian, and cylindrical coordinates. - Explaining the concept of three-dimensional spaces and multiplication of its two types. The course aims to study the applications of integration in calculating the lengths of curves Areas and volumes in different coordinates and some physical applications -The course aims to give the student a new background that he can benefit from when studying differential equations	a Objectives of the study subject
a-Knowledge and understanding	

-Recognizes the basic concepts of conic sections and coordinates. -Giving the student experience in graphing polar coordinates. - Recognizes the three-dimensional coordinate system and vectors. -Learn about sequences, the mechanism of convergence and divergence, series, and methods for testing them. -Subject-specific skills -Scientific reports -Graduation research -thinking skills -Developing the student's ability to work on performing assignments and submitting them on the scheduled date. -Trying to apply the concepts by solving different types of exercises. -Developing the student's ability to dialogue and discuss	Learning outcomes for the subject
	Indicative contents

Learning and teaching strategies	
-Continuous daily and weekly surprise tests. -Exercises and activities in the classroom. -Directing students to some sources that contain examples and exercises to benefit from them. -Exercises and sports problems -Assigning the student to some group activities and duties. -Allocate a percentage of the grade to daily assignments and tests.	Strategies

The student's study load is calculated for 15 weeks			
Structured SWL (h/sem)		Structured SWL (h/w)	
The student's regular academic load during the semester	60	The student's regular academic load per week	4
Unstructured SWL (h/sem)	90	Unstructured SWL (h/w)	6

Irregular study load for the student during the semester		The student's irregular academic load per week	
Total SWL (h/sem) The student's total academic load during the semester	150		

ModuleEvaluation					
Evaluation of the academic subject					
Learning outcome	week	Weight (grade)	Time/number		
LO #1, #2 and #10, #11	5 and 10	10% (10)	2	Tests	Formative assessment
LO #3, #4 and #6, #7	2 and 12	10% (10)	2	Tasks	
All	Continuous	10% (10)	1	Projects	
LO #5, #8 and #10	13	10% (10)	1	a report	
LO #1 - #7	7	10% (10)	2hr	Classroom test	Summary evaluation
All	16	50% (50)	3hr	Final test	
		100% (100 Marks)	Total assessment		

Delivery Plan (Weekly Syllabus)	
The theoretical weekly curriculum	
Material Covered	
Conic sections, quadratic equations, rotations.	the first
Polar coordinates, the relationship between polar and Cartesian coordinates	the second
, conic sections in polar coordinates, graphs in polar coordinates	the third
Equation of a line, circle, and cone in polar coordinates	the fourth
Arc length, area in polar coordinates.	Fifth
Cylindrical coordinates.	VI
Three-dimensional coordinate system	Seventh
Vectors, dot multiplication, cross multiplication	VIII
Lines and planes in space, applications.	Ninth
Sequences (definition and examples)	The tenth
Convergence and divergence	eleventh
Monotonic sequences.	twelveth
Methods for testing series and their applications.	Thirteenth

,Tyler series	fourteenth
McLaurin with its applications	Fifteenth

Delivery Plan (Weekly Lab. Syllabus) The weekly laboratory curriculum	
Material Covered	
	Week 1
	Week 2
	Week 3
	Week 4
	Week 5
	Week 6
	Week 7

Learning and Teaching Resources Learning and teaching resources		
Available in the library	Text	
Yes	(2) Calculus Thomas,1990	Required sources
Yes	Durfee. 2) Calculus and Analytic Geometric, New York ,1971 WH (3) Calculus and Analytical Geometry, Russell A. C., Translated by Ali Aziz Ali and others, Parts One and Two 1983 University of Mosul - Iraq	Recommended sources
www. Freescience.info/math		Online link

Grading Scheme Grading chart				
Group	Grade	Appreciation	Marks%	Definition
Success Group (50 - 100)	A - Excellent	Excellence	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors

Appendix No. 4 (Description of the academic subject) Department of Mathematics - College of Science – University of Al-Qadisiyah

	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	Deposit (in process)	(45-49)	More work required but credit awarded
	F - Fail	Failed	(0-44)	Considerable amount of work required

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

Study subject information				
Module Delivery		Foundations of mathematics 2		Course title
☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		Core		Course type
		MAT12108		Course Code
		7		number of units
		175		The number of hours
2	Semester of Delivery		UGx11 1	Course level
Type College Code		College	Type Dept. Code	Administering Department
E-mail		e-mail	Name	Module Leader
Ph.D.	Module Leader's Qualification		Professor	Module Leader's Acad. Title
E-mail		e-mail	Name (if available)	Module Tutor
E-mail		e-mail	Name	Peer Reviewer Name
1.0		Version Number	01/06/2023	Scientific Committee Approval Date

Relationship with other academic subjects			
the first	Semester	MAT11002	Grader
	Semester	-	Joint rapporteur

Subject objectives, learning outcomes and indicative contents	
- The student gets to know the most important basics of mathematics, such as its mathematical systems, how to build them, and the relationship between them - The student learns about creating the integer system	Objectives of the study subject

- The student learns about creating fields of rational, real, and complex numbers - The student understands the basis of the operations he performs on numbers, especially integers, by studying an introduction to... Number theory	
A-Knowledge and understanding - The student should deduce how to build the mathematical system - That the student knows how to build a field - For the student to become familiar with the basic theory of algebra. - The student will practice the relationships between numbers through number theory B-Subject-specific skills -Scientific reports -Graduation research C-thinking skills -Developing the student's ability to work on performing assignments and submitting them on the scheduled date. -The ability to think scientifically. -Ability to participate effectively in semester activities. -Skill in conducting research activities and using useful sources to support the main idea required. Dr-General and transferable skills(Other skills related to employability and personal development). -Developing the student's ability to use complex analysis to solve problems in science mathematics. -Developing the student's ability to recognize and solve examples with deductive and deductive ideas. -Developing the student's ability to deal with others by participating in scientific discussions. -Developing the student's ability to analyze and synthesize.	Learning outcomes for the subject
	Indicative contents

Learning and teaching strategies	
- Participation in the classroom. - Daily, semester and final written tests. - Oral exams in class. - Research activities. - Managing the lecture in a way that makes time feel	Strategies

important. - Encouraging correct answers and discussing wrong answers instead of punishing them. - Assigning the student to some group activities and duties. - Allocate a percentage of the grade to group activities. -Use an appropriate method related to this course.	
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The student's study load is calculated for 15 weeks			
Structured SWL (h/sem) The student's regular academic load during the semester	60	Structured SWL (h/w) The student's regular academic load per week	4
Unstructured SWL (h/sem) Irregular study load for the student during the semester	90	Unstructured SWL (h/w) The student's irregular academic load per week	6
Total SWL (h/sem) The student's total academic load during the semester	150		

ModuleEvaluation					
Evaluation of the academic subject					
Learning outcome	week	Weight (grade)	Time/number		
LO #1, #2 and #10, #11	5 and 10	10% (10)	2	Tests	Formative assessment
LO #3, #4 and #6, #7	2 and 12	10% (10)	2	Tasks	
All	Continuous	10% (10)	1	Projects	
LO #5, #8 and #10	13	10% (10)	1	a report	
LO #1 - #7	7	10% (10)	2hr	Classroom test	Summary evaluation
All	16	50% (50)	3hr	Final test	
		100% (100 Marks)	Total assessment		

Delivery Plan (Weekly Syllabus)	
The theoretical weekly curriculum	
	Material Covered

Basic definitions: A brief repetition of what the student studied in the introductory course - sets and relationships to them	the first
Introduction to the need for a new system different from the natural number system - defining the operations of addition and multiplication, the properties of each, and how to submerge $\mathbb{N}$ in $\mathbb{Z}$, and prove some important issues with illustrative examples	the second
Introduction to the need for a new system different from the natural number system - defining the operations of addition and multiplication, the properties of each, and how to submerge $\mathbb{N}$ in $\mathbb{Z}$, and prove some important issues with illustrative examples	the third
The reasons for finding a new system every time we transform - Defining the operations of addition and multiplication on rational numbers. Studying the properties that are achieved - Group immersion $\mathbb{Z}$ in the set $\mathbb{Q}$ - study of real numbers - immersion of $\mathbb{Q}$ in $\mathbb{R}$	the fourth
The reasons for finding a new system every time we transform - Defining the operations of addition and multiplication on rational numbers. Studying the properties that are achieved - Group immersion $\mathbb{Z}$ in the set $\mathbb{Q}$ - study of real numbers - immersion of $\mathbb{Q}$ in $\mathbb{R}$	Fifth
The reasons for finding a new system every time we transform - Defining the operations of addition and multiplication on rational numbers. Studying the properties that are achieved - Group immersion $\mathbb{Z}$ in the set $\mathbb{Q}$ - study of real numbers - immersion of $\mathbb{Q}$ in $\mathbb{R}$	VI
The need for a new system to establish it - properties of addition and multiplication - geometric representation of angles and roots of numbers as illustrative examples	Seventh
The need for a new system to establish it - properties of addition and multiplication - geometric representation of angles and roots of numbers as illustrative examples	VIII
The need for a new system to establish it - properties of addition and multiplication - geometric representation of angles and roots of numbers as illustrative examples	Ninth
The general form of a polynomial equation - the general solution to a polynomial equation whose coefficients are composite and of the first, second, third, and fourth order.	The tenth
The general form of a polynomial equation - the general solution to a polynomial equation whose coefficients are composite and of the first, second, third, and fourth order.	eleventh
Historical overview - basic definitions of the divisor in the correct setting - basic theorems about divisors and the greatest common divisor - division algorithm and its proof - least common multiple - Fermat's setting - Merssen's setting	twelveth
Historical overview - basic definitions of the divisor in the correct setting - basic theorems about divisors and the greatest common divisor - division algorithm and its proof - least common multiple - Fermat's setting - Merssen's setting	Thirteenth
Historical overview - basic definitions of the divisor in the correct setting - basic theorems about divisors and the greatest common divisor - division algorithm and its proof - least common multiple - Fermat's setting - Merssen's setting	fourteenth
Historical overview - basic definitions of the divisor in the correct setting - basic theorems about divisors and the greatest common divisor - division algorithm and its proof - least common multiple - Fermat's setting - Merssen's setting	Fifteenth

Delivery Plan (Weekly Lab. Syllabus) The weekly laboratory curriculum	
Material Covered	
	Week 1
	Week 2
	Week 3
	Week 4

	Week 5
	Week 6
	Week 7

Learning and Teaching Resources Learning and teaching resources		
Available in the library	Text	
Yes	3) ELEMENTS OF SET THEORY -HERBERT B -UNIVERSITY OF CALIRORNIA	Required sources
Yes	- Introduction to the Foundations of Mathematics - Dr. Adel Ghassan - Dr. Basil Atta - University of Baghdad 2-Foundations of mathematics–Dr. Hadi Jaber–Dr. Riyadh Shaker-Nader George– Albasrah university-part One	Recommended sources
www. Freescience.info/math		Online link

Grading Scheme Grading chart				
Group	Grade	Appreciation	Marks%	Definition
Success Group (50 - 100)	A - Excellent	Excellence	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	Deposit (in process)	(45-49)	More work required but credit awarded
	F - Fail	Failed	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Study subject information		
Module Delivery	linear algebra	Course title
☒ Theory ☒ Lecture ☐ Lab	Core	Course type
	MAT12109	Course Code

Appendix No. 4 (Description of the academic subject) Department of Mathematics - College of Science – University of Al-Qadisiyah

☒ Tutorial ☐ Practical ☐ Seminar		6		number of units	
		150		The number of hours	
2	Semester of Delivery		U	Course level	
Type College Code		College	Type Dept. Code	Administering Department	
E-mail		e-mail	Name		Module Leader
Ph.D.	Module Leader's Qualification		Professor	Module Leader's Acad. Title	
E-mail		e-mail	Name (if available)		Module Tutor
E-mail		e-mail	Name	Peer Reviewer Name	
1.0	Version Number		01/06/2023	Scientific Committee Approval Date	

Relationship with other academic subjects				
the first	Semester	MAT11003		Grader
	Semester	-		Joint rapporteur

Subject objectives, learning outcomes and indicative contents	
- Learn about vector space and its related concepts. - Identify subspace and its algebraic properties. - Knowledge of linear transformations and their applications. - The student's ability to relate matrices and linear transformations. - Learn about different applications of linear algebra.	Objectives of the study subject
A-Knowledge and understanding - Gaining experience and knowledge in the basic concepts of linear algebra. - Knowledge of linear correlation and linear independence of vectors. - Finding the dimension of vector space and its rules. - Finding the kernel and range of the linear transformation. B - Subject-specific skills	Learning outcomes for the subject

-summer training -Scientific reports -Graduation research C-thinking skills -Developing the student's ability to work on performing assignments and submitting them on the scheduled date. -Assigning the student to collect information via the Internet about the course and formulate a summary of it. -Developing the student's ability to dialogue and discuss. -Logical and mathematical thinking in finding solutions to problems Dr-General and transferable skills(Other skills related to employability and personal development). -Developing the student's ability to use the algebraic properties of vector spaces and linear transformations. -Developing the student's ability to deal with linearly symmetric spaces. -Developing the student's ability to dialogue and discuss.	
	Indicative contents

Learning and teaching strategies	
● Managing the lecture in a way that makes time feel important. ● Encouraging correct answers and discussing wrong answers instead of punishing them. ● Assigning the student to some group activities and duties. ● Allocate a percentage of the grade to group activities. ● Use an appropriate method related to this course.	Strategies

The student's study load is calculated for 15 weeks			
Structured SWL (h/sem) The student's regular academic load during the semester	60	Structured SWL (h/w) The student's regular academic load per week	4
Unstructured SWL (h/sem)	65	Unstructured SWL (h/w) The student's irregular academic load	6

Irregular study load for the student during the semester		per week	
Total SWL (h/sem) The student's total academic load during the semester	125		

ModuleEvaluation					
Evaluation of the academic subject					
Learning outcome	week	Weight (grade)	Time/number		
LO #1, #2 and #10, #11	5 and 10	10% (10)	2	Tests	Formative assessment
LO #3, #4 and #6, #7	2 and 12	10% (10)	2	Tasks	
All	Continuous	10% (10)	1	Projects	
LO #5, #8 and #10	13	10% (10)	1	a report	
LO #1 - #7	7	10% (10)	2hr	Classroom test	Summary evaluation
All	16	50% (50)	3hr	Final test	
		100% (100 Marks)	Total assessment		

Delivery Plan (Weekly Syllabus) The theoretical weekly curriculum	
Material Covered	
Vector space, subspace.	the first
Intersection, union, addition and direct addition of subspaces.	the second
Linear independence with related theorems.	the third
Basis (base) of vector space.	the fourth
The dimension of vector space and their properties.	Fifth
Coordinates and changing rules.	VI
The row rank and the vertical rank of the matrix and the relationship between them.	Seventh
The foundations (rules) in R^n .	VIII
Numerical multiplication of vectors.	Ninth
Cross multiplication of vectors.	The tenth

Linear transformations with examples.	eleventh
Conversion kernel, conversion extent.	twelveth
Linear transformation matrix and its properties.	Thirteenth
Linearly symmetric spaces.	fourteenth
Linear functions.	Fifteenth

Delivery Plan (Weekly Lab. Syllabus) The weekly laboratory curriculum	
Material Covered	
	Week 1
	Week 2
	Week 3
	Week 4
	Week 5
	Week 6
	Week 7

Learning and Teaching Resources Learning and teaching resources		
Available in the library	Text	
Yes	Stoll .RR and Wong .ET, Linear Algebra, London, -1 1968. Strange. G., Linear Algebra and Its Applications, -2 New York, 2nd, 1980.	Required sources
Yes	Mostow. G.D. and Sampson. JH, Linear Algebra, -1 London, 1969. 2- George Dhaif Al-Sabti, Linear Algebra, University of Basra - Iraq, 1, 1988. 3- Khaled Ahmed Al-Samarrai and Saad Ibrahim Mahdi, Introduction to Linear Algebra, University of Baghdad - Iraq, Parts One and Two, 1989. Yahya Abdel Saeed and Nizar Hamdoun Shukr, Linear Algebra, University of Mosul - Iraq, 1, 1988.	Recommended sources
www. Freescience.info/math		Online link

Grading Scheme Grading chart				
Group	Grade	Appreciation	Marks%	Definition

**Appendix No. 4 (Description of the academic subject) Department of Mathematics - College of
Science – University of Al-Qadisiyah**

Success Group (50 - 100)	A - Excellent	Excellence	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	Deposit (in process)	(45-49)	More work required but credit awarded
	F - Fail	Failed	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Study subject information				
Module Delivery		Advanced calculus		Course title
☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		Core		Course type
		MAT23113		Course Code
		5		number of units
		125		The number of hours
2	Semester of Delivery		U	Course level
Type College Code		College	Type Dept. Code	Administering Department
E-mail		e-mail	Name	Module Leader
Ph.D.	Module Leader's Qualification		Professor	Module Leader's Acad. Title
E-mail		e-mail	Name (if available)	Module Tutor
E-mail		e-mail	Name	Peer Reviewer Name
1.0	Version Number		01/06/2023	Scientific Committee Approval Date

Relationship with other academic subjects			
the second	Semester	MAT12107	Grader
	Semester	-	Joint rapporteur

Subject objectives, learning outcomes and indicative contents		
- Recognizing the concept of a function in several variables, continuity, total differentiation, approximation, and total differentiation in...n variables, Jacobians, function derivatives, the chain rule in general, the tangent plane, the directional derivative, and extrema. - Definition of double integration and generalizing the idea of integration to a function in several variables, methods for finding it and changing variables in double integration, polar coordinates, and applications to double integration.(the size,And space,And the mass,And determination). - Defining triple integration and discussing the basic aspects of triple integration and methods for finding it and changing variables in triple integration. Cylindrical and spherical coordinates have been used in finding triple integration and practical applications.. - Defining linear integration and discussing the basic properties of this integration, the basic elements on which it depends, the independence of linear integration from the path, and methods of reducing linear integration to usual integrals.. Discussing some elements of vector calculus, explaining Crane's theorem, differentiation, and Stokes, and some uses of these theories, as Crane's theory represents the relationship between linear integration and double integration.,Also discuss surface integral and Stokes' theorem.	a Objectives of the study subject	
A-Knowledge and understanding - Gaining experience and knowledge in drawing functions Mathematics - Solutions of differential equations - Finding areas under the curve and its applications in other sciences - Calculating surface areas and volumes of geometric shapes B-Subject-specific skills -summer training	Learning outcomes for the subject	

-Scientific reports -Graduation research C-thinking skills -Developing the student's ability to work on performing assignments and submitting them on the scheduled date. -Logical and mathematical thinking in finding solutions to problems -Developing the student's ability to dialogue and discuss. Dr-General and transferable skills(Other skills related to employability and personal development). -Developing the student's ability to use calculus to solve problems in other sciences. -Developing the student's ability to recognize types of functions. -Developing the student's ability to deal. -Developing the student's ability to dialogue and discuss.	
	Indicative contents

Learning and teaching strategies	
● Managing the lecture in a way that makes time feel important. ● Encouraging correct answers and discussing wrong answers instead of punishing them. ● Assigning the student to some group activities and duties. ● Allocate a percentage of the grade to group activities. ● Use an appropriate method related to this course.	Strategies

The student's study load is calculated for 15 weeks			
Structured SWL (h/sem) The student's regular academic load during the semester	60	Structured SWL (h/w) The student's regular academic load per week	4
Unstructured SWL (h/sem) Irregular study load for the student during the semester	65	Unstructured SWL (h/w) The student's irregular academic load per week	5
Total SWL (h/sem)	125		

The student's total academic load during the semester	
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ModuleEvaluation					
Evaluation of the academic subject					
Learning outcome	week	Weight (grade)	Time/number		
LO #1, #2 and #10, #11	5 and 10	10% (10)	2	Tests	Formative assessment
LO #3, #4 and #6, #7	2 and 12	10% (10)	2	Tasks	
All	Continuous	10% (10)	1	Projects	
LO #5, #8 and #10	13	10% (10)	1	a report	
LO #1 - #7	7	10% (10)	2hr	Classroom test	Summary evaluation
All	16	50% (50)	3hr	Final test	
		100% (100 Marks)	Total assessment		

Delivery Plan (Weekly Syllabus)	
The theoretical weekly curriculum	
Material Covered	
The concept of a function in several variables, the domain, and the corresponding domain Representing the function.	the first
Purpose (definition of purpose and theories related to it), continuity and its theories The function has several variables	the second
Derivation (definition and theories related to it), the relationship between derivation and continuity The function has several variables.	the third
Partial and total derivation	the fourth
Deriving vector functions for two or more variables	Fifth
Applications of differentiation of functions with two or more variables	VI
Double integration, engineering and physics applications	Seventh
Triple integration, engineering and physics applications	VIII
Linear integrals.	Ninth
Surface integration	The tenth
Green's theory	eleventh
Stokes theory	twelveth
The relationship between double and triple integration	Thirteenth

Linear integration applications	fourteenth
Surface integration applications	Fifteenth

Delivery Plan (Weekly Lab. Syllabus) The weekly laboratory curriculum	
Material Covered	
	Week 1
	Week 2
	Week 3
	Week 4
	Week 5
	Week 6
	Week 7

Learning and Teaching Resources Learning and teaching resources		
Available in the library	Text	
Yes	1) Thomas. GB, Calculus and Analytic Geomtry, 4th, 1984.	Required sources
Yes	Durfee. WH, Calculus and Analytic Geometric, -1 New York, 1971.	Recommended sources
www. Freescience.info/math		Online link

Grading Scheme Grading chart				
Group	Grade	Appreciation	Marks%	Definition
Success Group (50 - 100)	A - Excellent	Excellence	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	Deposit (in process)	(45-49)	More work required but credit awarded
	F - Fail	Failed	(0-44)	Considerable amount of work required

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

Study subject information				
Module Delivery		Methods for solving ordinary differential equations		Course title
☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		Core		Course type
		MAT23114		Course Code
		5		number of units
		125		The number of hours
3	Semester of Delivery		U	Course level
Type College Code		College	Type Dept. Code	Administering Department
E-mail		e-mail	Name	Module Leader
Ph.D.	Module Leader's Qualification		Professor	Module Leader's Acad. Title
E-mail		e-mail	Name (if available)	Module Tutor
E-mail		e-mail	Name	Peer Reviewer Name
1.0	Version Number		01/06/2023	Scientific Committee Approval Date

Relationship with other academic subjects			
the second	Semester	MAT12107	Grader
	Semester	-	Joint rapporteur

Subject objectives, learning outcomes and indicative contents	
- Identify methods and rules for finding solutions to various first- and second-order differential equations with initial values-And the limit.	a Objectives of the study subject

- The ability to use differential equations to solve mathematical problems. - Understanding the links between differential equations and mathematical analysis and highlighting the importance of equations in various different sciences. - Training the student to solve higher order linear equations using Laplace transforms and other methods.	
A-Knowledge and understanding - Gain experience and knowledge in solving differential equations. - Developing the student's way of thinking to find solutions to various science problems. -Connecting different mathematics topics and their relationship to each other, where each topic is considered complementary to the other. -Teaching the student to master the skills acquired over time and to have sound intuitive perception to a reasonable extent. B-Subject-specific skills -summer training -Scientific reports -Graduation research C-thinking skills -Developing the student's ability to work on performing assignments and submitting them on the scheduled date. -Logical and mathematical thinking in finding solutions to problems -Developing the student's ability to dialogue and discuss. Dr-General and transferable skills(Other skills related to employability and personal development). -Developing the student's ability to use calculus to solve problems in other sciences. -Developing the student's ability to recognize types of functions. -Developing the student's ability to deal. -Developing the student's ability to dialogue and discuss.	Learning outcomes for the subject
	Indicative contents

Learning and teaching strategies	
- Managing the lecture in a way that makes time feel important. - Encouraging correct answers and discussing wrong answers instead of punishing them. - Assigning the student to some group activities and duties. - Allocate a percentage of the grade to group activities. - Use an appropriate method related to this course.	Strategies

The student's study load is calculated for 15 weeks			
Structured SWL (h/sem) The student's regular academic load during the semester	60	Structured SWL (h/w) The student's regular academic load per week	4
Unstructured SWL (h/sem) Irregular study load for the student during the semester	65	Unstructured SWL (h/w) The student's irregular academic load per week	5
Total SWL (h/sem) The student's total academic load during the semester	125		

ModuleEvaluation					
Evaluation of the academic subject					
Learning outcome	week	Weight (grade)	Time/number		
LO #1, #2 and #10, #11	5 and 10	10% (10)	2	Tests	Formative assessment
LO #3, #4 and #6, #7	2 and 12	10% (10)	2	Tasks	
All	Continuous	10% (10)	1	Projects	
LO #5, #8 and #10	13	10% (10)	1	a report	
LO #1 - #7	7	10% (10)	2hr	Classroom test	Summary evaluation
All	16	50% (50)	3hr	Final test	
		100% (100 Marks)	Total assessment		

Delivery Plan (Weekly Syllabus) The theoretical weekly curriculum	
Material Covered	
Classification of ordinary differential equations - formation of the differential equation.	the first
-Separable differential equations - Homogeneous differential equations. - Complete differential equations.	the second
- Linear differential equations. - Bernoulli differential equations	the third
-Linear differential equations of order n (solution methods) Linear differential equations of order n with fixed coefficients.	the fourth
Solution method using distinct roots	Fifth
Solution of inhomogeneous linear differential equations - method of finding a special solution using the method of indefinite coefficients	VI
How to change parameters-Study of differential equations with variable coefficients and some methods for solving them.	Seventh
- Euler's equation and the method of solving it - using the power series around the normal point and the Verbinus method by spreading around the regular anomalous points	VIII
Bessel equation -Legendre equation	Ninth
Study of Laplace's concept with its characteristics	The tenth
Laplace transforms-Inverse Laplace transforms-unit step function-convolution theorem	eleventh
Solutions of differential equations with initial conditions using Laplace - some problems with a linear system, constant coefficients, and initial conditions	twelveth
Methods for solving systems of linear ordinary differential equations using eigenvectors and eigenvalues of the constant matrix	Thirteenth
Transform the differential equation of order n To a first-order system and n Of the independent variables	fourteenth
Physical and engineering applications of differential equations	Fifteenth

Delivery Plan (Weekly Lab. Syllabus) The weekly laboratory curriculum	
Material Covered	
	Week 1
	Week 2
	Week 3
	Week 4

	Week 5
	Week 6
	Week 7

Learning and Teaching Resources		
Learning and teaching resources		
Available in the library	Text	
Yes	Arrowsmith. DK&Place. CM, "Ordinary Differential Equations" 1982, London. -1 Rabenstein. AL, "Introduction to Ordinary Differential Equations", 1972. -2 Brauer F. & Nohel J. A. "Ordinary Differential Equations: A First Corona Virus", 2nd, 1973, London, Amsterdam. -3 stein. R., "Interoduction To Ordinary Differential Equations"2nd, New York 1972. -4	Required sources
Yes	1- Khaled Ahmed Al-Samarrai and Yahya Abd Saeed and "Methods for Solving Differential Equations," Iraqi Ministry of Higher Education and Scientific Research, 1980. 2- Riyadh Shaker Naoum and Ibrahim Riyadh Gharbal, "Methods for solving ordinary differential equations and their applications," University of Basra - Iraq, 1982.	Recommended sources
www. Freescience.info/math		Online link

Grading Scheme				
Grading chart				
Group	Grade	Appreciation	Marks%	Definition
Success Group (50 - 100)	A - Excellent	Excellence	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	Deposit (in process)	(45-49)	More work required but credit awarded
	F - Fail	Failed	(0-44)	Considerable amount of work required

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

Study subject information				
Module Delivery		Probability		Course title
☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		Core		Course type
		MAT23115		Course Code
		5		number of units
		125		The number of hours
3	Semester of Delivery		U	Course level
Type College Code		College	Type Dept. Code	Administering Department
E-mail		e-mail	Name	Module Leader
Ph.D.	Module Leader's Qualification		Professor	Module Leader's Acad. Title
E-mail		e-mail	Name (if available)	Module Tutor
E-mail		e-mail	Name	Peer Reviewer Name
1.0	Version Number		01/06/2023	Scientific Committee Approval Date

Relationship with other academic subjects			
the second	Semester	MAT12107	Grader
	Semester	-	Joint rapporteur

Subject objectives, learning outcomes and indicative contents	
- Giving the student an idea of the principles of descriptive statistics and the mechanism of use. - Translating the problem into a mathematical formula to predict the outcome if the data changes. - Giving the student experience in building statistical tables and how to build relationships between variables	a Objectives of the study subject

in a scientific-mathematical manner. -This course provides the student with the ability and ability to know and guess the expected probabilities of an event and a specific problem, how to express them, and predict their future results.	
a-Knowledge and understanding -Gaining the intellectual ability to analyze a statistical problem and find its probabilities of failure or success. -Acquire the skill of drawing variables in the form of graphs and shapes to determine the extent of the relationship between them. -Ensure that the student is able to classify variables and follow certain types of probability distributions. -Linking statistical and probability theories and laws to real-life problems and topics and trying to find solutions to them and discuss them Through graduation research B-Subject-specific skills -summer training -Graduation research -Scientific reports C-thinking skills -Developing the student's ability to work on performing assignments and submitting them on the scheduled date. -Analyze the problem statistically and mathematically and find solutions based on the expected results - Developing the student's ability to dialogue and discuss. Dr-General and transferable skills(Other skills related to employability and personal development). -Developing the student's ability to deal with technical means. -Developing the student's ability to deal with the Internet. -Developing the student's ability to deal with multiple media. -Developing the student's ability to dialogue and discuss.	Learning outcomes for the subject
	Indicative contents

Learning and teaching strategies	
• Managing the lecture in an applied manner linked to the reality of daily life to attract the student to the topic of the lesson without straying from the core of the topic so	Strategies

that the material is flexible and amenable to understanding and analysis.. • Assigning the student to some group activities and duties. • Allocate a percentage of the grade to daily assignments and tests.	
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The student's study load is calculated for 15 weeks			
Structured SWL (h/sem) The student's regular academic load during the semester	60	Structured SWL (h/w) The student's regular academic load per week	4
Unstructured SWL (h/sem) Irregular study load for the student during the semester	65	Unstructured SWL (h/w) The student's irregular academic load per week	5
Total SWL (h/sem) The student's total academic load during the semester	125		

ModuleEvaluation					
Evaluation of the academic subject					
Learning outcome	week	Weight (grade)	Time/number		
LO #1, #2 and #10, #11	5 and 10	10% (10)	2	Tests	Formative assessment
LO #3, #4 and #6, #7	2 and 12	10% (10)	2	Tasks	
All	Continuous	10% (10)	1	Projects	
LO #5, #8 and #10	13	10% (10)	1	a report	
LO #1 - #7	7	10% (10)	2hr	Classroom test	Summary evaluation
All	16	50% (50)	3hr	Final test	
		100% (100 Marks)	Total assessment		

Delivery Plan (Weekly Syllabus) The theoretical weekly curriculum	
Material Covered	
Population, sample, statistical data collection, frequency distribution table, data display.	the first

Arithmetic mean, median, mode	the second
Measures of absolute dispersion (range, standard deviation)	the third
The meaning of probability, accidents, mutually exclusive events,	the fourth
Independent and independent events, laws of probability.	Fifth
The concept of conditional probability, Bayes' law, Bayes' theorem.	VI
The concept of a discrete random variable, the distribution function of a discrete random variable	Seventh
Probability density function of a discrete random variable.	VIII
The concept of a continuous random variable, the distribution function of a continuous random variable	Ninth
Probability density function for a continuous random variable.	The tenth
Expectation and variance of a discrete and continuous random variable	eleventh
Probability distributions separate (Bernoulli–Binomial–Poisson)	twelveth
Normal distribution and its applications.	Thirteenth
Examples	fourteenth
Examples	Fifteenth

Delivery Plan (Weekly Lab. Syllabus) The weekly laboratory curriculum	
Material Covered	
	Week 1
	Week 2
	Week 3
	Week 4
	Week 5
	Week 6
	Week 7

Learning and Teaching Resources Learning and teaching resources		
Available in the library	Text	
Yes	1) Perm S. Mann: Introductory Statistics, John Wiley and sons, Inc., 2001	Required sources
Yes	2) Harry Frank, Steven C. Althoen: Statistics concepts and applications. Cambridge	Recommended sources

	University Press, 1994. (3) Introduction to mathematical statistics, R.Hogg and A.Grage, 1974 (4) Principles of Statistics, Salim Ismail Al-Gharbi and Ali Muhammad Sadiq Seifi, 1985 Baghdad University Press-Iraq	
	www. Freescience.info/math	Online link

Grading Scheme				
Grading chart				
Group	Grade	Appreciation	Marks%	Definition
Success Group (50 - 100)	A - Excellent	Excellence	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	Deposit (in process)	(45-49)	More work required but credit awarded
	F - Fail	Failed	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Study subject information				
Module Delivery		Group theory		Course title
☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		Core		Course type
		MAT23116		Course Code
		5		number of units
		125		The number of hours
3	Semester of Delivery		U	Course level
Type College Code		College	Type Dept. Code	Administering Department
E-mail		e-mail	Name	Module Leader

Appendix No. 4 (Description of the academic subject) Department of Mathematics - College of Science – University of Al-Qadisiyah

Ph.D.	Module Leader's Qualification		Professor	Module Leader's Acad. Title	
E-mail		e-mail	Name (if available)		Module Tutor
E-mail		e-mail	Name	Peer Reviewer Name	
1.0	Version Number		01/06/2023	Scientific Committee Approval Date	

Relationship with other academic subjects			
the second	Semester	MAT12108	Grader
	Semester	-	Joint rapporteur

Subject objectives, learning outcomes and indicative contents	
- Identify the basic theorems in group theory. - Identify the groups and the structural strings of the groups. - Identify important types of groups(Normal groups,Groups are powerless,Solvable groups)Study its properties and explain its importance. - Study the grade equation and its applications. - Study Silo's theorems and explain their importance. - Give an introduction to Gallo's theory with some applications.	Objectives of the study subject
A-Knowledge and understanding - Gaining experience and knowledge of algebraic structures - Understanding the mechanism of dealing with group structure - How to use algebraic structures (groups in particular) in understanding and developing other sciences B-Subject-specific skills -Scientific reports -Graduation research C-thinking skills	Learning outcomes for the subject

-Developing the student's ability to work on performing assignments and submitting them on the scheduled date. -Logical and mathematical thinking in finding solutions to algebraic problems -Developing the student's ability to dialogue and discuss. Dr-General and transferable skills(Other skills related to employability and personal development). -Developing the student's ability to use group theory to solve dilemmas in other sciences. -Developing the student's ability to recognize the types of groups. -Developing the student's ability to deal. -Developing the student's ability to dialogue and discuss.	
	Indicative contents

Learning and teaching strategies	
• Managing the lecture in a way that makes time feel important. • Encouraging correct answers and discussing wrong answers instead of punishing them. • Assigning the student to some group activities and duties. • Allocate a percentage of the grade to group activities. • Use an appropriate method related to this course	Strategies

The student's study load is calculated for 15 weeks			
Structured SWL (h/sem) The student's regular academic load during the semester	60	Structured SWL (h/w) The student's regular academic load per week	4
Unstructured SWL (h/sem) Irregular study load for the student during the semester	65	Unstructured SWL (h/w) The student's irregular academic load per week	6
Total SWL (h/sem)	125		

The student's total academic load during the semester	
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ModuleEvaluation					
Evaluation of the academic subject					
Learning outcome	week	Weight (grade)	Time/number		
LO #1, #2 and #10, #11	5 and 10	10% (10)	2	Tests	Formative assessment
LO #3, #4 and #6, #7	2 and 12	10% (10)	2	Tasks	
All	Continuous	10% (10)	1	Projects	
LO #5, #8 and #10	13	10% (10)	1	a report	
LO #1 - #7	7	10% (10)	2hr	Classroom test	Summary evaluation
All	16	50% (50)	3hr	Final test	
		100% (100 Marks)	Total assessment		

Delivery Plan (Weekly Syllabus) The theoretical weekly curriculum	
Material Covered	The week
Study of conformational groups and their properties	the first
Study of normal groups and their properties	the second
Definition of the row equation and explaining its importance and application	the third
Presenting the Perseid theorem and its related results and explaining its importance	the fourth
Presenting Silov's theorems and explaining their importance	Fifth
Some related theorems	VI
Definition of a normal series, giving some examples and properties	Seventh
Defining the structural series, giving some examples and properties	VIII
Some related theorems	Ninth
Presenting Jordan-Holder's theorem with related theorems	The tenth
Complete the results of Jordan-Holder's theorem	eleventh
Definition of solvable groups with examples	twelveth
Properties of solvable groups.	Thirteenth
Kalois Theorem (related theorems)	fourteenth
Some applications of Calo's theory	Fifteenth

Delivery Plan (Weekly Lab. Syllabus) The weekly laboratory curriculum	
Material Covered	
	Week 1
	Week 2
	Week 3
	Week 4
	Week 5
	Week 6
	Week 7

Learning and Teaching Resources Learning and teaching resources		
Available in the library	Text	
Yes	Joseph J. Rotman, "Advance Modern Algebra", 2003 -1 Joseph J. Rotman, "An introduction of the theory of groups" 1994. -2	Required sources
Yes	David M. Burton, "Introduction to Modern Abstract Algebra", 1967. -1 4-D. Jalal Naoum Kassab, "Introduction to Modern Algebra," 1987. 5- Dr. Ramadan Muhammad Juhaime, "Abstract Algebra" 2000 6- Dr. Adel Ghassan Naoum, "Introduction to Group Theory," 1982	Recommended sources
www. Freescience.info/math		Online link

Grading Scheme Grading chart				
Group	Grade	Appreciation	Marks%	Definition
Success Group (50 - 100)	A - Excellent	Excellence	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	Deposit (in process)	(45-49)	More work required but credit awarded

Appendix No. 4 (Description of the academic subject) Department of Mathematics - College of Science – University of Al-Qadisiyah

	F - Fail	Failed	(0-44)	Considerable amount of work required

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

Study subject information				
Module Delivery		Numerical Analysis1		Course title
☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar		Core		Course type
		MAT24119		Course Code
		5		number of units
		125		The number of hours
4	Semester of Delivery		U	Course level
Type College Code		College	Type Dept. Code	Administering Department
E-mail		e-mail	Name	Module Leader
Ph.D.	Module Leader's Qualification		Professor	Module Leader's Acad. Title
E-mail		e-mail	Name (if available)	Module Tutor
E-mail		e-mail	Name	Peer Reviewer Name
1.0	Version Number		01/06/2023	Scientific Committee Approval Date

Relationship with other academic subjects			
the second	Semester	MAT12107	Grader
	Semester	-	Joint rapporteur

Subject objectives, learning outcomes and indicative contents	
	a

- The student understands the importance of numerical analysis and understands its methods for solving practical problems for which analytical solutions may not be available. - Knowledge of numerical methods for solving nonlinear equations. - Study and analyze errors related to these methods and discuss their convergence rates. - Estimate the errors associated with these methods and discuss the convergence of iterative methods. - Numerical methods for calculus with a discussion of accuracy and estimation of errors associated with these methods. -Solve ordinary differential equations using numerical methods and study Convergence and stability of these methods.	Objectives of the study subject
A-Knowledge and understanding - The ability to solve mathematical problems in: differentiation, integration, differential equations, systems of linear and non-linear equations using numerical methods and study their accuracy and the possibility of improving them. - Familiarity with determining root locations. - Error analysis and discussion. - Gain experience and knowledge in solving nonlinear equations using numerical methods. - Gain experience and knowledge in using a calculator. B-Subject-specific skills -summer training -Scientific reports Graduation research C-thinking skills -Developing the student's ability to work on performing assignments and submitting them on the scheduled date. -The student's ability to discuss with his classmates the topic under study. -Developing the student's ability to express and communicate his point of view clearly and understandably.	Learning outcomes for the subject
	Indicative contents

Learning and teaching strategies	
- Lectures and discussions -Discussion and brainstorming. - Show respect for all student discussions that take place in the lecture hall. - The student should explain the topic to his classmates. - Encouraging team and cooperative work. -Encouraging correct answers and discussing wrong answers instead of punishing them. -Managing the lecture in a way that makes time feel important.	Strategies

The student's study load is calculated for 15 weeks			
Structured SWL (h/sem) The student's regular academic load during the semester	60	Structured SWL (h/w) The student's regular academic load per week	4
Unstructured SWL (h/sem) Irregular study load for the student during the semester	65	Unstructured SWL (h/w) The student's irregular academic load per week	7
Total SWL (h/sem) The student's total academic load during the semester	125		

ModuleEvaluation					
Evaluation of the academic subject					
Learning outcome	week	Weight (grade)	Time/number		
LO #1, #2 and #10, #11	5 and 10	10% (10)	2	Tests	Formative assessment
LO #3, #4 and #6, #7	2 and 12	10% (10)	2	Tasks	
All	Continuous	10% (10)	1	Projects	
LO #5, #8 and #10	13	10% (10)	1	a report	
LO #1 - #7	7	10% (10)	2hr	Classroom test	Summary evaluation
All	16	50% (50)	3hr	Final test	
		100% (100 Marks)	Total assessment		

Delivery Plan (Weekly Syllabus) The theoretical weekly curriculum	
Material Covered	The week
Error analysis, relative error, absolute error.	the first
Determination of root locations, field bisection method, misplacement method.	the second
The fixed point iterative method, Newton-Raphson method, conditions and degree of convergence of the methods.	the third
Aitken method to accelerate convergence of methods, systems of nonlinear equations.	the fourth
Kaos elimination method, matrix partitioning methods.	Fifth
Jacobi method, Kaus-Seidel method.	VI
Successive satisfaction method.	Seventh
Iterative methods, dysfunctional and non-dysfunctional linear systems.	VIII
Lacrange method, partitioned differences.	Ninth
Front set differences, rear set differences.	The tenth
Central specific differences.	eleventh
Newton's formulas for finite differences.	twelveth
Front and center approximation of derivatives.	Thirteenth
Backward approximation of derivatives.	fourteenth
Discuss the error.	Fifteenth

Delivery Plan (Weekly Lab. Syllabus) The weekly laboratory curriculum	
Material Covered	
	Week 1
	Week 2
	Week 3
	Week 4
	Week 5
	Week 6
	Week 7

Learning and Teaching Resources Learning and teaching resources		
Available in the library	Text	

Yes	Froberg CE, Introduction To Numerical Analysis, -1 London, 1969.	Required sources
Yes	Hildebrand. FB, WH, Introduction To Numerical -1 Analysis, New York, 1974. 2- Ali Muhammad Sadiq and Ibtisam Kamal al-Din, Principles of Numerical Analysis, University of Baghdad, 1986. 3- Kazem Muhammad Hussein Al-Lami, Introduction to Numerical Analysis, University of Basra, 1987. Kendall A. Atkinson, translated by Kazem Muhammad Hussein Al-Lami and Muntaha Girgis Shamoun, Introduction to Numerical Analysis, University of Basra, 1988.	Recommended sources
www. Freescience.info/math		Online link

Grading Scheme				
Grading chart				
Group	Grade	Appreciation	Marks%	Definition
Success Group (50 - 100)	A - Excellent	Excellence	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	Deposit (in process)	(45-49)	More work required but credit awarded
	F - Fail	Failed	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Study subject information		
Module Delivery	Methods for solving partial differential equations	Course title
☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	Core	Course type
	MAT24120	Course Code
	5	number of units
	125	The number of hours

Appendix No. 4 (Description of the academic subject) Department of Mathematics - College of
Science – University of Al-Qadisiyah

4	Semester of Delivery		U	Course level	
Type College Code		College	Type Dept. Code	Administering Department	
E-mail		e-mail	Name		Module Leader
Ph.D.	Module Leader's Qualification		Professor	Module Leader's Acad. Title	
E-mail		e-mail	Name (if available)		Module Tutor
E-mail		e-mail	Name	Peer Reviewer Name	
1.0	Version Number		01/06/2023	Scientific Committee Approval Date	

Relationship with other academic subjects			
the second	Semester	MAT23114	Grader
	Semester	-	Joint rapporteur

Subject objectives, learning outcomes and indicative contents	
- Explaining what is meant by partial differential equations, how to solve them, a brief presentation of their classification, and an overview of a number of ideas that will be studied later, since most of the physical phenomena, whether they are in the field of fluid flow, electrical, mechanical, electromagnetic in our daily lives, quantum mechanics, optics, or The flow of heat can be described in general by partial differential equations. In fact, most mathematical physics is partial differential equations. Although the simplifications transform the equations under study into ordinary differential equations, the complete description of these systems falls within the general field of partial differential equations.	a Objectives of the study subject
A-Knowledge and understanding - Gain experience and knowledge in applicationsPartial differential equations - Solutions of partial differential equations - Finding solutionsFor partial differential equationsAnd	Learning outcomes for the subject

its applications in other sciences - Finding a mathematical model to solve a specific problem using partial differential equations B-Subject-specific skills -summer training -Scientific reports -Graduation research C-thinking skills -Developing the student's ability to work on performing assignments and submitting them on the scheduled date. -Logical and mathematical thinking in finding solutions to problems -Developing the student's ability to dialogue and discuss.	
	Indicative contents

Learning and teaching strategies	
• Managing the lecture in a way that makes time feel important. • Encouraging correct answers and discussing wrong answers instead of punishing them. • Assigning the student to some group activities and duties. • Allocate a percentage of the grade to group activities. • Use an appropriate method related to this course.	Strategies

The student's study load is calculated for 15 weeks			
Structured SWL (h/sem) The student's regular academic load during the semester	60	Structured SWL (h/w) The student's regular academic load per week	4
Unstructured SWL (h/sem) Irregular study load for the student during the semester	65	Unstructured SWL (h/w) The student's irregular academic load per week	8
Total SWL (h/sem) The student's total academic load during the semester	125		

ModuleEvaluation					
Evaluation of the academic subject					
Learning outcome	week	Weight (grade)	Time/number		
LO #1, #2 and #10, #11	5 and 10	10% (10)	2	Tests	Formative assessment
LO #3, #4 and #6, #7	2 and 12	10% (10)	2	Tasks	
All	Continuous	10% (10)	1	Projects	
LO #5, #8 and #10	13	10% (10)	1	a report	
LO #1 - #7	7	10% (10)	2hr	Classroom test	Summary evaluation
All	16	50% (50)	3hr	Final test	
		100% (100 Marks)	Total assessment		

Delivery Plan (Weekly Syllabus)	
The theoretical weekly curriculum	
Material Covered	The week
Introductory concepts, linear partial differential equations, features	the first
Deriving the differential equation by eliminating the usual constants and eliminating the optional functions	the second
Semilinear partial differential equations, the auxiliary Lacrange system and various methods of solution are solved examples.	the third
Homogeneous linear partial differential equations of the first order with fixed coefficients	the fourth
Homogeneous linear partial differential equations of the second order with fixed coefficients	Fifth
Second-order inhomogeneous linear partial differential equations with variable coefficients	VI
Higher order homogeneous linear partial differential equations with fixed coefficientsreducible	Seventh
Higher order homogeneous linear partial differential equations with fixed coefficientsIrreducible	VIII
Partial differential equationsWith variable coefficients, they can be converted into linear partial differential equations with fixed coefficients.	Ninth
Inhomogeneous partial differential equations	The tenth
Legal formulas for partial, hyperbolic, equivalent and imperfect equationsBelow the limit stroke	eleventh
For partial, hyperbolic, equivalent and imperfect equationsBelow the limit stroke,With some examples	twelveth
Second-order partial differential equations in two variables with some examples	Thirteenth

How to separate variables	fourteenth
Rotation of the wave equation, heat equation, Laplace equation, classification of boundary conditions, Cauchy problem.	Fifteenth

Delivery Plan (Weekly Lab. Syllabus) The weekly laboratory curriculum	
Material Covered	
	Week 1
	Week 2
	Week 3
	Week 4
	Week 5
	Week 6
	Week 7

Learning and Teaching Resources Learning and teaching resources		
Available in the library	Text	
Yes	Carrier. GE & Pearson. C.E Partial Differential Equations, Theory and Technique. New York. 1976.	Required sources
Yes	Garabedian. PR E Partial Differential Equations. 1964 (Partial differential equations for scientific and engineering colleges) Lacey, J. Farlow translated by Atallah Thamer	Recommended sources
www. Freescience.info/math		Online link

Grading Scheme Grading chart				
Group	Grade	Appreciation	Marks%	Definition
Success Group (50 - 100)	A - Excellent	Excellence	90 - 100	Outstanding Performance
	B - Very Good	very good	80 – 89	Above average with some errors
	C - Good	good	70 – 79	Sound works with notable errors
	D - Satisfactory	middle	60 – 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 – 59	Work meets minimum criteria

Appendix No. 4 (Description of the academic subject) Department of Mathematics - College of Science – University of Al-Qadisiyah

Fail Group (0 – 49)	FX – Fail	Deposit (in process)	(45-49)	More work required but credit awarded
	F - Fail	Failed	(0-44)	Considerable amount of work required

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

Study subject information				
Module Delivery		Mathematical statistics		Course title
☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		Core		Course type
		MAT24121		Course Code
		5		number of units
		125		The number of hours
4	Semester of Delivery		U	Course level
Type College Code		College	Type Dept. Code	Administering Department
E-mail		e-mail	Name	Module Leader
Ph.D.	Module Leader's Qualification		Professor	Module Leader's Acad. Title
E-mail		e-mail	Name (if available)	Module Tutor
E-mail		e-mail	Name	Peer Reviewer Name
1.0	Version Number		01/06/2023	Scientific Committee Approval Date

Relationship with other academic subjects			
the third	Semester	MAT23115	Grader
	Semester	-	Joint rapporteur

Subject objectives, learning outcomes and indicative contents	
- Learn about the basic concepts of mathematical statistics. - Learn about distributions and their importance. - Identify random sampling distributions. - Knowledge of applications of distributions in various sciences. -Learn about the principle of ordered statistics and their distributions.	a Objectives of the study subject
A-Knowledge and understanding - Gaining experience and knowledge in knowing the distributions of the random sample. - Knowing the distributions of random variables using moment generating functions. - Knowing the distributions of random variables using transformations. - Knowing the distributions of the arithmetic mean and variance $\bar{X}$, S^2 - Identify some important distributions such as F and t distribution. - Identify the concept of ranked statistics and their distributions. B-Subject-specific skills -Scientific reports -Graduation research C-thinking skills -Developing the student's ability to work on performing assignments and submitting them on the scheduled date. -Logical and mathematical thinking in finding solutions to problems -Developing the student's ability to dialogue and discuss. Dr-General and transferable skills(Other skills related to employability and personal development). -Developing the student's ability to use distributions and ways to know some transformations. -Developing the student's ability to recognize the types of distributions. -Developing the student's ability to dealWith ranked distributions and statistics. -Developing the student's ability to dialogue and discuss.	Learning outcomes for the subject

	Indicative contents

Learning and teaching strategies	
• Managing the lecture in a way that makes time feel important. • Encouraging correct answers and discussing wrong answers instead of punishing them. • Assigning the student to some group activities and duties. • Allocate a percentage of the grade to group activities. • Use an appropriate method related to this course.	Strategies

The student's study load is calculated for 15 weeks			
Structured SWL (h/sem) The student's regular academic load during the semester	60	Structured SWL (h/w) The student's regular academic load per week	4
Unstructured SWL (h/sem) Irregular study load for the student during the semester	65	Unstructured SWL (h/w) The student's irregular academic load per week	6
Total SWL (h/sem) The student's total academic load during the semester	125		

ModuleEvaluation					
Evaluation of the academic subject					
Learning outcome	week	Weight (grade)	Time/number		
LO #1, #2 and #10, #11	5 and 10	10% (10)	2	Tests	Formative assessment
LO #3, #4 and #6, #7	2 and 12	10% (10)	2	Tasks	
All	Continuous	10% (10)	1	Projects	
LO #5, #8 and #10	13	10% (10)	1	a report	
LO #1 - #7	7	10% (10)	2hr	Classroom test	Summary

All	16	50% (50)	3hr	Final test	evaluation
		100% (100 Marks)	Total assessment		

Delivery Plan (Weekly Syllabus) The theoretical weekly curriculum	
Material Covered	The week
An overview of some distributions and their characteristics	the first
Definition of the concept of sampling and the concept of statistical effects	the second
Study of some sampling distributions, functions generating the moments of one or more random variables	the third
Study of some sampling distributions, functions generating the moments of one or more random variables	the fourth
The study of some sampling distributions, transformations of one or more random variables	Fifth
Know the distribution of sample rate and variance	VI
Knowledge of the concept of central purpose theorem and some applications to some distributions	Seventh
Study some special distributions such as the chi-square distribution and the...F and t distribution	VIII
Study some special distributions such as the chi-square distribution and the...F and t distribution	Ninth
Study some applications on special distributions	The tenth
Examples of special applications	eleventh
Study the concept of ordered statistics and their distributions	twelveth
Study the distributions of ranked statisticsFor one variable, two variables, or fornOf random variables	Thirteenth
A comprehensive review of the article	fourteenth
Examples for students to solve	Fifteenth

Delivery Plan (Weekly Lab. Syllabus) The weekly laboratory curriculum	
Material Covered	
	Week 1
	Week 2
	Week 3
	Week 4

	Week 5
	Week 6
	Week 7

Learning and Teaching Resources Learning and teaching resources		
Available in the library	Text	
Yes	Mathematical Statistics "Hogg and Grage"	Required sources
Yes	Mathematical Statistics "Mode and Graybile"	Recommended sources
www. Freescience.info/math		Online link

Grading Scheme Grading chart				
Group	Grade	Appreciation	Marks%	Definition
Success Group (50 - 100)	A - Excellent	Excellence	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	Deposit (in process)	(45-49)	More work required but credit awarded
	F - Fail	Failed	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Study subject information				
Module Delivery		Ring theory		Course title
☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		Core		Course type
		MAT24122		Course Code
		5		number of units
		125		The number of hours
4	Semester of Delivery		U	Course level

Appendix No. 4 (Description of the academic subject) Department of Mathematics - College of Science – University of Al-Qadisiyah

Type College Code		College	Type Dept. Code	Administering Department	
E-mail		e-mail	Name		Module Leader
Ph.D.	Module Leader's Qualification		Professor	Module Leader's Acad. Title	
E-mail		e-mail	Name (if available)		Module Tutor
E-mail		e-mail	Name	Peer Reviewer Name	
1.0	Version Number		01/06/2023	Scientific Committee Approval Date	

Relationship with other academic subjects			
the third	Semester	MAT23116	Grader
	Semester	-	Joint rapporteur

Subject objectives, learning outcomes and indicative contents	
- give Definition of loop and examples. - Make the student distinguish between the partial group and the partial ring and the ideal of the total ring. - Give a definition of the concept of cyclic conformations. - The ability to employ different theorems to study the types and properties of the ring. - Learn about the classification of fields according to their characteristics. -Identify factorable and unfactorable polynomials.	a Objectives of the study subject
A-Knowledge and understanding - The student should distinguish between a regular group and a ring-forming group. - To know the partial and ideal circle, distinguish between them, and link these two concepts. - To familiarize the student with the concept of cyclic shapes and their basic theorems. - The student should know how to find internal and external direct multiplication. - The student should know the complete circle (the square) and the field and know the connection between them. - To know which polynomials are analyzable and which are unanalyzable. B-Subject-specific skills	Learning outcomes for the subject

-Scientific reports -Graduation research C-thinking skills -Developing the student's ability to work on performing assignments and submitting them on the scheduled date. -The ability to think scientifically. -Ability to participate effectively in semester activities. -Skill in conducting research activities and using useful sources to support the main idea required. Dr-General and transferable skills(Other skills related to employability and personal development). -Developing the student's ability to use complex analysis to solve problems in mathematical sciences. -Developing the student's ability to recognize and solve examples with deductive and deductive ideas. Dr3-Developing the student's ability to deal with others by participating in scientific discussions. -Developing the student's ability to analyze and synthesize.	
	Indicative contents

Learning and teaching strategies	
● Managing the lecture in a way that makes time feel important. ● Encouraging correct answers and discussing wrong answers instead of punishing them. ● Assigning the student to some group activities and duties. ● Allocate a percentage of the grade to group activities. ● Use an appropriate method related to this course. ● Participation in the classroom. ● Daily, semester and final written tests. ● Oral exams in class. ● Research activities.	Strategies

The student's study load is calculated for 15 weeks			
Structured SWL (h/sem)		Structured SWL (h/w)	
The student's regular academic load during the semester	60	The student's regular academic load per week	4

Unstructured SWL (h/sem) Irregular study load for the student during the semester	65	Unstructured SWL (h/w) The student's irregular academic load per week	5
Total SWL (h/sem) The student's total academic load during the semester	125		

ModuleEvaluation					
Evaluation of the academic subject					
Learning outcome	week	Weight (grade)	Time/number		
LO #1, #2 and #10, #11	5 and 10	10% (10)	2	Tests	Formative assessment
LO #3, #4 and #6, #7	2 and 12	10% (10)	2	Tasks	
All	Continuous	10% (10)	1	Projects	
LO #5, #8 and #10	13	10% (10)	1	a report	
LO #1 - #7	7	10% (10)	2hr	Classroom test	Summary evaluation
All	16	50% (50)	3hr	Final test	
		100% (100 Marks)	Total assessment		

Delivery Plan (Weekly Syllabus)	
The theoretical weekly curriculum	
Material Covered	The week
The ring and its properties, zero-dividing elements, square, field. Partial ring, characteristic of the ring with some of its properties, immersion of a ring in a ring with a neutral element, neutral elements (equal strengths) and non-strong elements with some of their properties.	the first
The ring and its properties, zero-dividing elements, square, field. Partial ring, characteristic of the ring with some of its properties, immersion of a ring in a ring with a neutral element, neutral elements (equal strengths) and non-strong elements with some of their properties.	the second
The ring and its properties, zero-dividing elements, square, field. Partial ring, characteristic of the ring with some of its properties, immersion of a ring in a ring with a neutral element, neutral elements (equal strengths) and non-strong elements with some of their properties.	the third
The ring and its properties, zero-dividing elements, square, field. Partial ring, characteristic of the ring with some of its properties, immersion of a ring in a ring with a neutral element, neutral elements (equal strengths) and non-strong elements with some of their properties.	the fourth
The ring and its properties, zero-dividing elements, square, field. Partial ring, characteristic of the ring with some of its properties, immersion of a ring in a ring with a neutral element, neutral elements (equal strengths) and non-strong elements with some of their properties.	Fifth
Cyclic symmetries, basic theorems of cyclic symmetries.	VI
Cyclic symmetries, basic theorems of cyclic symmetries.	Seventh

Cyclic symmetries, basic theorems of cyclic symmetries.	VIII
Ideals, the main ideals ring, the dividing ring, the primary and greatest ideals and the relationship between them.	Ninth
Ideals, the main ideals ring, the dividing ring, the primary and greatest ideals and the relationship between them.	The tenth
Ideals, the main ideals ring, the dividing ring, the primary and greatest ideals and the relationship between them.	eleventh
Ideals, the main ideals ring, the dividing ring, the primary and greatest ideals and the relationship between them.	twelveth
Boolean ring and Boolean algebra with some of their properties and applications	Thirteenth
Boolean ring and Boolean algebra with some of their properties and applications	fourteenth
Boolean ring and Boolean algebra with some of their properties and applications	Fifteenth

Delivery Plan (Weekly Lab. Syllabus) The weekly laboratory curriculum	
Material Covered	
	Week 1
	Week 2
	Week 3
	Week 4
	Week 5
	Week 6
	Week 7

Learning and Teaching Resources Learning and teaching resources		
Available in the library	Text	
Yes	The Theory Of Groups, Rotman JJ 2nd. 1973, Boston.	Required sources
Yes	1) The Theory Of Groups, Macdonald I., 1968, Oxford 2) Abstract Algebra, David M. Burton, 1988, WM.C. Brown Publishers. 3) - Introduction to Group Theory, Basil Atta Abdel Majeed et al., 1982, Ministry of Higher Education and Scientific Research - Iraq.	Recommended sources
www.Freescience.info/math		Online link

Grading Scheme

Grading chart

Group	Grade	Appreciation	Marks%	Definition
Success Group (50 - 100)	A - Excellent	Excellence	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	Deposit (in process)	(45-49)	More work required but credit awarded
	F - Fail	Failed	(0-44)	Considerable amount of work required

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

Study subject information

Module Delivery		Mathematical analysis 1		Course title
☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		Core		Course type
		MAT35125		Course Code
		5		number of units
		125		The number of hours
5	Semester of Delivery		U	Course level
Type College Code		College	Type Dept. Code	Administering Department
E-mail		e-mail	Name	Module Leader
Ph.D.	Module Leader's Qualification		Professor	Module Leader's Acad. Title
E-mail		e-mail	Name (if available)	Module Tutor
E-mail		e-mail	Name	Peer Reviewer Name
1.0	Version Number		01/06/2023	Scientific Committee Approval Date

Relationship with other academic subjects

the third	Semester	MAT23113	Grader
	Semester	-	Joint rapporteur

Subject objectives, learning outcomes and indicative contents	
- Identify real numbers and their mathematical properties. - The student will be familiar with the classification of differential equations in terms of degree and rank. -Identify applications of real numbers in various fields. - Identify real sequences and calculate their limits. - To verify the convergence of a convergent sequence. - To learn about sequences and some of their different types. - The ability to deal with some concepts in real analysis, such as sequences, limits, and complete metric spaces.	a Objectives of the study subject
A-Knowledge and understanding - Gaining experience and knowledge in sports analysis. -Connecting different mathematics topics and their relationship to each other, where each topic is considered complementary to the other. -Teaching the student to master the skills acquired over time and to have sound intuitive perception to a reasonable extent. B-Subject-specific skills -summer training -Scientific reports -Graduation research C-thinking skills Developing the student's ability to work on performing assignments and submitting them on the scheduled date. -Logical and mathematical thinking in finding solutions to problems -Developing the student's ability to dialogue and discuss. Dr-General and transferable skills(Other skills related to employability and personal development). -Developing the student's ability to use calculus to solve problems in other sciences. -Developing the student's ability to recognize types of	Learning outcomes for the subject

functions. -Developing the student's ability to deal. -Developing the student's ability to dialogue and discuss.	
	Indicative contents

Learning and teaching strategies	
• Managing the lecture in a way that makes time feel important. • Encouraging correct answers and discussing wrong answers instead of punishing them. • Assigning the student to some group activities and duties. • Allocate a percentage of the grade to group activities. • Use an appropriate method related to this course. • Participation in the classroom. • Daily, semester and final written tests. • Oral exams in class. • Research activities.	Strategies

The student's study load is calculated for 15 weeks			
Structured SWL (h/sem) The student's regular academic load during the semester	60	Structured SWL (h/w) The student's regular academic load per week	4
Unstructured SWL (h/sem) Irregular study load for the student during the semester	65	Unstructured SWL (h/w) The student's irregular academic load per week	5
Total SWL (h/sem) The student's total academic load during the semester	125		

ModuleEvaluation				
Evaluation of the academic subject				
Learning outcome	week	Weight (grade)	Time/number	

LO #1, #2 and #10, #11	5 and 10	10% (10)	2	Tests	Formative assessment
LO #3, #4 and #6, #7	2 and 12	10% (10)	2	Tasks	
All	Continuous	10% (10)	1	Projects	
LO #5, #8 and #10	13	10% (10)	1	a report	
LO #1 - #7	7	10% (10)	2hr	Classroom test	Summary evaluation
All	16	50% (50)	3hr	Final test	
		100% (100 Marks)	Total assessment		

Delivery Plan (Weekly Syllabus) The theoretical weekly curriculum	
Material Covered	The week
A historical overview, real numbers, the relationship between real and rational numbers, and Archimedes' property.	the first
Real numbers are an ordered field, complete with the density theorem for rational and irrational numbers	the second
Its definition and examples, semi-metric spaces, Euclidean and constraint spaces, and some basic principles in topology.	the third
.- Sequences, real sequences, and convergence in metric spaces	the fourth
Some real sequences, complete metric spaces, and the solid point theorem	Fifth
Its definition, examples, and some special infinite series, testing the convergence of alternating series	VI
Absolute convergence and conditional divergence are other tests.	Seventh
Objectives of functions, objective theorems, some expansions of the concept of objectives of continuous functions	VIII
Equivalent theorems of continuity - sequential continuity -	Ninth
Uniform continuity - the property of average value	The tenth
Stacked groups-Some important theorems in stacking	eleventh
Separate groups-Interconnected groups	twelveth
Equivalent theorems for correlation-Continuity and interconnectedness	Thirteenth
Derivatives: The space of differentiable functions. Properties of derivatives	fourteenth
Rolle's Theorem - Mean Value Theorem	Fifteenth

Delivery Plan (Weekly Lab. Syllabus) The weekly laboratory curriculum	
Material Covered	
	Week 1
	Week 2
	Week 3
	Week 4
	Week 5
	Week 6
	Week 7

Learning and Teaching Resources Learning and teaching resources		
Available in the library	Text	
Yes	1- Adel Ghassan Naoum, "Introduction to Mathematical Analysis," University of Baghdad - Iraq, 1986, first edition	Required sources
Yes	2- Anwar Badrane and others: An introduction to real analysis, Dar Al-Awal for Publishing and Distribution, Jordan, 1992. 3-Apostol. TM, "Mathematical Analysis" 2nd, 1974, London. 4-Ash, R.B., "Real analysis and probability", 1972. New York. 5-Royden. H.L., "Real Analysis", 1988. London.	Recommended sources
www. Freescience.info/math		Online link

Grading Scheme Grading chart				
Group	Grade	Appreciation	Marks%	Definition
Success Group (50 - 100)	A - Excellent	Excellence	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	Deposit (in process)	(45-49)	More work required but credit awarded
	F - Fail	Failed	(0-44)	Considerable amount of work required

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

Study subject information				
Module Delivery		Mathematical analysis 2		Course title
☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		Core		Course type
		MAT36131		Course Code
		5		number of units
		125		The number of hours
6	Semester of Delivery		U	Course level
Type College Code		College	Type Dept. Code	Administering Department
E-mail		e-mail	Name	Module Leader
Ph.D.	Module Leader's Qualification		Professor	Module Leader's Acad. Title
E-mail		e-mail	Name (if available)	Module Tutor
E-mail		e-mail	Name	Peer Reviewer Name
1.0	Version Number		01/06/2023	Scientific Committee Approval Date

Relationship with other academic subjects			
Fifth	Semester	MAT35125	Grader
	Semester	-	Joint rapporteur

Subject objectives, learning outcomes and indicative contents	
- Learn about the basic concepts of the derivative	Objectives of the study subject

and how to find it using the definition and its applications. - Learn about the Riemann integral of functions and how to find them using the definition and its properties. - Identify function sequences, their point and regular convergence, and how to replace limits with integration. - The identifier of the measure of subsets of the set of real numbers. - Identify measurable functions and their properties - Learn about the Riemann integral-Astrology and its comparison with the Riemann integral. -Learn about the Riemann integral, its most important properties, and compare it with the Riemann integral	
A-Knowledge and understanding - Knowing the derivatives of functions and how to find the derivatives of functions using the definition and some of its applications - Knowledge of the Riemannian integral of functions, its most important properties, and its relationship to continuity and the derivative - Knowing the measure of a subset of the set of real numbers - Knowing and understanding the Libeck integral, explaining its importance in other sciences, and comparing it with the Riemann integral B-Subject-specific skills -Scientific reports -Graduation research C-thinking skills -Developing the student's ability to work on performing assignments and submitting them on the scheduled date. -Logical and mathematical thinking in finding solutions to problems -Developing the student's ability to dialogue and discuss. Dr-General and transferable skills(Other skills related to employability and personal development).	Learning outcomes for the subject

-Developing the student's ability to use calculus to solve problems in other sciences. -Developing the student's ability to recognize types of functions. -Developing the student's ability to deal. -Developing the student's ability to dialogue and discuss.	
	Indicative contents

Learning and teaching strategies	
• Readings, self-learning, seminars, Developed lecture. • Activities in the classroom. • Directing students to some websites to benefit from them. • Giving examples and questions that stimulate student thinking. • Managing the lecture in a way that makes time feel important. • Encouraging correct answers and discussing wrong answers instead of punishing them. • Assigning the student to some group activities and duties. • Allocate a percentage of the grade to group activities. • Use an appropriate method related to this course.	Strategies

The student's study load is calculated for 15 weeks			
Structured SWL (h/sem) The student's regular academic load during the semester	60	Structured SWL (h/w) The student's regular academic load per week	4
Unstructured SWL (h/sem) Irregular study load for the student during the semester	65	Unstructured SWL (h/w) The student's irregular academic load per week	6
Total SWL (h/sem)	125		

The student's total academic load during the semester	
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ModuleEvaluation Evaluation of the academic subject					
Learning outcome	week	Weight (grade)	Time/number		
LO #1, #2 and #10, #11	5 and 10	10% (10)	2	Tests	Formative assessment
LO #3, #4 and #6, #7	2 and 12	10% (10)	2	Tasks	
All	Continuous	10% (10)	1	Projects	
LO #5, #8 and #10	13	10% (10)	1	a report	
LO #1 - #7	7	10% (10)	2hr	Classroom test	Summary
All	16	50% (50)	3hr	Final test	evaluation
		100% (100 Marks)	Total assessment		

Delivery Plan (Weekly Syllabus) The theoretical weekly curriculum	
Material Covered	The week
How to calculate derivatives of functions using the definition and studying the properties of derivative functions and their relationship to continuity	the first
Rolle's theorem, mean value theorem, Cauchy's mean value theorem, applications about these theorems	the second
Define the Riemann integral and give examples that show how to find the Riemann integral of functions, Properties of Riemannian integrable functions	the third
Relationship between the size of discontinuity points, their Riemannian susceptibility, and related results	the fourth
Sequences of Riemannian integrable functions and how to replace the limit with the integral for regularly convergent sequences	Fifth
Definition of the Riemann-Estrelges integral With some examples	VI
Study its most important properties and compare it with the Riemann integral	Seventh
Defining measurable groups and studying their properties	VIII
Defining measurable functions, giving some examples (simple functions, distinctive functions), and studying their properties.	Ninth
Definition of Liebeck integral with some examples	The tenth
Properties of Libeck integrals	eleventh
Comparison between the Riemann integral and the Libeck integral	twelveth

Sequences of integrable functions, Liberia	Thirteenth
Definition of bounded covariance functions with some examples and important properties	fourteenth
Definition of absolute continuity functions with some examples and important properties	Fifteenth

Delivery Plan (Weekly Lab. Syllabus) The weekly laboratory curriculum	
Material Covered	
	Week 1
	Week 2
	Week 3
	Week 4
	Week 5
	Week 6
	Week 7

Learning and Teaching Resources Learning and teaching resources		
Available in the library	Text	
Yes	Manfred Stoll, "Introduction to Real Analysis" 1997 -1 Burill and Knudsen, "Real Variable", 1969 -2 Wilter. Rudin, "Principle of Mathematical Analysis" 1964 -3	Required sources
Yes	Murray R. Spiegel, "Real Variables", 1969 -1 R. M. Dudley, "Real Analysis and Probability", 2004 -2 3- Dr. Adel Ghassan Naoum, "Introduction to Mathematical Analysis," 1985	Recommended sources
www. Freescience.info/math		Online link

Grading Scheme Grading chart				
Group	Grade	Appreciation	Marks%	Definition
Success Group (50 - 100)	A - Excellent	Excellence	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings

Appendix No. 4 (Description of the academic subject) Department of Mathematics - College of Science – University of Al-Qadisiyah

	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	Deposit (in process)	(45-49)	More work required but credit awarded
	F - Fail	Failed	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Study subject information				
Module Delivery		Topology 1		Course title
☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		Core		Course type
		MAT47137		Course Code
		5		number of units
		125		The number of hours
7	Semester of Delivery		U	Course level
Type College Code		College	Type Dept. Code	Administering Department
E-mail		e-mail	Name	Module Leader
Ph.D.	Module Leader's Qualification		Professor	Module Leader's Acad. Title
E-mail		e-mail	Name (if available)	Module Tutor
E-mail		e-mail	Name	Peer Reviewer Name
1.0	Version Number		01/06/2023	Scientific Committee Approval Date

Relationship with other academic subjects			
VI	Semester	MAT36131	Grader
	Semester	-	Joint rapporteur

Subject objectives, learning outcomes and indicative contents		
- Learn about topological space, its theories, and how to create a topology. - Study of topological concepts related to the study of continuous, open and closed sets and functions. - The student should know that topological properties are properties that are constant under the influence of isomorphic functions. - The student should know that genetic properties are constant properties under the influence of subspaces. - To teach the student that topological development is an extension of set theory.	Objectives of the study subject	
A-Knowledge and understanding - Gaining experience and knowledge in dealing with groups. - Gaining experience and knowledge in dealing with types of functions. - Gaining experience and knowledge in dealing with group disputes. - Gaining experience and knowledge in using data and axioms to prove theories. B-Subject-specific skills -Scientific reports -Graduation research C-thinking skills -Developing the student's ability to work on performing assignments and submitting them on the scheduled date. -Logical and mathematical thinking in finding solutions to problems -Developing the student's ability to dialogue and discuss. Dr-General and transferable skills(Other skills related to employability and personal development). -Developing the student's ability to recognize types of groups -Developing the student's ability to recognize types of functions. -Developing the student's ability to dialogue and discuss. -Developing the student's ability to find solutions and evidence.	Learning outcomes for the subject	

	Indicative contents
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Learning and teaching strategies	
-Readings, self-learning, seminars. -Activities in the classroom. -Instructing students to use the Internet to gain benefits. -Giving examples and questions that stimulate student thinking. -Assigning the student to some activities and duties -Collective. -Allocate a percentage of the grade to group activities. -Use an appropriate method related to this course.	Strategies

The student's study load is calculated for 15 weeks			
Structured SWL (h/sem) The student's regular academic load during the semester	60	Structured SWL (h/w) The student's regular academic load per week	4
Unstructured SWL (h/sem) Irregular study load for the student during the semester	65	Unstructured SWL (h/w) The student's irregular academic load per week	7
Total SWL (h/sem) The student's total academic load during the semester	125		

ModuleEvaluation					
Evaluation of the academic subject					
Learning outcome	week	Weight (grade)	Time/number		
LO #1, #2 and #10, #11	5 and 10	10% (10)	2	Tests	Formative assessment
LO #3, #4 and #6, #7	2 and 12	10% (10)	2	Tasks	
All	Continuous	10% (10)	1	Projects	

Appendix No. 4 (Description of the academic subject) Department of Mathematics - College of Science – University of Al-Qadisiyah

LO #5, #8 and #10	13	10% (10)	1	a report	Summary evaluation
LO #1 - #7	7	10% (10)	2hr	Classroom test	
All	16	50% (50)	3hr	Final test	
		100% (100 Marks)	Total assessment		

Delivery Plan (Weekly Syllabus) The theoretical weekly curriculum	
Material Covered	The week
The concept of topological spaces, some examples, topological formation, some types of topology (scattered, non-scattered, right ray,...)	the first
Definition of open and closed sets and adjacencies, Find it in some examples in topology, The relationship between them	the second
Rule and partial rule, how to generate a topology from a rule, Some theorems for the rule	the third
Interior points, within the group, Theorems for internal points with examples	the fourth
Goal points, Closeness, Properties and theorems of closure, Examples of closure	Fifth
Boundary points, external points, their properties and their relationship within the group and the closure of the group, examples	VI
Definition of subspaces, examples, genetic property theorems,	Seventh
Definition of continuity, images and inverse images of topological spaces, the relationship of continuity to internal points and closure, examples.	VIII
Definition of topological isomorphism, topological property, Examples	Ninth
Division spaces, topology for multiplication through the rule, the inside of multiplication topology, projections,	The tenth
Projections, subspaces, continuity	eleventh
T0, T1, T2, the relationship between them, studying them in terms of whether they are a genetic characteristic or not, a topological characteristic or not.	twelveth
Regular and natural spaces, T3, T4, studied from the perspective of whether it is a genetic characteristic or not, a topological characteristic or not	Thirteenth
Compact and non-compact spaces (definitions and examples), their relationship to Hausdorff space	fourteenth
Locally compact spaces (definitions and examples), Pathologically aligned spaces (definitions and examples)	Fifteenth

Delivery Plan (Weekly Lab. Syllabus) The weekly laboratory curriculum
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Material Covered	
	Week 1
	Week 2
	Week 3
	Week 4
	Week 5
	Week 6
	Week 7

Learning and Teaching Resources		
Learning and teaching resources		
Available in the library	Text	
Yes	Sharma JN, Topology, Krishna Prakashan Media -4 P Ltd, 2003.	Required sources
Yes	-William Bervin, Translated by Atallah Thamer Al-Ani, Basics of general topology, Baghdad University-Iraq, 1986. 3 -Abd Rabbo Muhammad Aslim, The jurisprudence of topology, Palestine, 1999.	Recommended sources
www. Freescience.info/math		Online link

Grading Scheme				
Grading chart				
Group	Grade	Appreciation	Marks%	Definition
Success Group (50 - 100)	A - Excellent	Excellence	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	Deposit (in process)	(45-49)	More work required but credit awarded
	F - Fail	Failed	(0-44)	Considerable amount of work required

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

Study subject information				
Module Delivery		Nodal analysis 1		Course title
☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		Core		Course type
		MAT47138		Course Code
		5		number of units
		125		The number of hours
7	Semester of Delivery		U	Course level
Type College Code		College	Type Dept. Code	Administering Department
E-mail		e-mail	Name	Module Leader
Ph.D.	Module Leader's Qualification		Professor	Module Leader's Acad. Title
E-mail		e-mail	Name (if available)	Module Tutor
E-mail		e-mail	Name	Peer Reviewer Name
1.0	Version Number		01/06/2023	Scientific Committee Approval Date

Relationship with other academic subjects			
VI	Semester	MAT36131	Grader
	Semester	-	Joint rapporteur

Subject objectives, learning outcomes and indicative contents	
- For the student to become familiar with analytical functions and what is related to them in terms of purpose, continuity, and derivation.	Objectives of the study subject

- And learn about Cauchy's equations-Riemann and its sufficient conditions and on harmonic functions. - The student will be familiar with elementary functions:Asian,Logarithmic,Trigonometry,Hyperbolic trigonometry,Inverse trigonometric functions,Inverse hyperbolic trigonometric functions. - The student will be familiar with definite integration and linear integration, in addition to the theorems related to integration.	
A-Knowledge and understanding - The student should deduce the nature of complex numbers and represent them in a polar representation. - The student should know the groups in the complex plane. - The student should distinguish continuous functions with a complex variable. - The student should deduce the sufficient and necessary conditions for the function to be analytic. - The student should be able to represent different analytical functions (the complex exponential function, the trigonometric and hyperbolic functions, the complex logarithmic function and the complex power functions). - For the student to deduce the nature of linear integrals and for the student to know Crane's theorem. -The student should deduce Cauchy's integral formulas and prove Liouville's theorem. -The student applies the principle of maximum value. B-Subject-specific skills -Scientific reports -Graduation research C-thinking skills -Developing the student's ability to work on performing assignments and submitting them on the scheduled date. -The ability to think scientifically. -Ability to participate effectively in semester activities. -Skill in conducting research activities and using useful sources to support the main idea required. Dr-General and transferable skills(Other skills related to employability and personal development). -Developing the student's ability to use complex analysis to solve problems in mathematical sciences. -Developing the student's ability to recognize and solve examples with deductive and deductive ideas. -Developing the student's ability to deal with others by participating in scientific discussions.	Learning outcomes for the subject

-Developing the student's ability to analyze and synthesize.	
	Indicative contents

Learning and teaching strategies	
-Lectures. -Classroom discussion from a scientific perspective. -Directing students to some websites to benefit from them. -Mini discussion sessions. -Training students on how to prepare scientific research. -Managing the lecture in a way that makes time feel important. -Encouraging correct answers and discussing wrong answers instead of punishing them -Assigning the student to some group activities and duties. -Allocate a percentage of the grade to group activities. -Use an appropriate method related to this course.	Strategies

The student's study load is calculated for 15 weeks			
Structured SWL (h/sem) The student's regular academic load during the semester	60	Structured SWL (h/w) The student's regular academic load per week	4
Unstructured SWL (h/sem) Irregular study load for the student during the semester	65	Unstructured SWL (h/w) The student's irregular academic load per week	7
Total SWL (h/sem) The student's total academic load during the semester	125		

ModuleEvaluation				
Evaluation of the academic subject				
Learning outcome	week	Weight (grade)	Time/number	

LO #1, #2 and #10, #11	5 and 10	10% (10)	2	Tests	Formative assessment
LO #3, #4 and #6, #7	2 and 12	10% (10)	2	Tasks	
All	Continuous	10% (10)	1	Projects	
LO #5, #8 and #10	13	10% (10)	1	a report	
LO #1 - #7	7	10% (10)	2hr	Classroom test	Summary evaluation
All	16	50% (50)	3hr	Final test	
		100% (100 Marks)	Total assessment		

Delivery Plan (Weekly Syllabus) The theoretical weekly curriculum	
Material Covered	The week
Definition of complex analysis, a historical overview, the most important applications of the topic, the complex plane, the emergence of complex numbers, algebraic properties.	the first
Cartesian representation of complex numbers, polar representation of complex numbers, powers and roots.	the second
Cartesian representation of complex numbers, polar representation of complex numbers, powers and roots.	the third
Functions, purpose and continuity, analytic functions and Cauchy-Riemann equations, harmonic functions, total functions	the fourth
Functions, purpose and continuity, analytic functions and Cauchy-Riemann equations, harmonic functions, total functions	Fifth
Functions, purpose and continuity, analytic functions and Cauchy-Riemann equations, harmonic functions, total functions	VI
Elementary analytical functions, polynomials and trigonometric functions, basic theorem in algebra.	Seventh
Elementary analytical functions, polynomials and trigonometric functions, basic theorem in algebra.	VIII
Rational functions, exponential functions, hyperbolic functions, logarithmic functions, complex integrals, Cauchy's theorem in integration and its applications.	Ninth
Rational functions, exponential functions, hyperbolic functions, logarithmic functions, complex integrals, Cauchy's theorem in integration and its applications.	The tenth
Rational functions, exponential functions, hyperbolic functions, logarithmic functions, complex integrals, Cauchy's theorem in integration and its applications.	eleventh
Integration and contours, definite integral, integration on contours, Crane's theorem, Cauchy's theorem, Cauchy-Corsat's theorem, Cauchy's integral formulas, Moreira's theorem, Liouville's theorem.	twelveth
Integration and contours, definite integral, integration on contours, Crane's theorem, Cauchy's theorem, Cauchy-Corsat's theorem, Cauchy's integral formulas, Moreira's theorem, Liouville's theorem.	Thirteenth
Integration and contours, definite integral, integration on contours, Crane's theorem, Cauchy's theorem, Cauchy-Corsat's theorem, Cauchy's integral formulas, Moreira's theorem, Liouville's theorem.	fourteenth
Integration and contours, definite integral, integration on contours, Crane's theorem, Cauchy's theorem, Cauchy-Corsat's theorem, Cauchy's integral formulas, Moreira's theorem, Liouville's theorem.	Fifteenth

Delivery Plan (Weekly Lab. Syllabus) The weekly laboratory curriculum	
Material Covered	
	Week 1
	Week 2
	Week 3
	Week 4
	Week 5
	Week 6
	Week 7

Learning and Teaching Resources Learning and teaching resources		
Available in the library	Text	
Yes	James Ward Brown & Raul V. Churchill, Complex Variables & Applications, Eight Edition, McGraw-Hill, Singapore, Sydney, New York, (2009). -1	Required sources
Yes	Alan Jeffrey, Complex Analysis and Applications, (2006). -1 L. V. Ahlfors, Complex Analysis, Second Edition, New York, (1966). -2	Recommended sources
www. Freescience.info/math		Online link

Grading Scheme Grading chart				
Group	Grade	Appreciation	Marks%	Definition
Success Group (50 - 100)	A - Excellent	Excellence	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	Deposit (in process)	(45-49)	More work required but credit awarded
	F - Fail	Failed	(0-44)	Considerable amount of work required

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

Study subject information				
Module Delivery		Dali analysis		Course title
☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		Core		Course type
		MAT47139		Course Code
		5		number of units
		125		The number of hours
7	Semester of Delivery		U	Course level
Type College Code		College	Type Dept. Code	Administering Department
E-mail		e-mail	Name	Module Leader
Ph.D.	Module Leader's Qualification		Professor	Module Leader's Acad. Title
E-mail		e-mail	Name (if available)	Module Tutor
E-mail		e-mail	Name	Peer Reviewer Name
1.0	Version Number		01/06/2023	Scientific Committee Approval Date

Relationship with other academic subjects			
VI	Semester	MAT36131	Grader
	Semester	-	Joint rapporteur

Subject objectives, learning outcomes and indicative contents	
- The student will be familiar with the concepts of:	Objectives of the study

vector spaces - metric spaces - standard spaces - convergence in standard spaces - Banach spaces - Hilbert spaces. - The student will become familiar with linear functions, division spaces, continuity and constraint spaces, and study some important theorems in orthogonality.	subject
a-Knowledge and understanding - Learn about the basic concepts of functional analysis - Recognizes metric and standard spaces - Learn about continuous linear functions - Learn about the different applications of functional analysis B - Subject-specific skills - summer training. -Scientific reports. - Graduation research C- Thinking skills - Logical and mathematical thinking in finding solutions to problems -Developing the student's ability to dialogue and discuss. -Developing the student's ability to work on performing assignments and submitting them on the scheduled date. Dr-General and transferable skills(Other skills related to employability and personal development). -Developing the student's ability to use the algebraic properties of vector spaces and linear transformations. -Developing the student's ability to deal with linearly symmetric spaces. -Developing the student's ability to dialogue and discuss.	Learning outcomes for the subject
	Indicative contents

Learning and teaching strategies	
● Good knowledge of functional analysis ● Problem solving and applications ● It uses linear functions and studies the properties of linear functions,	Strategies

such as continuity, constraint, and the morphology of standard spaces • Study of bound linear effects (Hahn-Benach theorem and open function) • Learning strategies used to develop cognitive skills • Exercises and sports forms • View related websites • Readings, self-learning, seminars. • Interaction and participation in the classroom. • Giving exercises and homework. • Directing students to some websites to benefit from them.	
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The student's study load is calculated for 15 weeks			
Structured SWL (h/sem) The student's regular academic load during the semester	60	Structured SWL (h/w) The student's regular academic load per week	4
Unstructured SWL (h/sem) Irregular study load for the student during the semester	65	Unstructured SWL (h/w) The student's irregular academic load per week	8
Total SWL (h/sem) The student's total academic load during the semester	125		

ModuleEvaluation					
Evaluation of the academic subject					
Learning outcome	week	Weight (grade)	Time/number		
LO #1, #2 and #10, #11	5 and 10	10% (10)	2	Tests	Formative assessment
LO #3, #4 and #6, #7	2 and 12	10% (10)	2	Tasks	
All	Continuous	10% (10)	1	Projects	
LO #5, #8 and #10	13	10% (10)	1	a report	
LO #1 - #7	7	10% (10)	2hr	Classroom test	Summary evaluation
All	16	50% (50)	3hr	Final test	
		100% (100 Marks)	Total assessment		

Delivery Plan (Weekly Syllabus) The theoretical weekly curriculum	
Material Covered	The week
Vector spaces - some important examples - balanced symmetrical groups -	the first
Absorbent sets - subspaces - direct addition - rules and dimension - convexity.	the second
Standard space - some important examples.	the third
Normative spaces - equivalent standards.	the fourth
Equal standards.	Fifth
Banach spaces	VI
Metric principles in standard spaces	Seventh
Convergence in standard spaces - some important examples	VIII
Linear functions-quotient spaces	Ninth
Constraint continuity -spaces of constrained linear functions-	The tenth
Formation of normative spaces	eleventh
Separable modular spaces.	twelveth
Elementary Hilbert space - Definition of Hilbert space with some important theorems.	Thirteenth
Orthogonality - unary orthogonal groups.	fourteenth
Unilateral rule	Fifteenth

Delivery Plan (Weekly Lab. Syllabus) The weekly laboratory curriculum	
Material Covered	
	Week 1
	Week 2
	Week 3
	Week 4
	Week 5
	Week 6
	Week 7

Learning and Teaching Resources Learning and teaching resources		
Available in the library	Text	

Yes	- Introduction To Functional Analysis" by Sharma J.Vasishtha AR, 1975	Required sources
Yes	- Introduction To Functional Analysis With Application" Kreyszig, 1978 - Introduction to Hilbert Space" Berberian SK, 1976, New York	Recommended sources
www. Freescience.info/math		Online link

Grading Scheme				
Grading chart				
Group	Grade	Appreciation	Marks%	Definition
Success Group (50 - 100)	A - Excellent	Excellence	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	Deposit (in process)	(45-49)	More work required but credit awarded
	F - Fail	Failed	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Study subject information				
Module Delivery		Topology 2		Course title
☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		Core		Course type
		MAT48143		Course Code
		5		number of units
		125		The number of hours
8	Semester of Delivery		U	Course level
Type College Code		College	Type Dept. Code	Administering Department
E-mail		e-mail	Name	Module Leader
Ph.D.	Module Leader's Qualification		Professor	Module Leader's Acad. Title
E-mail		e-mail	Name (if available)	Module Tutor
E-mail		e-mail	Name	Peer Reviewer Name

Appendix No. 4 (Description of the academic subject) Department of Mathematics - College of Science – University of Al-Qadisiyah

1.0	Version Number	01/06/2023	Scientific Committee Approval Date
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Relationship with other academic subjects			
VI	Semester	Math431	Grader
	Semester	-	Joint rapporteur

Subject objectives, learning outcomes and indicative contents	
- Identifying the weak topological space, its theories, and the concept of convergence in the topological space. - Study of advanced topological concepts such as homotopic functions and contractible spaces. - To teach the student the concept of convergence in topology.	Objectives of the study subject
A-Knowledge and understanding - Gaining experience and knowledge in dealing with homotopic functions. - Gaining experience and knowledge in dealing with types of functions. - Gaining experience and knowledge in dealing with path interconnection. - Gain experience and knowledge in visualizing the basic concept of convergence. B - Subject-specific skills - summer training. -Scientific reports. - Graduation research C- Thinking skills - Logical and mathematical thinking in finding solutions to	Learning outcomes for the subject

problems -Developing the student's ability to dialogue and discuss. -Developing the student's ability to work on performing assignments and submitting them on the scheduled date. Dr-General and transferable skills(Other skills related to employability and personal development). -Developing the student's ability to recognize types of weak topologies -Developing the student's ability to recognize types of functions. -Developing the student's ability to visualize convergence, the basis of which is the topological space. -Developing the student's ability to find solutions and evidence..	
	Indicative contents

Learning and teaching strategies	
-Readings, self-learning, seminars. -Activities in the classroom. -Instructing students to use the Internet to gain benefits. -Giving examples and questions that stimulate student thinking. -Managing the lecture in a way that makes time feel important. -Encouraging correct answers and discussing wrong answers instead of punishing them. -Assigning the student to some group activities and duties. -Allocate a percentage of the grade to group activities. -Use an appropriate method related to this course.	Strategies

The student's study load is calculated for 15 weeks			
Structured SWL (h/sem)		Structured SWL (h/w)	
The student's regular academic load	60	The student's regular academic load per week	4

during the semester			
Unstructured SWL (h/sem) Irregular study load for the student during the semester	65	Unstructured SWL (h/w) The student's irregular academic load per week	7
Total SWL (h/sem) The student's total academic load during the semester	125		

ModuleEvaluation					
Evaluation of the academic subject					
Learning outcome	week	Weight (grade)	Time/number		
LO #1, #2 and #10, #11	5 and 10	10% (10)	2	Tests	Formative assessment
LO #3, #4 and #6, #7	2 and 12	10% (10)	2	Tasks	
All	Continuous	10% (10)	1	Projects	
LO #5, #8 and #10	13	10% (10)	1	a report	
LO #1 - #7	7	10% (10)	2hr	Classroom test	Summary evaluation
All	16	50% (50)	3hr	Final test	
		100% (100 Marks)	Total assessment		

Delivery Plan (Weekly Syllabus)	
The theoretical weekly curriculum	
Material Covered	The week
The concept of interconnection, some examples, theorems	the first
Applications of connected spaces, the mean value theorem, locally and path-connected spaces	the second
Convergence withSome theorems for convergence,Study of convergence in the case of Hausdorff space	the third
Weak topologies with examples and theorems	the fourth
Paths with examples and theorems	Fifth
Path correlation with examples and theorems	VI
The relationship of continuity to interdependence	Seventh
Genetic and topological properties, the relationship of interconnection and closeness to the axioms of separation	VIII
Functions and equivalent paths are utopias, theorems and examples	Ninth

Equivalent spaces are utopian, Homotopic pattern	The tenth
Contractible spaces with examples and theorems	eleventh
Shrinkable spaces, And its relationship to continuity. Theorems	twelveth
General information in groups	Thirteenth
Building the basic group	fourteenth
Properties and theorems	Fifteenth

Delivery Plan (Weekly Lab. Syllabus) The weekly laboratory curriculum	
Material Covered	
	Week 1
	Week 2
	Week 3
	Week 4
	Week 5
	Week 6
	Week 7

Learning and Teaching Resources Learning and teaching resources		
Available in the library	Text	
Yes	Sharma JN, Topology, Krishna Prakashan Media P Ltd, 2003. -1	Required sources
Yes	Maunder CRF, Algebraic Topology, McGraw Hill, 1966. -1 2 - William Bervin, Translated by Atallah Thamer Al-Ani, Basics of general topology, Baghdad University- Iraq, 1986. 3 - Abd Rabbo Muhammad Aslim, The jurisprudence of topology, Palestine, 1999.	Recommended sources
www. Freescience.info/math		Online link

Grading Scheme
Grading chart

Appendix No. 4 (Description of the academic subject) Department of Mathematics - College of Science – University of Al-Qadisiyah

Group	Grade	Appreciation	Marks%	Definition
Success Group (50 - 100)	A - Excellent	Excellence	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	Deposit (in process)	(45-49)	More work required but credit awarded
	F - Fail	Failed	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Study subject information				
Module Delivery		Nodal analysis 2		Course title
☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		Core		Course type
		MAT48144		Course Code
		5		number of units
		125		The number of hours
8	Semester of Delivery		U	Course level
Type College Code		College	Type Dept. Code	Administering Department
E-mail		e-mail	Name	Module Leader
Ph.D.	Module Leader's Qualification		Professor	Module Leader's Acad. Title
E-mail		e-mail	Name (if available)	Module Tutor
E-mail		e-mail	Name	Peer Reviewer Name
1.0	Version Number		01/06/2023	Scientific Committee Approval Date

Relationship with other academic subjects			
VI	Semester	Math433	Grader
	Semester	-	Joint rapporteur

Subject objectives, learning outcomes and indicative contents	
- For the student to become familiar with sequences and complex series and what is related to them in terms of defining convergent sequences and convergence and divergence of series. - To become familiar with power series and the conditions imposed on them. - The student will learn about sediments by identifying abnormal points and the usefulness of sediments in calculating complex integrals. -The student will be familiar with the applications of angle conservation and its importance in medicine and physics.	Objectives of the study subject
A-Knowledge and understanding - The student should distinguish sequences and convergent sequences. - To know the Tyler series and the Lorant series and the relationship between them. - The student should distinguish abnormal points and poles and find their ranks. - The student should use the residuals to find the value of the integral. - The student should know the applications of angles. B - Subject-specific skills - summer training. -Scientific reports. - Graduation research C- Thinking skills -Developing the student's ability to work on performing assignments and submitting them on the scheduled date. -The ability to think scientifically. -Ability to participate effectively in semester activities. -Skill in conducting research activities and using useful sources to support the main idea required. Dr-General and transferable skills(Other skills related to employability and personal development). -Developing the student's ability to use complex analysis to solve problems in mathematical sciences. -Developing the student's ability to recognize and solve examples with deductive and deductive ideas.	Learning outcomes for the subject

-Developing the student's ability to deal with others by participating in scientific discussions. -Developing the student's ability to analyze and synthesize. -Developing the student's ability to find solutions and evidence..	
	Indicative contents

Learning and teaching strategies	
-Lectures. -Classroom discussion from a scientific perspective. -Directing students to some websites to benefit from them. -Mini discussion sessions. -Training students on how to prepare scientific research. -Managing the lecture in a way that makes time feel important. -Encouraging correct answers and discussing wrong answers instead of punishing them. -Assigning the student to some group activities and duties. -Allocate a percentage of the grade to group activities. -Use an appropriate method related to this course.	Strategies

The student's study load is calculated for 15 weeks			
Structured SWL (h/sem) The student's regular academic load during the semester	60	Structured SWL (h/w) The student's regular academic load per week	4
Unstructured SWL (h/sem) Irregular study load for the student during the semester	65	Unstructured SWL (h/w) The student's irregular academic load per week	5
Total SWL (h/sem) The student's total academic load during the semester	125		

ModuleEvaluation					
Evaluation of the academic subject					
Learning outcome	week	Weight (grade)	Time/number		
LO #1, #2 and #10, #11	5 and 10	10% (10)	2	Tests	Formative assessment
LO #3, #4 and #6, #7	2 and 12	10% (10)	2	Tasks	
All	Continuous	10% (10)	1	Projects	
LO #5, #8 and #10	13	10% (10)	1	a report	
LO #1 - #7	7	10% (10)	2hr	Classroom test	Summary evaluation
All	16	50% (50)	3hr	Final test	
		100% (100 Marks)	Total assessment		

Delivery Plan (Weekly Syllabus) The theoretical weekly curriculum	
Material Covered	The week
Definition of sequence, convergent sequence, divergence and convergence of series, convergence circle	the first
Definition of sequence, convergent sequence, divergence and convergence of series, convergence circle	the second
Definition of sequence, convergent sequence, divergence and convergence of series, convergence circle	the third
Power series, Cauchy-Hammerd's theorem, Tyler's theorem, Lorent series, Cauchy's inequality.	the fourth
Power series, Cauchy-Hammerd's theorem, Tyler's theorem, Lorent series, Cauchy's inequality.	Fifth
Power series, Cauchy-Hammerd's theorem, Tyler's theorem, Lorent series, Cauchy's inequality.	VI
Power series, Cauchy-Hammerd's theorem, Tyler's theorem, Lorent series, Cauchy's inequality.	Seventh
Power series, Cauchy-Hammerd's theorem, Tyler's theorem, Lorent series, Cauchy's inequality.	VIII
Power series, Cauchy-Hammerd's theorem, Tyler's theorem, Lorent series, Cauchy's inequality.	Ninth
Calculating remainders and residues, types of anomalous points, finding true integrals.	The tenth
Calculating remainders and residues, types of anomalous points, finding true integrals.	eleventh
Calculating remainders and residues, types of anomalous points, finding true integrals.	twelveth
Calculating remainders and residues, types of anomalous points, finding true integrals.	Thirteenth
Angle preserving applications and their applications.	fourteenth
Angle preserving applications and their applications.	Fifteenth

Delivery Plan (Weekly Lab. Syllabus) The weekly laboratory curriculum	
Material Covered	
	Week 1
	Week 2
	Week 3
	Week 4
	Week 5
	Week 6
	Week 7

Learning and Teaching Resources Learning and teaching resources		
Available in the library	Text	
Yes	James Ward Brown & Raul V. Churchill, Complex Variables & Applications, Eight Edition, McGraw-Hill, Singapore, Sydney, New York, (2009). -2	Required sources
Yes	Alan Jeffrey, Complex Analysis and Applications, (2006). -1 L. V. Ahlfors, Complex Analysis, Second Edition, New York, (1966). -2	Recommended sources
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Grading Scheme Grading chart				
Group	Grade	Appreciation	Marks%	Definition
Success Group (50 - 100)	A - Excellent	Excellence	90 - 100	Outstanding Performance
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	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	Deposit (in process)	(45-49)	More work required but credit awarded
	F - Fail	Failed	(0-44)	Considerable amount of work required

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