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

Academic Program and Course Description Guide

2024

Introduction:

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

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

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

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

Concepts and terminology:

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

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

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

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

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

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

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

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

Ministry of Higher Education and Scientific Research

Scientific supervision and evaluation device

Department of Quality Assurance and Academic Accreditation

Academic Description Program
2023-2024

Name university: Mosul
Name collage: Computer science And Mathematic
Name of department: Mathematics
File filling date: 1-4-2024

Signature:
Asst. Prof. Dr.
Abdulghafor Mohammed Amin

Department Head

Date: 24/4/2024

Signature:

The file has already been checked by

Director of Quality Assurance and Assesment Performance of the college of computer science and mathematic
Asst. Prof. Dr. Mohammed Chachan yonnis
Date: 24/4/2024

Signature:

Associate Dean for Scientific Affairs

Prof. Dr. Safwan Omar Hasoon

Date: 24/4/2024

Signature:
Approval of the Dean
Prof. Dr. Dhuha Basheer Abdullah
Date: 24/4/2024

1. Program Vision

The department's goal is to maintain the distinguished scientific reputation derived from the quality of its graduates in terms of knowledge, skills, and abilities in the field of mathematics.

2. Program Mission

The Department of Mathematics should be a leading center in education and scientific research.

3. Program Objectives

1. Continuous aspiration towards excellence in education, scientific research, and professional service in various sciences.
2. Prepare students for the labor market and develop their communication abilities to positively interact with others through active participation in the training program.
3. Acquire skills to demonstrate ideas and encourage teamwork through graduation projects.
4. Prepare students for graduate studies in the field of Mathematics
5. Preparing specialized scientific leaders through graduate programs.
6. Interaction with other sciences

4. Program Accreditation

Does the program have program accreditation? And from which agency?

National Council of Teachers of Mathematics(NCTM)

5. Other external influences

Central examinations

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	9	2	20.4%	

College Requirements	**11**	**3**	**16.6%**	
Department Requirements	**34**	**3**	**63%**	
Summer Training	**40**	**2**	**100%**	
Other				

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

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
First year	MS 101	Foundations of Mathematics (1)	3	
	MS 102	Advanced Calculus (1)	4	
	MS 103	Various sports methods	2	
	MS 104	Programming	2	2
	UOM104	Human rights and democracy	2	
	MS 106	General physics	2	2
	MS 107	Foundations of Mathematics (2)	3	
	MS 108	Advanced Calculus (2)	4	
	MS 109	Linear algebra	2	
	UOM103	The Computer	2	2
	MS 111	Principles of Statistics	2	
	UOM102	English language (1)	2	
	UOM101	Arabic language	2	
	MS 201	Advanced Calculus (1)	4	
	MS 202	Ordinary differential equations	2	
	MS 203	Algebra of groups	3	
	MS 204	Probability	2	
	MS 205	Mathematical physics	2	
	MS 206	English language (2)	2	
	MS 207	Advanced Calculus (2)	4	
	MS 208	Partial differential equations	3	2
	MS 209	Numerical analysis (1)	2	
	MS 210	Algebra of rings	3	

	UOM101	Arabic language	2	
Third Year	MS 301	Mathematical analysis (1)	2	
	MS 302	Operations research	2	
	MS 303	Mathematical modeling	2	2
	MS 304	English language (3)	3	
	MS 305	Mathematical Statistics (1)	3	
	MS 306	Numerical analysis (2)	2	2
	MS 307	Mathematical Analysis (2)	2	
	MS 308	Number theory	2	
	MS 309	Computational mathematics	2	2
	MS 310	Theory of ordinary differential equations	2	
	MS 311	Mathematical statistics (2)	3	
	MS 312	Fuzzy mathematics	2	
	MS 301	Mathematical analysis (1)	3	
	MS 302	Operations research	2	
Fourth year	MS 401	Complex analysis (1)	3	
	MS 402	Topology (1)	2	
	MS 403	Functional analysis (1)	3	
	MS 404	Graph theory	2	
	MS 405	Dynamic systems	2	
	MS 406	Scientific research method	2	
	MS 407	Complex analysis (2)	4	
	MS 408	Topology (2)	2	
	MS 409	Functional analysis (2)	3	
	MS 410	Research project	2	
	MS 411	English language (4)	2	
	MS 412	Optimization	2	

8. Expected learning outcomes of the program

Knowledge	
1. 1. Continuous aspiration towards cognitive excellence in	1. Theory

education and scientific research 2. How the student is able to collect information and acquire scientific and practical skills through graduation projects 3. Qualifying students for postgraduate studies in the field of mathematics. 4. Preparing specialized scientific staff in the graduate program and interaction with other sciences. 5. Qualifying students as teachers in the Directorate of Education 6. Encouraging scientific research and improving the student's discussion skills	2. Process 3. Student training/summer training 4. Graduation research
Skills	
1. The skill of deduction and analysis. 2. Mathematical and statistical solution skill. 3. The skill of comparing, building hypotheses, and making decisions. 4. The skill of building, analyzing and interpreting mathematical models. 5. The skill of discussing and making the right decisions. 6. Skill in using modern means, including computers. 7. Skill in using modern applied statistical programs and programming languages. 8. The skill of writing programs to solve and estimate problems. 9. The skill of searching for correct scientific information. 10. The skill of conducting scientific research, analyzing it, solving its problems, and drawing appropriate conclusions in solving them for the purpose of decision-making.	1. The ability to study group. 2. The ability to conduct scientific discussion among students. 3. The ability to develop skills among students. 4. Ability in discussion, analysis, and collective decision-making. Develop the ability to cooperate.
Ethics	
1. Demonstrate awareness of ethical issues related to data privacy, confidentiality, and intellectual property. 2. Adhere to ethical guidelines and professional standards 3. Embrace lifelong learning and stay updated with emerging trends and technologies in the field.	

9. Teaching and Learning Strategies

1. Continuous aspiration towards cognitive excellence in education, scientific research and professional service in various sciences.
2. Preparing students for the labor market and developing their abilities to interact and communicate with others through effective participation in the field training program.
3. Acquiring skills to present ideas and work within one team through graduation projects.
4. Qualifying students for postgraduate studies in the field of mathematics.
5. Preparing specialized scientific leaders through the graduate program.
6. Interaction with other sciences.

10. Evaluation methods

1. Electronic exams (on line).

2. Central and monthly examinations.
3. Daily exams.
4. Daily duties.
5. Scientific reports
6. Computerized laboratory examinations.
7. Graduation projects.

Academic Rank	Specialization		NO.
professor	**Mathematics**	**Algebra**	**2**
professor	**Mathematics**	**Optimization**	**3**
professor	**Mathematics**	**Time series**	**1**
professor	**Mathematics**	**Intelligence techniques**	**1**
professor	**Mathematics**	**Statement theory**	**1**
professor	**Mathematics**	**Numerical analysis**	**1**
Assistant Professor	**Mathematics**	**Differential equations**	**1**
Assistant Professor	**Mathematics**	**Numerical analysis**	**2**
Assistant Professor	**Mathematics**	**Algebra**	**1**

Assistant Professor	**Mathematics**	**Fluid mechanics**	**1**
Assistant Professor	**Mathematics**	**Applied mathematics**	**4**
Assistant Professor	**Mathematics**	**Optimization**	**1**
Teacher	**Mathematics**	**Dynamic systems**	**1**
Teacher	**Mathematics**	**Applied mathematics**	**5**
Teacher	**Mathematics**	**Computational mathematics**	**2**
Teacher	**Mathematics**	**Differential equations**	**2**
Teacher	**Mathematics**	**Algebraic geometry**	**1**
Teacher	**Computer**	**Digital signal processing**	**1**
Teacher	**Mathematics**	**Numerical analysis**	**3**
Teacher	**Mathematics**	**Algebra**	**2**
Teacher	**Mathematics**	**Optimization**	**2**
Teacher	**Mathematics**	**Topology**	**2**
Teacher	**Mathematics**	**Intelligent numerical algorithms**	**1**
Teacher	**Mathematics**	**Statement theory**	**1**
Teacher	**law**	**constitutional law**	**1**
Assistant teacher	**Mathematics**	**Statement theory**	**2**
Assistant teacher	**Computer**	**Communications and networks**	**1**
Assistant teacher	**Mathematics**	**Differential equations**	**1**
Assistant teacher	**Mathematics**	**Optimization**	**2**
Assistant teacher	**Statistics**	**Counting**	**1**
Assistant teacher	**Mathematics**	**Algebra of rings**	**1**

Professional Development

Mentoring new faculty members

1. E-learning.
2. Using the Internet.
3. Using modern means of communication.
4. Use modern means of communication.
5. Extracurricular activities.
6. Advanced training courses in learning modern programs.

Professional development of faculty members
Briefly describe the academic and professional development plan and arrangements for faculty members such as teaching and learning strategies, assessment of learning outcomes, professional development, etc.

11. Acceptance Criterion

1. Central admission to the Ministry of Higher Education and Scientific Research.

2. The student's average is on the central admission lists, with the exception of the children of teaching staff, the martyrs' building, and the privileges stipulated in the Ministry's instructions, as they are accepted according to desire for distribution among the scientific departments.

12. The most important sources of information about the program

State briefly the sources of information about the program.

13. Program Development Plan

Transferring academic subjects for all levels in the Department of Mathematics to the Bologna track

Program Skills Outline

				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
First year	MS 101	Foundations of Mathematics (1)	C	√	√	√	√	√	√	√	√	√	√	√	√
	MS 102	Advanced Calculus (1)	B	√	√	√	√	√	√	√	√	√	√	√	√
	MS 103	Miscellaneous Mathematical Methods	B	√	√	√	√	√	√	√	√	√	√	√	√
	MS 104	Programming	B	√	√	√	√	√	√	√	√	√	√	√	√
	UOM104	Human rights and democracy	B	√	√	√	√	√	√	√	√	√	√	√	√
	MS 106	General physics	B	√	√	√	√	√	√	√	√	√	√	√	√
	MS 107	Foundations of Mathematics (2)	C	√	√	√	√	√	√	√	√	√	√	√	√
	MS 108	Advanced Calculus (2)	B	√	√	√	√	√	√	√	√	√	√	√	√
	MS 109	Linear algebra	C	√	√	√	√	√	√	√	√	√	√	√	√
	UOM103	the computer	B	√	√	√	√	√	√	√	√	√	√	√	√
	MS 111	Principles of Statistics	B	√	√	√	√	√	√	√	√	√	√	√	√
	UOM102	English language (1)	B	√	√	√	√	√	√	√	√	√	√	√	√

Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
Second Year	UOM101	Arabic	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	MS 202	Advanced Calculus (1)	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	MS 203	Ordinary differential equations	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	MS 204	Algebra of groups	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	MS 205	Probability	my choice	√	√	√	√	√	√	√	√	√	√	√	√
	MS 206	Mathematical physics	my choice	√	√	√	√	√	√	√	√	√	√	√	√
	MS 207	English language (2)	my choice	√	√	√	√	√	√	√	√	√	√	√	√
	MS 208	Advanced Calculus (2)	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	MS 209	Partial differential equations	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	MS 210	Numerical analysis (1)	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	MS 211	Algebra of rings	my choice	√	√	√	√	√	√	√	√	√	√	√	√
	MS 212		my choice	√	√	√	√	√	√	√	√	√	√	√	√
Third Year	MS 301	Mathematical Analysis (1)	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	MS 302	Operations research	Basic	√	√	√	√	√	√	√	√	√	√	√	√

	MS 303	Mathematical modeling	**Basic**	√	√	√	√	√	√	√	√	√	√	√	√
	MS 304	English language (3)	**Basic**	√	√	√	√	√	√	√	√	√	√	√	√
	MS 305	Mathematical Statistics (1)	**my choice**	√	√	√	√	√	√	√	√	√	√	√	√
	MS 306	Numerical analysis (2)	**my choice**	√	√	√	√	√	√	√	√	√	√	√	√
	MS 307	Mathematical Analysis (2)	**my choice**	√	√	√	√	√	√	√	√	√	√	√	√
	MS 308	Number theory	**Basic**	√	√	√	√	√	√	√	√	√	√	√	√
	MS 309	Computational mathematics	**Basic**	√	√	√	√	√	√	√	√	√	√	√	√
	MS 310	Theory of ordinary differential equations	**Basic**	√	√	√	√	√	√	√	√	√	√	√	√
	MS 311	Mathematical statistics (2)	**Basic**	√	√	√	√	√	√	√	√	√	√	√	√
	MS 312	Fuzzy mathematics	**my choice**	√	√	√	√	√	√	√	√	√	√	√	√
Fourth year	MS 401	Nodal analysis (1)	**Basic**	√	√	√	√	√	√	√	√	√	√	√	√
	MS 402	Topology (1)	**Basic**	√	√	√	√	√	√	√	√	√	√	√	√
	MS 403	Functional analysis (1)	**Basic**	√	√	√	√	√	√	√	√	√	√	√	√
	MS 404	Statement theory	**Basic**	√	√	√	√	√	√	√	√	√	√	√	√
	MS 405	Dynamic systems	**Basic**	√	√	√	√	√	√	√	√	√	√	√	√
	MS 406	Scientific research method	**Basic**	√	√	√	√	√	√	√	√	√	√	√	√

MS 407	Nodal analysis (2)	**Basic**	√	√	√	√	√	√	√	√	√	√	√	√	√	√
MS 408	Topology (2)	**Basic**	√	√	√	√	√	√	√	√	√	√	√	√	√	√
MS 409	Functional analysis (2)	**Basic**	√	√	√	√	√	√	√	√	√	√	√	√	√	√
MS 410	research project	**Basic**	√	√	√	√	√	√	√	√	√	√	√	√	√	√
MS 411	English language (4)	**Basic**	√	√	√	√	√	√	√	√	√	√	√	√	√	√
MS 412	Optimization	**Basic**	√	√	√	√	√	√	√	√	√	√	√	√	√	√

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	جبر خطي			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **S minar**	
Module Code	**MS 109**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	UG		**Semester of Delivery**	2	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	منى محسن محمد علي فرح حازم محمد		**e-mail**	Monamoh74@uomosul.edu.iq farahalkadoo@uomosul.edu.iq	
Module Leader's Acad. Title	أستاذ مساعد مدرس		**Module Leader's Qualification**	Ph.D M.SC.	
Module Tutor	Name (if available)		**e-mail**		
Peer Reviewer Name	منى محسن محمد علي فرح حازم محمد		**e-mail**	Monamoh74@uomosul.edu.iq farahalkadoo@uomosul.edu.iq	
Scientific Committee Approval Da	01 06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	**1. التعرف على فضاء المتجهات والمفاهيم المتعلقة بها** **2. التعرف على الفضاء الجزئي والخواص الجبرية له** **3. معرفة التحويلات الخطية وتطبيقاتها**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1- فهم وتطبيق مجموعة متنوعة من الأساليب الرياضية: يتعلم الطلاب مجموعة متنوعة من الطرق والأساليب الرياضية المختلفة التي يمكن استخدامها لحل المسائل الرياضية المعقدة.** **2- تطوير مهارات التفكير النقدي: يتم تعزيز مهارات التحليل والتركيب والتفكير النقدي عندما يتعلم الطلاب طرقًا رياضية متنوعة. يتم تشجيع الطلاب على التفكير بشكل منهجي والتحليل العميق للمسائل الرياضية.** **3- القدرة على حل المسائل الرياضية المعقدة: يتعلم الطلاب كيفية تحليل وفهم المسائل الرياضية المعقدة وتطبيق الأساليب والتقنيات الرياضية المناسبة لحلها بشكل صحيح.** **4- التفكير الإبداعي والابتكار: يشجع تعلم طرق رياضية متنوعة الطلاب على التفكير الإبداعي والابتكار في مجال حل المسائل الرياضية. يتعلم الطلاب كيفية تطوير حلول جديدة وفريدة باستخدام الأساليب الرياضية.**
Indicative Contents المحتويات الإرشادية	**يتضمن المحتوى الارشادي مايلي :** **1- فضاء المتجهات والفضاءالجزئي (15 ساعة)** **2- التركيب الخطي (15 ساعة)** **3- القاعدة والبعد (15 ساعة)** **4- فضاء الجداء الداخلي (15 ساعة)** **5- التحويلات الخطية (15 ساعة)**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**الإستراتيجية الرئيسية التي سيتم تبنيها في تقديم هذه الوحدة هي تشجيع مشاركة الطلاب في التمارين ، وفي الوقت نفسه تقوم بتحسين وتوسيع مهارات التفكير الناقد. سيتم تحقيق ذلك من خلال الفصول الدراسية ، والدروس التفاعلية ، ومن خلال النظر في نوع من التجارب البسيطة التي تنطوي على بعض أنشطة أخذ العينات المثيرة للاهتمام للطلاب.**

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4	**Structured SWL (h/sem)** الحمل الدراسي المنتظم للطالب خلال الفصل	63
Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4	**Unstructured SWL (h/sem)** الحمل الدراسي غير المنتظم للطالب خلال الفصل	87
		Total SWL (h/sem)	130

	الحمل الدراسي الكلي للطالب خلال الفصل

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevan Le rning Outcome
Formative assessment	Quizzes	3	15% (10)	7 , 12 , 15	LO #1 – 4
	Assignments	3	15% (10)	2 , 6 , 12	LO # 1 , 2 , 3
	Projects / Lab.	0	0	Continuous	
	Report	1	10% (10)	13	LO # 1 , 2
Summative assessment	Midterm Exam	2 hr	10% (10)	11	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
٧	Material Covered
Week 1	فضاء المتجهات والمبرهنات المتعلقة بها
Week 2	متجه الوحدة والطول
Week 3	الزاوية بين متجهين
Week 4	الفضاء الجزئي والمبرهنات المتعلقة به
Week 5	التركيب الخطي
Week 6	الاستقلال الخطي والتركيب الخطي
Week 7	امتحان يومي
Week 8	القاعدة والبعد
Week 9	فضاء الجداء الداخلي
Week 10	امتحان نصف الكورس الثاني
Week 11	التحويلات الخطية
Week 12	امتحان يومي

Week 13	امثلة على التحويلات الخطية
Week 14	التحويل الصفري والتحويل الذاتي
Week 15	امتحان يومي
Week 16	امتحان نهائي الكورس الثاني

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
١	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1) Stoll .R. R. and Wong .E. T. Linear Algebra, London, 1968. 2) Strang . G., Linear Algebra and Its Application, New York, 2nd ,1980. 3) Mostow . G. D. and Sampson. J .H., Linear Algebra, London, 1969. 4) جورج ضايف السبتي ، الجبر الخطي ، جامعة البصرة – العراق ، 1 ، 1988 . 5) خالد احمد السامرائي وسعد ابراهيم مهدي ، مقدمة في الجبر الخطي ، جامعة بغداد – العراق ، الجزئيين الاول والثاني ، 1989. يحيى عبد الستار ونزار حمدون شكر ، الجبر الخطي ، جامعة الموصل – العراق ، 1 ، 1988.	Yes
Recommended Texts		No
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(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.

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	طرائق رياضية متنوعة			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MS 103**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	UG		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	منى محسن محمد علي		**e-mail**	Monamoh74@uomosul.edu.iq	
Module Leader's Acad. Title	أستاذ مساعد		**Module Leader's Qualification**	Ph.D	
Module Tutor	Name (if available)		**e-mail**		
Peer Reviewer Name	منى محسن محمد علي		**e-mail**	Monamoh74@uomosul.edu.iq	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	**4. حل انظمة من المعادلات الخطية** **5. اعطاء الطالب خبرة في التعامل مع المصفوفات بأنواعها واجراء مختلف العمليات عليها** **6. كيفية ايجاد المحددات والخواص المتعلقة بها** **7. كيفية حل منظومة المعادلات الخطية باستخدام بطريقة حذف كاوس-جوردان وطريقة كرامر**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**5- فهم وتطبيق مجموعة متنوعة من الأساليب الرياضية: يتعلم الطلاب مجموعة متنوعة من الطرق والأساليب الرياضية المختلفة التي يمكن استخدامها لحل المسائل الرياضية المعقدة.** **6- تطوير مهارات التفكير النقدي: يتم تعزيز مهارات التحليل والتركيب والتفكير النقدي عندما يتعلم الطلاب طرقًا رياضية متنوعة. يتم تشجيع الطلاب على التفكير بشكل منهجي والتحليل العميق للمسائل الرياضية.** **7- القدرة على حل المسائل الرياضية المعقدة: يتعلم الطلاب كيفية تحليل وفهم المسائل الرياضية المعقدة وتطبيق الأساليب والتقنيات الرياضية المناسبة لحلها بشكل صحيح.** **8- التفكير الإبداعي والابتكار: يشجع تعلم طرق رياضية متنوعة الطلاب على التفكير الإبداعي والابتكار في مجال حل المسائل الرياضية. يتعلم الطلاب كيفية تطوير حلول جديدة وفريدة باستخدام الأساليب الرياضية.**
Indicative Contents المحتويات الإرشادية	**يتضمن المحتوى الارشادي مايلي :** **6- طرق حل منظومة المعادلات الخطية (15 ساعة)** **7- العمليات الجبرية على المصفوفات (15 ساعة)** **8- المصفوفات الخاصة والامثلة عليها (15 ساعة)** **9- كيفية إيجاد المحددات (15 ساعة)** **10- طرق حل المعادلات الخطية باستخدام حذف كاوس-جوردان (15 ساعة) وباستخدام قاعدة كرامر .**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**الإستراتيجية الرئيسية التي سيتم تبنيها في تقديم هذه الوحدة هي تشجيع مشاركة الطلاب في التمارين ، وفي الوقت نفسه تقوم بتحسين وتوسيع مهارات التفكير الناقد. سيتم تحقيق ذلك من خلال الفصول الدراسية ، والدروس التفاعلية ، ومن خلال النظر في نوع من التجارب البسيطة التي تنطوي على بعض أنشطة أخذ العينات المثيرة للاهتمام للطلاب.**

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4	**Structured SWL (h/sem)** الحمل الدراسي المنتظم للطالب خلال الفصل	63
Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4	**Unstructured SWL (h/sem)** الحمل الدراسي غير المنتظم للطالب خلال الفصل	87
		Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	130

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	15% (10)	4 , 10 , 14	LO #1 – 4
	Assignments	3	15% (10)	2 , 6 , 12	LO # 1 , 2 , 3
	Projects / Lab.	0	0	Continuous	
	Report	1	10% (10)	13	LO # 1 , 2
Summative assessment	Midterm Exam	2 hr	10% (10)	11	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
١	Material Covered
Week 1	منظومة المعادلات الخطية
Week 2	المصفوفات
Week 3	العمليات الجبرية على المصفوفات
Week 4	امتحان يومي
Week 5	مدور المصفوفة
Week 6	العمليات السطرية الأولية
Week 7	معكوس المصفوفة
Week 8	طريقة حذف كاوس-جوردان
Week 9	المحددات
Week 10	امتحان يومي
Week 11	امتحان نصف الكورس الأول
Week 12	طريقو العوامل المتممة
Week 13	حل المعادلات الخطية بأستخدام قاعدة كرامر
Week 14	امتحان يومي
Week 15	حل امثلة متنوعة عن المعادلات الخطية

Week 16	**امتحان نهائي الكورس الأول**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
١	**Material Covered**
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**1. طرق رياضية ، رياض شاكر نعوم واخرون ، الطبعة الاولى 1985 ، جامعة البصرة / العراق** **2. مقدمة في الجبر الخطي مع تطبيقات ، بيرنارد كولمان ، ترجمة عادل غسان نعوم وباسل عطا الهاشمي ، الطبعة الاولى 1990 ، جامعة بغداد / العراق** **3. الجبر الخطي ، جورج ضايف السبتي ، جامعة البصرة – العراق 1988**	Yes
Recommended Texts		No
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria

More work required but credit awarded	(45-49)	راسب (قيد المعالجة)	**FX** – Fail	**Fail Group (0 – 49)**
Considerable amount of work required	(0-44)	راسب	**F** – Fail	

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.

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	برمجة	**Module Delivery**	
Module Type	B	☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	MS 104		
ECTS Credits	4.00		
SWL (hr/sem)	100		
Module Level	UG	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Shua'a Mahmood Aziz	**e-mail**	shuaamaziz@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	Enaam Ghanim Saeed	**e-mail**	enaamghanim@uomosul.edu.iq
Peer Reviewer Name	Ban Ahmed Hasan mitres	**e-mail**	banah.mitras@uomousl.edu.iq
Scientific Committee Approval Date	17/06/2023	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. تمكين الطالب من استخدام اساسيات البرمجة بشكل حر من خلال استخدام الايعازات البرمجية وبكفاءة 2.اعطاء الطالب خبرة باستخدام المعادلات والدوال الرياضية الموجودة في برنامج الماتلاب 3.اعطاء الطالب الخبرة التعامل مع المصفوفات باستخدام الماتلاب والدوال الجاهزة الخاصة بالمصفوفات 4.تمكين الطالب من كتابة دوال خارجية واستدعائها.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. ان يمتلك خبرة برمجية من الممكن أن تؤهله الى استخدام برنامج ماتلاب. 2. يستطيع استدعاء الايعازات البرمجية حسب حاجته في المواد العلمية التي سوف يتعلمها في المراحل اللاحقة. 3. بامكانه تطوير برامج اخرى حسب المسائل التي سوف يطلع عليها لاحقا. 4. عمل برامج عديدة خاصة بالمواد الرياضية وخاصة التحليل العددي.
Indicative Contents المحتويات الإرشادية	الفصل الأول مقدمة ماتلاب ومميزاته، نوافذ الماتلاب واستخداماتها، الثوابت والمتغيرات، العمليات الحسابية، العمليات المنطقية، العمليات العلائقية، أسبقية تنفيذ العمليات وكيفية الاستفادة من المساعدة ايعازات الادخال والاخراج. 15 ساعة الفصل الثاني الجمل الشرطية، جملة الدوران for، برامج بخصوص جملة الدوران، جملة الدورانwhile ، برامج بخصوص جملة الدوران 15 ساعة الفصل الثالث المصفوفات وأنواعها، العمليات على المصفوفات، دوال جاهزة خاصة بالمصفوفات 14 ساعة الفصل الرابع الدوال الشخصية، أنواع الدوال الشخصية، الرسم الثنائي البعد والرسم الثلاثي البعد 15 ساعة

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	تتمثل الإستراتيجية الرئيسية التي سيتم تبنيها في تقديم هذه الوحدة في تشجيع الطلاب على المشاركة في التدريبات ، مع تحسين

مهارات التفكير النقدي لديهم وتوسيعها في نفس الوقت. سيتم تحقيق ذلك من خلال الفصول والبرامج التعليمية التفاعلية ومن خلال التفكير في نوع التجارب البسيطة التي تتضمن بعض أنشطة أخذ العينات التي تهم الطلاب. ومعرفة أسس المفاهيم ومن أين أتت وأخذ تطبيقات واقعية على ذلك.	

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4,2	**Structured SWL (h/sem)** الحمل الدراسي المنتظم للطالب خلال الفصل	63
Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2,2	**Unstructured SWL (h/sem)** الحمل الدراسي غير المنتظم للطالب خلال الفصل	37
		Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	%10 (20)	,105	
	Assignments	2	%5(10)	4,8	
	Projects / Lab.	1	%10 (10)		
	Report				
Summative assessment	Midterm Exam	1 ساعة	%10 (10)	8	
	Final Exam	3 ساعات	%50 (50)	16	
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	مقدمة ماتلاب ومميزاته+نوافذ الماتلاب واستخداماتها
Week 2	الثوابت والمتغيرات +العمليات الحسابية+العمليات المنطقية+العمليات العلائقية

Week 3	أسبقية تنفيذ العمليات وكيفية الاستفادة من المساعدة
Week 4	ايعازات الادخال والاخراج
Week 5	الجملة الشرطية
Week 6	جملة الدوران for
Week 7	برامج بخصوص جملة الدوران
Week 8	امتحان نصف الكورس
Week 9	جملة الدورانwhile
Week 10	برامج بخصوص جملة الدوران
Week 11	المصفوفات وأنواعها
Week 12	العمليات على المصفوفات
Week 13	دوال جاهزة خاصة بالمصفوفات
Week 14	الدوال الشخصية
Week 15	الرسم
Week 16	امتحان نهاية الكورس

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
٧	Material Covered
Week 1	تعلم كيفية استدعاء الماتلاب ونوافذه
Week 2	الثوابت والمتغيرات +العمليات الحسابية+العمليات المنطقية+العمليات العلائقية
Week 3	اسبقية تنفيذ العمليات و كيفية الاستفادة من المساعدة
Week 4	ايعازات الادخال والاخراج
Week 5	تنفيذ برامج الجمل الشرطية if
Week 6	تنفيذ برامج جملة الدورانfor
Week 7	تكملة تنفيذ برامج جملة الدورانfor

8Week	امتحان نصف الكورس
9 Week	تنفيذ برامج جملة الدوران while
10 Week	تكملة تنفيذ برامج بخصوص جملة الدوران
11Week	المصفوفات وأنواعها
12Week	تنفيذ برامج العمليات على المصفوفات
13Week	تنفيذ الدوال الجاهزة خاصة بالمصفوفات
14Week	تنفيذ الدوال الشخصية
15Week	تنفيذ دوال الرسم
16Week	امتحان نهاية الكورس

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	"كتاب الماتلاب" المؤلف عصام سرحان ذياب 2023	نعم
Recommended Texts	"كتاب الماتلاب للمهندسين" المؤلف عدنان شاهين 2023	نعم
Websites	www.mathworks.com	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(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.

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية				
Module Title	**Mathematical Foundation (1)**		**Module Delivery**	
Module Type	**Core**		☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MS101**			
ECTS Credits	**6**			
SWL (hr/sem)	**150**			
Module Level	UG	**Semester of Delivery**	1	
Administering Department	Type Dept. Code	**College**	Type College Code	
Module Leader	Raida Dawood Mahmood	**e-mail**	raida.1961@uomosul.edu.iq	
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.	
Module Tutor	Maha F. khalaf	**e-mail**	maha.farman@uomosul.edu.iq	
Peer Reviewer Name	**Raida Dawood M.**	**e-mail**	**raida.1961@uomosul.edu.iq**	
Scientific Committee Approval Date	17/6/2023	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. The students acquisition of the concept of phrases and mathematical logic. 2. Methods of dealing with these concepts algebraically. 3. Using sets, relations and functions in the third and fourth stage.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Method of proving the properties of union and intersection. 2. Method of proving the properties of relations. 3. Apply mathematic techniques to find equivalence class. 4. Gain in formation about the types of functions and their properties. 5. Method of proving the properties of direct and inverse image.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Chapter 1 The background of set theory, union and intersection of sets, operation on sets [15 hrs] Chapter 2 Difference set, symmetric Difference, power set, Mathematical logic, truth table of sentences. [15 hrs] Chapter 3 Order pair , cartesian product, Relation ,R^{-1} , union and intersections of relation, domain R, Range R. [15 hrs] Chapter 4 Reflexive, symmetric, transitive, equivalence relation union and intersection of equivalence relation, equivalence classes. [15 hrs] Chapter 5 Functions, surjective, injective, bijective, composition of function, invertible function, direct image, inverse image. [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5	**Structured SWL (h/sem)** الحمل الدراسي المنتظم للطالب خلال الفصل	78
Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5	**Unstructured SWL (h/sem)** الحمل الدراسي غير المنتظم للطالب خلال الفصل	72
		Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	15% (15)	5,8, 10	LO #1, 2, 3
	Assignments	3	15% (15)	2,7,12	LO # 1-4
	Projects / Lab.				
	Report	1	10%(10)	12	LO # 5
Summative assessment	**Midterm Exam**	1 hr	10% (10)	8	LO # 1-3
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
١	**Material Covered**
Week 1	The background of set theory, operations on sets.
Week 2	Symmetric Difference, power set.
Week 3	Mathematical logic.
Week 4	Cartesian product, Relations.
Week 5	Composition of relations.
Week 6	Theorems in composition of relations.
Week 7	Union and intersection of relations.
Week 8	Mid-term Exam +Domain R and Range R.
Week 9	Equivalence relation, reflexive, symmetric and transitive.
Week 10	Example of equivalence relation.
Week 11	Equivalence class and example.
Week 12	Functions, Example of functions.
Week 13	Onto, one to one and bijective functions.
Week 14	Composition of function, invertible function.
Week 15	Direct image and invers image.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
١	**Material Covered**
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources

مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	.1 Pinter, set theory. .2 Adel, N. and Basil,A.,Introduction to the foundations of Mathematics.	Yes
Recommended Texts	Al-Mayahy,N.F.,Foundations of Mathematics, (2019)	No
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(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.

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية

Module Title	الديمقراطية وحقوق الانسان		**Module Delivery**	
Module Type	**S**		☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOM 104**			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level	UG	**Semester of Delivery**	1	
Administering Department	Type Dept. Code	**College**	Type College Code	
Module Leader	Idrees Hadher Heeshan	**e-mail**	E-mail: idreeshather@uomosul. Iq	
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)	**e-mail**	E-mail	
Peer Reviewer Name	Ban Ahmed Hasan mitres	**e-mail**	banah.mitras@uomousl.edu.iq	
Scientific Committee Approval Date	17/06/2023	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1 - يهدف تدريس المادة الى التثقيف في مجال حقوق الانسان كونه جزء اساسي في تزويد الاجيال الجديدة بالمعارف الضرورية لاجل ادراك حقوقه الغير قابله للتصرف وبالوسائل التي تكفل لها ممارسة تلك الحقوق والدفاع عنها 2 - تهدف تدريس المادة الى احترام حقوق الانسان وحرياته الاساسية للناس جميعا دون تميز بسبب العرق او الجنس او اللغة أو الدين ، وان التميز بين البشر بسبب العرق أو اللون أو الاصل يسبب اهانة للكرامة الإنسانية 3 - تهدف دراسة مادة حقوق الانسان على ان تضمن في الدساتير الدول وهذا ما جاء في دستور

العراق لعا م 2005	
1 - اكتساب الطالب الجامعي المعرفة والمهارة الخاصة بالدفاع عن حقوقه وحرياته وفقا لما جاء في المواثيق الدولية والتشريعات الدستورية والقانونية الوطنية 2-يحدد الطالب التأصيل التاريخي لحقوق الانسان 3 -يكون عنصر فاعل في المجتمع داخل الجامعة وخارجها 4-يساهم في تنمية الوعي لدى المواطنين ويكون له دور باز في المنظمات المجتمع المدني 5- بتصرف الطالب بكل ثقه لضمان تحقيق حقوق الانسان في الاتجاه الى القضاء ومناصرة كل الضعفاء والمظلومين	**Module Learning Outcomes** مخرجات التعلم للمادة الدراسية
1. تعريف حقوق الانسان لغة واصطلاحا واهم خصائص حقوق الانسان وانواع حقوق الانسان المدنية والسياسة والاقتصادية (4 ساعه) 2. التطور التاريخي لحقوق الانسان في الحضارة القديمة والاديان السماوية(4ساعة) 3. حقوق الانسان في العصر الحديث والمنظمات الدولية والحكومية والغير الحكومية (4ساعة) 4. الضمانات القانونية والقضائية والبرلمانية لحقوق الانسان (5 ساعة)	**Indicative Contents** المحتويات الإرشادية

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
5. تعريف حقوق الانسان لغة واصطلاحا واهم خصائص حقوق الانسان وانواع حقوق الانسان المدنية والسياسة والاقتصادية (4 ساعه) 6. التطور التاريخي لحقوق الانسان في الحضارة القديمة والاديان السماوية(4ساعة) 7. حقوق الانسان في العصر الحديث والمنظمات الدولية والحكومية والغير الحكومية (4ساعة) 8. الضمانات القانونية والقضائية والبرلمانية لحقوق الانسان (5 ساعة)	**Strategies**

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2,2	**Structured SWL (h/sem)** الحمل الدراسي المنتظم للطالب خلال الفصل	33
Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1,3	**Unstructured SWL (h/sem)** الحمل الدراسي غير المنتظم للطالب خلال الفصل	17
		Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	15% (15)	5, 10,13	LO #1, 2, 10 and 11
	Assignments	3	15% (15)	2,6,12	LO # 3, 4, 6 and 7
	Projects / Lab.				
	Report	1	10% (10)	11	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
١	Material Covered
Week بال 1	المقدمة في الحقوق والحريات العامة تعريف الحق لغة واصطلاحا"
Week بال 2	ماهي انواع الحقوق والحريات العامة
Week 3	التطور التاريخي للحقوق والحريات العامة
Week 4	حقوق الانسان في حضارة وادي الرافدين الموطن الاصلي العراق
Week 5	تشريع مملكة اشتونا وشريعة حمورابي
Week 6	حقوق الانسان في حضارة وادي الرافدين + حقوق الانسان في الحضارة اليونانية والرومانية
Week 7	نصف الفصل امتحان
Week 8	حقوق الانسان في الاديان السماوية
Week 9	حقوق الانسان في العصر الحديث في المنظمات الحكومية والغير حكومية
Week 10	حقوق الانسان في التشريعات الوطنية ومنها دستور العراق لعام 2005
Week 11	الضمانات القانونية للحقوق والحريات العامة على الصعيد الداخلي
Week 12	الضمانات القضائية للحقوق والحريات العامة على الصعيد الداخلي

Week 13	الرقابة القضائية على اعمال الادارة
Week 14	الضمانات السياسية للحقوق والحريات
Week 15	الرقابة البرلمانية
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
١	**Material Covered**
Week 1	Lab 1: Introduction to Agilent VEE and PSPICE
Week 2	Lab 2: Thévenin's / Norton's Theorem and Kirchhoff's Laws
Week 3	Lab 3: First-Order Transient Responses
Week 4	Lab 4: Second-Order Transient Responses
Week 5	Lab 5: Frequency Response of RC Circuits
Week 6	Lab 6: Frequency Response of RLC Circuits
Week 7	Lab 7: Filters

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education	Yes
Recommended Texts	DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2020, dissidents.	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings

	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(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.

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية		
Module Title	**Calculus I**	**Module Delivery**

Module Type	**Core**		☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**
Module Code	**MS102**		
ECTS Credits	**8**		
SWL (hr/sem)	**200**		

Module Level	1	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Ahmed Mohammed Ali	**e-mail**	ahmedgraph@uomosul.edu.iq
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	Assma Salah Aziz	**e-mail**	asmaas982@uomosul.edu.iq
Peer Reviewer Name	**Abdughafoor Jasim S.**	**e-mail**	**dabdul_salim@uomosul.edu.iq**
Scientific Committee Approval Date	**18/06/2023**	**Version Number**	**1.0**

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Provide the fundamental base for elementary mathematics. .4

	.5 Use mathematical functions like algebraic and transcendental functions and application of derivatives to solve mathematics, engineering and physics problems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	.6 Basic 2D curves drawing and lines using properties. .7 Apply mathematic techniques to find the limits and continuous. .8 Apply differential calculus and higher order to solve mathematics, engineering and physics problems. .9 Expanding on many of the functions that were taken in the previous stages. .10 Learn about new functions and study their properties.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Chapter 1 Relations and functions, domain and range, operations on functions. Inverse functions, special function and graphs. Graphing linear equations, distance between two points and between point and line. The rate of change functions, increasing and decreasing functions. Slope and Equations for lines, functions and their graph. [18 hrs.] Chapter 2 Limits and continuity, introduction to limit, some properties of limits, limit involving infinity. Formula definition of Limit. The Limits of rational functions. Some important Theorem on limits. Introduction to continuous functions, algebraic operations on continuous functions, properties of continuous functions. [18 hrs.] Chapter 3 Derivative of functions, derivative by using definition. Derivative of corner, Differentiation rules. Second and higher order derivatives. Chain rule, implicit differentiation. [17 hrs.] Chapter 4 Derivative of special functions and some properties of Transcendental functions, such as: Trigonometric functions, Natural logarithm function, Exponential function, Exponential and logarithmic function bases other than e, Hyperbolic functions, Inverse of trigonometric functions, Inverse of hyperbolic

	functions, L'Hopital's Rules. [18 hrs.] Chapter 5 Applications of derivatives: Related rates of change. Slopes and tangent lines with derivatives, Extreme values, Maximum and Minimum Theorems, Rolle's Theorem and Mean Value Theorem, Cauchy's Mean Value Theorem, Monotonicity test (Maximum and Minimum regions) Critical points, concavity and inflections points, Asymptotes, A curve sketching, Graphing Rational functions. Engineering applications Physical applications, Arithmetic applications, velocity, acceleration with application. [18 hrs.]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students. And knowing the basis of the concepts and where they came from and taking realistic applications on that.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	107	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	10% (30)	5, 9, 13	LO #1-3
	Assignments	5	1% (5)	2,4,6,8,10	LO # 1-4
	Projects / Lab.				
	Report	1	1% (5)	12	
Summative assessment	Midterm Exam	1r. and half	10% (10)	7	LO # 1-3
	Final Exam	3hrs.	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
٧	Material Covered
Week 1	Relations and functions, domain and range, operations on functions. Inverse functions,
Week 2	Special function and graphs. Graphing linear equations, distance between two points and between point and line.
Week 3	The rate of change functions, increasing and decreasing functions. Slope and Equations for lines, functions and their graph.
Week 4	Introduction to limit, some properties of limits, limit involving infinity.
Week 5	Formula definition of Limit, The limits of rational functions. Some important Theorem on limits.
Week 6	Introduction to continuous functions, algebraic operations on continuous functions, properties of continuous functions.
Week 7	Mid-term Exam + Derivative of functions, derivative by using definition. Derivative of corner.
Week 8	Differentiation rules. Second and higher order derivatives. Chain rule, implicit differentiation.

Week 9	Derivative of special functions and some properties of Transcendental functions, such as: Trigonometric functions.
Week 10	Natural logarithm function, Exponential function, Exponential and logarithmic function bases other than e.
Week 11	Hyperbolic functions, Inverse of trigonometric functions, Inverse of hyperbolic functions, L'Hopital's Rules.
Week 12	Applications of derivatives: Related rates of change. Slopes and tangent lines with derivatives.
Week 13	Extreme values, Maximum and Minimum Theorems, Rolle's Theorem and Mean Value Theorem, Cauchy's Mean Value Theorem.
Week 14	Monotonicity test (Maximum and Minimum regions) Critical points, concavity and inflections points, Asymptotes, A curve sketching, Graphing Rational functions.
Week 15	Engineering applications, Physical applications, Arithmetic applications, velocity, and acceleration with application.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
١	**Material Covered**
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	THOMAS' CALCULUS, 4th edition , 2018 BY: GEORGE B. THOMAS, JR., JOEL HASS, CHRISTOPHER HEIL and MAURICE D. WEIR	Yes

Recommended Texts	CALCULUS, 9th edition , 2020 BY: JAMES STEWART, DANIEL CLEGG and SALEEM WATSON.	Yes
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(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.

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	General physic			**Module Delivery**	
Module Type	**S**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MS 106				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	1U(		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Taha Mustafa Khudur		**e-mail**	dr.tahamustafa@uomosul.edu.iq	
Module Leader's Acad. Title	lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Khudur Ali– lecturer		**e-mail**	khederali@uomosul.edu.iq	
Scientific Committee Approval Date	15 / 6 /2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	**The following courses will be used to monitor students' performance :**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Students will learn various techniques for performing algebraic and analytic
Indicative Contents المحتويات الإرشادية	**The indicative content is the subject specific content that students may have provided in response to the question.** Indicative content includes the following. **Part A – Theoretical lectures** Kinematics , A body moving at constant velocity, A body moving at constant acceleration, The instantaneous velocity and acceleration **[8 hrs]** Kinematics equations, The freely falling body, The freely falling body, Projectile motion **[8 hrs]** Newton's laws of motion, Light as an electromagnetic wave, friction**[8 hrs]** **Part B lab.:** **كل مختبر ادناه ساعتين**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2	**Structured SWL (h/sem)** الحمل الدراسي المنتظم للطالب خلال الفصل	63
Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.5	**Unstructured SWL (h/sem)** الحمل الدراسي غير المنتظم للطالب خلال الفصل	37
		Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
٧	Material Covered
Week 1	kinematics
Week 2	A body moving at constant velocity.
Week 3	A body moving at constant acceleration
Week 4	The instantaneous velocity and acceleration
Week 5	Kinematics equations
Week 6	The freely falling body
Week 7	Projectile motion
Week 8	Newton's laws of motion
Week 9	friction
Week 10	First quarterly exam
Week 11	Light as an electromagnetic wave
Week 12	The of reflection
Week 13	Convex and concave spherical mirrors
Week 14	Convex and concave spherical lenses

Week 15	Second quarterly exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
١	**Material Covered**
Week 1	Lab. 1: ايجاد التعجيل الارضي
Week 2	Lab. 2: سرعة الصوت
Week 3	Lab 3: الوزن النوعي
Week 4	Lab 4: ايجاد معامل انكسار للبلوك الزجاجي
Week 5	Lab 5: ايجاد البعد البؤري للعدسة المحدبة
Week 6	Lab 6: ايجاد معامل الاحتكاك
Week 7	Lab 7: ايجاد لزوجة السائل
Week 8	Lab 8: قانون اوم
Week 9	Lab9: ايجاد البعد البؤري للعدسة المقعرة
Week10	Lab 10: ايجاد البعد البؤري لمرأة مستوية
Week 11,12	Lab 11: ايجاد الحرارة الكاملة للأنصار الجليد
Week 13-15	امتحان ومراجعة

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1- Physics for scientists and engineers with modern physics \Douglas C .Giancoli (2009) 2- Physics for scientists and engineers with modern physics \Raymond a.(2010) 3- تجارب الفيزياء العملية - Admon \	Yes Yes
Recommended Texts		
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks**	**Definition**

			%	
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(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.

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Mathematical Foundation 2**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MS107**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	UG		**Semester of Delivery**	2	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Raida Dawood Mahmood		**e-mail**	raida.1961@uomosul.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Maha F. khalaf		**e-mail**	maha.farman@uomosul.edu.iq	
Peer Reviewer Name	**Raida Dawood M.**		**e-mail**	**raida.1961@uomosul.edu.iq**	
Scientific Committee Approval Date	17/6/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	6. The students acquisition of the concept of equivalence and the cardinal number. 7. The students learns how the natural numbers , integer numbers and rational numbers was created. 8. Identify the hypotheses of real numbers and create complex numbers.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	11. Calculate the cardinal number of any finite and infinite set. 12. Find the cardinal number of power set. 13. Using mathematical induction to prove the properties of natural numbers. 14. Find the retationship between the numbers N,Z,Q,IR, and ℂ 15. Understanding the concept of algebraic structure , especially groups
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Chapter 1 The background of equivalent set , Cardinal number , example, cantors Theorem , Card(N) , Card(Z), Card(Q), Card(IR) [15 hrs] Chapter 2 Peano axioms, Mathematical induction , properties of natural numbers. [15 hrs] Chapter 3 The set of integer numbers , its properties , its relationship with the natural numbers, rational numbersv, Division algorithm [15 hrs] Chapter 4 The set of complex numbers, conjugat number, polar represention De Moiver Theorem, the fundamental theorem of Algebra [15 hrs] Chapter 5 Concept of algebraic structure, binary operation, associative, commutative, group, infinite algebraic structure, Z_n

	[15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5	**Structured SWL (h/sem)** الحمل الدراسي المنتظم للطالب خلال الفصل	78
Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5	**Unstructured SWL (h/sem)** الحمل الدراسي غير المنتظم للطالب خلال الفصل	72
		Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	15% (15)	5, 8,10	LO #1, 2, 3
	Assignments	3	15% (15)	2,7,12	LO # 1-4
	Projects / Lab.				
	Report	1	10%(10)	10	LO # 4
Summative assessment	**Midterm Exam**	1 hr	10% (10)	8	LO # 1-3
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
١	Material Covered
Week 1	The background of equivalent sets.
Week 2	Cardinal number and example.
Week 3	Infinite sets and countable sets.
Week 4	Calculating cardinal number, and adding cardinal number.
Week 5	Cantors Theorem.
Week 6	Peano axioms , Mathematical induction.
Week 7	Arithmetic of natural numbers.
Week 8	Mid-term Exam +The set of integer numbers Z
Week 9	The properties of integer numbers.
Week 10	The set of rational numbers (Q) , Real numbers (IR)
Week 11	Properties of rational numbers , Division algorithm
Week 12	Complex numbers (ℂ) , the geometrical representation for the ℂ.
Week 13	Conjugat number , polar represention .
Week 14	De Moivres Theorem , The fundamental theorem of Algebra.
Week 15	The background of group theory , definition and examples.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
١	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	

Week 7	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	.3 Pinter, set theory. .4 Adel, N. and Basil,A.,Introduction to the foundations of Mathematics.	Yes
Recommended Texts	Al-Mayahy,N.F.,Foundations of Mathematics, (2019)	No
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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Module Information معلومات المادة الدراسية				
Module Title	الحاسوب		**Module Delivery**	
Module Type	B		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOM103			
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level	UG	**Semester of Delivery**	3	
Administering Department	Type Dept. Code	**College**	Type College Code	
Module Leader	**Ahmed Entesar**	**e-mail**	ahmed_entesar84@uomosul.edu.iq	
Module Leader's Acad. Title	**Assistant Professor**	**Module Leader's Qualification**	Ph.D.	
Module Tutor	**Noor Rafeh**	**e-mail**	**noorrafeh@uomosul.edu.iq**	
Peer Reviewer Name	Ban Ahmed Hasan mitres	**e-mail**	banah.mitras@uomousl.edu.iq	
Scientific Committee Approval Date	17/06/2023	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	ان اهداف تعلم برنامج **Word** هي : 1- التعرف على وظائف البرنامج والتعرف على واجهته وطرق استخدامه. 2- اكتساب المهارات اللازمة لإنشاء وتحرير وتنسيق المستندات النصية بما في ذلك الرسائل والتقارير والمستندات الرسمية وغيرها. 3- تحسين القدرة على كتابة النصوص وتنظيمها وتنسيقها بطريقة متقنة لتبدو أكثر إتقانًا واحترافية. 4- القدرة على إضافة المحتوى المتعدد الوسائط (الصور والرسوم البيانية ومقاطع الفيديو والصوت) إلى المستندات النصية. 5- - تعزيز القدرة على إدارة وتنظيم الملفات والمجلدات والبحث عن المستندات بطريقة فعالة. 6- القدرة على إنشاء الجداول وإضافة الرسوم البيانية والرسوم البيانية لتنظيم المعلومات وعرضها بشكل واضح ومنظم. 7- استخدام المراجع والحواشي والملاحظات والفهارس بطريقة صحيحة. 8- تحسين سرعة الكتابة باستخدام الاختصارات والأدوات الأخرى المتاحة في البرنامج.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- إنشاء المستندات النصية الأساسية، مثل الرسائل والمذكرات والتقارير. 2- تنسيق النصوص وإضافة الألوان والصور والأشكال والجداول لجعل المستند أكثر إتقانًا وجاذبية. 3- إدارة وتنظيم الوثائق، عبر إنشاء ملفات وترتيبها وحفظها وطباعتها. 4- إنشاء القوائم والفهارس والملاحظات والمعادلات الرياضية والرسوم البيانية. 5- إنشاء الخطابات والتقارير الشاملة والمستندات الرسمية، مثل العروض التقديمية والعقود والاتفاقيات. 6- إنشاء السير الذاتية والملفات الشخصية، والتي تستخدم في عمليات التوظيف والبحث عن وظائف. 7- إنشاء البريد الإلكتروني والرسائل الإلكترونية، والتي تستخدم في التواصل الشخصي والمهني. 8- القيام بالمراسلات الرسمية، مثل كتابة خطابات رسمية للحكومة أو المؤسسات العامة. 9- إنشاء الكتب الإلكترونية والمقالات والأبحاث الأكاديمية، والتي تستخدم في الكتابة الأكاديمية والنشر العلمي. 10- العمل على مشاريع الكتابة الإبداعية، مثل الروايات والقصص القصيرة والشعر. 11- إنشاء العروض التقديمية والشرائح التعليمية، والتي تستخدم في العروض التقديمية والتدريس. 12- إنشاء المواد الإعلامية، مثل المطبوعات الإعلانية والشعارات والكروت الشخصية.
Indicative Contents المحتويات الإرشادية	1- مقدمة عامة 2- الواجهة الرئيسية ومحتوياتها. 3- النص الرئيسي **Word Art**. _____ [12 ساعة] 4- اعدادات عامة. 5- النصوص **Text**. _____ [**15** ساعة] 6- مختصرات لوحة المفاتيح الاساسية . 7- الرسوم. 8- الجداول. _____ [10 ساعة]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	الإستراتيجية الرئيسية التي سيتم اعتمادها في تقديم هذه الوحدة التعليمية هي تشجيع الطلاب على المشاركة في التمارين وعمل التقارير، مع تحسين وتوسيع مهارات التفكير النقدي لديهم في نفس الوقت. وسيتم تحقيق ذلك من خلال الدروس والتمارين التفاعلية، وأيضًا بالتفكير في نوعية التجارب البسيطة التي تتضمن بعض الأنشطة العينية التي تثير اهتمام الطلاب.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2	**Structured SWL (h/sem)** الحمل الدراسي المنتظم للطالب خلال الفصل	63
Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.5	**Unstructured SWL (h/sem)** الحمل الدراسي غير المنتظم للطالب خلال الفصل	37
		Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	5% (10)	5, 10	LO #1, 2, 3, 6 and 7
	Assignments	2	5% (10)	,93	
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	% (10)10	13	LO # 4, 5 and 8
Summative assessment	**Midterm Exam**	2 hr	0% (10)1	7	LO # 1-6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Material Covered	١
واجهة البرنامج الرئيسية	Week 1
النص الرئيسي (Word Art)	Week 2
الإعدادات العامة للبرنامج	Week 3
النص المباشر (Plane Text)	Week 4
امتحان يومي	Week 5
صندوق النص (Text Box)	Week 6
مختصرات لوحة المفاتيح (Keyboard Shortcut)	Week 7
الرسوم ((Graphics والأشكال الأساسية (Shapes)	Week 8
الصور (Pictures)و الرسوم الكارتونية ((Clip Art	Week 9
إدراج جدول, تغيير قياسات الجدول, ملئ بيانات الجدول, حشر أسطر وأعمدة داخل الجدول ومحاذاة الخلايا	Week 10
,ودمج خلايا الجدول, تقسيم خلايا الجدول, ترتيب الأسطر تصاعدياً وتنازلياً, إيجاد مجموع عناصر سطر أو عمود وحذف سطر أو عمود داخل الجدول	Week 11
امتحان يومي	Week 12
مناقشة التقارير	Week 13
مناقشة التقارير	Week 14
إمتحان نهاية الكورس	Week 15

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
١	**Material Covered**
Week 1	واجهة البرنامج الرئيسية
Week 2	النص الرئيسي (**Word Art**)
Week 3	الإعدادات العامة للبرنامج
Week 4	النص المباشر (**Plane Text**)
Week 5	النص المباشر (**Plane Text**)
Week 6	صندوق النص (**Text Box**)
Week 7	مختصرات لوحة المفاتيح **(Keyboard Shortcut)**
Week 8	الرسوم (**Graphics**) والأشكال الأساسية (**Shapes**)
Week 9	امتحان نصف الفصل
Week 10	الصور (**Pictures**) والرسوم الكارتونية (**ClipArt**)
Week 11	المخططات التوضيحية (**SmartArt**)
Week 12	المخططات الإحصائية (**Statistical Charts**)
Week 13	الجداول (**Tables**)
Week 14	الجداول (**Tables**)
Week 15	امتحان فصلي

Learning and Teaching Resources مصادر التعلم والتدريس		
Available in the Library?	**Text**	

Required Texts	**"Microsoft Word 2019 Step by Step" by Joan Lambert and Steve Lambert**	لا
Recommended Texts		No
Websites	محاضرات وورد 2010 شرح مفصل	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(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.

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**English Language**			**Module Delivery**	
Module Type	**Support**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	UOM102				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	UC		**Semester of Delivery**	2	
Administering Department			**College**		
Module Leader	Zahraa Ahmed Othman		**e-mail**	zahraa.alpachachi@uomosul.edu.iq	
Module Leader's Acad. Title	Asst. lecturer		**Module Leader's Qualification**	M.SC	
Module Tutor	None		**e-mail**	None	
Peer Reviewer Name	**Raida Dawood M.**		**e-mail**	**raida.1961@uomosul.edu.iq**	
Scientific Committee Approval Date	17/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1. To be able to speak English fluently and accurately. 2. To think in English and then speak. 3. To be able to talk in English. 4. To be able to compose freely and independently in speech and writing. 5. To be able to read books with understanding.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. To address grammar issues that students encounter in their daily speech, writing, reading and listening 2. To address the issue of grammatical errors that affect effective communication 3. To improve your reading skills through the practice of vocabulary enrichment, reading comprehension exercises, speed reading strategies, written responses, discussions, and reflections 4. Recognize the structure and organization of paragraphs, 5. Use strategies to think critically about reading and use appropriate technology to enhance reading comprehension, reading speed, and vocabulary development 6. Develop the writing skill.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction: about new headway pre-intermediate plus [1 hrs] Tenses: past-present-future, wh- questions. Vocabulary- using a bilingual 5dictionary, reading (communication). Everyday English (social expressions) [hrs] Grammar: Review about tenses, Present tenses, have and have got. Vocabulary: about (daily life), listening and match between verb and nouns. Practices about simple present and present continuous, Reading: about living in hrs]3the USA. Social expressions about every day English. [Past tenses, simple past and past continuous, practice, Reading and listening, regular and irregular verbs. Vocabulary: about N.- V.- Adj. endings. Everyday hrs]4English (time expressions). [Grammar: the quantities, also about Something/someone/somewhere, hrs]4practices. Reading: about markets, practices. [

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	- developing the four skills: The main strategy that will be adopted in The skill of speaking, The skill of reading, The skill of writing, The skill of listening, Also, enable the students for the use of grammar correctly,

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**50**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	15% (15)	4,9 and 11	LO #1, #2 and #5
	Assignments	3	15% (15)	2,10 and 13	LO #3, #4 and #6
	Report	1	10% (10)	13	LO #1, #4
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO #1 - #5
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
١	**Material Covered**
Week 1	Introduction: new headway pre-intermediate plus
Week 2	Grammar: Tenses, wh- questions, practices.
Week 3	Vocabulary- how to use a bilingual dictionary, reading about (communication)
Week 4	Everyday English (social expressions), listening, practices.
Week 5	Grammar: Present tenses, have and have got, practices.
Week 6	Vocabulary about (daily life), listening and match between vocabularies, practices.
Week 7	Mid-term Exam.
Week 8	simple present and present continuous, practices, reading about living in the USA.
Week 9	Social expressions about every day English, practices.
Week 10	Grammar: simple past and past continuous tenses, practices.
Week 11	Reading and listening, regular and irregular verbs, practices.
Week 12	Vocabulary: about N.- V.- Adj. endings, practices, Everyday English (time expressions), practices.
Week 13	Grammar: quantity (some, many, any, much, few,….), practice.
Week 14	Grammar: about Something/someone/somewhere, practices.
Week 15	Reading: about markets, practices.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
١	**Material Covered**
Week 1	None
Week 2	None
Week 3	None
Week 4	None
Week 5	None
Week 6	None
Week 7	None

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Headway pre-intermediate plus student's book. (John and Liz Soars)	Yes
Recommended Texts	Headway pre-intermediate plus work's book	Yes
Websites	https://7esl.com/	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Arabic Language**			**Module Delivery**	
Module Type	**Support**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**STAT106**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	**UGI**		**Semester of Delivery**	1	
Administering Department			**College**	CSM	
Module Leader	م. م. مروة عدنان إسماعيل		**e-mail**	Marwa-Adnan@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Lecturer		**Module Leader's Qualification**	MSc.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	25/02/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1- التعرف على الكلام العربي: من ناحية تعريفة، اقسامة، الى علامات كل قسم منه. 2- معرفة الجملة العربية واقسام الجملة العربية والجمل الاسمية والجمل الفعلية 3- التعرف على حركات الاعراب: سواء كانت اصلية او فرعية 4- معرفة الطالب بالعفل العربي: من حيث الصحة والاعلال 5- معرفة الطالب الفعل العربي من حيث اللزوم والتعدي 6- معرفة لطالب الفعل العربي من حيث الزمن 7- طرق كتابة العدد و تذكرة وتانيثه 8- معرفة علامات الترقيم في الكلام 9- تعلم قواعد رسم الهمزة 10- التعرف على طريقة كتابة التاء المربوطة، والمبسوطة 11-قل ولا تقل: الأخطاء الشائعة لدى المتكلمين والكتاب 12-معرفة ماهو الأسلوب الخبري، 13-معرفة ماهو الأسلوب الانشائي، 14-تعلم مهارات لغوية: تنمية الذوق اللغوي، وتحسين الأسلوب لدى المتعلمين
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- ان يعرف الطالب الكلام العربي: من ناحية تعريفة، اقسامة، الى علامات كل قسم منه. 2- ان يتعلم الطالب الجملة العربية واقسام الجملة العربية والجمل الاسمية والجمل الفعلية 3- التعرف على حركات الاعراب: سواء كانت اصلية او فرعية 4- ان يعرف الطالب العفل العربي: من حيث الصحة والاعلال 5- ان يتعلم الطالب الفعل العربي من حيث اللزوم والتعدي 6- معرفة الطالب الفعل العربي من حيث الزمن 7- معرف الطالب طرق كتابة العدد و تذكرة وتانيثه 8- معرفة الطالب لعلامات الترقيم في الكلام 9- ان يتعلم الطالب قواعد رسم الهمزة 10- معرف الطالب على طريقة كتابة التاء المربوطة، والمبسوطة 11- قل ولا تقل: الأخطاء الشائعة لدى المتكلمين والكتاب 12-التعرف على الأسلوب الخبري، 13- معرفة ماهو الأسلوب الانشائي، 14- التعلم على مهارات لغوية: تنمية الذوق اللغوي، وتحسين الأسلوب لدى المتعلمين
Indicative Contents المحتويات الإرشادية	1- التعرف على الكلام العربي: من ناحية تعريفة، اقسامة، الى علامات كل قسم منه[ساعه 2] 2- معرفة الجملة العربية واقسام الجملة العربية والجمل الاسمية والجمل الفعلية، ساعه 2 3- التعرف على حركات الاعراب: سواء كانت اصلية او فرعية، ساعه 2 4- معرفة الطالب بالعفل العربي: من حيث الصحة والاعلال، ساعه 2 5- معرفة الطالب الفعل العربي من حيث اللزوم والتعدي، ساعه 2 6- معرفة لطالب الفعل العربي من حيث الزمن، ساعه 2 7- طرق كتابة العدد و تذكرة وتانيثه، ساعه 2 8- معرفة علامات الترقيم في الكلام، ساعه 2 9- تعلم قواعد رسم الهمزة، ساعه 2 10- التعرف على طريقة كتابة التاء المربوطة، والمبسوطة، ساعه 2 11- قل ولا تقل: الأخطاء الشائعة لدى المتكلمين والكتاب ، ساعه 2

12- معرفة ماهو الأسلوب الخبري، ساعه 2 13- معرفة ماهو الأسلوب الانشائي، ساعه 2 14- التعلم مهارات لغوية: تنمية الذوق اللغوي، وتحسين الأسلوب لدى المتعلمين، ساعه 2	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
الإستراتيجية الرئيسية التي سيتم تبنيها في تقديم هذه الوحدة هي تشجيع الطلاب على المشاركة على المشاركه في الكلام الفربي وكتابته بالصورة الصحيحه ، مع تحسين مهارات التفكير النقدي وتوسيعها في نفس الوقت. سيتم تحقيق ذلك من خلال الفصول والبرامج التعليمية التفاعلية ومن خلال النظر في أنواع التجارب البسيطة التي تتضمن بعض أنشطة أخذ العينات التي تهم الطلاب.	**Strategies**

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
2	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	33	**Structured SWL (h/sem)** الحمل الدراسي المنتظم للطالب خلال الفصل
1	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	17	**Unstructured SWL (h/sem)** الحمل الدراسي غير المنتظم للطالب خلال الفصل
		50	**Total SWL (h/sem)** الحمل الدراسي الكلي للطالب خلال الفصل

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	15% (15)	5 and 10	LO #1, #2 and #10, #11
	Assignments	3	15% (15)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.				
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100		

		Marks)	

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
١	Material Covered
Week 1	الكلام العربي: تعريفة، اقسامة، وعلامات كل قسم.
Week 2	الجملة العربية: تعريفها ، اقسامها : الاسمية والفعلية
Week 3	حركات الاعراب: اصلية، فرعية
Week 4	العفل العربي: من حيث الصحة والاعلال
Week 5	الفعل العربي من حيث اللزوم والتعدي
Week 6	الفعل العربي من حيث الزم
Week 7	امتحان
Week 8	العدد: تذكرة، وتانيثه
Week 9	علامات الترقيم في الكلام
Week 10	قواعد رسم الهمزة
Week 11	التاء المربوطة، والمبسوطة
Week 12	قل ولا تقل: الأخطاء الشائعة لدى المتكلمين والكتاب
Week 13	الأسلوب الخبري،
Week 14	والأسلوب الإنشائي
Week 15	مهارات لغوية: تنمية الذوق اللغوي، وتحسين الأسلوب لدى المتعلمين
Week 16	امتحان نهاية الفصل

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
١	Material Covered
Week 1	Lab 1:
Week 2	Lab 2

Week 3	Lab 3
Week 4	Lab 4:
Week 5	Lab 5:
Week 6	Lab 6:
Week 7	Lab 7:

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	جامع الدروس العربية: الشيخ مصطفى الغلاييني	no
Recommended Texts	الجملة العربية: تأليفها وأقسامها د. فاضل السامرائي	No
Websites	https://www.almrsal.com/post/923401	

Grading Scheme

مخطط الدرجات

Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(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.

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Calculus II**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MS108**				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Ahmed Mohammed Ali		**e-mail**	ahmedgraph@uomosul.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Assma Salah Aziz		**e-mail**	asmaas982@uomosul.edu.iq	
Peer Reviewer Name	**Abdughafoor Jasim S.**		**e-mail**	**dabdul_salim@uomosul.edu.iq**	
Scientific Committee Approval Date	**18/06/2023**		**Version Number**	**1.0**	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	.9 Provide the fundamental base for elementary types of coordinates and applications. .10 Integrations of algebraic functions, transcendental functions and application of integrations to solve mathematics, engineering and physics problems. .11 Learn the sequences and series and convergence and divergence methods.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	.16 Elementary types of coordinates and applications .17 Learn techniques integration. .18 Applications of integrations to solve mathematics, engineering and physics problems. .19 Expanding on many of the functions that were taken in the previous stages. .20 Learn the sequences and series and convergence and divergence methods.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Chapter 1 Integration: Introduction of Integrations, Types of integrations, Integrations of special functions, such as: Algebraic functions, Trigonometric functions, Natural logarithm function, Exponential function, Exponential and logarithmic function bases other than e, Hyperbolic functions, Inverse of trigonometric functions, Inverse of hyperbolic functions, celling and floor functions. [18 hrs.] Chapter 2 Techniques of integration: Integration using substitution, Integration by parts, Integration of Trigonometric (power, product), Trigonometric substitutions, Rational functions and partial fractions, Rationaling substitutions, Integration of rational function in sine and cosine, Integral by hyperbolic substation, Improper Integral, Comparison test for improper Integrals, King property integration. [18 hrs.] Chapter 3 Applications of integration: Definition of Areas and types of areas, Definition Volumes and types of volumes, length of curves in the plane, Areas of Surfaces

	of revolution. [17 hrs.] Chapter 4 Review the Cartesian coordinates with two dimensions, Polar Coordinates and types of polar equations, Symmetric of polar, Converting between Cartesian and polar, Tangents to polar curves, Area with polar, Arc length of polar curves, Cartesian coordinates with three dimensions, Representations and decrement octanes, distance formula and section formula in three dimensions, graphs , Applications in three dimensions, introduction of cylindrical and spherical coordinates with converting [18 hrs.] Chapter 5 Introduction about Sequences, formula of sequences, types of sequences, convergent and divergent of sequences, Testing for monotonicity for sequences, Introduction about series and formula of series, geometric series, Test convergence and divergence of series, Introduction of polynomials, Maclaurin polynomial, Taylor polynomial. [18 hrs.]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students. And knowing the basis of the concepts and where they came from and taking realistic applications on that.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

6	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	93	**Structured SWL (h/sem)** الحمل الدراسي المنتظم للطالب خلال الفصل
7	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	107	**Unstructured SWL (h/sem)** الحمل الدراسي غير المنتظم للطالب خلال الفصل
200			**Total SWL (h/sem)** الحمل الدراسي الكلي للطالب خلال الفصل

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	3	10% (30)	5, 9, 13	LO #1-3
	Assignments	5	1% (5)	2,4,6,8,10	LO # 1-4
	Projects / Lab.				
	Report	1	1% (5)	12	
Summative assessment	**Midterm Exam**	1r. and half	10% (10)	7	LO # 1-3
	Final Exam	3hrs.	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Integration: Introduction of Integrations, Types of integrations, Integrations of special functions, such as: Algebraic functions, celling and floor functions.
Week 2	Trigonometric functions, Natural logarithm function, Exponential function, Exponential and

	logarithmic function bases other than e.
Week 3	Hyperbolic functions, Inverse of trigonometric functions, Inverse of hyperbolic functions.
Week 4	Techniques of integration: Integration using substitution, Integration by parts, Integration of Trigonometric(power, product).
Week 5	Trigonometric substitutions, Rational functions and partial fractions.
Week 6	Rationaling substitutions, Integration of rational function in sine and cosine, Integral by hyperbolic substation.
Week 7	**Mid-term Exam +** Improper Integral, Comparison test for improper Integrals, King property integration.
Week 8	Applications of integration: Definition of Areas and types of areas, Definition Volumes, Types of volumes.
Week 9	Types of volumes, length of curves in the plane, Areas of Surfaces of revolution.
Week 10	Review the Cartesian coordinates with two dimensions, Polar Coordinates and types of polar equations.
Week 11	Symmetric of polar, Converting between Cartesian and polar, Tangents to polar curves, Area with polar, Arc length of polar curves.
Week 12	Cartesian coordinates with three dimensions, Representations and decrement octanes, distance formula and section formula in three dimensions, graphs, Applications in three dimensions, introduction of cylindrical and spherical coordinates with converting.
Week 13	Introduction about Sequences, formula of sequences, types of sequences, convergent and divergent of sequences, Testing for monotonicity for sequences,
Week 14	Introduction about series and formula of series, geometric series, Test convergence and divergence of series.
Week 15	Introduction of polynomials, Maclaurin polynomial, Taylor polynomial.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
٧	**Material Covered**
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	

Week 6	
Week 7	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	THOMAS' CALCULUS, 4th edition , 2018 BY: GEORGE B. THOMAS, JR., JOEL HASS, CHRISTOPHER HEIL and MAURICE D. WEIR	Yes
Recommended Texts	CALCULUS, 9th edition , 2020 BY: JAMES STEWART, DANIEL CLEGG and SALEEM WATSON.	Yes
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(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.

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	مبادئ الاحصاء			**Module Delivery**	
Module Type	**Baisc**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MS 111**				
ECTS Credits	**4.00**				
SWL (hr/sem)	**100**				
Module Level	UG		**Semester of Delivery**	2	
Administering Department			**College**		
Module Leader	Shahla Mouyad Khalil		**e-mail**	shahlasamer@uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor			**e-mail**		
Peer Reviewer Name	**Abdughafoor Jasim S.**		**e-mail**	**dabdul_salim@uomosul.edu.iq**	
Scientific Committee Approval Date	**18/06/2023**		**Version Number**	**1.0**	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. توضيح المفاهيم الأساسية مقدمه عن الاحصاء (تعاريف+ امثله.) 2. التعرف على العرض الجدولي التنزيعات المتجمعة وانواعها. 3. التمثيل البياني (المدرج المضلع المنحني التكراري) 4. مقايس التمركز(الوسط الحسابي للبيانات المبوبة وللبيانات غير المبوبة مع الأمثلة ومبرهنات والوسيط. 5 - الوسط التوافقي مع الأمثلة . الوسط الهندسي مع تعريف والأمثلة . الانحراف المتوسط والتباين والانحراف القياسي للبيانات المبوبة وغير المبوبة. 6- معامل الاختلاف والدرجه القياسيه مع الامثلة والعزم الزاثدي حول الصفر وانواعه- . 7- العزم الزائدي حول الوسط الحسابي (انواعه+ امثله) والتفلطح ومعامل الاختلاف. 8- التوافيق والتباديل مع بعض الامثلة
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- توضيح المفاهيم الأساسية مقدمه عن الاحصاء(تعاريف+ امثله.) 2- التعرف على العرض الجدولي التوزيعات المتجمعة وانواعها. 3- التمثيل البياني(المدرج المضلع المنحني التكراري) . 4- مقايس التمركز(الوسط الحسابي للبيانات المبوبة و للبيانات غير المبوبة مع الأمثلة ومبرهنات 5- الوسط التوافقي مع الأمثلة . الوسط الهندسي مع تعريف والأمثلة . الانحراف 6- المتوسط والتباين والانحراف القياسي للبيانات المبوبة وغير المبوبة. 7- معامل الاختلاف والدرجه القياسيه مع الامثله والعزم الزاثدي حول الصفر وانواعه. **8- العزم الزائدي حول الوسط الحسابي (انواعه+ امثله) والتفلطح و معامل الاختلاف والتوافيق والتباديل مع بعض الامثلة.**
Indicative Contents المحتويات الإرشادية	1- دراسة المفاهيم الاساسية مقدمة عن الاحصاء (تعاريف +امثلة) [5 ساعات] 2- التعرف على العرض الجدولي التوزيعات المتجمعة وانواعها. [5 ساعات] التمثيل البياني(المدرج المضلع المنحني التكراري). [5 ساعات] 3- مقايس التمركز(الوسط الحسابي للبيانات المبوبة و للبيانات غير المبوبة مع الأمثلة ومبرهنات والوسيط . الوسط التوافقي مع الأمثلة . الوسط الهندسي مع تعريف والأمثلة . الانحراف المتوسط والتباين والانحراف القياسي للبيانات المبوبة وغير المبوبة. [5 ساعات] 4- معامل الاختلاف والدرجه القياسيه مع الامثله والعزم الزاثدي حول الصفر وانواعه. العزم الزائدي حول الوسط الحسابي (انواعه+ امثله) والتفلطح و معامل الاختلاف والتوافيق والتباديل مع بعض الامثلة. [6 ساعات] 5- لتطبيق الاحصاء في الحياة العملية يجب فهم النتائج وتفسيرها بطريقة صحيحة وتطبيقها. [6 ساعات]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم

Strategies	الاستراتيجية الرئيسية التي سيتم تبنيها في تقديم هذه الوحدة هي تشجيع الطلاب على المشاركة في حل التمارين ،مع تحسين مهارات التفكير النقدي وتوسيعها في نفس الوقت. سيتم تحقيق ذلك من خلال الفصول والبرامج التعليميةالتفاعلية ومن خلال النظر في انواع التجارب البسيطة التي تتضمن بعض الانشطة اخذ العينات التي تهم الطلاب

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
3	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	48	**Structured SWL (h/sem)** الحمل الدراسي المنتظم للطالب خلال الفصل
3	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	52	**Unstructured SWL (h/sem)** الحمل الدراسي غير المنتظم للطالب خلال الفصل
100			**Total SWL (h/sem)** الحمل الدراسي الكلي للطالب خلال الفصل

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	3	15% (15)	5, 7, 10	LO #1, #2 , #7 and #8
	Assignments	3	15% (15)	2, 8, 12	LO #3, #4 , #6 and #7
	Projects / Lab.				
	Report	1	10% (10)	9	LO #2 , #3 and #4
Summative assessment	**Midterm Exam**	1r and half	10% (10)	8	LO #1 - #7
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Material Covered	١
مقدمة عن مفهوم الاحصاء (تعاريف +امثلة)	Week 1
التعرف على العرض الجدولي التوزيعات المتجمعة وانواعها. التمثيل البياني(المدرج المضلع المنحني التكراري)	Week 2
مقايس التمركز(الوسط الحسابي للبيانات المبببة وللبيانات غير المبوبة مع الأمثلة ومبرهنات.	Week 3
الوسط التوافقي .	Week 4
الوسط التوافقي للبيانات المبوبة وللبيانات غير المبوبة مع الأمثلة.	Week 5
الوسط الهندسي للبيانات المبوبة وللبيانات غير المبوبة مع تعريف والأمثلة.	Week 6
الانحراف المتوسط للبيانات المبوبة وغير المبوبة.	Week 7
والتباين للبيانات المبوبة وغير المبوبة	Week 8
معامل الاختلاف والدرجه القياسيه مع الامثله	Week 9
والعزم الزائدي حول الصفر للبيانات المبوبة وللبيانات غير المبوبة مع تعريف والأمثلة.	Week 10
العزم الزائدي حول الوسط الحسابي للبيانات المبوبة مع امثله .	Week 11
العزم الزائدي حول الوسط الحسابي للبيانات غير المبوبة **مع الامثلة.**	Week 12
والتفلطح و معامل الاختلاف مع بعض الامثلة.	Week 13
والتوافيق والتباديل مع بعض الامثلة.	Week 14
Advanced Exercises	Week 15

Delivery Plan (Weekly Lab. Syllabus) N/A المنهاج الاسبوعي للمختبر	
Material Covered	١
	Week 1

Learning and Teaching Resources

مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	مبادئ الاحصاء المؤلف :خاشع الراوي	**Yes**
Recommended Texts	**مصادر عديدة في الانترنيت**	**Yes**
Websites	**https:// www.wolframalpha.com .**	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(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.

Course Description Form

1. Course Name:	
Partial Differential Equations	
2. Course Code:	
MS 208	
3. Semester / Year:	
Autumn semester/ 2023-2024	
4. Description Preparation Date:	
18/9/2023	
5. Available Attendance Forms:	
Attendance in the classroom according to the announced weekly class schedule	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2 hours of theoretical lecturer + Tutorial lecture per the week/ 6 units	
7. Course administrator's name (mention all, if more than one name)	
Name: D. Rutana jassim Essa Email: rotinajasim@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	1. To familiarize the student with the definition and concept of partial differential equations and their formation. 2. That the student recognize the classification of the partial different in terms of degree and rank. 3. Identify the applications of partial differential equations in various fields.
9. Teaching and Learning Strategies	
Strategy	The main strategy to be adopted in this unit is to encourage students participate in the exercises, while at the same time improving and expand their thinking skills. This will be achieved through assignments sand how solve them

10. Course Structure

Week	Hours	Required Learning	Unit or subject name	Learning method	Evaluation method

		Outcomes			
1	4	1. Knowledge and understanding 2. Learn the methods and rules for finding solutions to different partial differential equations with initial and limit values. 3. Students will learn how to expand functions using Fourier series	**Introduction - First order partial differential equation (Basic definition)**	Attendance in the classroom and through the educational tools available inside the classroom	According to the tasks assigned to the student, such as daily preparation, daily, oral, monthly and written exams, and reports.
2	4		**First order partial differential equation (linear P.D.E., quasi-linear P.D.E)**		
3	4		**First order partial differential equation (Lagrang system, some examples)**		
4	4		**Second order partial differential (ellipse, parabolla)**		
5	4		**Second order partial differential (hyperola, wave equation, heat and Laplace equation)**		
6	4		**Second order partial differential (Bondary condition, Cauchy problem)**		
7	4		**Mid-term Exam**		
8	4		Fourier series		
9	4		**Fourier series (sine)**		
10	4		**Fourier series (cos)**		
11	4		**Fourier series (cos)**		
12	4		**separation of variables**		
13	4		**Fourier transformation**		
14	4		**Fourier transformation**		
15	4		**some of applications**		

11. Course Evaluation

Quizzes 25% Assignments 5% Report 10% Midterm Exam 10%
Final Exam 50%
Total 100%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	مقدمة إلى المعادلات التفاضلية الجزئية، د. عطا الله ثامر العاني
Main references (sources)	1. Theory and problem of differential equation Frank Ayres JR. 2.Elements of partial differential equation I Sneddon
Recommended books and references (scientific journals, reports…)	Not specified, Only within the specialization of partid differential equations and according to the approved course titles

Electronic References, Websites	Not specified, Only within the specialization partial differential equations and according to approved course titles

اسم و توقيع رئيس القسم او الفرر

ا.د.عبدالغفور جاسم

اسم و توقيع صاحب المقرر

د.رتينة جاسم عيسى

Course Description Form

1. Course Name:
Mathematical Physics
2. Course Code:
MS 205
3. Semester / Year:
Autumn semester/ 2023-2024
4. Description Preparation Date:
18/9/2023
5. Available Attendance Forms:
Attendance in the classroom according to the announced weekly class schedule
6. Number of Credit Hours (Total) / Number of Units (Total)
2 hours of theoretical lecturer + Tutorial lecture per the week/ 6 units
7. Course administrator's name (mention all, if more than one name)
Name: D. Rutana jassin essa Email: rotinajasim@uomosul.edu.iq
8. Course Objectives

Course Objectives	1. Introduce students to the mathematical tools and techniques that are used to model physical phenomena. 2. Develop students' understanding of the mathematical concepts and principles that underpin classical mechanics, quantum mechanics, electromagnetic theory, and thermodynamics. 3. Help students develop the ability to perform mathematical calculations and solving problems common to mathematical physi 4. Encourage students to think critically and analytically about the relationship between mathematical models and physical reality. 5. Provide students with the opportunity to apply mathematical principl and techniques to real-world physical problems. 6. Enhance students' communication and presentation skills through the use of technical language and scientific notation. 7.Facilitate the development of research skills, including the ability to identify and evaluate sources of information, and to conduct independe research in the field of mathematical physics. 8. Foster an appreciation for the beauty and elegance of mathematical models and their applications in physics. 9.Promote an understanding of the interdisciplinary nature of physics a the importance of collaboration across different fields of study.

9. Teaching and Learning Strategies

Strategy	1. Practice regular problem-solving: Mathematical physics is a subject tha requires practice. Therefore, it is essential to solve a large amount of mathematical problems regularly. 2. Master the fundamentals: Mathematical physics involves several mathematical concepts and formulas. It is ideal to have a strong understanding of the basics of mathematics to effectively master the material. 3. Understand the physical concepts: Mathematical physics is an integrate study of mathematical and physical theories. Understanding the underlying principles of physics is essential for mastering the subject. 4. Read the textbook and lecture notes: Textbooks and lecture notes offer more structured approach to understanding the subject. It helps to read the assigned readings before attending lectures and completing the assigned practice problems. 5. Collaborate with peers: Studying in groups gives opportunities to work through difficult problems, compare notes, and share insights. Active group participation can improve problem-solving techniques and encourage discussion of concepts. 6. Err on the side of overlearning: To gain mastery of the subject, one mu be persistent and committed to the learning process. Incorporate both intentional and unintentional types of learning. 7.Seek guidance from instructors: Instructors are available to help learn with any difficulties they may encounter in attempting to understand material. You can ask questions in class, during office hours, and throu email communication.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	1. Demonstrate a strong understanding of the mathematical principles and techniques that underpin classical mechanics, quantum mechanics, electromagnetism, and thermodynamics. 2. Apply mathematical principles and techniques to solve	Vector: process of vectors , multiplication , Dot product , cross product , use of vectors in physics.	Attendance in the classroom and through the educational tools available inside the classroom	According to the tasks assigned to the student, such as daily preparation, daily, oral, monthly and written exams, and reports.
2	4		Classical Mechanics : displacement , vetocity , acceleration in one dimension, Free falling of body		
3	4		velocity acceleration in two dimension , motion of projectle		
4	4		Circular motion , Relation between linear and circular		

		problems and model physical phenomena in classical mechanics, quantum mechanics, electromagnetism, and thermodynamics. 3. Interpret mathematical models and analyze their physical significance using scientific reasoning. 4. Demonstrate the ability to perform mathematical calculations accurately, efficiently and correctly, using appropriate tools such as computer-based programs or software. 5. Communicate mathematical physics concepts clearly and effectively through verbal, written, and visual means, using appropriate technical language and notation. 6. Conduct independent research using appropriate resources, identify relevant resources, and critically evaluate and interpret scientific information. 7. Collaborate effectively with team members in the development of mathematically based models in the physical sciences. 8. Develop an appreciation for the	motion		
5	4		Forces : kind of force in nature , Newton Laws of 1st , 2nd Laws . The inclined plain		
6	4		Atwood Mechine , Fraction force , Coefficient of friction		
7	4		Force and weight in Elevator.		
8	4		Work and Energy , work and kinetic energy , fore from potential energy		
9	4		Conversation of Mechancal Energy , total Mechanical Energy .		
10	4		System of particles , Momentum and collisions : system of particls , Newton law for system of particals , Center of mass		
11	4		Center of mass for few particles, Center ay mass for Continvous Rod .		
12	4		Elastic Collision and in elastic Collision		
13	4		wave equation : wave , wave in string , oscillation , simple harmonic motion .		
14	4		Mass an spring , energy of mass of the spring		
15	4		Solution of wave equation .		

		elegance and beauty of the mathematical models in physics and their applications in the natural world. 9. Understand and appreciate the interdisciplinary nature of physics and the need for integration of different fields of study in solving scientific problems.			

11. Course Evaluation

Quizzes 25% Assignments 5% Report 10% Midterm Exam 10%
Final Exam 50%
Total 100%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	(1 Mathematical Tools for Physics" by James ".Nearing (2 Introduction to Electrodynamics" by David ".J (3 .Griffiths
Main references (sources)	1. "Mathematical Methods in the Physical Sciences" by Mary L. Boas. 2. "Mathematical Methods for Physicists" by Geo B. Arfken and Hans J. Weber.
Recommended books and references (scientific journals, reports…)	Not specified, Only within the specialization of mathematical physics and according to the approved course titles
Electronic References, Websites	Not specified, Only within the specialization mathematical physic and according to the approved cou titles

اسم و وتوقيع صاحب المقرر

د . رتينة جاسم عيسى

اسم و توقيع رئيس القيم او الفرع

ا . د . عبدالغفور جاسم

Course Description Form

1. Course Name:	
Ordinary Differential Equations	
2. Course Code:	
MS 202	
3. Semester / Year:	
Autumn semester/ 2023-2024	
4. Description Preparation Date:	
10/9/2023	
5. Available Attendance Forms:	
Attendance in the classroom according to the announced weekly class schedule	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2 hours of theoretical lecturer + Tutorial lecture per the week/ 6 units	
7. Course administrator's name (mention all, if more than one name)	
Name: D. Thair Younis Tahnoon Email: Thairyounis59@uomosul.edu.iq Lecturer: Merna Adel Aziz merna_samarchi@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• To learn the basics of differential equations • To learn the classification and types of differential equations. • Training the student on methods and strategies for solving differential equations. • Identify the applications of differential equations in different fields suc as physics, chemistry and engineering sciences.
9. Teaching and Learning Strategies	
Strategy	Managing the lecture in a practical way related to the reality of daily life to attract the student to the topic of the lesson Without straying from the heart of the matter, so that the material is flexible and subject to understanding and analysis. Assigning the student some group activities and duties. Allocate a percentage of the grade for daily assignments and tests. Active participation in the classroom is evidence of the student's commitment and responsibility. Commitment to the deadline for submitting assignments and research. The quarterly and final exams reflect commitment and knowledge and skill achievement. Daily applications, exercises and homework

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	1. Understanding the basics concepts of differential equations 2. The ability to recognize between types of differential equations of the first order. 3. The ability to distinguish between methods of solving ordinary differential equations of first order. 4. Gaining the ability and skill to use methods of solving first order differential equations and dealing with them. 5. learning the linear homogenous and non-homogenous differential equations with constant coefficients of n-th order. 6. The ability to solve linear homogenous and non-homogenous differential equations with constant coefficients of n-th order by using different methods. 7. learning the Linear differential equations with variable coefficient like Euler equation and the method of solving this equation 8. Gaining the ability to analyze, explain and solve problems. 9. Providing the student with the skills of communication, expression and discussion to stimulate mathematical thinking, understanding and solving mathematical issues.	Fundamental concepts in Differential equation	Attendance in the classroom and through the educational tools available inside the classroom	According to the tasks assigned to the student, such as daily preparation, daily, oral, monthly and written exams, and reports.
2	4		Kinds of solutions, formulation of D.E.		
3	4		Differential Es. of first order and first degree, equations of separation variables,		
4	4		Homogeneous D.Es. and equations with linear coefficients		
5	4		Exact and not Exact differential equations, integral factor		
6	4		Linear differential equation and Bernoulli equation, methods of solution, some physical and economic application to differential equations		
7	4		Linear D.Es. of n- th order with constant coefficients and the linearly independence		
8	4		Midterm Exam		
9	4		Linear differential equations with constant coefficients and the operator method		
10	4		Linear homogenous D.Es. with constant coefficients		
11	4		linear non homogenous D.Es. with constant coefficients, Undetermined Coefficients		
12	4		linear non homogenous D.Es. with constant coefficients, Variation of parameters		
13	4		Linear differential equations with variable coefficient, Euler equation.		
14	4		Homogenous Euler equation, method of solution,		
15	4		Non -homogenous Euler equation, method of solution, solving D.Es. by power series examples.		

11. Course Evaluation	
Quizzes 30% Assignments 5% Report 5% Midterm Exam 10% Final Exam 50% Total 100%	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	1) خالد أحمد السامرائي ويحيى عبد سعيد، "طرق حل المعادلات التفاضلية " وزارة التعليم العالي والبحث العلمي، 1980. 2) فرانك ايرز" المعادلات التفاضلية " ملخصات شوم ، ترجمة نخبة من الاساتذة المتخصصين ، دار ماكجر وهيل للنشر، 1972
Main references (sources)	1. Elementary differential equations – Earl D. Rainville and Bedient E , 1990 2. Ordinary Differential Equations, Gabriel Nagy, 2021
Recommended books and references (scientific journals, reports…)	Not specified, Only within the specialization of differential equations theory and according to the approved course titles
Electronic References, Websites	Not specified, Only within the specialization of differen equations theory and according to the approved course tit

Course Description

1. Course Name:
Advanced Calculus (1)
2. Course Code:
CM MS 24 F 211
3. Semester / Year:
Autumn / 2023-2024
4. Description Preparation Date:
1/9/2023
5. Available Attendance Forms:
Attendance in the classroom according to the announced weekly class schedule
6. Number of Credit Hours (Total) / Number of Units (Total)
Four hours of theory + one hour of discussion per week / 8 units
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Saad Fawzi Al-Azzawi Email: saad_alazawi@uomosul.edu.iq Name: Dr. Ahmed Entesar Ghitheeth Email: : ahmed_entesar84@uomosul.edu.iq
8. Course Objectives

Course Objectives	This study aims to explore the concept of multivariable functions by examining partial derivative and Higher order partial derivatives, including Laplace Equation. It also covers essential topics such as the Chain rule, Implicit Differentiation, directional derivative and the gradient. Additionally, the study analyzes Tangents Plane and Normal Lines on the Surface. Furthermore, it delves into the concept of extreme values, methods for testing them, and their practical applications, with a particular emphasis on using the Lagrange method for their determination. Moreover, the study introduces the double integral and extends the concept of integration to multivariable functions. It explores methods for evaluating double integrals, including reversing the order of integration and applying integration in polar coordinates. Practical applications, such as calculating volume, area, mass, and moments, are also discussed. The study further examines the triple integral by covering its fundamental principles, computation methods, and variable transformations. Cylindrical and spherical coordinates are utilized for evaluating triple integrals, along with a review of their diverse practical applications.

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	1. Learn the concept of partial derivative. 2. Solve examples of chain rule problems, 3. How to find and classify extreme values in addition to using Lagrange's theorem, 4. Solve some applied problems using Lagrange's theorem, 5. Learn the concept of double integrals and inverting the limits of integration.6. Address some applications such as areas and volumes, 7. Solve double integrals using polar coordinates	Introduction in Functions of Several Variables	Attendance in the classroom and through the educational tools available inside the classroom	According to the tasks assigned to the student, such as daily preparation, daily, oral, monthly and written exams, and reports.
2	5		Higher order partial derivatives, Laplace Equation.		
3	5		Chain rule		
4	5		Implicit Differentiation		
5	5		Tangents Plane and Normal Lines on the Surface		
6	5		short - course exam		
7	5		Extrema values (The way of test)		
8	5		Lagrange method +Application of Extrema values		
9	5		Mid - course exam		
10	5		Multiple Integrals (Reverse the order of integration)		
11	5		Applied of Double Integration in Calculate Areas and Volumes		
12	5		Double Integrals in Polar Coordinates		
13	5		Triple integrals		
14	5		Triple Integrals in Cylindrical Coordinates		
15	5		Triple Integrals in Spherical Coordinates		
16	5		Preparatory week before the final Exam		

11. Course Name:				
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports…etc	Short exam 10%	Mid Exam %30	Final Exam 60%	Total 100%

12. Learning and Teaching Resources :	
Required textbooks (curricular books, if any)	
Main references (resources)	Thomas G. B. , Calculus and Analytic Geometry, 4^{th}, 1984. Durfee W.H., Calculus and Analytic Geometry, New York, 1971.
Recommended books and references (scientific journal, reports…)	Thomas, Calculus, 12th, 2010. Thomas, Calculus, 15th, 2024
Electronic References, Websites	

Name and signature of Module leader

Dr. Saad Fawzi Al-azzzawi

Name and signature of the head of the department or branch

Course Description

1. Course Name:
Advanced Calculus (2)
2. Course Code:
CM MS 24 F 212
3. Semester / Year:
Spring/ 2023-2024
4. Description Preparation Date:
1/9/2023
5. Available Attendance Forms:
Attendance in the classroom according to the announced weekly class schedule
6. Number of Credit Hours (Total) / Number of Units (Total)
Four hours of theory per week / 6 units
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Saad Fawzi Al-Azzawi Email: saad_alazawi@uomosul.edu.iq Name: Dr. Ahmed Entesar Ghitheeth Email: : ahmed_entesar84@uomosul.edu.iq

8. Course Objectives	
Course Objectives	This study explores masses, moments, and centers of mass using double integration in Cartesian and polar coordinates, as well as masses and moments through triple integration in cylindrical and spherical coordinates. It also examines linear integration, Crane's theorem, and their interrelation, as Crane's theorem establishes the connection between linear integration and double integration by incorporating linear integration with double integrals. Furthermore, the study covers surface area, divergence, rotation, and flow, along with an analysis of the divergence theorem and Stokes' theorem. Additionally, it includes discussions on various examples, surface integration, and Stokes' theorem
9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	4	1- Identify the basic concepts of moments and centers of mass. 2- Identify finding moments and centers of mass using double and triple integrals. 3- Identify the relationship between linear integrals and Crane's theorem. 4- Identify the basic concepts of divergence and rotation. 5- Use Stokes's theorem to find the work done on vectors.	General review of triple integrals and the relationship	Attendance in the classroom and through the educational tools available inside the classroom	According to the tasks assigned to the student, such as daily preparation, daily, oral, monthly and written exams, and reports.
2	4		Mass, first moments and centers of mass with double integrals (in polar coordinates)		
3	4		Moment of inertia (second moments) by double integrals		
4	4		Midpoint with some examples solved by double integrals		
5	4		Masses and Moments in Three Dimensions in Cylindrical and Spherical Coordinates		
6	4		short - course exam		
7	4		Line Integral		
8	4		Green's Theorem		
9	4		Integrating Line Integration and Double Integration Using Crane's Theorem		
10	4		Mid - course exam		
11	4		Surface Area		
12	4		Dissipative and conservative		
13	4		Divergence and Circulation Flux		
14	4		Divergence Theorem		
15	4		Stokes's Theorem		
16	4		Preparatory week before the final Exam		

11. Course Name:				
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports…etc	Short exam 10%	Mid Exam %30	Final Exam **6**0%	Total 100%

12. Learning and Teaching Resources :	
Required textbooks (curricular books, if any)	
Main references (resources)	Thomas G. B. , Calculus and Analytic Geometry, 4th, 1984. Durfee W.H., Calculus and Analytic Geometry, New York, 1971.
Recommended books and references (scientific journal, reports…)	Thomas, Calculus, 12th, 2010. Thomas, Calculus, 15th, 2024
Electronic References, Websites	

Name and signature of module leader

Dr. Saad Fawzi Al-azzzawi

Name and signature of the head of the department or branch

Course Description

University: Mosul

College: Computer Science and Mathematics

Department or Branch: Mathematics

1. Course Name:
Numerical Analysis (2) / 3rd Class
2. Course Code:
MS 306
3. Semester / Year:
1st Semester / 2023 - 2024
4. Description Preparation Date:
4/9/2023
5. Available Attendance Forms:
Classroom according to the announced weekly lesson schedule
6. Number of Credit Hours (Total) / Number of Units (Total)
2 hours of theory and 2 hours of practical per week / 3 units
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Ekhlass Saadallah Ahmed/ Professor Email: drekhlass-alrawi@uomosul.edu.iq Name: Dr. Ahmed Farooq Qasim/ Asst. Prof. ..... Email: ahmednumerical@uomosul.edu.iq Name: Dr. Mohammed Omar Al-Amr/ Asst. Prof. ..... Email: alamr@uomosul.edu.iq ..... Name: Dr. Susan H. Mohammad Email: susan.al-hakam@uomosul.edu.iq
8. Course Objectives

Course Objectives	• The student's teaching of Numerical Analysis 2 aims at his knowledge of the numerical methods for solving a problem that may be difficult to find an analytical solution. • Study numerical methods to find the numerical integral with their application in solving examples. • Study the error analysis of the approximate solutions of these numerical methods to make it easier for us to know which numerical methods are better in finding the value of numerical integration. • To understand the methods of solving ordinary differential equations numerically with different examples. • To understand the least square approximation ,linear, nonlinear approximation for x and for constants.

	• Writing algorithms for those numerical methods and programming them using MatLab language practically.

9. Teaching and Learning Strategies

Strategy	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2+2	Learn how to derive formulas for numerical integration methods, solve differential equations, and integrate, while studying errors and writing algorithms for each and program it in MATLAB.	Interpolation polynomial approximation (Lagrange polynomial)	My presence in the classroom and through the educational tools available inside the classroom	According to the tasks assigned to the student, such as daily preparation, daily, oral, monthly and written exams, and reports.
2	2+2		Newton formulas of finite differences and solving examples		
3	2+2		Numerical integration –derivative of Trapezoidal rule with solving an example and write algorithm		
4	2+2		Derivative of one third Simpson's rule with a study of error analysis and solving an example and write algorithm		
5	2+2		Derivative of 3/8 Simpson's rule and solving an example and write algorithm		
6	2+2		Midpoint Method with solving an example with write a duty-solving example		
7	2+2		Romberg method and solving an example and write algorithm		
8	2+2		Gauss-Legendre with solving different examples		
9	2+2		Closed Newton-Cotes methods with a daily exam		
10	2+2		Mid - course exam		
11	2+2		Derivative of explicit Euler's and implicit Euler's method with solving an example and write algorithm		
12	2+2		Derivative of implicit Euler's method with solving an example and write algorithm		
13	2+2		Taylor series method and solving examples and write algorithm		

14	2+2		Fourth order Runge-Kutta method and solving examples and write algorithm		
15	2+2		Preparatory week before the final Exam		

11. Course Evaluation

Daily attendance and preparation: 10 points
Practical: 15 points , Monthly exams: 25 points , Final exam: 50 points

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Ali Muhammad Sadiq Saifi and Ibtisam Kamal Al-Din, Principles of Numerical Analysis, University of Baghdad, 1986.
Main references (sources)	Numerical Methods Using MatLab, fourth edition, John H.M. and Kurtis D.F. :2004
Recommended books and references (scientific journals, reports, …)	Not specified only includes numerical analysis2 and identifying specific addresses
Electronic References, Websites	Not specified only includes numerical analysis2 and identifying specific addresses
Curriculum or description update rate	10 %

Name and Signature of the Course Instructor

Prof. Dr. Ekhlass Saadallah Ahmed
Asst. Prof. Dr. Ahmed Farooq Qasim

Name and Signature of the Head of Department or Branch

Prof. Dr. Abdulghafoor Jasim Salim

Course Description

1. Course Name:	
Probability /second	
2. Course Code:	
MS204	
3.Semester / Year:	
first/2023-2024	
4.Description Preparation Date:	
1/10/2023	
5. Available Attendance Forms: Attendance in the classroom according to the announced weekly class schedule	
6. Number of Credit Hours (Total) / Number of Units (Total)	
4 hours of theory per week / 4 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Hamsa Throt ..... Email: hamsathrot @uomosul.edu.iq	
8. Course Objectives	
Course Objectives	1- The student should mention the basic definitions 2. Learn about the introduction and basic definitions of the topic of probability 3. Distinguishing between the probability density function, the probability mass function, and the joint probability density function with various examples. 4-Identify discrete distributions and their types and

	study examples of them with theorems for expectation and variance. 5-The student describes the method. 6-Explain the mathematical formula of the method. 7- Summarize the steps to solve the method. 8-Apply the method to a numerical problem. 9-Tabulate and discuss results.

9. Teaching and Learning Strategies

Strategy	The main strategy to be adopted in delivering this unit is to encourage students to engage in exercises, while at the same time improving and expanding their critical thinking skills. This will be accomplished through interactive classes and tutorials and by looking at types of simple experiments that include some sampling activities of interest to students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4		Random variables (definitions + examples)	My presence in the classroom and through the educational tools available inside the	According to the tasks assigned to the student, such as daily preparation, daily, oral, monthly and written exams,

				classroom	and reports.
2	4		Examples of probability		
3	4		Bayes' theorem + conditional probability + examples		
4	4		Binomial distribution + theorems.		
5	4		Poisson distribution + theorems + examples		
6	4		Kamma distribution.		
7	4		Normal distribution + examples + theorems		
8	4		Standard normal distribution + examples + theorems		
9	4		Mid-course exam		
10	4		Exponential distribution + regular distribution.		

11	4		Probability density function (definitions + examples).		
12	4		Probability mass function (definitions + examples).		
13	4		Moment generation function (definitions + application of the function to distributions)		
14	4		Joint probability density function (theorems + examples)		
15	4		Bernoulli distribution + theorems		

11. Course Evaluation and Grade Divisions

Daily attendance and preparation = 10 points. Midterm exam = 30 points. Final exam = 60 points.

12. Learning and teaching resources

1-Basil Younis Dhnoon "Probability and Statistics"

2- Tharwat Mohamed Abdel Moneim "A Modern Introduction to Statistics and Probability" 2011

The curriculum or description update rate is 10%.

Name and signature of the head	**Name and signature of the course owner**
of the department or branch	**Dr.** Hamsa Throt

Course Description

University: Mosul **College:** Computer Science and Mathematics **Department: Mathematics**

1. Course Name:
Rings algebra
2. Course Code:
MS 210
3. Semester / Year:
Second Semester/ 2023-2024
4. Description Preparation Date:
4/9/2023
5. Available Attendance Forms:
Attendance in the classroom according to the announced weekly class schedule
6. Number of Credit Hours (Total) / Number of Units (Total)
5 Hours of theory per week/ 6 units
7. Course administrator's name (Groups Algebra)
Name: Shaimaa Hatim Ahmed Email: shaymaahatim@uomosul.edu.iq
8. Course Objectives

Course Objectives	1. Giving the student definitions of rings, examples and related theorems 2. Make the student distinguish between rings and subrings. 3. The ability to employ different theorems to study the types and properties of rings.

9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	1. Know the concept of algebra ic structur	Definition and Elementary Properties of Rings	Presenc e in the class room	Accord ing to the tasks assigne d to the

2	5		Definition of ring and some example		
3	5		Definition of Zero divisor with examples and some basic theorems		
4	5		Integral domain and commutative ring with identity with examples and some basic theorems		
5	5		Definitions of Sub-ring and center of rings		
6	5		Some theorems of rings and sub-rings		
7	5		definitions of Ideals with examples and theorems		
8	5		Special ideals and elements such as : Prime ideals, maximal ideal and principal ideal		
9	5		Idempotent elements and nilpotent elements		
10	5		Jacobson radical of rings and unite elements		
11	5		Definition Quotient Rings with examples and theorems		
12	5		Polynomial Rings and Boolean Rings		
13	5		Definition of Homomorphisms and isomorphisms, examples and theorems		
14	5		Definition of fields and sub-fields		
15	5		Some important theorems of fields		

11. Course Evaluation

Tests = 15 marks **homework scores** = 5 marks **Reports** = 10 marks **grades Assignments within the college** = 10 **Semester exam** = 10 marks **Final exam** = 50 marks

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Not Specified
Main references (sources)	INTRO-DUCTION TO MOD'ERN ABSTRACT ALGEBRA, David, M. Burton, 1968, ADDISON-
Recommended books and references (scientific journals, reports…)	Nicholas J. Garber, and Lester A. Hoel," *Traffic and Highway Engineering*", fourth
Electronic References, Websites	Not Specified

Lecturer Coordinator
Asst. Prof. Shaimaa Hatim Ahmed

Head of the department
Prof Dr. Abdulghafor Jassim Salim

Course Description

University: Mosul **College:** Computer Science and Mathematics **Department: Mathematics**

1. Course Name:
Groups algebra
2. Course Code:
MS 203
3. Semester / Year:
First Semester/ 2023-2024
4. Description Preparation Date:
4/9/2023
5. Available Attendance Forms:
Attendance in the classroom according to the announced weekly class schedule
6. Number of Credit Hours (Total) / Number of Units (Total)
5 Hours of theory per week/ 6 units
7. Course administrator's name (Groups Algebra)
Name Shaimaa Hatim Ahmed Email: shaymaahatim@uomosul.edu.iq
8. Course Objectives

Course Objectives	1. Giving the student definitions of groups and their examples and theorems. 2. Make the student distinguish between groups, cyclic groups, and subgroups 3. The ability to describe different theorems to study the types and characteristics of group.

9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	1. Know the concept of algebraic structur	Definition and Elementary Properties of group	Presence in the class room	According to the tasks assigned to the

2	5		Definition of semi-group and group with some examples		
3	5		Definition of abelian group and cyclic group with some examples		
4	5		(Cyclic group)		
5	5		Some fundamental theorems of group		
6	5		Direct product Group		
7	5		Definition of sub-group and center of group with some examples and theorems		
8	5		Product of two sub-group and some theorems		
9	5		Normal sub-group and Quotient Groups		
10	5		Lagrange theorem's and index of sub-group		
11	5		Homomorphisms of Definition and examples		
12	5		Kernel of function, Isomorphism and basic properties		
13	5		The fundamental Theorems Factor theorem and First theorem		
14	5		(Congruent modulo) groups of Zn and theorems		
15	5		Symmetric group of G with theorems		

11. Course Evaluation

Tests = 15 marks **homework scores** = 5 marks **Reports** = 10 marks **grades Assignments within the college** = 10 **Semester exam** = 10 marks **Final exam** = 50 marks

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Not Specified
Main references (sources)	INTRO-DUCTION TO MOD'ERN ABSTRACT ALGEBRA, David, M. Burton, 1968, ADDISON-
Recommended books and references (scientific journals, reports…)	The Theory of Groups, Macdonald, Qxford.
Electronic References, Websites	Not Specified

Lecturer Coordinator
Asst. Prof. Shaimaa Hatim Ahmed

Head of the department
Prof Dr. Abdulghafor Jassim Salim

Course Description

University: Mosul

College: Computer Science and Mathematics

Department or Branch: Mathematics

1. Course Name:
Numerical Analysis (1) / 2rd Class
2. Course Code:
MS 209
3. Semester / Year:
2st Semester / 2023 - 2024
4. Description Preparation Date:
4/9/2023
5. Available Attendance Forms:
Classroom according to the announced weekly lesson schedule
6. Number of Credit Hours (Total) / Number of Units (Total)
2 hours of theory and 2 hours of practical per week / 3 units
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Ekhlass Saadallah Ahmed/ Professor **Email: drekhlass-alrawi@uomosul.edu.iq** **Name: Dr. Ahmed Farooq Qasim/ Asst. Prof.** **Email: ahmednumerical@uomosul.edu.iq** ..... **Name: Dr. Mohammed Omar Al-Amr/ Asst. Prof.** **Email: alamr@uomosul.edu.iq** ..... **Name: Dr. Susan H. Mohammad** ..... **Email: susan.al-hakam@uomosul.edu.iq** **Name: Dr. Elaf sulaiman khaleel** **Email: elaf.sulaiman@uomosul.edu.iq**

8. Course Objectives	
Course Objectives	1. To introduce numerical approximation techniques for solving standard problems in Mathematics. 2. To derive some of these techniques from mathematics principles. 3. To explain how computer software is able to produce numerical solutions, and to enable a judgment of whether the results are reliable. 4. To provide opportunities for implementing numerical techniques on a computer. 5. Writing algorithms for those numerical methods and programming them using MatLab language practically.

9. Teaching and Learning Strategies	
Strategy	The main strategy adopted in delivering this unit is to encourage student participation in the exercises, while simultaneously enhancing and expanding their critical thinking skills. This will be achieved through interactive classroom and tutorials, and by considering the type of simple experiments that include some sampling activities that interest students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2+2	Learn how to derive formulas for finding solutions to linear equations, study the error, find the solution to a system of linear equations, write the algorithm for each one, and program it in MATLAB.	Introduction in numerical analysis and define rounding and chopped.	My presence in the classroom and through the educational tools available inside the classroom	According to the tasks assigned to the student, such as daily preparation, daily, oral, monthly and written exams, and reports.
2	2+2		Define the absolute error and relative error with solving an examples.		
3	2+2		Error sources and errors in calculations(addition, subtraction, multiplication and division) and solve examples , write a duty.		
4	2+2		Define the root of the equation and determination of roots positions with solving examples.		
5	2+2		daily exam + Numerical methods to solve nonlinear equation , Bisection method with write algorithm.		
6	2+2		False position method and solving an example and write algorithm.		
7	2+2		Derivative of the approximation root of Secant method , solve an example and write algorithm.		
8	2+2		Mid-term Exam		
9	2+2		Derivative of the approximation root of Newton-Raphson method and solve examples and write algorithm.		
10	2+2		Special cases of Newton-Raphson method and solve examples , write a duty.		
11	2+2		Fixed point method with solving several examples and write algorithm.		
12	2+2		daily exam + Aitken method and Steffensen's method with solving examples and write properties.		
13	2+2		Gauss elimination metod , Gauss Jordan method to solve linear system of equations.		

14	2+2		LU-Decomposition methods (Doolittel, Croute and Cholesky) and solve examples.		
15	2+2		Iterative methods : Jacobi method, Gauss-seidel method + Report.		

11. Course Evaluation

Daily attendance and preparation: 10 points
Practical: 15 points , Monthly exams: 25 points , Final exam: 50 points

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Ali Muhammad Sadiq Saifi and Ibtisam Kamal Al-Din, Principles of Numerical Analysis, University of Baghdad, 1986.
Main references (sources)	Numerical Methods Using MatLab, fourth edition, John H.M. and Kurtis D.F. :2004
Recommended books and references (scientific journals, reports, ...)	Not specified only includes numerical analysis2 and identifying specific addresses
Electronic References, Websites	Not specified only includes numerical analysis2 and identifying specific addresses
Curriculum or description update rate	10 %

Name and Signature of the Course Instructor

Prof. Dr. Ekhlass Saadallah Ahmed
Asst. Prof. Dr. Ahmed Farooq Qasim

Name and Signature of the Head of Department or Branch

Prof. Dr. Abdulghafoor Jasim Salim

Course Description Form

University: Mosul **College:** Computer Science and Mathematics **Department:** Mathematics

1. Course name and academic level	
Computational Mathematics I / 3rd Class	
2. Course Code:	
CM MS 25 F 365	
3. Semester / Year:	
Second Semester 2023-2024	
4. Description Preparation Date:	
18/09/2023	
5. Available Attendance Forms:	
Attendance in the classroom and laboratory according to the announced weekly lesson schedule	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2 Hours of theory per week / 2 units 2 Hours of practical work per week / 1 unit	
7. Course administrator's name (mention all, if more than one name)	
Dr. Waleed Mohammed Al-Hayani	waleedalhayani@uomosul.edu.iq
8. Course objectives	
Course Objectives	Teaching the student the Maple program, which is an interactive computational system and a programming language at the same time, so that the student can use it as a programming language capable of solving many of his simple and complex scientific problems in his field of research, as Maple can perform numerical and symbolic solutions to mathematical functions and expressions.
9. Teaching and Learning Strategies	
Strategy	The student obtains sufficient basic information and instructions in the Maple program, so that the student learns and has the ability to create a simple program in Maple.

10. Course Structure

Week	Hours	Required learning outcomes	Unit or subject name	Learning method	Evaluation method

1	4	Learn the basics of programming	Introduction to Maple: How to download and run Maple.	Presence in the classroom and through practical work in the laboratory with application	According to the tasks assigned to the student, such as daily preparation, daily, oral, monthly and written exams.
2	4		Basic arithmetic operations, Basic mathematical functions.		
3	4		High School Algebra 1: Floating-point Arithmetic, Evaluate, Factoring a polynomial, Expanding an expression, Collecting like terms, Simplifying an expression.		
4	4		Simplifying radicals, Simplifying rational functions, convert an expression to a different form, Solve equations, Sort, Primes, gcd and lcm.		
5	4		High School Algebra 2: Sequences, Sets, Lists, Summation and producto, The “for” loop with examples.		
6	4		Calculus One Variable: Functions, Limits, Differentiation, Extrema, Taylor, and series expansions.		
7	4		Integration (Integration by Substitution, Integration by parts, Partial fractions).		
8	4		Calculus Multi Variables: Functions, Limits, Partial Derivatives, Implicit derivatives.		
9	4		Multiple integrals (Double integrals, Triple integrals).		
10	4		Graphics 2D: Two-Dimensional Plotting, Parametric Plots, Multiple plots.		
11	4		عطلة العيد		
12	4		Polar plots, Plotting implicit functions, Plotting Points, Title and text in a plot.		
13	4		Mid-Exam		
14	4		Graphics 3D: Three-Dimensional Plotting, Parametric Plots, Multiple plots, Space Curves, Contour Plots.		
15	4		Linear Algebra: Matrices and their types, Vectors and their types.		

11. Course Evaluation and Grade Distribution	
Midterm exam = 30 Degrees. Daily attendance and preparation = 5 Degrees. Practical exam = 15 Degrees. Final exam = 50 Degrees.	
12. Learning and Teaching Resources	
Required textbooks (methodology books if any)	Indeterminate
Main References (Sources)	• Bernard V. Liengme, "Maple", Morgan & Claypool Publishers, (2019). • Frank Garvan, "The Maple Book", Chapman & Hall/CRC, (2002).
Recommended supporting books and references (scientific journals, reports...)	• Martha L. Abell and James P. Braselton, "Maple by Example", 3rd Ed., Elsevier Academic Press, (2005).
Electronic References, Websites	Indeterminate
Curriculum or description update rate	10%

Lecturer Coordinator
Assist. Prof. Dr. Waleed Mohammed Al-Hayani

Head of the Department
Prof. Dr. Abdulghafor Jassim Salim

University: Mosul **College:** Computer Science and Mathematics s **Department:** Mathematics

1. Course Name:	
Financial Mathematics	
2. Course Code:	
CMMS24F367	
3. Semester / Year:	
2nd Semester 2023-2024	
4. Description Preparation Date:	
18/09/2023	
5. Available Attendance Forms:	
Classroom attendance according to the announced weekly class schedule	
6. Number of Credit Hours (Total) / Number of Units (Total)	
4 weekly hours / 3 credit units	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Mohammed Omar Al-Amr Email: alamr@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	1. Provide students with the fundamental concepts of simple interest, including its definitions, formulas, and methods of calculation, in addition to the amount's formula, equal payments, debt discounting. 2. Master the concept of periodic interest and its related mathematics, including calculating delay periods and interest, and applying the amount's formula. 3. Explain and simplify the concept of compound interest and its calculation methods, including the compound amount and present value of long-term payments. 4. Enable students to apply financial mathematical concepts and techniques in solving practical problems related to interest. 5. Provide students with the necessary computational and analytical skills to deal with financial problems in fields such as investment, and finance.

9. Teaching and Learning Strategies	
Interactive Lectures	Explanation of core concepts with real-world examples
Problem-Based Learning	Solving applied problems in interest calculations, loans, and investm
Practical Exercises	Application of mathematical formulas to real financial data
Continuous Assessment	Short quizzes, weekly assignments, written exam

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Understand simple interest fundamentals and apply its formula	Simple Interest: Definition and Formula	Interactive Lecture	Applied Exercises
2	4	Master simple interest calculation methods	Simple Interest Calculation Methods	Interactive Lecture	Assignments
3	4	Apply short-term equal payment concepts	Short-Term Equal Payments	Interactive Lecture	Applied Exercises
4	4	Understand debt repayment mechanisms	Debt Repayment	Interactive Lecture	Assignments
5	4	Master present value and discount calculations	Present Value and Discount	Interactive Lecture	Short Quiz
6	4	Apply present value concepts to multiple amounts	Present Value for Multiple Amounts	Interactive Lecture	Applied Exercises
7	4	Understand periodic interest fundamentals	Periodic Interest: Definition and Formula	Interactive Lecture	Applied Exercises
8	4	Evaluate acquired knowledge	Midterm Exam	Cumulative Assessment	Written Exam
9	4	Calculate late payment interest	Late Payment Interest	Interactive Lecture	Applied Exercises
10	4	Extract final loan installment	Final Loan Installment Calculation	Interactive Lecture	Assignments
11	4	Understand compound interest fundamentals	Compound Interest: Definition and Formula	Interactive Lecture	Applied Exercises
12	4	Apply compound interest formula	Compound Interest Formula	Interactive Lecture	Practical Evaluation
13	4	Calculate long-term payments	Long-Term Equal Payments	Interactive Lecture	Short Quiz
14	4	Master present value calculations	Present Value with Compound Interest	Interactive Lecture	Applied Exercises
15	4	Discuss practical applications	Applications Discussion	Practical Exercises	Participation Assessment

11.Course Evaluation	
Midterm exam = 30 Degrees.	Attendance and preparation = 5 Degrees.
Short exam = 5 Degrees.	Final exam = 60 Degrees.

12.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	مقدمة في الرياضيات المالية، 2013، مناضل الجواري، دار اليازوري.
Recommended books and references (scientific journals, reports...)	• An Undergraduate Introduction to Financial Mathematics, 3rd Edition, 2012, J. Robert Buchanan. ○ An Elementary Introduction to Mathematical Finance, 3rd Edition, 2011, Sheldon Ross.
Electronic References, Websites	
Curriculum or description update rate	10%

Lecturer Coordinator
Assist. Prof. Dr. Mohammed Omar Al-Amr

Head of the Department
Prof. Dr. Abdulghafor Jassim Salim

University: Mosul **College:** Computer Science and Mathematics s **Department:** Mathematics

1.Course Name:
Mathematical Statistics1
2.Course Code:
CM MS 25 F 302 SS
3.Semester / Year:
Spring semester/ 2023-2024
4.Description Preparation Date:
18/9/2023
5. Available Attendance Forms:
Attendance in the classroom according to the announced weekly class schedule
6.Number of Credit Hours (Total) / Number of Units (Total)
4 hours of theory per the week/ 3 units
7.Course administrator's name (mention all, if more than one name)
Name: Email: @uomosul.edu.iq Lecturer: Hanadi Dawood Saleem hanadidawood@uomosul.edu.iq
8.Course Objectives

Course Objectives	Learn the basic concepts of mathematical statistics. - Learn about distributions and their importance. - Learn about random sampling distributions. - Know the applications of distributions in various sciences. - Learn about the principle of ordered statistics and its distributions
9.Teaching and Learning Strategies	
Strategy	The main strategy adopted in delivering this course is to encourage student participation in exercises, while simultaneously improving and expanding their thinking skills. This will be achieved through interactive classroom and tutorials, and by examining challenging issues to motivate students.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	The student learns the Distribution function	Distributions of functions of random variables: Distribution function technique	and through the educational tools	assigned to the student, such as daily preparation, daily, oral,
2	4	The student learns the Single variable	Distributions of functions of random variables: Single		

		transformation	variable transformation technique		
3	4	The student learns the Multivariable transformation	Distributions of functions of random variables: Multivariable transformation technique		
4	4	The student learns about Moment generation function	Distributions of functions of random variables: Moment generation function technique		
5	4	The student learns the mean	Sampling distributions of the mean		
6	4	The student learns populations	Sampling distributions of the mean: Finite populations		
7	4	The student learns Chi-square distribution	Sampling distributions: Chi-square distribution		
8	4	The student learns t-distribution	Sampling distributions: t-distribution		
9	4	The student learns F-distribution	Sampling distributions: F-distribution		
10	4	The student learns Ordered statistics	Sampling distributions: Ordered statistics		
11	4	The student learns about the Central purpose theorem	The purpose of distributions: Central purpose theorem		
12	4	The student learns the concept of Beta distribution	Beta distribution		
13	4	The student learns the concept of simulation	Introduction to simulation		
14	4	The student learns about the Distribution function relationship with simulation	Distribution function relationship with simulation		
15	4	The student learns about the **Jointly** Ordered statistics	**Jointly** Ordered statistics		

11.Course Evaluation	
Assignment and Daily Exams 10% Mid Exam 30% Final Exam 60% Total 100%	
12.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	John E. Freund's Mathematical Statistics with Applicatic Irwin Miller Marylees Miller,2014 1) Introduction to Mathematical Statistics, Robert V

	Hogg,2019 2) Mathematical Statistics with Applications, D. Wackerly,2008
Main references (sources)	Probability and statistical inference, Robert V. Hogg,202
Recommended books and references (scientific journals, reports…)	Not specified, Only within the specialization of different equations theory and according to the approved course titles
Electronic References, Websites	Not specified, Only within the specialization of differen equations theory and according to the approved cou titles

University: Mosul **College:** Computer Science and Mathematics s **Department:** Mathematics

Course Name:	
Mathematical Statistics 2	
Course Code:	
CM MS 25 F 302 SS	
Semester / Year:	
Spring semester/ 2023-2024	
Description Preparation Date:	
18/9/2023	
Available Attendance Forms:	
Attendance in the classroom according to the announced weekly class schedule	
Number of Credit Hours (Total) / Number of Units (Total)	
4 hours of theory per the week/ 3 units	
Course administrator's name (mention all, if more than one name)	
Name: Email: @uomosul.edu.iq Lecturer: Hanadi Dawood Saleem hanadidawood@uomosul.edu.iq	
Course Objectives	
Course Objectives	• - Learn the basic concepts of mathematical statistics. • - Learn about estimation methods • - Study point estimation and its types • - Learn about the principle of linear regression and analysis variance
Teaching and Learning Strategies	
Strategy	The main strategy adopted in delivering this course is to encourage student participation in exercises, while simultaneously improving and expanding their thinking skills. This will be achieved through interactive classroom and tutorials, and by examining challenging issues to motivate students.

Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	The student learns methods of estimation	Point estimation: Unbiasedness	m and nal tools through the educatio	daily preparat ion, daily, such as
2	4	The student learns the smallest variance	Point estimation: Efficiency		

3	4	The student learns the convergence of probability	Point estimation: Consistency		
4	4	The student learns about sufficidncy	Point estimation: Adequacy		
5	4	The student learns the types of estimation	Methods of finding an estimator: Method of moments		
6	4	The student learns estimation mathematically	Methods of finding an estimator: Maximum likelihood method		
7	4	The student learns Bayes estimation for samples	Methods of finding an estimator: Bayes estimation		
8	4	The student learns estimates parameter in the interval	Interval estimation: Confidence intervals for means		
9	4	The student learns F-distribution	Interval estimation: Difference between two means		
10	4	The student learns estimates parameter in the interval	Interval estimation: Confidence intervals for variances		
11	4	The student learns estimates parameter in the interval	Interval estimation: Ratio between two variances		
12	4	The student learns the concept of Regression	Regression		
13	4	The student learns the concept of Least squares method	Least squares method		
14	4	The student learns the concept of Correlation	Correlation		
15	4	The student learns about the Regression Applications	Regression Applications		

Course Evaluation	
Assignment and Daily Exams 10% Mid Exam 30% Final Exam 60% Total 100%	
Learning and Teaching Resources	
Required textbooks (curricular books, if any)	John E. Freund's Mathematical Statistics with Applications Irwin Miller Marylees Miller,2014 1) Introduction to Mathematical Statistics, Robe V. Hogg,2019 2) Mathematical Statistics with Applications, D. Wackerly,2008
Main references (sources)	Probability and statistical inference, Robert Hogg,2020
Recommended books and references (scientific journals, reports…)	Not specified, Only within the specialization of differential equations theory and according to the approved course titles
Electronic References, Websites	Not specified, Only within the specialization differential equations theory and according to t approved course titles

University: Mosul **College:** Computer Science and Mathematics s **Department:** Mathematics

Course Name:	
Theory of Differential Equations	
Course Code:	
CM MS 25 F 336	
Semester / Year:	
Spring semester/ 2023-2024	
Description Preparation Date:	
18/9/2023	
Available Attendance Forms:	
Attendance in the classroom according to the announced weekly class schedule	
Number of Credit Hours (Total) / Number of Units (Total)	
4 hours of theory per the week/ 3 units	
Course administrator's name (mention all, if more than one name)	
Name: D. Thair Younis Tahnoon Email: Thairyounis59@uomosul.edu.iq Lecturer: Merna Adel Aziz merna_samarchi@uomosul.edu.iq	
Course Objectives	
Course Objectives	• Learning the theoretical concepts of differential equations • Studying the existence and uniqueness theorems for solving differential equations • Understanding the linear independence theorems for solving differential equations • Learning how to solve linear homogeneous differential systems using eigenvalues and eigenvectors • Learning the concept of stability of solutions to differential systems, types of critical points of systems, and the phase plane and the trajectories of these points.
Teaching and Learning Strategies	
Strategy	The main strategy adopted in delivering this course is to encourage student participation in exercises, while simultaneously improving and expanding their thinking skills. This will be achieved through interactive classroom and tutorials, and by examining challenging issues to motivate students.
Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	The student learns the theories of the existence and uniqueness of solutions to differential equations	first order D.Es., the existence of solution theorem (Cauchy – peano th.1)	Attendance in the classroom and through the educational tools available inside the classroom	According to the tasks assigned to the student, such as daily preparation, daily, oral, monthly and written exams, and reports.
2	4	The student learns the theories of the existence and uniqueness of solutions to differential equations	Lipschitz condition, the existence and uniqness solutions theorem (Cauchy – peano th.2)		
3	4	The student learns the approximate methods for finding the solutions for differential equations	fixed point theorem, successive approximations method (Picard method) with examples.		
4	4	The student learns about nth order differential systems and the independence of their solutions.	Systems of n differential equations of first order, linearly independent functions		
5	4	The student learns the theorems of independence and linear dependence of solutions.	Linear independence theorems		
6	4	The student learns how to solve equations of order n with constant coefficients using the method of variation of parameters	Linear differential equation of n th order with constant Coefficient, Variation of parameters to find the solution of higher order D.Es., theorems		
7	4	The student learns how to solve linear homogeneous differential systems.	Linear differential systems, linear homogenous differential systems, Eigen values, Eigen vectors		
8	4		Mid term exam		
9	4	The student learns how to solve linear homogeneous differential systems.	solution for homogenous D.S. distinct Eigen values,		
10	4	The student learns how to solve linear	solution for homogenous D.S. distinct Eigen values, repeated		

		homogeneous differential systems.	Eigen values		
11	4	The student learns about the Legander equation and the Bessel equation and how to solve them.	Legendre equation, Bessel equation, method of solution		
12	4	The student learns the concept of oscillation theory and its theorems.	Oscillation theory with theorems		
13	4	The student learns the concept of stability and critical points of differential systems.	The concept of stability, stable solution, asymptotically stable solution, critical points for systems		
14	4	The student learns about the stability of linear differential systems.	Stability of the critical points for linear systems, roots of characteristic eq. are real and distinct, complex numbers		
15	4	The student learns about the stability of nonlinear systems.	Stability of the critical points for nonlinear systems, linearization method		

Course Evaluation	
Assignment and Daily Exams 10% Mid Exam 30% Final Exam 60% Total 100%	
Learning and Teaching Resources	
Required textbooks (curricular books, if any)	نظرية المعادلات التفاضلية، د. احمد زين العابدين محمد، جامعة الموصل، 1992
Main references (sources)	1. Elementary differential equations – Earl D. Rainville and Bedient E , 1990 2. Ordinary Differential Equations, Gabriel Nagy, 2021
Recommended books and references (scientific journals, reports…)	Not specified, Only within the specialization of differential equations theory and according to the approved course titles
Electronic References, Websites	Not specified, Only within the specialization differential equations theory and according to t approved course titles

University: Mosul **College:** Computer Science and Mathematics

Department or Branch: Mathematics

1. Course Name:
Numerical Analysis (2) / 3rd Class
2. Course Code:
MS 306
3. Semester / Year:
1st Semester / 2023 - 2024
4. Description Preparation Date:
18/9/2023
5. Available Attendance Forms:
Classroom according to the announced weekly lesson schedule
6. Number of Credit Hours (Total) / Number of Units (Total)
2 hours of theory and 2 hours of practical per week / 3 units
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Ekhlass Saadallah Ahmed/ Professor Email:drekhlass-alrawi@uomosul.edu.iq

8. Course Objectives	
Course Objectives	• The student's teaching of Numerical Analysis 2 aims at his knowledge of the numerical methods for solving a problem that may be difficult to find an analytical solution. • Study numerical methods to find the numerical integral with their application in solving examples. • Study the error analysis of the approximate solutions of these numerical methods to make it easier for us to know which numerical methods are better in finding the value of numerical integration. • To understand the methods of solving ordinary differential equations numerically with different examples. • To understand the least square approximation ,linear, nonlinear approximation for x and for constants. • Writing algorithms for those numerical methods and programming them using MatLab language practically.

9. Teaching and Learning Strategies	
Strategy	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2+2	Learn how to derive formulas for numerical integration methods, solve differential equations, and integrate, while studying errors and writing algorithms for each and program it in MATLAB.	Interpolation polynomial approximation (Lagrange polynomial)	My presence in the classroom and through the educational tools available inside the classroom	According to the tasks assigned to the student, such as daily preparation, daily, oral, monthly and written exams, and reports.
2	2+2		Newton formulas of finite differences and solving examples		
3	2+2		Numerical integration –derivative of Trapezoidal rule with solving an example and write algorithm		
4	2+2		Derivative of one third Simpson's rule with a study of error analysis and solving an example and write algorithm		
5	2+2		Derivative of 3/8 Simpson's rule and solving an example and write algorithm		
6	2+2		Midpoint Method with solving an example with write a duty-solving example		
7	2+2		Romberg method and solving an example and write algorithm		
8	2+2		Gauss-Legendre with solving different examples		
9	2+2		Closed Newton-Cotes methods with a daily exam		
10	2+2		Mid - course exam		
11	2+2		Derivative of explicit Euler's and implicit Euler's method with solving an example and write algorithm		
12	2+2		Derivative of implicit Euler's method with solving an example and write algorithm		
13	2+2		Taylor series method and solving examples and write algorithm		
14	2+2		Fourth order Runge-Kutta method and solving examples and write algorithm		
15	2+2		Preparatory week before the final Exam		

11. Course Evaluation

Daily attendance and preparation: 10 points
Practical: 15 points , Monthly exams: 25 points , Final exam: 50 points

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Ali Muhammad Sadiq Saifi and Ibtisam Kamal Al-Din, Principles of Numerical Analysis, University of Baghdad, 1986.
Main references (sources)	Numerical Methods Using MatLab, fourth edition, John H.M. and Kurtis D.F. :2004
Recommended books and references (scientific journals, reports, ...)	Not specified only includes numerical analysis2 and identifying specific addresses
Electronic References, Websites	Not specified only includes numerical analysis2 and identifying specific addresses
Curriculum or description update rate	10 %

Name and Signature of the Course Instructor

Prof. Dr. Ekhlass Saadallah Ahmed
Prof. Dr. Abdulghafor M. Al-Rozbayani

Name and Signature of the Head of Department or Branch

Prof. Dr. Abdulghafoor Jasim Salim

1. Course Name:
Operations Research (Third Year)
2. Course Code:
CM MS 24 F 338
3. Semester / Year:
Autumn / 2023-2024
4. Description Preparation Date:
18/9/2023
5. Available Attendance Forms:
Attendance in the classroom according to the announced weekly schedule
6. Number of Credit Hours (Total) / Number of Units (Total)
Four theoretical hours per week / 3 credit hours
7. Course administrator's name (mention all, if more than one name)
Name: Prof. Dr. Ghada Moayid Al-Naemi Email: drghadaalnaemi@uomosul.edu.iq
8. Course Objectives

Course Objectives	• Determining the minimum or maximum value of a specific function is called the objective function. • The objective of Operations Research is to provide a scientific basis to the decision maker for solving the problems involving the interaction of various components of an organization by employing a team of scientists from various disciplines, all working together for finding a solution which is in the best interest of the organisaton as a whole. The best solution thus obtained is known as optimal decision. • The Operations Research analyst or team of experts first have to examine the situation and clearly define what exactly happening there and identify the variables and constraints. Similarly identify what is the objective and put them all in the form of statement. The statement must include a) a precise description goals or objectives of the study, b) identification of controllable and uncontrollable variables and c) restrictions of the problem. The team should consult the personals at the spot and collect information, if something is beyond their reach, they have to consult duty engineers available and understand the facts and formulate the problem. • The objective of studying Operations Research is to apply scientific and analytical methods to support better and more efficient decision-making, especially in complex environments involving limited resources, multiple variables, and various constraints.

9. Teaching and Learning Strategies

Strategy	This course introduces students to the fundamentals of Operations Research (OR), emphasizing its theoretical foundations and practical applications in decision-making and optimization. The course covers the formulation of mathematical models for real-world problems, particularly linear programming, and explores solution techniques including the Simplex method, Duality Theory, and Sensitivity Analysis. Practical applications such as the transportation problem are also discussed. Students engage in exploratory tasks to foster critical thinking and deepen their understanding of OR principles.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	**Understanding the fundamental concepts** and principles of Operations Research and its role in decision-making. Formulating real-world problems into mathematical models. **Applying optimization techniques** such as linear programming. The basic and important methods that help in making correct decisions, which are linear programming problems, and some methods for solving linear programming problems and applying them to the transportation problem.	Introduction, Theoretical models for linear programming problems.	My participation in the classroom and the utilization of electronic platforms	In accordance with the responsibilities assigned to the student, including daily preparation, oral, monthly, and written exams, as well as reports.
2	4		Numerical procedures for soling linear programming problems, Graphical method.		
3	4		Basic and Basic feasible solution. Prime numbers and theorems.		
4	4		Simplex method (slack variables)		
5	4		Simplex method (artificial variables)		
6	4		Simplex multipliers method.		
7	4		Introduction, Dual method and Dual theorem.		
8	4		Mid Examination.		
9	4		The relationship between the two models solution and what results from them, The		

10	4		inverse basis method. Sensitivity analysis method, Changes in the right side of the constraints, Changes in objective function coefficients.		
11	4		Introduction, Find a primary solution , West corner method, least cost method.		
12	4		Vogle's method, Unbalanced transport problems, Find the optimal solution to the transport problem.		
13	4		Fractional Linear Programming.		
14	4		Methods for solving linear fractional programming Problems.		
15	4		Some methods to solve Methods for solving linear fractional programming problems		

11. Course Evaluation

Daily attendance and preparation are worth five points. Daily homework and exam = 5 marks. Monthly exams = 30 marks. Final exam = 60 marks.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Linear and Nonlinear Programming, 2008 Engineering Optimization Theory and Practice
Main references (sources)	• Introduction to operation research
Recommended books and references (scientific journals, reports…)	• Operation research.
Electronic References, Websites	There are many sources available on scientific platforms, as well as numerous videos and lectures.

1. Course Name:
Number theory (Third Year)
2. Course Code:
CMMS 25 F3 49
3. Semester / Year:
Spring/ 2023-2024
4. Description Preparation Date:
18/9/2023
5. Available Attendance Forms:
Attendance in the classroom according to the announced weekly schedule
6. Number of Credit Hours (Total) / Number of Units (Total)
Four theoretical hours per week / 3 credit hours
7. Course administrator's name (mention all, if more than one name)
Name: Prof. Dr. Ghada Moayid Al-Naemi Assist. Prof. Susan H. Mohammad Email: drghadaalnaemi@uomosul.edu.iq
8. Course Objectives

Course Objectives	• The *Number Theory* course aims to introduce students to the concepts of: divisibility, linear congruence, and the law of quadratic reciprocity. • It seeks to familiarize students with the theorems related to this subject, including: Fermat's theorem, the theorem of power residues, exponential functions, and Diophantine equations. • Given the importance of divisibility and the greatest common divisor (GCD) and how to find them, as well as prime numbers, their properties, the fundamental theorem of arithmetic, and its applications, the course also covers what divisibility means and how it is calculated. • Congruence offer an alternative perspective on divisibility by providing an effective tool for facilitating proofs and another means of studying number theory, including properties of congruence, their applications, and methods of solving them. • Complete and reduced residues, linear congruence, and the Chinese Remainder Theorem, along with Euler's and Fermat's theorems and the converse of Fermat's theorem are also

	discussed. • Algebraic congruence: what it means and how it is calculated, numerical functions: their meaning and how to compute them. • Familiarization with residue systems.

9. Teaching and Learning Strategies

Strategy	The course aims to equip students with a thorough understanding of the properties and philosophy of Number Theory. Students will recognize that arithmetic and number theory represent the science that studies the properties of numbers and their various relationships. The teaching approach focuses on core concepts such as divisibility, prime numbers, and congruences, rather than merely memorizing formulas. Each concept will be connected to practical or historical examples to enhance comprehension Simple, progressively challenging examples will be provided to guide students in writing mathematical proofs, especially using mathematical induction and congruence techniques Students will be assigned open-ended problems that require critical thinking and the integration of multiple ideas. Additionally, students will be given hypotheses and exploratory problems to investigate independently, such as observing patterns in modular residues without being provided with the underlying rules directly.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Providing the student with the ability to prove the theorems associated with the prescribed topics, solve mathematical problems related to each topic, provide mathematical examples of all the theorems in the course, and review the history of this course and its affiliation with other mathematics topics.	An introduction and historical overview of number theory, natural and integer numbers, integer characteristics, and basic integer theorems.	My participation in the classroom and the utilization of electronic platforms	In accordance with the responsibilities assigned to the student, including daily preparation, oral, monthly, and written exams, as well as reports.
2	4		The mathematical induction principle, divisibility, basic divisibility properties, the divisibility algorithm theorem, and numerical examples.		
3	4		Greatest common divisor, basic theorems for greatest common divisor, Euclid's algorithm theorem.		

4	4		Prime numbers and theorems.		
5	4		congruencies and their basic theorems.		
6	4		Divisibility of prime numbers and its fundamental theorems.		
7	4		Linear identities, linear identity systems with a variable.		
8	4		Mid Exam		
9	4		Chinese Remainder Theorem.		
10	4		Algebraic matching.		
11	4		Eid al-Fitr holiday.		
12	4		Euler and Fermat's theorems and the inverse of Fermat's theorem.		
13	4		Sediment systems.		
14	4		Reduced sediment system.		
15	4		Numerical functions.		

11. Course Evaluation	Daily attendance and preparation are worth five points. Daily homework and exam = 5 marks.Monthly exams = 30 marks. Final exam = 60 marks.

12. Learning and Teaching Resources	We do not have a prescribed literature.
Required textbooks (curricular books, if any)	نظرية الاعداد، (د.نادر ضبيط)،
Main references (sources)	نظرية الاعداد، (معروف عبد الرحمن)، 2013.
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

University: Mosul **College:** Computer Science and Mathematics

Department or Branch: Mathematics

1. Course Name / Class	
Mathematical Analysis (1) / 3rd Class	
2. Course Code:	
CM MS 25 F 331	
3. Semester / Year:	
1st Semester / 2023 – 2024	
4. Description Preparation Date:	
18 / 9 / 2023	
5. Available Attendance Forms:	
Classroom according to the announced weekly lesson schedule	
6. Number of Credit Hours (Total) / Number of Units (Total)	
4 hours per week / 3 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Assist. Prof. Dr. Barah Mahmood Sulaiman Email: barah_mahmood82@uomosul.edu.iq	
8. Course Objectives	
Objectives	– This module aims mathematical analysis aims to introduce the student to the basic concepts and techniques of real analysis. – Exploration of the properties of mathematical numbers: mathematical analysis investigates the properties of real numbers, such as their order, completeness, and algebraic and topological properties. It delves into the structure of the real number system and its various subsets. – Rigorous understanding of calculus: mathematical analysis provides a rigorous foundation for calculus. It aims to give a precise definition of limits, continuity, which are fundamental concepts in calculus. – Study of mathematical functions: mathematical analysis focuses on the behavior and properties of functions defined on the real numbers. – Development of mathematical reasoning and proof-writing skills: mathematical analysis is a discipline that emphasizes rigorous proofs and logical reasoning. It aims to develop students' ability to construct and present mathematical arguments in a precise and coherent manner.
9. Teaching and Learning Strategies	

Strategy	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	4	Ability to construct and present rigorous mathematical proofs; Understanding of the properties of real numbers: Students will learn about the order and completeness properties of real numbers, the algebraic structure of real numbers, and the topological properties of real line;	Definition of mathematical analysis with its most important applications	The course will be delivered through in-person lectures held in the Mathematics Department classroom, supplemented by online activities, resources, and assignments provided via the Google Classroom platform.	Students will be evaluated based on their performance in assigned tasks, including daily preparation, participation in daily and oral assessments, monthly and written examinations, and the submission of reports.
2	4		The real numbers, the relationship between the field of rational numbers and the field of real numbers		
3	4		Archimedes property, the set of real numbers, the concept of order, upper and lower bounds		
4	4		The concept of completeness, the complete ordered field, the density of relative numbers, the density of irrational numbers		
5	4	Understanding of fundamental concepts, such as sequences, series, limits, convergence, and continuity;	Real number sequences, convergent sequences, bounded sequences, monotonic sequences, alternating sequences		
6	4		Real number series, types of sequences, convergence of sequences		
7	4		Mid-term Exam + Tests for convergence of infinite series		
8	4	Understand key concepts in metric spaces and topology; analyze convergence and series multiplication; apply compactness and limits properties; study continuity, continuous maps, and uniform continuity; and apply the Mean Value Property in analysis.	Metric spaces, topological concepts, convergence in metric spaces		
9	4		Absolute and conditional convergence, multiplication of series		
10	4		Compactness, limits of functions and some important theorems in limits		
11	4		Continuity, Continuous maps, Real Continuous maps Space		
12	4		Real maps defined on compact spaces, uniform continuity		
13	4		Mean value property (examples with top applications)		
14	4	Understand and analyze sequences and series of functions with pointwise and uniform convergence	Sequences and series of functions, pointwise convergence and absolute convergence		
15	4		Infinite series of functions, power series		

11. Course Evaluation

Daily attendance and preparation: 2.5 points , Homework: 2.5 points
Daily exams: 5 points , Monthly exams: 30 points , Final exam: 60 points

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Adel Ghassan Naoum, Introduction to Mathematical Analysis, Mosul University Press, 1986
Main references (sources)	Rudin, W., Principles of Mathematical Analysis, 3rd ed., 1976, McGraw-Hill, Inc., New York, USA.
Recommended books and references (scientific journals, reports, ...)	Fusco, N., Marcellini, P., & Sbordone, C., "Mathematical Analysis: Functions of Several Real Variables and Applications", Switzerland: Springer International Publishing, 2024.
Electronic References, Websites	https://en.wikipedia.org/wiki/Mathematical_analysis
Curriculum or description update rate	10 %

Name and Signature of
the Course Instructor

Assist. Prof. Dr. Barah M. Sulaiman
Dr. Salma M. Faris

Name and Signature of
the Head of Department or Branch

Prof. Dr. Abdulghafoor Jasim Salim

University: Mosul **College:** Computer Science and Mathematics

Department or Branch: Mathematics

1. Course Name / Class	
Mathematical Analysis (2) / 3rd Class	
2. Course Code:	
CM MS 25 F 332	
3. Semester / Year:	
2nd Semester / 2023 - 2024	
4. Description Preparation Date:	
26 / 04 / 2023	
5. Available Attendance Forms:	
Classroom according to the announced weekly lesson schedule	
6. Number of Credit Hours (Total) / Number of Units (Total)	
4 hours per week / 3 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Salma Muslih Faris Email: salma_muslih67@uomosul.edu.iq Name: Assist. Prof. Dr. Barah Mahmood Sulaiman Email: barah_mahmood82@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	– Mathematical analysis aims to introduce the student to the basic concepts and techniques of real analysis. – Understanding Differentiation helps students develop an understanding of how a function's output changes in response to small changes in its input. – Analyzing Extrema: Differentiation enables the identification and analysis of critical points, which include local maxima and minima of a function. – Analyzing Graphs and Behavior: Differentiation provides valuable insights into the behavior of a function's graph. – Approximating Areas: Riemann integration allows us to approximate the area under a curve by dividing the region into smaller rectangles and summing their individual areas. The aim is to obtain a close approximation to the exact area. – Understanding Measurable Sets: Measure theory aims to study measurable sets and their properties. Measurable sets are subsets of a measure space. The aim is to define and characterize measurable sets and explore their properties. – Generalizing Integration: The Lebesgue integral aims to provide a more general and flexible framework for integration compared to the Riemann integral. – Overcoming Riemann's Limitations: The Lebesgue integral aims to overcome the limitations of the Riemann integral, such as the inability to integrate functions with unbounded or discontinuous points.
9. Teaching and Learning Strategies	

Strategy	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	4	Understand differentiation, derivatives, and properties of differentiable functions, Apply Fermat's principle, Rolle's theorem, and the mean value theorem, Use L'Hôpital's rule to compute limits, Apply Taylor series and Taylor's theorem to approximate	The differentiation, the derivative, the space of differentiable functions	The course will be delivered through in-person lectures held in the Mathematics Department classroom, supplemented by online activities, resources, and assignments provided via the Google Classroom platform.	Students will be evaluated based on their performance in assigned tasks, including daily preparation, participation in daily and oral assessments, monthly and written examinations, and the submission of reports.
2	4		Fermat's principle, Rolle's theorem, mean value theorem		
3	4		L'Hôpital's law, Taylor series, Taylor's theorem		
4	4	Understand and apply Riemann integration. Analyze continuous and monotonic functions in relation to Riemann integration. Recognize properties of the Riemann integral. Identify Riemann integrable functions.	Riemann integration, definition, examples		
5	4		Relation between continuous, monotonic functions and Riemann integration		
6	4		Riemann integral as a positive non-variance monotonic linear transformation		
7	4		Space of Riemann integrable functions		
8	4	Understand measure theory and measurable functions. Calculate measures of bounded and unbounded sets. Recognize non-measurable and negligible sets and their properties.	Mid-term Exam + Measure Theory, lengths of bounded open intervals,		
9	4		lengths of bounded open sets, Measure of unbounded sets, measurable functions		
10	4		Examples of an unmeasurable set		
11	4		Inner and outer measure of bounded sets, measurable bounded sets.		
12	4		Negligible sets, some important characteristics and theories about negligible sets		
13	4	Define Lebesgue integration with examples. Understand Lebesgue's theorem on Riemann integration and its limitations. Explore key properties of Lebesgue integration. Understand the space of Lebesgue integrable functions.	Define Lebesgue integration with some examples,		
14	4		Lebesgue's theorem of Riemann integration, some weaknesses points of Riemann integration.		
15	4		Some properties of Lebesgue integration, the space of Lebesgue integrable functions		

11. Course Evaluation
Daily attendance and preparation: 2.5 points , Homework: 2.5 points Daily exams: 5 points , Monthly exams: 30 points , Final exam: 60 points

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Adel Ghassan Naoum, Introduction to Mathematical Analysis, Mosul University Press, 1986
Main references (sources)	Rudin, W., Principles of Mathematical Analysis, 3rd ed., 1976, McGraw-Hill, Inc., New York, USA.
Recommended books and references (scientific journals, reports, ...)	Fusco, N., Marcellini, P., & Sbordone, C., "Mathematical Analysis: Functions of Several Real Variables and Applications", Switzerland: Springer International Publishing, 2024.
Electronic References, Websites	https://en.wikipedia.org/wiki/Mathematical_analysis
Curriculum or description update rate	10 %

Name and Signature of
the Course Instructor

Assist. Prof. Dr. Barah M. Sulaiman
Dr. Salma M. Faris

Name and Signature of
the Head of Department or Branch

Prof. Dr. Abdulghafoor Jasim Salim

Course Description

1. Course Name:
Cryptography
2. Course Code:
CMMS24F456
3. Semester / Year:
2023-2024
4. Description Preparation Date:
1/9/2023
5. Available Attendance Forms:
In classroom of mathematical department
6. Number of Credit Hours (Total) / Number of Units (Total)
4 hours in every week/ 3 units
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Ban Ahmed Hasan Mitras Email: banah.mitras@uomosul.edu.iq
8. Course Objectives

Course Objectives	* Recognize on cryptography and its algorithms. *Study of classical encryption algorithms. * Study of modern encryption algorithms.
9. Teaching and Learning Strategies	
Strategy	Methods and algorithms of modern and classical cryptography
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4		General definitions		
2	4		Transposition Encrypt Algorithm		
3	4		Route transposition (zig-zag, anti zig-zag, horizontal, vertical)		
4	4		Clock-wise, anti-clock, diagonal route		
5	4		Double column transposition algorithm		
6	4		Polyliteral Transposition Algorithm		
7	4		Substitution Cipher Algorithm		
8	4		Direct(Additive) Cipher Algorithm		
9	4		Multiplicative Cipher Algorithm		
10	4		Affine Cipher Algorithm		
11	4		Stream –modern Encrypt Algorithms		
12	4		Encrypt Algorithms by ASCCI code		
13	4		Mathematical models to cryptography		
14	4		Morse Cipher Algorithm		
15	4		Beal's homophonic cipher algorithm		

Course Description

1. Course Name / Class

Dynamical Systems / 4th Class

2. Course Code:

CM MS 24 F 466

3. Semester / Year:

1st Semester / 2023 - 2024

4. Description Preparation Date:

18 / 09 / 2024

5. Available Attendance Forms:

Classroom according to the announced weekly lesson schedule, electronically on Google Classroom platform.

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

4 hours per week / 3 units

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

Name: Dr. Salma Muslih Faris
Email: salma_muslih67@uomosul.edu.iq

8. Course Objectives

Course Objectives	– Develop the theory of iterative problem-solving and understand the fundamental ideas of dynamical systems. – Understand iterations, fixed points, and periodic points. – Study the basic concepts of dynamical systems. – Explore fundamental theories such as bifurcation theory and chaos theory. – Study dynamical systems in Euclidean and complex settings. – Examine advanced types of chaos (e.g., expanding functions).

9. Teaching and Learning Strategies

Strategy	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method

1	4	Understand the basic concepts of dynamical systems, including fixed points, periodic points, orbits, attraction, and repelling; explore SDIC, density, and topological transitivity; and apply examples and theorems related to these concepts.	Basic Definition of Dynamical Systems (DS): Fixed points, periodic points, orbits, attraction, and repelling.	The course will be delivered through in-person lectures held in the Mathematics Department classroom, supplemented by online activities, resources, and assignments provided via the Google Classroom platform.	Students will be evaluated based on their performance in assigned tasks, including daily preparation, participation in daily and oral assessments, monthly and written examinations, and the submission of reports.
2	4		Study of some examples in DS with special families.		
3	4		Definitions of SDIC (Sensitive Dependence on Initial Conditions), density, and topological transitivity.		
4	4		Examples and theorems related to the above concepts.		
5	4	Understand the concept of bifurcation, identify and distinguish between saddle-node, pitchfork, and Hopf bifurcations, and analyze examples illustrating each type.	Definition of Bifurcation.		
6	4		Study of types of bifurcation: saddle-node / pitchfork bifurcation.		
7	4		Pitchfork bifurcation and Hopf bifurcation.		
8	4		Examples for all the mentioned types of bifurcation.		
9	4	Understand the definition of chaos, recognize key chaotic families such as the logistic and tent maps, explore other chaotic functions, and explain the relationship between bifurcation and chaos.	Definition of Chaos.		
10	4		The most famous chaotic families: logistic map, tent map, etc.		
11	4		Other chaotic functions.		
12	4		The relationship between bifurcation and chaos.		
13	4	Understand dynamical systems in high-dimensional Euclidean spaces, analyze complex dynamical systems including Julia and Fatou sets, and explore the behavior of expanding functions.	Dynamical systems on high-dimensional Euclidean spaces.		
14	4		**Complex dynamical systems** (Julia sets and Fatou sets).		
15	4		Expanding functions.		

11. Course Evaluation

Daily attendance and preparation: 2.5 points , Homework: 2.5 points
Daily exams: 5 points , Monthly exams: 30 points , Final exam: 60 points

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Introduction to Chaotic dynamical Systems. R.L. Devaney
Main references (sources)	Encountered with Chaos, Gulic.
Recommended books and references (scientific journals, reports, ...)	
Electronic References, Websites	
Curriculum or description update rate	10 %

Course Description Form

University: Mosul **College:** Computer Science and Mathematics **Department:** Mathematics

13.Course name and academic level	
Mathematical Transforms / 4th Class	
14.Course Code:	
CM MS 25 F 437	
15.Semester / Year:	
First Semester 2023-2024	
16.Description Preparation Date:	
1/09/2023	
17.Available Attendance Forms:	
Attendance in the classroom according to the announced weekly class schedule.	
18.Number of Credit Hours (Total) / Number of Units (Total)	
4 Hours of theory per week / 3 units	
19.Course administrator's name (mention all, if more than one name)	
Dr. Ahmed M. Jomaa Dr. Mohammed Omar Al-Amr	ahmed.m.j.jassim@uomosul.edu.iq alamr@uomosul.edu.iq
20.Course objectives	

Course Objectives	1. Developing students' problem-solving skills through mathematical transformation techniques. 2. Introducing students to the wide applications of transformations in various scientific fields. 3. Simplifying solutions to complex problems using transformation methods. 4. Strengthening fundamental understanding of concepts and definitions related to mathematical transformations. 5. Training students to use transformations in solving differential equations. 6. Highlighting the importance of transformation methods as a crucial mathematical tool for scientists and researchers.

21. Teaching and Learning Strategies

Interactive Lectures	Explaining fundamental concepts of mathematical transforms with practical examples
Problem-Based Learning (PBL)	Solving real-world problems using mathematical transforms
Collaborative Learning	Group work to solve complex problems using mathematical transforms
Continuous Assessment	Periodic quizzes, weekly assignments, and comprehensive final examination

22. Course Structure

Week	Hours	Required learning outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Learn about the Laplace transform, its properties, and some applications in solving differential equations and integrals.	Introduction and definitions, Kernal, Definition of Laplace integral	Presence in the classroom	According to the tasks assigned to the student, such as daily preparation, daily, oral, monthly and written exams.
2	4		Laplace transformation, Properties, Theorems, Examples		
3	4		Laplace Transform of derivatives and integrals, Theorems		
4	4		Inverse transform of Laplace, Method of evaluating inverse		
5	4		Convolution theorem, Properties, Examples		
6	4		Step, Impulse and periodic functions,		
7	4		Mid-term Exam + solving exercises		
8	4		Fourier series, Definitions, Properties		

9	4		Using Properties of sine and cosine		
10	4		Evaluation of Fourier coefficients, Properties, Examples		
11	4		Even and Odd functions, Definitions, principles, Examples		
12	4		Complex form of the Fourier series, Definitions, Examples		
13	4		Z-Transformation, Definitions, Theorems, properties		
14	4		Properties of Z-transform, Theorems, Examples		
15	4		Inverse of Z-transform, Definitions, methods, applications		

23. Course Evaluation and Grade Distribution

Midterm exam = 30 Degrees. Attendance and preparation = 5 Degrees.

Daily exam = 5 Degrees. Final exam = 60 Degrees.

24. Learning and Teaching Resources

Required textbooks (methodology books if any)	Indeterminate
Main References (Sources)	• Ladis, D Kovach, Advance Engineering Mathematics, 5th Edition, Addison Wesley Publishing Com., 2011.
Recommended supporting books and references (scientific journals, reports...)	• Gupta, Parmanand. *Topics in Laplace and Fourier transforms*. Laxmi Publications Pvt Limited, 2019. • Zill, Dennis G., and Michael R. Cullen. Differential equations with boundary-value problems. 7th Edition. Cengage Learning, 2008. • Spiegel, Murray R. *Schaum's Outline of Laplace Transforms*. McGraw Hill Professional, 1965.
Electronic References, Websites	Indeterminate

Curriculum or description update rate	5%

Lecturer Coordinator
Assist. Prof. Dr. Waleed Mohammed Al-Hayani

Head of the Department
Prof. Dr. Abdulghafor Jassim Salim

Course Description

1. Course Name / Class	
Graph Theory / 4th Class	
2. Course Code:	
CMMS 25_F4031	
3. Semester / Year:	
2nd Semester / 2023 - 2024	
4. Description Preparation Date:	
1 / 9 / 2023	
5. Available Attendance Forms:	
Classroom according to the announced weekly lesson schedule	
6. Number of Credit Hours (Total) / Number of Units (Total)	
4 hours per week / 3 units	
7. Course administrator's name (mention all, if more than one name)	
Name: ***Dr. Raghad A. Mustafa***	**Email:** *raghad.math@uomosul.com*
8. Course Objective	
Course Objective	Identification of graph, directed graph and some special graph. Tracks, paths, and circuits, connected graph, distance in the graph and on the tree, planner graph, and graph immersion are also identified. genus, thickness, number of intersections, and some related results and theorems are identified.

9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students. And knowing the basis of the concepts and where they came from and taking realistic applications on that

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	4	Understand the basic concepts of graph theory.	Introduction to the theory of graphs and its importance to other sciences	The course will be delivered through in-person lectures held in the Mathematics Department classroom, supplemented by online activities, resources, and assignments provided via the Google Classroom platform.	Students will be evaluated based on their performance in assigned tasks, including daily preparation, participation in daily and oral assessments, monthly and written examinations, and the submission of reports.
2	4		Basic Concepts in Graph theory.		
3	4		Directed graphs with some special graphs		
4	4		Connected and distance in graph		
5	4		Trees and forest with some theorems		
6	4	The ability to apply graph theory in different fields.	Planner graph		
7	4		Closed and oriented surfaces		
8	4		Mid-Exam		
9	4		Thickness, genus and number of crosses		
10	4		Kurtovsky's theorem and some		

			theorems		
11	4	students excel in computing, artificial intelligence, statistical analysis, and other	Eid al-Fitr		
12	4		graph coloring		
13	4		Some applications of graph theory		
14	4		Review		
15	4		Final-Exam		

11. Course Evaluation	
Daily exams: 10 points , Monthly exams: 30 points , Final exam: 60 points	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	علي عزيز علي ، " مقدمة في نظرية البيان " وزارة التعليم العالي والبحث العلمي ، الجمهورية العراقي جامعة الموصل 1983.
Main references (sources)	Chartrand , G. and Lesniak , L.; (2016). Graphs and Digraphs,6th ed.,Wadsworth and Brooks/Cole, California
Recommended books and references (scientific journals, reports, ...)	[1].Bondy, J.A. and Murty, U.S.R.; (2008). Graph Theory, Library of Congress Control Number: 2007940370. [2].Diestel , R. . (2005). Graph Theory , Springer – Verlag Heidelberg , New York 2005. [3].Douglas , B. W.; (2002). Introduction in Graph Theory , printed in India by Rashtriya printers. [4].Fournier , J.C. ; (2009). Graph Theory and Applications, John Wiley & Sons, Inc. 111 River Street . USA.
Electronic References, Websites	https://en.wikipedia.org/wiki/Graph_theory
Curriculum or description update rate	10 %

Name and Signature of the Course Instructor	Name and Signature of the Head of Department of Branch
Dr. Raghad Abdulazeez Mustafa	*Prof. Dr. Abdulghafoor J. Salim*

Course Description

1. Course Name:
Function analysis1/ The fourth stage
2. Course Code:
CM MS 21 F 441
3. Semester / Year:
2023-2024
4. Description Preparation Date:
1/10//2023
5. Available Attendance Forms:
Attendance in the classroom according to the announced weekly class schedule
6. Number of Credit Hours (Total) / Number of Units (Total)
Four theoretical lessons per week / 3 units
7. Course administrator's name (mention all, if more than one name)
Name: DR.AHMED AMER Email: :aahmedamer68@uomosul.edu.iq ....

8. Course Objectives	
Course Objectives	• Students will study a new spaces, its properties and different type of operators

9. Teaching and Learning Strategies	
Strategy	Vector, normed and Banach spaces Linear, bounded and continuous operators

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	2	My presence in the classroom and through the educational tools available inside the classroom, with some site visits	**Definition, Examples and some properties of vector spaces**	Learn the methods of evaluating and analyzing the types of roads found in the urban and rural road network and how to determine their capacity and level of service.	According to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, written and reports exams.
2	2	My presence in the classroom and through the educational tools available inside the classroom, with some site visits	**Linear combination, span set, linearly independence, finite and infinite dimension,**		
3	2	My presence in the classroom and through the educational tools available inside the classroom, with some site visits	**Definition, sum and intersection of subspace, direct summand**		
4	2	My presence in the classroom and through the educational tools available inside the classroom, with some site visits	**Definition, Minkowski's inquality, Cauchy Schwartz inequality, some properties of normed spaces**		
5	2	My presence in the classroom and through the educational tools available inside the classroom, with some site visits	**Metric space, convergent sequence and Cauchy sequence**		
6	2	My presence in the classroom and through the educational tools available inside the classroom, with some site visits	**Definition, The space C[a,b]**		

7	2	My presence in the classroom and through the educational tools available inside the classroom, with some site visits	**Open and Closed set, subspace of Banach space**		
8	2	My presence in the classroom and through the educational tools available inside the classroom, with some site visits	**Domain, Range of the operator, Null space, differentiation operator , integration operator**		
9	2	My presence in the classroom and through the educational tools available inside the classroom, with some site visits	**Definition , composite of two operators**		
10	2	My presence in the classroom and through the educational tools available inside the classroom, with some site visits	**Definition, sylvester's law**		
11	2	My presence in the classroom and through the educational tools available inside the classroom, with some site visits	**Definition, Finite dimension Theorem**		
12	2	My presence in the classroom and through the educational tools available inside the classroom, with some site visits	**Definition, continuity and boundedness Theorem**		
13	2	My presence in the classroom and through the educational tools available inside the classroom, with some site visits	**Definition of functional, linear functional, examples**		

14	2	My presence in the classroom and through the educational tools available inside the classroom, with some site visits	**Definition , Theorem**		
15			Definition and some examples		

11. Course Evaluation
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports.....etc

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description

1. Course Name:
Function analysis2/ The fourth stage
2. Course Code:
CM MS 22 F 442
3. Semester / Year: ....
2023-2024
4. Description Preparation Date:
1/10//2023
5. Available Attendance Forms:
Attendance in the classroom according to the announced weekly class schedule
6. Number of Credit Hours (Total) / Number of Units (Total)
Four theoretical lessons per week / 3 units
7. Course administrator's name (mention all, if more than one name)
Name: DR.AHMED AMER Email: :aahmedamer68@uomosul.edu.iq
8. Course Objectives

Course Objectives	• Students will study a new spaces, its properties and different type of operators

9. Teaching and Learning Strategies	
Strategy	Inner product space, Hilbert space, orthogonal complements, Representation of functional on Hilbert spaces, Hilbert adjoint operator

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Definition and some examples	**Definition, Examples and some properties of vector spaces**	Learn the methods of evaluating and analyzing the types of roads found in the urban and rural road network and how to determine their capacity and level of service.	According to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, written and reports exams.
2	2	Definition and some examples	**Linear combination, span set, linearly independence, finite and infinite dimension,**		
3	2	Some theorem and proposition	**Definition, sum and intersection of subspace, direct summand**		
4	2	Schwarz inequality, parallelogram equality polarization identity	**Definition, Minkowski's inquality, Cauchy Schwartz inequality, some properties of normed spaces**		

5	2	Theorem and Examples	**Metric space, convergent sequence and Cauchy sequence**		
6	2	Orthogonal element to element Orthogonal element to set Orthogonal set to set	**Definition, The space C[a,b]**		
7	2	Definition, examples, theorem	**Open and Closed set, subspace of Banach space**		
8	2	Definition, examples, Gram–schmidt process	**Domain, Range of the operator, Null space, differentiation operator , integration operator**		
9	2	Theorem and Examples	**Definition , composite of two operators**		
10	2	Definition, examples,	**Definition, sylvester's law**		
11	2	Theorem and Examples	**Definition, Finite dimension Theorem**		

12	2	Definition, examples,	**Definition, continuity and boundedness Theorem**		
13	2	Theorem and Examples	**Definition of functional, linear functional, examples**		
14	2	Self adjoint,Unitary ,Normal operators	**Definition , Theorem**		
15	2		Definition and some examples		

11. Course Evaluation

Daily attendance and preparation = 3 marks. Daily homework and exam = 5 marks. Reports = 2 marks. Monthly exams = 30 marks. Final exam = 60 marks.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	