Course Description Form

1. Course Name:
Stochastic Processes I
2. Course Code:
CMSI24-F4121
3. Semester / Year:
2023-2024
4. Description Preparation Date:
1/9/2023
5. Available Attendance Forms:
Studying in classrooms in the department
6. Number of Credit Hours (Total) / Number of Units (Total)
Theory 3 + Tutorial 1 in week / 3 units
7. Course administrator's name (mention all, if more than one name)
Name: Asst. Prof. Dr. Muthanna Subhi Sulaiman Email: muthanna.sulaiman@uomosul.edu.iq Name: Lecture Shaimaa Waleed Mohmood Email: shaimaa.waleed@uomosul.edu.iq
8. Course Objectives

Course Objectives	1. This course provides a comprehensive introduction to stochastic processes. 2. Focusing on their fundamental concepts, principles, and applications. 3. It covers topics ranging from basic probability theory to advanced stochastic models. 4. Equipping students with the necessary knowledge and skills to analyze and model various phenomena involving randomness and uncertainty. 5. Modeling and analyzing systems with the Markov property. 6. Understanding the behavior of Markov chains. 7. Examining transition probabilities and constructing transition matrices. 8. Studying special types of Markov chains, such as absorbing and ergodic chains. 9. Determining and analyzing the stationary distribution.

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, computer labs, assignments, quizzes, and projects.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Understanding of generating function and probability generating	Definition of generating function and probability generating function.	Lecture, discussion.	Exams, assignments, and reports.
2	4	Understanding of generating function and probability generating	Probability generating function of sum discrete random variables.	Lecture, discussion.	Exams, assignments, and reports.
3	4	Understanding of generating function and probability generating	Probability generating function of sum of a random number of discrete random variables.	Lecture, discussion.	Exams, assignments, and reports.
4	4	Understanding of generating function and probability generating	Generating function of bivariate distribution.	Lecture, discussion.	Exams, assignments, and reports.
5	4	Gain a solid understanding of the fundamental concepts and principles of stochastic processes	Introduction to Stochastic processes.	Lecture, discussion.	Exams, assignments, and reports.
6	4	Gain a solid understanding of the fundamental concepts and principles of stochastic processes	Definitions and examples of stochastic processes.	Lecture, discussion.	Exams, assignments, and reports.
7	4	Identify and analyze sources of uncertainty and randomness in various systems	Specification of stochastic processes with independent increments.	Lecture, discussion.	Exams, assignments, and reports.
8	4	Identify and analyze sources of uncertainty and randomness in various systems	Mid-term Exam + Stationary processes, Covariance stationary, Gaussian process.	Lecture, discussion.	Exams, assignments, and reports.
9	4	Develop skills in predicting and forecasting future outcomes using stochastic models	Definition of Markov Chain and transition probability matrix.	Lecture, discussion.	Exams, assignments, and reports.
10	4	Develop skills in predicting and forecasting future outcomes using stochastic models	Random walk and Absorbing barriers.	Lecture, discussion.	Exams, assignments, and reports.
11	4	Apply stochastic processes to model and solve problems	Higher transition probabilities (derivation of Chapman-Kolmogorov equation).	Lecture, discussion.	Exams, assignments, and reports.
12	4	Apply stochastic	Initial distribution	Lecture, discussion.	Exams, assignments,

		processes to model and solve problems	and Probability Distribution.		and reports.
13	4	Gain proficiency in using computational tools and programming languages to simulate and analyze stochastic processes	Transition Diagram and Transition tree with application and examples of M.C.	Lecture, discussion.	Exams, assignments, and reports.
14	4	Gain proficiency in using computational tools and programming languages to simulate and analyze stochastic processes	Two-state Markov chain.	Lecture, discussion.	Exams, assignments, and reports.
15	4	Gain proficiency in using computational tools and programming languages to simulate and analyze stochastic processes	Introduction to classification of Markov chain.	Lecture, discussion.	Exams, assignments, and reports.

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 , 40+60

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Al-Rubaie, Fadel Mohsen and Abd, Salah Hamza, (2000), "Introduction to Stochastic Processes." Dar-Books and Documents, Baghdad.
Main references (sources)	• Cox D.R &H.D. Miller, "The theory of stochastic process", 1985. • Parzen," Stochastic Process", 1962. • Ross, S. M. (1983), "Stochastic Processes" Wiley, New York.
Recommended books and references (scientific journals, reports…)	Thanoun, Basil Younis, (2011), "Markovian Modeling with Practical Applications." Dar Ibn Al-Atheer for Printing and Publishing, University of Mosul, Iraq. Part one and two.
Electronic References, Websites	

Course Description Form

13. Course Name:	
Stochastic Processes II	
14. Course Code:	
CMSI24-F4221	
15. Semester / Year:	
2023-2024	
16. Description Preparation Date:	
1/2/2024	
17. Available Attendance Forms:	
Studying in classrooms in the department	
18. Number of Credit Hours (Total) / Number of Units (Total)	
Theory 3 + Tutorial 1 in week / 3 units	
19. Course administrator's name (mention all, if more than one name)	
Name: Asst. Prof. Dr. Muthanna Subhi Sulaiman Email: muthanna.sulaiman@uomosul.edu.iq Name: Lecture Shaimaa Waleed Mohmood Email: shaimaa.waleed@uomosul.edu.iq	
20. Course Objectives	
Course Objectives	10. Understand the concept of a Markov chain and its classifications. 11. Recognize the different types of states in a Markov chain, such as absorbing, transient, and recurrent states. 12. Learn to classify Markov chains based on their behavior, including irreducible, reducible, and periodic chains. 13. Identify and analyze the stationary distribution of a Markov chain. 14. Understand the basic properties and characteristics of a Poisson process. 15. Derive and interpret the probability density function and cumulative distribution function of the Poisson process. 16. Understand the concept and assumptions of a branching process. 17. Calculate the mean and variance of a branching process. 18. Understand the characteristics and assumptions of a birth and death process. 19. Calculate the mean and variance of a birth and death process. 20. Understand the basic concepts and components of queuing models. 21. Identify and apply different queuing models, such as M/M/1.
21. 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, computer labs, assignments, quizzes, and projects.

22. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Communicate effectively, both orally and in writing, about the concepts, analysis, and results related to the classification of these stochastic processes.	Classification of Markov Chain. Classification of state of a Markov chain.	Lecture, discussion.	Exams, assignments, and reports.
2	4	Classify and analyze different types of states or behaviors within each process, such as absorbing, transient, recurrent, and periodic states.	Recurrent and transient states.	Lecture, discussion.	Exams, assignments, and reports.
3	4	Classify and analyze different types of states or behaviors within each process, such as absorbing, transient, recurrent, and periodic states.	Computation of first passage and mean recurrence time.	Lecture, discussion.	Exams, assignments, and reports.
4	4	Evaluate and interpret the stationary distribution, steady-state behavior, and equilibrium properties of the processes.	Stationary distribution of a Markov chain (steady states dist.).	Lecture, discussion.	Exams, assignments, and reports.
5	4	Gain a solid understanding of the fundamental concepts and principles of stochastic processes	Markov Process with discrete state space, introduction to counting process.	Lecture, discussion.	Exams, assignments, and reports.
6	4	Gain a solid understanding of the fundamental concepts and principles of stochastic processes	The Poisson process, and assumptions Poisson process.	Lecture, discussion.	Exams, assignments, and reports.
7	4	Calculate and interpret relevant performance measures, such as mean, variance, extinction probabilities, and waiting times.	Derivation the p.d.f. of a Poisson process.	Lecture, discussion.	Exams, assignments, and reports.
8	4	Calculate and interpret relevant	Properties of Poisson process, additive and	Lecture, discussion.	Exams, assignments, and reports.

		performance measures, such as mean, variance, extinction probabilities, and waiting times.	difference property.		
9	4	Develop forecasting skills and forecast future results using stochastic models.	Mid-term Exam + Decomposition of a Poisson process.	Lecture, discussion.	Exams, assignments, and reports.
10	4	Develop forecasting skills and forecast future results using stochastic models.	Poisson process and related distribution- Inter arrival time and waiting time.	Lecture, discussion.	Exams, assignments, and reports.
11	4	Calculate and interpret relevant performance measures, such as mean, variance, extinction probabilities, and waiting times.	Introduction to Branching Process. Generating function and probability of extinction.	Lecture, discussion.	Exams, assignments, and reports.
12	4	Calculate and interpret relevant performance measures, such as mean, variance, extinction probabilities, and waiting times.	Calculate the mean and variance of a branching process.	Lecture, discussion.	Exams, assignments, and reports.
13	4	Calculate and interpret relevant performance measures, such as mean, variance, extinction probabilities, and waiting times.	Birth and Death process. Pure Birth process and Yule – Furry process.	Lecture, discussion.	Exams, assignments, and reports.
14	4	Calculate and interpret relevant performance measures, such as mean, variance, extinction probabilities, and waiting times.	Pure death process and pure Birth – Death process.	Lecture, discussion.	Exams, assignments, and reports.
15	4	Calculate and interpret relevant performance measures, such as mean, variance, extinction probabilities, and waiting times.	Stochastic Process in Queuing model, General concepts, m/m/1 steady state behavior.	Lecture, discussion.	Exams, assignments, and reports.

23. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc , 40+60

24. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Al-Rubaie, Fadel Mohsen and Abd, Salah Hamza, (2000), "Introduction to Stochastic Processes." Dar-Books and Documents, Baghdad.
Main references (sources)	• Cox D.R &H.D. Miller, "The theory of stochastic process", 1985. • Parzen," Stochastic Process", 1962. • Ross, S. M. (1983), ''Stochastic Processes" Wiley, New York.
Recommended books and references (scientific journals, reports…)	Thanoun, Basil Younis, (2011), "Markovian Modeling with Practical Applications." Dar Ibn Al-Atheer for Printing and Publishing, University of Mosul, Iraq. Part one and two.
Electronic References, Websites	

Course Description Form

1. Course Name:
Design and Analysis of Experiments/1
2. Course Code:
CMSI23-F4141
3. Semester / Year:
2023−2024
4. Description Preparation Date:
2024
5. Available Attendance Forms:
Students' attendance in the halls of the Statistics and Informatics Department
6. Number of Credit Hours (Total) / Number of Units (Total)
Theoretical 2, Practical 2 (4)/ (3)
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Muzahem Mohammed Yahya Al-Hashimi Email: muzahim_alhashime@uomosul.edu.iq Name: Dr. Wisam Wadullah Saleem Email: wisam-stat@uomosul.edu.iq
8. Course Objectives

Course Objectives	• Gain practical experience in designing and conducting experiments while developing critical thinking skills to assess the appropriateness of experimental designs for specific research questions. • Acquire the ability to select the appropriate experiment design based on scientific principles. • Empower students to handle data when encountering statistical challenges that necessitate analysis. • Equip students with the knowledge and skills necessary for performing statistical analysis, constructing analysis of variance tables, conducting comparisons, and testing hypotheses and confidence intervals. • Improve problem-solving skills within the context of experiment design, result evaluation, and interpretation.
9. Teaching and Learning Strategies	
Strategy	• Introducing fundamental concepts and statistical methods for the design and analysis of experiments. • Cultivating students' ability to critically assess experimental designs, interpret data, and draw meaningful conclusions. • Employing diverse educational strategies to enhance knowledge acquisition. • Fostering active student participation through engaging class discussions and problem-solving exercises. • Assessing students to gauge their knowledge, skills, and

	comprehension.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First week	2 Theoretical and 2 Practical	Understand fundamental concepts and terminology.	Fundamental concepts and terminology.	Whiteboard and Presentation slides.	Monthly written examinations and oral examinations
Second week	2 Th+2P	Familiarize with the fundamentals of experimental design.	Fundamentals of experimental design.	Whiteboard and presentation slides.	Monthly written examinations and oral examinations
Third week	2 Th+2P	Gain knowledge of Completely Randomized Design.	Completely Randomized Design.	Whiteboard and presentation slides.	Monthly written examinations and oral examinations
Fourth week	2 Th+2P	Understand the application of Completely Randomized Design in the case of unequal replications.	Completely Randomized Design in the case of unequal replications.	Whiteboard and presentation slides.	Monthly written examinations and oral examinations
Fifth week	2 Th+2P	Learn to implement Complete Randomized Design with more than one observation per Experimental Unit.	Complete Randomized Design with more than one observation per Experimental Unit.	Whiteboard and presentation slides.	Monthly written examinations and oral examinations
Sixth week	2 Th+2P	Develop familiarity with Randomized Complete Block Design.	Randomized Complete Block Design.	Whiteboard and presentation slides.	Monthly written examinations and oral examinations
Seventh week	2 Th+2P	Acquire skills for handling missing values.	Missing values.	Whiteboard and presentation slides.	Monthly written examinations and oral examinations
Eighth week	2 Th+2P	Gain proficiency in Randomized Complete Block Design with more than one observation per Experimental Unit.	Randomized Complete Block Design with more than one observation per Experimental Unit.	Whiteboard and presentation slides.	Monthly written examinations and oral examinations
Ninth week	2 Th+2P	Learn how to determine the number of blocks or replications. **Mid Examination**	Determine the number of blocks or replications.	Whiteboard and presentation slides.	Monthly written examinations and oral examinations
Tenth week		Familiarize with the Latin Square Design.			
Eleventh week		Gain familiarity with the Latin Square Design with more than one			

	2 Th+2P	observation per Experimental Unit.	Latin Square Design.	Whiteboard and presentation slides.	examinations
Twelfth week	2 Th+2P	Learn about finding missing values in the Latin Square Design.	Latin Square Design with more than one observation per Experimental Unit.	Whiteboard and presentation slides.	Monthly written examinations and oral examinations
Thirteenth week	2 Th+2P	Acquire familiarity with the Graeco-Latin Square Design.	Missing values.	Whiteboard and presentation slides.	
Fourteenth week	2 Th+2P	Develop familiarity with multiple comparisons.	Graeco-Latin Square Design.	Whiteboard and presentation slides.	Monthly written examinations and oral examinations
Fifteenth week	2 Th+2P	**1st Semester Final Exam**	Multiple comparisons.	Whiteboard and presentation slides.	Monthly written examinations and oral examinations
					Monthly written examinations and oral examinations
					Monthly written examinations and oral examinations
					Monthly written examinations and oral examinations

11. Course Evaluation

Mid-term 40%, Final examination 60 %

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Alrrawi, Khasheh and Mahmoud Khalaf Allah. Design and analysis of agricultural experiments. Dar Al Kutub

	Printing and Publishing Foundation. University of Al-Mosul. Iraq.
Main references (sources)	Al-Imam, Mohammed. Design and analysis of experiments. Al-Riyadh, Saudi Arabia, 2010.
Recommended books and references (scientific journals, reports…)	Montgomery, Douglas C. Design and analysis of experiments. John wiley & sons, 2017.
Electronic References, Websites	World Wide Web

Course Description Form

1. Course Name:
Design and Analysis of Experiments/2
2. Course Code:
CMSI23-F4241
3. Semester / Year:
2023−2024
4. Description Preparation Date:
2024
5. Available Attendance Forms:
Students' attendance in the halls of the Statistics and Informatics Department
6. Number of Credit Hours (Total) / Number of Units (Total)
Theoretical 2, Practical 2 (4)/ (3)
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Muzahem Mohammed Yahya Al-Hashimi muzahim_alhashime@uomosul.edu.iq Dr. Wisam Wadullah Saleem wisam-stat@uomosul.edu.iq
8. Course Objectives

Course Objectives	• Gain practical experience in designing and conducting experiments while developing critical thinking skills to assess the appropriateness of experimental designs for specific research questions. • Acquire the ability to select the appropriate experiment design based on scientific principles. • Empower students to handle data when encountering statistical challenges that necessitate analysis. • Equip students with the knowledge and skills necessary for performing statistical analysis, constructing analysis of variance tables, conducting comparisons, and testing hypotheses and confidence intervals. • Improve problem-solving skills within the context of experiment design, result evaluation, and interpretation.
9. Teaching and Learning Strategies	
Strategy	• Introducing fundamental concepts and statistical methods for the design and analysis of experiments. • Cultivating students' ability to critically assess experimental designs, interpret data, and draw meaningful conclusions. • Employing diverse educational strategies to enhance knowledge acquisition. • Fostering active student participation through engaging class discussions and problem-solving exercises.
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First week	2 Theoretical and 2 Practical	Familiarize with the Randomized Incomplete Block Design.	Randomized Incomplete Block Design.	Whiteboard and Presentation slides.	Monthly written examinations and oral examinations
Second week	2 Th+2P	Familiarize with Youden Square Design.	Youden Square Design	Whiteboard and presentation slides.	Monthly written examinations and oral examinations
Third week	2 Th+2P	Factorial Experiments.	Factorial Experiments.	Whiteboard and presentation slides.	Monthly written examinations and oral examinations
Fourth week	2 Th+2P	Familiarize with Two Factor Experiment in C.R.D.	Two-Factor Experiment in a C.R.D	Whiteboard and presentation slides.	Monthly written examinations and oral examinations
Fifth week	2 Th+2P	Familiarize with Three Factor Experiment in C.R.D.	Three-Factor Experiment in a C.R.D	Whiteboard and presentation slides.	Monthly written examinations and oral examinations
Sixth week	2 Th+2P	Familiarize with Factorial Experiment Conducted in R.C.B.D.	Factorial Experiment Conducted in R.C.B.D.	Whiteboard and presentation slides.	Monthly written examinations and oral examinations
Seventh week	2 Th+2P	Familiarize with Factorial Experiment in L.S.Design.	Factorial Experiment in a L.S.Design.	Whiteboard and presentation slides.	Monthly written examinations and oral examinations
Eighth week	2 Th+2P	**Mid Examination**	Nested and Nested Factorial Experiments.	Whiteboard and presentation slides.	Monthly written examinations and oral examinations
Ninth week	2 Th+2P	Familiarize with Nested and Nested-Factorial Experiments.	Confounding.	Whiteboard and presentation slides.	Monthly written examinations and oral examinations
Tenth week	2 Th+2P	Familiarize with Confounding.	Complete Confounding.	Whiteboard and presentation slides.	Monthly written examinations and oral examinations
Eleventh week	2 Th+2P	Familiarize with Complete Confounding.	Partial Confounding.	Whiteboard and presentation slides.	Monthly written examinations and oral examinations
Twelfth week	2 Th+2P	Familiarize with Partial Confounding.	Split-plot Designs.	Whiteboard and presentation slides.	Monthly written examinations and oral examinations
Thirteenth week	2 Th+2P	Familiarize with Split-plot Designs.	Split-Split Plot Design.	Whiteboard and presentation slides.	Monthly written examinations and oral examinations
Fourteenth week		Familiarize with Split-Split Plot Design. Familiarize with Split Block Design.	Split – Block Design.		

Fifteenth week					

11. Course Evaluation

Mid-term 40%, Final examination 60 %

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Alrrawi, Khasheh and Mahmoud Khalaf Allah. Design and analysis of agricultural experiments. Dar Al Kutub Printing and Publishing Foundation. University of Al Mosul. Iraq.
Main references (sources)	Al-Imam, Mohammed. Design and analysis of experiments. Al-Riyadh, Saudi Arabia, 2010.
Recommended books and references (scientific journals, reports…)	Montgomery, Douglas C. Design and analysis of experiments. John wiley & sons, 2017.
Electronic References, Websites	World Wide Web

Course Description Form

1. Course Name:
D/ Statistical inference(1)/First phase
2. Course Code:
CMSI24-F2251
3. Semester / Year:
The First course/2023/2024
4. Description Preparation Date:
17/9/2023
5. Available Attendance Forms:
Classrooms of department statistics and informatics
6. Number of Credit Hours (Total) / Number of Units (Total)
(3) theoretical hours and (1) discussion hours/number of units: 3
7. Course administrator's name (mention all, if more than one name)
Name: Dr.Raya Salim Mohammad Ali *Email: rayasalim73@uomosul.edu.iq* *Email :zeennorsal@uomosul.edu.iq*
8. Course Objectives

Course Objectives	● *1. Identify properties of a good estimators* ● *2.Learn about point Estimation methods*

9. Teaching and Learning Strategies

Strategy	*1- Gaining the ability to know the properties of the estimator in terms of Unbiasedness ,consistency, efficiency, etc* *-2 Developing the skull to compere statistical estimators using statistical criteria* *-3 Acquire the ability to find point estimator for probability distribution parameter*

10. Course Structure

Week	***Hours***	***Required Learning Outcomes***	***Unit or subject name***	**Learning method**	**Evaluation method**
First	***3(T) +1(D)***	*Recognizing the concepts of parameter, random variable, sample space, and parameter space*	*Introduction to statistics inferential*	Blackboard	Daily, semester and final exams - Duties Student participati

Second	***3(T) +1(D)***	*Study of the non-bias property with examples of estimators of parameters of some discrete and continuous distributions*	*Unbiased property*	Blackboard	Daily, semester and final exams - Duties Student participation
Third	***3(T) +1(D)***	*Studying the mean square error and using it to compare estimators with examples*	*Mean square error*	Blackboard	Daily, semester and final exams - Duties Student participation
Fourth	***3(T) +1(D)***	*Study of the consistency property with examples of estimators of the parameters of some continuous and discrete distributions*	*Consistency properly*	Blackboard	Daily, semester and final exams - Duties Student participation
Fifth	***3(T) +1(D)***	*Study of the adequacy property by the conditional probability method with examples of estimators of the parameters of some continuous and discrete distributions*	*Sufficincy property conditional probability method*	Blackboard	Daily, semester and final exams - Duties Student participation
Sixth	***3(T) +1(D)***	*Studying the adequacy property by factoring method and how to find the sufficient estimator with examples of estimators of the parameters of some probability distributions*	*The adequacy property is a factorisation method*	Blackboard	Daily, semester and final exams - Duties Student participation
seventh	***3(T) +1(D)***	*Studying the property of adequacy by likening the*	*Sufficiency property Exponetail family method*	Blackboard	Daily, semester and final exams - Duties Student participation

		probability distribution to the exponential family and finding a sufficient estimator with examples of estimators of the parameters of some probability distributions.			
Eghith	***3(T) 1(D)***	*Studying the efficiency property by likening the probability distribution to the exponential family and finding an adequate estimator with examples of estimators of the parameters of some probability distributions* ~~~~	*Semester exam*	Blackboard	Daily, semester and final exams - Duties Student participation
nineth	**3(T) +1(D)**	Study of the efficiency property, Fisher information, and how to know the efficiency of the estimator, as well as the comparison between two estimators	Efficiency property	Blackboard	Daily, semester and final exams - Duties Student participation
Tenth	**3(T) +1(D)**	Study of Cramer-Rao's inequality and its use in studying the property of the unbiased estimator with minimal variance	Cramer -Raw inqality	Blackboard	Daily, semester and final exams - Duties Student participation
Eleventh	**3(T) +1(D)**	Study of point estimation methods and their properties	Some point Estimation method	Blackboard	Daily, semester and final exams - Duties Student participation

Tweleveth	**3(T) +1(D)**	~~ Study of estimation by the method of moments with examples	Estimation using the method of moment	Blackboard	Daily, semester and final exams - Duties Student participation
Thirteenth	**3(T) +1(D)**	Study of estimation by the maximum likelihood method with examples	Maximum likelihood Estimation	Blackboard	Daily, semester and final exams - Duties Student participation

11. Course Evaluation

Semester Exam 40% ,Final Exam 60%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Methods for solving differential equations / written by Khaled Al-Samarrai
Main references (sources)	Engineering Mathematics / Written by Khaled Abdel Hamid Al-Nouri
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:
D/ Statistical inference(2)/First phase
2. Course Code:
CMSI24-F2251
3. Semester / Year:
The second course/2023/2024
4. Description Preparation Date:
17/2/2024
5. Available Attendance Forms:
Classrooms of department statistics and informatics
6. Number of Credit Hours (Total) / Number of Units (Total)
(3) theoretical hours and (1) discussion hours/number of units: 3
7. Course administrator's name (mention all, if more than one name)
Name: Dr.Raya Salim Mohammad Ali *Email: rayasalim73@uomosul.edu.iq* *Email :zeennorsal@uomosul.edu.iq*
8. Course Objectives

Course Objectives	*Objectives of the study material 1. Identify how to construct confidence intervals for mean and variance parameters~~ 2. Learn about testing statistical hypotheses from a theoretical and applied aspect~~ 3. Learn how to calculate errors of the first and second types*

9. Teaching and Learning Strategies

Strategy	*1 – Acquiring the ability to know how to find confidence intervals for the mean and variance~~2 – Developing the skill to test statistical hypotheses, determining the critical region, and calculating errors of the first and second types~~~~3 – Acquiring the ability to find the best critical region*

10. Course Structure

Week	***Hours***	***Required Learning Outcomes***	***Unit or subject name***	**Learning method**	**Evaluation method**
First	***3(T) +1(D)***	*Learn about point and interval estimation methods*	*Introduction about estimation Theory*	Blackboard	Daily, semester and final exams - Duties Student participati

Second	***3(T) +1(D)***	*Explain how to construct confidence intervals*	*Interval estimation*	Blackboard	Daily, semester and final exams - Duties Student participation
Third	***3(T) +1(D)***	*Illustrate how to construct a confidence interval about mean*	*Interval estimation about means*	Blackboard	Daily, semester and final exams - Duties Student participation
Fourth	***3(T) +1(D)***	*Explain how to form a confidence interval for the difference between two means from two natural populations in the case of known and unknown variance and the sample size is small and large with the drawing*	*Interval estimation for difference between two means*	Blackboard	Daily, semester and final exams - Duties Student participation
Fifth	***3(T) +1(D)***	*Explain how to construct the confidence interval for the variance in the case of a known and unknown population mean with a drawing*	*Interval Estimation for variances*	Blackboard	Daily, semester and final exams - Duties Student participation
Sixth	***3(T) +1(D)***	*Illustrate how to construct a confidence interval for a ratio between two variances with a diagram*	*Interval estimation for ratio between two variances*	Blackboard	Daily, semester and final exams - Duties Student participation
seventh	***3(T) +1(D)***		*Example*	Blackboard	Daily, semester and final exams - Duties Student participation
Eghith	***3(T) 1(D)***	*Derivation of the power function law and its relationship with errors of the first and second types~~~~*	*Power function*	Blackboard	Daily, semester and final exams - Duties Student participation

nineth	**3(T) +1(D)**		Examples	Blackboard	Daily, semester and final exams - Duties Student participation
Tenth	**3(T) +1(D)**	Derivation of a law for this function and its relationship with the power and error function of the first and second kindDerivation of a law for this function and its relationship with the power and error function of the first and second kind	Operating characteristic function	Blackboard	Daily, semester and final exams - Duties Student participation
Eleventh	**3(T) +1(D)**		Examples	Blackboard	Daily, semester and final exams - Duties Student participation
Tweleveth	**3(T) +1(D)**	Finding the best critical region based on the ratio between two weighting functions	Best critical region	Blackboard	Daily, semester and final exams - Duties Student participation
Thirteenth	**3(T) +1(D)**	Choosing the statistical hypothesis sequentially based on observations instead of taking the entire sample	Sequential test	Blackboard	Daily, semester and final exams - Duties Student participati

11. Course Evaluation

Semester Exam 40% ,Final Exam 60%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Methods for solving differential equations / written by Khaled Al-Samarrai
Main references (sources)	Engineering Mathematics / Written by Khaled Abdel Hamid Al-Nouri
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Multivariate Analysis I
2. Course Code:
CMS124-F4131
3. Semester / Year:
First Semester / 2023-2024
4. Description Preparation Date:
8 / 2 / 2024
5. Available Attendance Forms:
Classrooms
6. Number of Credit Hours (Total) / Number of Units (Total)
(4) credit hours / (3) units
7. Course administrator's name (mention all, if more than one name)
1. Name: Dr. Ban Ghanem Al-Ani Email: drbanalani@uomosul.edu.iq 2. Name: Alla Hamoodat Email: allahamoodat@uomosul.edu.iq
8. Course Objectives
The course aims to introduce the student to the basic concepts and statistical laws related to multiple common random variables, as well as appropriate tests related to them, and how to apply these laws to reality in interpreting the results of studies and research in all fields of life, in addition to solving some life problems that can be formulated through multiple linked random variables.
9. Teaching and Learning Strategies
• Adopting the lecture method and linking each topic to the practical aspect • Giving some simple practical exercises that are discussed by the students and solved during the lecture, with the participation of all students in the discussions. • Motivate students and encourage them to express their opinion • The ability to give an explanation of the solutions they reached • Encouraging students to think and come up with many and varied solutions • Emphasis on self-learning • Assigning students homework and receiving them from the student on the specified dates. • Encouraging students to expand their use of the Internet by assigning students tasks that require the use of the Internet and computers.

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1st	4	1- The student will be able to understand methods related to statistical methods in analyzing multivariate data 2- How does the student deal with studying more than one variable at a time? 3- The student applies multiple statistical analysis methods in the fields of practical life, relying on statistical software to analyze data 4- The student learns how to analyze multiple variables simultaneously. This means that he can examine how different variables are related and how they affect each other	Basic concepts: Some important issues in multivariate	Theoretical and practical	1. Daily, semester and final tests 2. Evaluating students' participation in dialogue and discussion 3. Duties
2nd	4		Characteristic roots and vectors and their properties		
3rd	4		Definition of random variable, random vector with similarities and differences between them		
4th	4		Quadratic forms and its properties		
5th	4		Bivariate normal distribution with examples and exercises		
6th	4		Linear combination of multivariate normal distribution		
7th	4		Distribution of linear		

			combinations of multivariate normal distribution with examples and exercises		
8th	4		Marginal distribution with examples and exercises		
9th	4		Moment generating function		
10th	4		Some properties of the moment generating function in multivariate analysis		
11st	4		Characteristic function		
12th	4		Semester exam		
13th	4		Correlations		
14th	4		Solutions for exercises		
15th	4		Final exam		

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)	Shalal Al-Jubouri (2000) "Multivariate Analysis", Dar Al-Kutub Printing Directorate, Baghdad
Main references (sources)	1- Anderson T. W. (1958) "An Introduction to Multivariate Statistical Analysis". New York. John Wiley. 2- Morrison, Donald F. (1990.)" Multivariate statistical methods", McGraw-Hill series in probability and statistics
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	Richard A. Johnson and Dean W. Wichern, (2007). "Applied Multivariate Statistical Analysis" Pearson

Course Description Form

1. Course Name:
Multivariate Analysis II
2. Course Code:
CMSI24-F4131
3. Semester / Year:
Second Semester / 2023-2024
4. Description Preparation Date:
8 / 2 / 2024
5. Available Attendance Forms:
Classrooms
6. Number of Credit Hours (Total) / Number of Units (Total)
(4) credit hours / (3) units
7. Course administrator's name (mention all, if more than one name)
1. Name: Dr. Ban Ghanem Al-Ani Email: drbanalani@uomosul.edu.iq 2. Name: Hyllaa Anas Abdual majeed…… Email: hyllaa.77@uomosul.edu.iq
8. Course Objectives
The course aims to introduce the student to the basic concepts and statistical laws related to multiple common random variables, as well as appropriate tests related to them, and how to apply these laws to reality in interpreting the results of studies and research in all fields of life, in addition to solving some life problems that can be formulated through multiple linked random variables.
9. Teaching and Learning Strategies
• Adopting the lecture method and linking each topic to the practical aspect • Giving some simple practical exercises that are discussed by the students and solved during the lecture, with the participation of all students in the discussions. • Motivate students and encourage them to express their opinion • The ability to give an explanation of the solutions they reached • Encouraging students to think and come up with many and varied solutions • Emphasis on self-learning • Assigning students homework and receiving them from the student on the specified dates. • Encouraging students to expand their use of the Internet by assigning students tasks that require the use of the Internet and computers.

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1st	4	1- The student will be able to understand the methods related to statistical methods in analyzing multivariate data 2- How does the student deal with studying more than one variable at a time? 3- The student applies various statistical analysis methods in the fields of practical life, relying on statistical software to analyze data 4- The student learns how to analyze multiple variables simultaneously. This means that he can examine how different variables are related and how they affect each other 5- The student will be able to choose the appropriate multiple statistical analysis according to the phenomenon studied and solve various problems 6- The student provides statistical consultations to researchers	The conditional distribution	Theoretical a practical	1. Daily, semester and final tests 2. Evaluating students' participation in dialogue and discussion 3. Duties
2nd	4		Parameter estimation by m.l.e when ∑ and μ are know		
3rd	4		Parameter estimation by m.l.e when ∑ and		

			μ are unknown with examples and exercises		
4th	4		Sufficient statistic when ∑ and μ are know		
5th	4		Examples and exercises		
6th	4		The Multivariate regression		
7th	4		Parameter estimation of multivariate linear regression by L.S.M		
8th	4		Parameter estimation of multivariate linear regression by m.l.e.		
9th	4		Examples and exercises		
10th	4		Hypothesis testing about vector mean when ∑ know		
11st	4		Hypothesis testing about vector mean when ∑ unknown		
12th	4		Hypothesis testing about ∑		
13th	4		Semester exam		
14th	4		Hypothesis testing about two means vectors		
15th	4		Final exam		

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 30 marks for the semester exam +10 marks for the daily exam +60 marks for the final exam	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Shalal Al-Jubouri (2000) "Multivariate Analysis", Dar Al-Kutub Printing Directorate, Baghdad
Main references (sources)	3- Anderson T. W. (1958) "An Introduction to Multivariate Statistical Analysis". New York. John Wiley. 4- Morrison, Donald F. (1990.)" Multivariate statistical methods", McGraw-Hill series in

	probability and statistics
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	Richard A. Johnson and Dean W. Wichern, (2007). “Applied Multivariate Statistical Analysis” Pearson

Course Description Form

1. Course Name:	
Simulation	
2. Course Code:	
CMSI24-F4161	
3. Semester / Year:	
First semester / year 2023−2024	
4. Description Preparation Date:	
2024−2−2	
5. Available Attendance Forms:	
Attendance in the classroom	
6. Number of Credit Hours (Total) / Number of Units (Total)	
Number of study hours (3) / Number of units (3)	
7. Course administrator's name (mention all, if more than one name)	
Name: omar salim ibrahim Email: omarsalim85@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• It aims to present concepts about simulation • Intermittent event simulation • Generating random numbers according to certain probability functions • The student will be able to generate data from continuous and discrete distributions using MATLAB programming to practice simulation • Students' ability to understand statistical models in simulation and program them
9. Teaching and Learning Strategies	
Strategy	Study of simulation, starting with the introduction, basic definitions, and how to perform manual simulation of some problems The student will be able to understand and know the simulation Devise appropriate methods to solve statistical problems Able to generate random numbers manually Able to generate random numbers using statistical software The student devises appropriate methods to solve the problems he faces in data analysis Adds his knowledge of statistical programming to solve problems He communicates effectively with his colleagues while working on the computer and completing assignments
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	The student will be able to understand and learn about the simulation	Introduction to modeling and simulation	Classroom + blackboard + data show	Exam
2	3	The student will be able to understand and learn about the simulation	Characteristics of simulation models/simulation model/simulation objectives/disadvantages and advantages of simulation	Classroom + blackboard + data show	Exam
3	3	The student will be able to understand and learn about the simulation	Areas of simulation application / steps in simulation studying / simulation programs / simulation methods	Classroom +blackboard + data show	Exam
4	3	Able to generate random numbers manually	Generating Random namber /methods of generating random numbers with examples of each method and programming in the Matlab language	Classroom +blackboard + data show	Homework
5	3	Able to generate random numbers manually	Linear congenital method / inverse method / inverse transformation method in the case of discrete random variables	Classroom + blackboard + data show + calculator lab	Homework
6	3	He communicates effectively with his colleagues while working on the computer and completing assignments	The inverse transformation method in the case of continuous random variables with example	Classroom + blackboard + data show + calculator lab	discussion

7	3	Able to generate random numbers manually and using statistical software	Distributions and Simulation Random Variable Generation for Continuous Distributions	Classroom + blackboard + data show + calculator lab	Exam
8	3	Able to generate random numbers manually and using statistical software	;Distributions and Simulation Random Variable Generation for Continuous Distributions	Classroom + blackboard + data show + calculator lab	discussion
9	3	Able to generate random numbers manually	Generating random numbers using two functions	Classroom + blackboard + data show + calculator lab	Homework
10	3	Able to solve problems	Midterm Exam	Classroom	Exam
11	3	Able to generate random numbers manually and using statistical software	Random Variable Generation for Discrete Distributions	Classroom + blackboard + data show + calculator lab	discussion
12	3	Able to generate random numbers manually and using statistical software	Random Variable Generation for Discrete Distributions	Classroom + blackboard + data show + calculator lab	discussion
13	3	He uses his knowledge of statistical programming to solve problems He communicates effectively with his colleagues	Methods for generating continuous and discrete distributions using ready-made functions in MATLAB + learning generation using the ready-made program Minitab	Classroom + blackboard + data show + calculator lab	Reports

		while working on the computer and completing assignments			
14	3	The student devises appropriate methods to solve the problems he faces in data analysis	Methods for testing random numbers	Classroom + blackboard + data show + calculator lab	Exam
15	3	The student devises appropriate methods to solve the problems he faces in data analysis	Examples of generating random numbers with three different probability functions, continuous and discrete /Simulation Methods box moller	Classroom + blackboard + data show + calculator lab	Exam

11. Course Evaluation

20 marks monthly exam
5 marks daily exam
5 grade exam reports
5 marks exam assignments
5 marks for oral exam
60 marks for the final exam of the course

12. Learning and Teaching Resources

Required textbooks (curricular books if any)	An introduction to computer stochastic simulation and its modeling using MATLAB, Dr. Basil Younis
Main references (sources)	Discrete-Event System Simulation", Banks Carson II Nelson Nicol, Fifth Edition"
Recommended books and references (scientific journals, reports…)	nothing
Electronic References, Websites	nothing

Course Description Form

1. Course Name:	
Intelligent techniques	
2. Course Code:	
CMSI24-F4251	
3. Semester / Year:	
First semester / year 2023−2024	
4. Description Preparation Date:	
2024−2−2	
5. Available Attendance Forms:	
Attendance in the classroom	
6. Number of Credit Hours (Total) / Number of Units (Total)	
Number of study hours (4) / Number of units (3)	
7. Course administrator's name (mention all, if more than one name)	
Name: omar salim ibrahim Email: omarsalim85@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• Understand the basics of artificial intelligence and its sub-fields. • Enable the student to solve some statistical problems using artificial intelligence algorithms represented by artificial neural networks • Explore real-world applications of AI across various industries. Understand the basics of artificial intelligence and its sub-fields. • The student should be able to describe the models and algorithms used in artificial neural networks • Studying the most important modern intelligent technologies Writing special programs in neural networks • Study neural networks, the most important algorithms and genetic algorithm
9. Teaching and Learning Strategies	
Strategy	If the student successfully completes this course, he will be able to: 1- Knowing the importance of artificial intelligence applications 2- Writing special programs in neural networks and algorithms 3- Learn about open-loop, closed-loop, single-layer and multi-layer artificial neural networks 4- Explains the most important applications of artificial neural networks and genetic algorithms.

	5- Explains the benefits and drawbacks of applications of artificial neural networks and genetic algorithms 6- Enabling the student to solve some statistical problems using artificial intelligence algorithms 7 – Enabling the student to write programs for artificial intelligence

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	The student will be able to understand and know artificial intelligence	Introduction to artificial intelligence Artificial intelligence applications Fields of artificial intelligence	Classroom + blackboard + data show	Exam
2	3	The student will be able to understand and know artificial neural networks	Introduction to artificial neural networks Its properties, applications, and relationship to the biological network	Classroom + blackboard + data show	Exam
3	3	The student will be able to understand and know transformation functions	Components of neural networks, activation or transformation functions with application examples + programming in the Matlab language	Classroom +blackboard + data show	Exam
4	3	Neural network architecture	Single Layer Networks recurrent neural networks Multi-layer networks with examples	Classroom +blackboard + data show	Homework
5	3	Neural networks	- Methods of teaching intelligent neural network	Classroom + blackboard + data show + calculator lab	Homework

			- Supervised education - Unsupervised education - Reinforcing education		
6	3	The student will be able to understand and draw types of neural networks	Examples of how to draw different types of neural networks ,Logic gates Application on MATLAB	Classroom + blackboard + data show + calculator lab	discussion
7	3	The student will be able to understand neural network algorithms	Mc Culloch-Pitts Neuron	Classroom + blackboard + data show + calculator lab	Exam
8	3	The student will be able to understand neural network algorithms	Examples of a network Mc Culloch-Pitts Neuron Application to MATLAB	Classroom + blackboard + data show + calculator lab	discussion
9	3	The student will be able to understand neural network algorithms	Perceptron network algorithm	Classroom + blackboard + data show + calculator lab	Homework
10	3	The student will be able to understand neural network algorithms	Examples of perceptron network algorithm	Classroom	Exam
11	3	The student will be able to understand neural network algorithms	Exam	Classroom + blackboard + data show + calculator lab	discussion
12	3	The student will be able to understand neural	Error back propagation algorithm	Classroom + blackboard + data show +	discussion

		networks		calculator lab	
13	3	The student will be able to understand neural network algorithms	Examples of error back propagation network	Classroom + blackboard + data show + calculator lab	Reports
14	3	The student will be able to understand genetic algorithm	Definition of genetic algorithm Steps of genetic algorithm Genetic algorithm terminology Creation of chromosomes	Classroom + blackboard + data show + calculator lab	Exam
15	3	The student will be able to understand genetic algorithm	- Boom Mathematical examples of genetic algorithm	Classroom + blackboard + data show + calculator lab	General questions and discussion + achievement test

11. Course Evaluation

20 marks monthly exam ;5 marks daily exam ;5 grade exam reports
5 marks exam assignments ;5 marks for oral exam ;10 marks laboratory practical exam ; 50 marks for the final exam of the course

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Nothing
Main references (sources)	Jeannette Lawrence, "Inrtoduction to neural networks", 5th edition, 1993. Jacek Zurada , "Introduction to Artificial Neural Systems", 1st edition, 1994. S.N. Sivanadam and S.N. Deepa, "Introduction to Genetic Algorithm", 1st edition, 2007.
Recommended books and references (scientific journals, reports…)	Dr. S. N. Sivanandam and Dr. M. Paulraj, "Introduction to Artificial Neural Networks", Vikas Publishing House PVT LTD, 2003. Fakhreddine O. Karray and Clarence De Silva, "Soft computing and Intellegent System Design", 2004.
Electronic References, Websites	Nothing

Course Description Form

1. Course Name:	
Data mining (2)	
2. Course Code:	
CMSI24-F4151	
3. Semester / Year:	
Course 1\ 2023–2024	
4. Description Preparation Date:	
20\ 02\ 2024	
5. Available Attendance Forms:	
Attendance+Examination	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2 + 2 Practice	
7. Course administrator's name (mention all, if more than one name)	
Name: Ass. Prof. Dr. Osamah Basheer Shukur Email: drosamahannon@uomosul.edu	Name: Lec. Dr. Nur Nawzat
8. Course Objectives	
It is considered a complement to Data Mining (1) and aims to specialize more in data mining concepts and methods.	
9. Teaching and Learning Strategies	
Developing students on data mining, classification, and clustering by using statistical and machine learning methods	

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
20/09/2023	2		**Extracting Rules from Groups**	**H.W**	Assignment
27/09/2023	2		**Decision Trees**	**H.W**	
04/10/2023	2		**Splitting criteria**	**H.W**	
11/10/2023	2		**Examples of solution**	**H.W**	
18/10/2023	2		**Classification**	**H.W**	
25/10/2023	2		**Linear simple regression**	**H.W**	
01/11/2023	2		**Examples of solution**	**H.W**	Assignment
08/11/2023	2		**Multiple linear regression**	**H.W**	Exam
15/11/2023	2		**Classification and regression trees**	**H.W**	Assignment
22/11/2023	2		**Logistic Regression**	**H.W**	
29/11/2023	2		**Neural Networks**	**H.W**	
06/12/2023	2		**Time series data mining**	**H.W**	
13/12/2023	2		**Case study**	Assignment	Exam

11.Course Evaluation
40 for mid-course exam, 60 for final exam

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	**Giudici, P. (2005).** ***Applied data mining: statistical methods for business and industry.*** **John Wiley & Sons.** **Nisbet, R., Elder, J., & Miner, G. (2009).** ***Handbook of statistical analysis and data mining applications.*** **Academic press.**
Electronic References, Websites	

Course Description Form

1. Course Name:	
Regression Analysis (1)	
2. Course Code:	
CMSI24-F3121	
3. Semester / Year:	
First/ 2023−2024	
4. Description Preparation Date:	
20-2-2024	
5. Available Attendance Forms:	
Actual presence	
6. Number of Credit Hours (Total) / Number of Units (Total)	
3 Credit/ 3 Hours	
7. Course administrator's name (mention all, if more than one name)	
Name: Ass. Prof. Dr. Bashar A. Al-Talib Email: bashar.altalib@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• Developing the student's ability to understand the philosophy of the subject and its concepts • Satisfy his concepts on the subject of regression analysis in Linear and non-linear Models • The student's understanding of the situation of qualitative variables that require the use of variables Fake and others.
9. Teaching and Learning Strategies	
Strategy	**The teaching and learning strategy in Regression Analysis (1) is based on the following:** • **Teaching:** To try to give the student a preliminary idea about the methods of regression analysis in studying the relationships between the independent variables and the dependent variable in simple and multiple linear and non-linear regression models, and to study the dummy variables and violations in the analysis assumptions and the resulting problems. • **Learning:** The student must have the ability to deal with and analyze data that fits linear and non-linear models and deal with qualitative variables, as well as detect, deal with and address the problems that regression models suffer from.

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or Subject Name**	**Learning method**	**Evaluation method**
1. First 2. Second 3. Third 4. Fourth 5. Fifth 6. Sixth 7. Seventh 8. Eighth 9. Nineth 10. Tenth 11. Eleventh 12. Twelveth 13. Thirteenth 14. Fourtenth Fiftenth	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	1. introduction 2. Parameter estimation 3. Parameter estimation 4. Properties of the equation 5. Estimating the variance of parameters 6. Hypothesis testing and confidence limits 7. Equivalence tests and correlation coefficient 8. The relationship of the correlation coefficient to the regression coefficient 9. Regression through the origin 10. Testing hypotheses for the correlation coefficient 11. Array method 12. Violations of analysis	1. Introduction to simple linear regression analysis, analysis assumptions 2. Estimating regression parameters using the least squares method-1- 3. Estimating regression parameters using the least squares method -2- 4. Some properties of the regression line equation - Estimating the variance of the regression coefficient 5. Estimating the variance of the intercept, estimating the mean variance of the response 6. Hypothesis testing (testing the significance of the Y/X regression coefficient, confidence limits (interval estimation)], for the true mean value of the dependent variable 7. (Equivalence between the F-test and the t-test, the coefficient of determination R^2, the correlation coefficient between the expected values and the actual	**Theoretical lectures + practical lectures + Youtube channel +Daily posts +SPSS application**	**Daily posts + daily and quarterly exams + Reports + Homework**

		assumptions 13. Self-correlation 14. Adjusting autocorrelation Differentiate between correlation and regression relationships	observed values 8. The relationship of the correlation coefficient r to the estimated regression coefficient, the lack of fit test, the maximum value of the coefficient of determination, 9. Regression from the origin, testing hypotheses related to regression from the origin 10. Testing hypotheses related to the correlation coefficient, estimation using the maximum-likelihood method 11. Matrix method in simple linear regression (analysis of variance table, variance and covariance, mean response variance) 12. Violations or defects in the analysis assumptions (are the assumptions met, is the relationship linear, 13. Testing for auto-correlation between errors 14. Adjusting the autocorrelation between errors, testing the normal distribution of the error term The difference between correlation and regression		

11.	
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 textbo (curricular books, if any)	1. Regression Analysis . A Practical Introduction. By Jeremy Arkes. Be ... Edition, 2nd edition 2023. No. Of Pages, 392. Publisher, Taylor & Francis Ltd. Toggle . 2. Jeremy Arkes (2023), "Regression Analysis: A Practical Introduction [2 ed.]", Routledge. 3. Bolin, Jocelyn H. is the author of 'Regression Analysis in R : A Comprehensive View for the Social Sciences', published 2023 under ISBN 9780367272586 and ISBN 036727258X.
Main references (sources	4. Douglas C. Montgomery; Elizabeth A. Peck; G. Geoffrey Vining 2021, "Introduction to Linear Regression Analysis" 6th Edition, Wiley-Blackwell, Print ISBN 9781119578727, 1119578728, Copyright 2021 5. William Mendenhall, Terry Sincich (2020), "A Second Course in Statistics: Regression Analysis", 8th Edition, Pearson
Recommended books and references (scientific journals, reports…)	6. Daniel P. McGibney (2023), "Applied Linear Regression for Business Analytics with R. A Practical Guide to Data Science with Case Studies",International Series in Operations Research & Management Science", Volume 337, Springer 7. Samprit Chatterjee, Jeffrey S. Simonoff (2020), "Regression Modeling and Data Analysis with Applications in R [2 ed.],Wiley Series in Probability and Statistics, Wiley 8. Peter H. Westfall, Andrea L. Arias (2020), "Understanding Regression Analysis [1 ed.]",Routledge 9. JIM FROST (2019), "Regression Analysis: An Intuitive Guide [1 ed.]"
Electronic Referenc Websites	Dr. Bashar A. Al-Talib Chanell https://youtube.com/@user-bp4bo3ht6y?si=Vdm0DdXzSduJTyC-

Course Description Form

13. Course Name:
Regression Analysis (2)
14. Course Code:
CMSI24-F3121
15. Semester / Year:

First/ 2023−2024	
16. Description Preparation Date:	
21-2-2024	
17. Available Attendance Forms:	
Actual presence	
18. Number of Credit Hours (Total) / Number of Units (Total)	
3 Credit/ 3 Hours	
19. Course administrator's name (mention all, if more than one name)	
Name: Ass. Prof. Dr. Bashar A. Al-Talib **Email:** bashar.altalib@uomosul.edu.iq	
20. Course Objectives	
Course Objectives	• Satisfy his concepts on the subject of regression analysis in linear models in multiple regression • Dealing with non-linear models for simple and multiple regression • The student's understanding of the situation of qualitative variables, which requires the use of imaginary variables and others. • Giving the student an introduction to the problems of multiple linear regression models
21. Teaching and Learning Strategies	
Strategy	**The teaching and learning strategy in Regression Analysis (1) is based on the following:** • **Teaching:** Trying to give the student a preliminary idea about simple and multiple linear and nonlinear multiple regression models and studying the dummy variables and violations in the analysis assumptions and the problems that result from them. • **Learning:** The student must have the ability to deal with and analyze data that fits linear models in multiple regression and non-linearity and deal with qualitative variables, as well as detect, deal with and address the problems that regression models suffer from.

22. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or Subject Name**	**Learning method**	**Evaluation method**

15. First 16. Second 17. Third 18. Fourth 19. Fifth 20. Sixth 21. Seventh 22. Eighth 23. Nineth 24. Tenth 25. Eleventh 26. Twelveth 27. Thirteenth 28. Fourtenth 29. Fiftenth	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	1. Multiple linear regression 2. Properties of capabilities 3. Analysis of variance table 4. Additional sum of squares 5. Successive sources of variation 6. And the Doolittle method 7. Choosing the best regression equation -1- 8. Choosing the best regression equation -2- 9. Gradual decline 10. Dummy variables 11. Simple nonlinear regression 12. Determine the degree of equation 13. Multiple nonlinear regression 14. Multiple regression model violations -1- 15. Multiple regression model	1. Multiple linear regression (analysis assumptions, least squares parameter estimation, population variance estimation, S2, or Mse) 2. Properties of estimators using the least squares method, variance of the mean response, standard partial regression coefficient 3. Analysis of variance table, corrected sum of squares 4. Additional sum of squares, finding the additional sum of squares by the shortcut method, testing hypotheses, and an analysis of variance table for the corrected and additional sums of squares. 5. Successive sources of variation 6. Using the Doolittle method to find the vector of estimated parameters, the relationship between confidence limits and hypothesis testing	Theoretical lect +	Daily

23.	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc	
24. Learning and Teaching Resources	
Required textboc (curricular books, if any)	6. Regression Analysis . A Practical Introduction. By Jeremy Arkes. Be ... Edition, 2nd edition 2023. No. Of Pages, 392. Publisher, Taylor & Francis Ltd. Toggle . 7. Jeremy Arkes (2023), "Regression Analysis: A Practical Introduction [2 ed.]", Routledge. 8. Bolin, Jocelyn H. is the author of 'Regression Analysis in R : A Comprehensive View for the Social Sciences', published 2023 under ISBN 9780367272586 and ISBN 036727258X.
Main references (source	9. Douglas C. Montgomery; Elizabeth A. Peck; G. Geoffrey Vining 2021, "Introduction to Linear Regression Analysis" 6th

	Edition, Wiley-Blackwell, Print ISBN 9781119578727, 1119578728, Copyright 2021 10. William Mendenhall, Terry Sincich (2020), "A Second Course in Statistics: Regression Analysis", 8th Edition, Pearson
Recommended books and references (scientific journals, reports…)	10. Daniel P. McGibney (2023), "Applied Linear Regression for Business Analytics with R. A Practical Guide to Data Science with Case Studies",International Series in Operations Research & Management Science", Volume 337, Springer 11. Samprit Chatterjee, Jeffrey S. Simonoff (2020), "Regression Modeling and Data Analysis with Applications in R [2 ed.],Wiley Series in Probability and Statistics, Wiley 12. Peter H. Westfall, Andrea L. Arias (2020), "Understanding

	Regression Analysis [1 ed.]",Routledge 13. JIM FROST (2019), "Regression Analysis: An Intuitive Guide [1 ed.]"
Electronic Reference Websites	Dr. Bashar A. Al-Talib Chanell https://youtube.com/@user-bp4bo3ht6y?si=Vdm0DdXzSduJTyC-

Course Description Form

1. Course Name:	
Mathematical Statistics I	
2. Course Code:	
CMSI24-F3111	
3. Semester / Year:	
First semester	
4. Description Preparation Date:	
February 10th 2024	
5. Available Attendance Forms:	
In-class	
6. Number of Credit Hours (Total) / Number of Units (Total)	
Lecture hours: 3 hours, Recitation: 1 hour, Credit: 3 Credit	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Zaid Tariq Saleh Al-Khaledi Email: zaid.alkhaledi@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	**1. Explain probability mass, density, cumulative distribution functions, joint density, mass, and cumulative functions with their properties** **2. Identify different moments of a single variable and their properties and relations between moments** **3. Identifying generating functions and cumulants with their uses and properties** **4. Learn about important measures such as median, modes, harmonic mean, variance, mean deviation, and coefficient of variation. These measures are essential in studying statistical properties of discrete and continuous distributions Which the student will study in Mathematical Statistics 2 in the second course.** **5. Learning joint probability functions, marginal and conditional probability functions, joint, marginal, conditional moments, joint generating functions, and cumulants.** **6. Defining theoretical joint measures such as covariance, simple correlation, and partial correlation coefficients.**
9. Teaching and Learning Strategies	
Strategy	Encouraging students to participate in the class through discussion and solving exercises, while improving and expanding their critical thinking skills through reports and using software to calculate cumulative probabilities, moments, or drawing probability functions. Also linking the knowledge, they receive with the subjects that they studied in

	previous levels and the levels that they will turn to later.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	4	Probability mass and density functions Cumulative distribution function with properties	Lecture_01	Lecture	Homework
Week 2	4	Mathematical expectation with properties, Moments around zero, central and non-central moments. factorial moments	Lecture_02	Lecture	Homework
Week 3	4	Moment generating function characteristic function with properties	Lecture_03	Lecture	Homework
Week 4	4	Probability generating function cumulant generating function	Lecture_04	Lecture	Homework
Week 5	4	Median, Modes, Harmonic mean geometric mean	Lecture_05	Lecture	Homework
Week 6	4	Mean deviation, variance with properties	Lecture_06	Lecture	Homework
Week 7	4	Midterm exam	---	---	Test
Week 8	4	Joint probability mass and density functions, joint cumulative distribution functions	Lecture_07	Lecture	Homework
Week 9	4	Marginal density, mass, cumulative functions	Lecture_08	Lecture	Homework
Week 10	4	Joint moments, marginal moments independence	Lecture_09	Lecture	Homework
Week 11	4	Joint moment generating, characteristic function, joint cumulant generating functions and marginals	Lecture_10	Lecture	Homework
Week 12	4	Conditional distributions, conditional cumulative distribution function with properties	Lecture_11	Lecture	Homework
Week 13	4	Conditional moments	Lecture_12	Lecture	Homework
Week 14	4	Covariance and simple correlation coefficients	Lecture_13	Lecture	Homework
Week 15	4	Partial correlation with examples	Lecture_14	Lecture	Homework
Week 16	4	Final exam	---	---	Test

11. Course Evaluation

Quizzes: 2 (worth 10%)
Assignments: 2 (worth 10%)
Open-book exams: 5 (worth 10%)
Reports: 1 (worth 10%)
Midterm Exam: 1 (worth 10%)
Final Exam: 1 (worth 50%)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Hermiz,A.H.(1989),"Mathematical Statistics ", Directorate of Dar Al-Kutub for Printing and Publishing, University of Mosul, Iraq
Main references (sources)	School, P., Louisville, KY, (2013), "Probability and

	mathematical statistics",
Recommended books and references (scientific journals, reports…)	Hog, R.V. and Craig, A.T. (1978)," Introduction to mathematical statistics ", fourth edition, Macmillan Publishing Co., Inc. NEW YORK
Electronic References, Websites	

Course Description Form

13. Course Name:	
Mathematical Statistics II	
14. Course Code:	
CMSI24-F3111	
15. Semester / Year:	
Second semester	
16. Description Preparation Date:	
February 10th 2024	
17.Available Attendance Forms:	
In-class	
18.Number of Credit Hours (Total) / Number of Units (Total)	
Lecture hours: 3 hours, Recitation: 1 hour, Credit: 3 Credit	
19. Course administrator's name (mention all, if more than one name)	
Name: Dr. Zaid Tariq Saleh Al-Khaledi Email: zaid.alkhaledi@uomosul.edu.iq	
20. Course Objectives	
Course Objectives	**1. Applying all the vocabulary of mathematical statistics 1 to discrete and continuous distributions.** **2. Recognizing the applications of each distribution.** **3. Studying the distributions of linear combinations of single and more than one independent variable by using mgf, cdf, and transformation techniques.** **4. Studying the importance of sampling distributions in different fields of statistics especially confidence intervals and hypothesis testing.** **5. Studying the importance of order statistics and their distributions and properties.**

	6. Studying the importance of the central limit theorem which is important in studying distributions of estimators, tests, and other properties in large samples.

21. Teaching and Learning Strategies

Strategy	Encouraging students to participate in the class through discussion and solving exercises, while improving and expanding their critical thinking skills through reports and using software to calculate cumulative probabilities, moments, or drawing probability functions. Also linking the knowledge, they receive with the subjects that they studied in previous levels and the levels that they will turn to later.

22. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	4	Discrete distributions: Uniform and Bernoulli distribution.	Lecture_01	Lecture	Homework
Week 2	4	Binomial distribution.	Lecture_02	Lecture	Homework
Week 3	4	Poisson distribution	Lecture_03	Lecture	Homework
Week 4	4	Geometric distribution.	Lecture_04	Lecture	Homework
Week 5	4	Continuous distributions: uniform Distribution. Methods of finding distribution of functions of random variables.	Lecture_05	Lecture	Homework
Week 6	4	Normal distribution.	Lecture_06	Lecture	Homework
Week 7	4	Midterm exam	---	---	Test
Week 8	4	Gamma distribution	Lecture_07	Lecture	Homework
Week 9	4	Distributions of nonlinear functions of independent continuous random variables.	Lecture_08	Lecture	Homework
Week 10	4	Transformation technique in discrete distributions	Lecture_09	Lecture	Homework
Week 11	4	Chi square distribution	Lecture_10	Lecture	Homework
Week 12	4	Student t distribution	Lecture_11	Lecture	Homework
Week 13	4	F distribution	Lecture_12	Lecture	Homework
Week 14	4	Order statistics, distribution of single order statistic.	Lecture_13	Lecture	Homework
Week 15	4	Distribution of functions of order statistics.	Lecture_14	Lecture	Homework
Week 16	4	Final Exam	---	---	Test

23. Course Evaluation

Quizzes: 2 (worth 10%)
Assignments: 2 (worth 10%)
Open-book exams: 5 (worth 10%)
Reports: 1 (worth 10%)
Midterm Exam: 1 (worth 10%)
Final Exam: 1 (worth 50%)

24. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Hermiz,A.H.(1989),"Mathematical Statistics ", Directorate of Dar Al-Kutub for Printing and Publishing, University of Mosul, Iraq
Main references (sources)	School, P., Louisville, KY, (2013), "Probability and mathematical statistics",
Recommended books and references (scientific journals, reports…)	Hog, R.V. and Craig, A.T. (1978)," Introduction to mathematical statistics ", fourth edition, Macmillan Publishing Co., Inc. NEW YORK
Electronic References, Websites	

Course Description Form

1. Course Name	
Operation Research	
2. Course Code:	
CMSI23-F3151	
3. Semester / Year	
:First/2023-2024	
4. Description Preparation Date	
19/2/2024	
5. Available Attendance Forms:	
third Hall in the department of Informatic & Statistics	
6. Number of Credit Hours (Total) / Number of Units (Total	
4hr/3unit	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr.Zinah mudher yeahya Email: Zeenamudhar@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• **Assisting managementin making optimal decisions…..** • **Building & solving the mathematical model** • **-Learn about Sensitivity Analysis to identify how much variations in the input values for a given**

	variable impact the results for a mathematical model

9. Teaching and Learning Strategies

Strategy	The student will learn to create a mathematical model for industrial facilities and solve it according to the operations research method, as well as test the suitability of the model for future changes.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Operation research	Operation Research: Introduction& Definition	In the hall	
2	4	Linear programming	Linear programming Concept	Inthe hall	
3	4	linear programming model	Scientific &mathematical formula of linear programming model	Inthe hall	
4	4	Building mode	Building L.P models with application	In the hall	
5	4	Graphical method	Solve the L.P. model, Graphical method	Inthe hall	
6	4	Special case in graphical method	Special case in graphical method No feasible solution, Multi – optimal solution, Unbounded solution, Degeneracy	Inthe hall	
7	4	simplex method	Solve the L.P by using simplex	In the hall	

			method		
8	4	Special case simplex method	in Special case in simplex method, No feasible solution, Multi – optimal solution, Unbounded solution, Degeneracy	Inthe hall	
9	4	M- Technique	M- Technique	Inthe hall	
10	4	Dual model	Dual model	In the hall	
11	4		Finding the optimal solution of dual model from the primal model &also vice versa	Inthe hall	
12	4	Dual simplex	Dual simplex method,building model& solution technology	Inthe hall	
13	4	Sensitivity Analysis or post optimality analysis	Change in objective function coefficients :,coefficients of basic &non basic variables	In the hall	
14	4	Sensitivity Analysis or post optimality analysis	Change in right side coefficients	Inthe hall	

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)	Operation Research
Main references (sources)	**Hamdy taha(2011)Operation research "an an introduction"** Hiller&Liberman(1995)Introduction to operations Research
Recommended books and references (scientific	

journals, reports…)		
Electronic References, Websites		

Course Description Form

1.	Course Name:
	Operation Research
2.	course Code: :
	CMSI23-F3251
3.	Semester / Year:
	Second/2022-2023
4.	Description Preparation Date:
	19/2/2024
5.	Available Attendance Forms:
	third Hall in the department of Informatic & Statistics
6.	Number of Credit Hours (Total) / Number of Units (Total))
	4hr/3unit
7.	Course administrator's name (mention all, if more than one name)
	Name: Dr. zinah mudher yehya Email: Zeenamudhar@uomosul.edu.iq
8.	Course Objectives

Course Objectives	• Learn about TRANSPORTATION Problem to minimize total cost • Learn about Network Analysis to minimize total project cost and minimize total project duration • Recognize the intention of Game theory to produce optimal

	decision -making of independent and competing actors in a strategic setting Recognize the intention of Storage theory to produce optimal decision -making of independent and competing actors in a strategic setting &minimizing the total cost

21	Teaching and Learning Strategies
Strategy	The main strategy that will be adopted is to encourage student participation in solving exercises, and at the same time improve and expand their critical thinking skills so that the student learns to help management by making optimal decisions with the highest profit and lowest possible cost using game theory and also learns to find the optimal time to complete projects through networks. Business and the student learns to transport goods at the lowest cost and the shortest path. One of the important topics that the student must learn is the theory of storage in order to determine the optimal storage, the optimal demand, and the reorder point at the lowest cost to meet future needs.

22	Course Structure				
Week	**Hours**	**Unit or subject name**	**Required Learning Outcomes**	**Learning method**	**Evaluation method**
1	4	Transportation	Definition of Transportation model,		
2	4	Optimal sol. of transportation	Test the optimal of mal Transportation problem		
3	4		Balanced Transportation problem		
4	4	Network Analysis &network drawing rules	Drawing network		
5	4	Critical path method(CPM (Forward& backward solution of critical	Computation of CPM (Early &late time)		

		bath)			
6	4	PERT network	PROGRAM EVALUTION &REVIEW TECHNIQUE		
7	4	Game theory	**Game theory**		
8	4	Solution method	Create &solve a matrix of came theory		
9	4	Optimal solution of two players	optimal solution of Two persons zero- sum Games		
10	4	Graphical method &game theory	Solve game matrix graphically of 2*m &m*2 order		
11	4	Linear Programming &Game theory	Solve the game matrix of order (m*n)by L.P.		
12	4	Storage Theory	Def.&Type of storage		
13	4	Purchase modelwith out shortage &with shortage	Compute the optimal storage with min.cost		
14	4	Product model without shortage &with shortage	Compute the optimal storage with min.cost		

22	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
23	Learning and Teaching Resources

Required textbooks (curricular books, if any)	Operation Research
Main references (sources)	**Hamdy taha(2011)Operation research "an introduction"** Hiller&Liberman(1995)Introduction to operations Research
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Biostatistics(1)
2. Course Code:

CMSI24-F31314
3. Semester / Year:
2023-2024
4. Description Preparation Date: 15/2/2024
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total):
(3) / (2)
7. Course administrator's name (mention all, if more than one name)
Name: Mhasen Saleh Altalib Email: mhasenaltalib@uomosul.edu.iq
8. Course Objectives

Course Objectives	1. This course aims to provide the student with basic information and scientific training in the field of biostatistics through the application of many types of important statistical methods in data analysis, especially in the field of science and statistical applications in the field of clinical medicine, as well as benefiting from it in other fields 2. Familiarize yourself with the subject of statistical hypothesis testing, when it is applied, the extent to which its results are benefited, and what are the statistical terms that must be recognized (such as the level of significance, error of the first and second kind, types of hypotheses .....) in order to define the hypothesis and apply it correctly, which leads to a decision Correct decision. 3. What is the statistical hypothesis, what does it consist of, and what is its statistical formula. 4. Identifying the types of tests: for one community, two communities, or more, and what are the statistical characteristics of this community. 5. What are the parameters being tested, mean, ratio or variance... 6. Study population data through standard and clinical life tables.
9. Teaching and Learning Strategies	
Strategy	Encouraging students to participate in the class through discussion and solving exercises, while improving and expanding critical thinking skills through reports and using programs to calculate the statistical laboratory, as well as linking the knowledge they receive with the materials they studied in previous levels and the levels they will turn to later.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First	3	1. There are two possible outcomes	Hypothesis testi	Live meeting-whiteboard	Daily Exams

		of hypothesis testing: The null hypothesis, H0, is rejected, in which case we have evidence that supports the alternative hypothesis. Do not reject the null hypothesis H0, as in this case we do not have sufficient evidence to support the alternative hypothesis.	definitions with gene concepts		And a semester exam
Second			Building hypotheses: the null hypothesis and the alternative hypothesis with testing from one side and from two sides, error of the first and second kind, and the power of the statistical test.		
Third		2. Learn about the statistical hypothesis and how to formulate it.	Test criterion: The steps involved in testing a hypothesis.		
Fourth		3. Errors of the first and second types 4. Great level 5. Areas of rejecting and accepting the null hypothesis	Tests related to averages: A test related to one average in the case of large samples.		
Fifth		6. The statistical laboratory, its types and uses 7. Collect data from the sample and calculate its laboratory statistical value	Tests related to averages: a test related to one average, analysis hypotheses and applied examples related to one average test in the case of small samples.		
Sixth		8. How to make a decision. 9. Types of tests (parametric) For small and large samples.	Difference of two means tests: The difference between two means using large samples. Z-test		
Seventh		a) Test of means (one mean, two means, more than two means (one-way and two-way analysis of variance)) b) Variance testing (single variance, two variances, and multiple variances)	Difference of two means tests: The difference between two means using small samples t-test and test the difference between two related means. t-tailed.		
Eight		C) Proportions test (one ratio, two ratios). Dr.. Testing the variance of communities	Testing the difference between more than two means: Introduct analysis of variance - c way and two-way.		
Nineth			One-way analysis to estimate covariance model parameters.		
Tenth			Two-way analysis of variance and practical examples. A test related to proportions for a population with a binomial distribution - for one sample + applied examples		
Eleventh			Test related to proportions for a population with a binomial distribution - for one sample + applied examples.		
Twelfth			Testing the difference between two ratios / applied examples..		
Thirteenth			Standard deviation and variance tests: Testing the variance of a single population.		
Fourteenth			A test for homogeneity of variances between two independent estimates.		

Fifteenth			Standard deviation and variance tests: A test for the equality of several variances.		

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)	1. Al-Rawi, Khasha'a Mahmoud (1998) "Introduction to the Principles of Statistics", first edition, Ibn Al-Atheer Press, University of Mosul-Iraq. 2. Prof. Kamal Alwan Khalaf and Prof. Dr. Emad Hazim (2009) "Testing Statistical Hypotheses", Al Jazeera Printing and Publishing Office - Baghdad.
Recommended books and references (scientific journals, reports…)	3e- Daryl S. Paulson, (2008); "Biostatistics and Microbiology" Bioscience Labortoies Bozeman, MT, USA.
Electronic References, Websites	

Course Description Form

1. Course Name:
Biostatistics(1)
2. Course Code:
CMSI23–G3231
3. Semester / Year:
second 2023–2024
4. Description Preparation Date:
15/2/2024
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total)
7. Course administrator's name (mention all, if more than one name)
Name: Mhasen Saleh Altalib Email: mhasenaltalib@uomosul.edu.iq
8. Course Objectives

Course Objectives	1-This course aims to provide the student with basic information and scientific training in the field of biostatistics through the application of many types of important statistical methods in data analysis, especially in the field of science and statistical applications in the field of clinical medicine, as well as benefiting from it in other fields. 2) Distinguish between vital statistics and vital statistics. 3) Studying population data through both standard and clinical life tables. 4) Study the survival data and their statistical distributions and analyze them. 5) Knowing how to verify the results of laboratory analyzes, the accuracy of these analyzes, and the consistency of results between health units such as hospitals and analysis laboratories. 6) How to calculate and use the appropriate dose for any vaccine, treatment, or insecticide, i.e. in general, any medical drug.

9. Teaching and Learning Strategies

Strategy	Encouraging students to participate in the class through discussion and solving exercises, while improving and expanding critical thinking skills through reports and using programs to calculate the statistical laboratory, as well as linking the knowledge they receive with the materials they studied in previous levels and the levels they will turn to later.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First	3	1. Biostatistics is the application of statistics to a wide range of topics in biology. Biostatistics includes designing biological tests, especially in medicine and agriculture, collecting, summarizing and analyzing information from these experiments, interpreting results and drawing conclusions from them. The terms "biometric" or "biometric" can also be used as synonyms for vital statistics. 2. Identify the areas of application of biostatistics, including: Public health - including epidemiology research, health services research, nutrition and environmental health. Medicine - clinical test design and analysis. Genetics, genetics, and genetic statistics that attempt to relate abnormalities in genotype with phenotype. The results of the researches were applied in the field of agriculture to improve the quality	biostatistics: definitions with general concepts.	Live meeting-whiteboard	Daily Exams And a semester exam
Second	3		Birth and death rates.		
Third	3		disease rates and Practical examples.		
Fourth	3		Measure of the relationship between life factors - Practical examples.		
Fifth	3		Comparing two rates of death from a particular cause		
Sixth	3		Fisher's exact test for comparison of two rates- Practical examples.		

Seventh	3	and quantity of crops and the breeding of farm animals. It is appli in biomedical research to find alle of a gene responsible for genetic diseases. 3. Learn about laboratory analyzes and how to verify the validity of their results through some statistical tests. 4. How to conduct vital tests, the effectiveness of medical drugs such as a vaccine, treatment or pesticide. 5. Comparison of death rates for a particular cause. 6. Confirming the seriousness of diseases and indicating which of the is more risk, in addition to studying another reason for increasing this risk. 7. Determine the confidence limits for relative severity. 8. Learn how to calculate and use the appropriate dose for any vaccine, treatment, or insecticide, i.e. in general, any medical drug. 9. How to determine vital tests- Estimate the median dose. Analyze survival data - life functio death function and hazard functio and the relationship between the functions.	Usual and clinical life schedule.		
Eight	3		Comparison of two sets of survival data.		
Nineth	3		Comparison of two sets of survival data- Relative Risk estimation for a single study with confidence limits.		
Tenth	3		General relative risk estimation with confidence limits- Practical examples		
Eleventh	3		Laboratory analyzes - concordance between the results of two laboratorie		
Twelfth	3		Matching in terms of effectiveness, sensitivity and accuracy.		
Thirteenth	3		Matching in terms of sensitivity and accuracy -double test		
Fourteenth	3		vital tests- Estimate the median dose- Practical examples		
Fifteenth	3		Analyze survival data - life function, death function and hazard function, and the relationship between these functions.		

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)	2. Al-Rawi, Khasha'a Mahmoud (1998) "Introduction to the Principles of Statistics", first edition, Ibn Al-Atheer Press, University of Mosul-Iraq. 2. Prof. Kamal Alwan Khalaf and Prof. Dr. Emad Hazim (2009) "Testing Statistical Hypotheses", Al Jazeera Printing and Publishing Office - Baghdad.
Recommended books and references (scientific journals, reports…)	3e- Daryl S. Paulson, (2008); "Biostatistics and Microbiology" Bioscience Labortoies Bozeman, MT, USA.
Electronic References, Websites	

Course Description Form

1. Course Name:

Management of information systems
2. Course Code:
CMSI23-F3161
3. Semester / Year:
First course / 2023-2024
4. Description Preparation Date:
14/2/2024
5. Available Attendance Forms:
My attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
4 hours/3 units
7. Course administrator's name (mention all, if more than one name)
Name: Mahmoud Mohammed Taher Jader Al-Abadi Email: Mahmood81_tahr@uomosul.edu.iq
8. Course Objectives

Course Objectives	**• Giving an idea of the importance of business management** **• Methods of scheduling** **• The most important scheduling algorithms**

9. Teaching and Learning Strategies

Strategy	The concept of the information system, characteristics of information, the nature of management information systems, the importance of managing management information systems, scheduling standards, system characteristics, single-processor scheduling algorithms, applied examples, precedence scheduling algorithm, advantages that the information system brings to organizations, stages of the control and oversight process, the issue of sequences. The main returns achieved by the information system are multiprocessor scheduling algorithms, multiprocessor scheduling algorithms without communication cost, algorithms for scheduling linked processes with equal execution times .

10. Course Structure

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

First	4	The importance of management information systems, terms of management information, direct loop statement model, number of processors, process time	The concept of managem information systems	writing board Data show	Homework
Second	4	Components of management information systems, statement structure, types of scheduling	Definition of managemen information systems	writing board Data show	Homework
Third	4	Objectives of management information syster static processor, homogeneous and heterogeneous rocessors	Data processing system	writing board Data show	Homework
Fourth	4	Characteristics of an ideal information syster single-processor scheduling algorithms, firstcome, first-served scheduling algorithm	Characteristics of an idea information system	writing board Data show	Homework
Fifth	4	Personnel resources, hardware resources, software resources, data resources, smallest work first scheduling algorithm	Management information system resources	writing board Data show	Homework
Sixth	4	The emergence of the information and knowledge revolution, Internet and network technology, the emergence of electronic business models, the acceleration of quantitat and qualitative changes in the business environment, globalization, the precedence scheduling algorithm.	Factors affecting the development of management information systems:	writing board Data show	Daily exam
Seventh	4	Multiprocessor scheduling algorithms, independent process scheduling algorithms, largest time process scheduling algorithm	Management information system activities:	writing board Data show	Homework
Eighth	4	Semester exam	Semester exam	Semester exam	Semester exam
Ninth	4	Data, information, knowledge, smallest time process scheduling algorithm	The concept of data and information	writing board Data show	Homework
Tenth	4	Genesis and evolution of,the smallest level-fi scheduling algorithm with time estimation	The relationship between data and information	writing board Data show	Homework
Eleventh	4	Defining and discovering the problem: diagnosing the problem, analyzing the proble finding alternatives to solve the problem, Evaluate the available alternatives to solve the problem:	Information retrieval systems	writing board Data show	Homework
Twelveth	4	The concept of information systems strategy, the role of the management information system in achieving competitive advantages	Stages of decision-maki	writing board Data show	Homework
Twelfth	4	Division of the information systems life cycle management information system activities:	Strategic planning for information systems	writing board Data show	Homework
Thirteenth	4	The emergence of the information and knowledge revolution, Internet and network technology, and the emergence of electronic business models	Information system life cycle	writing board Data show	Daily exam
Fourteenth	4	Accelerating quantitative and qualitative changes in the business environment, globalization, and precedence scheduling algorithm	Factors affecting the development of management information systems:	writing board Data show	Homework

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)	ادارة نظم المعلومات الادارية
Main references (sources)	الحارث عبد ا منعم احمد حمد النيل ، 2019،"نظم ا علومات

	الادارية"،كلية الادارة والاقتصاد ،جامعة شندي مقرر نظم ا علومات الإدارية،جامعة الشام ا خاصة،كلية العلوم الإدارية،قسم إدارة الموارد البشرية Abraham, S. and Peter Baer, G. (1998), "**Oprating System Concepts**", Addison-Wesley Publishing Company. AL-Sbawy, A. M. and Mahmood, E. M. (2001), "**Construct an Optimal Scheduling for Multiple Processors**".
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	الإدارية" المعلومات أبشر،2021، "نظم أحمد المعطى عبد https://missystems.blogspot.com/

Course Description Form

1. Course Name:					
Survival Analysis					
2. Course Code:					
CMSI23-F3171					
3. Semester / Year:					
First semester					
4. Description Preparation Date:					
February 10th 2024					
5. Available Attendance Forms:					
In-class					
6. Number of Credit Hours (Total) / Number of Units (Total)					
Lecture hours: 3 hours, Credit: 3 Credits					
7. Course administrator's name (mention all, if more than one name)					
Name: Dr. Manaf Hazim Ahmed Email: manaf.ahmed@uomosul.edu.iq					
8. Course Objectives					
Course Objectives	Providing the student with the basic concepts in the theory of queuing and its practical applications				
9. Teaching and Learning Strategies					
Strategy	Understand key queuing theory terms and concepts such as arrival rate, service rate and wait length. Study different models of queuing theory, starting with simple models such as M/M/1 and progressing towards more complex scenarios. Practice problem solving to reinforce theoretical concepts and calculate performance measures. Explore how to apply the theory Waiting in a range of industries through case studies. Participate in practical exercises including designing and improving waiting systems.				
10. Course Structure					
Week	**Hou**	**Required Learning Outcomes**	**Unit or**	**Learning**	**Evaluation**

	rs		subject name	method	method
Week 1	3	Introduction to queuing theory	Lecture_01	Lecture	Homework
Week 2	3	Characteristics of queue models	Lecture_02	Lecture	Homework
Week 3	3	The distributions in queues Theory	Lecture_03	Lecture	Homework
Week 4	3	The process of birth and death	Lecture_04	Lecture	Homework
Week 5	3	Single-service queuing model/ characteristics	Lecture_05	Lecture	Homework
Week 6	3	Single-service model/ steady state distribution, important indicators of the queuing system	Lecture_06	Lecture	Homework
Week 7	3	Single-service model / Calculating the probability distribution	---	---	Test
Week 8	3	Single-service queuing model with limited capacity / probability distribution of the system, important indicators of the model	Lecture_07	Lecture	Homework
Week 9	3	Midterm exam	Lecture_08	Lecture	Homework
Week 10	3	Practical applications on models	Lecture_09	Lecture	Homework
Week 11	3	Queue model with multiple centers	Lecture_10	Lecture	Homework
Week 12	3	Queuing model with multiple centers and limited model capacity/probability distribution of the model, important indicators	Lecture_11	Lecture	Homework
Week 13	3	For a queuing model with multiple centers, limited model capacity, and limited demand source/probability distribution of the model, important indicators of the queuing model	Lecture_12	Lecture	Homework
Week 14	3	Queuing model with multiple centers / practical applications on models	Lecture_13	Lecture	Homework
Week 15	3	Final project: discussion of findings	Lecture_14	Lecture	Homework
Week 16	3	Final Exam	---	---	Test

11. Course Evaluation

Quizzes: 2 (worth 10%)
Assignments: 2 (worth 5%)
Reports: 1 (worth 5%)
Midterm Exam: 1 (worth 20%)
Final Exam: 1 (worth 60%)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	Queuing Theory, Dr. Adnan Abdel Rahman Berry 1989
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

13. Course Name:
Reliability/Third phase
14. Course Code:

CMSI24-F3141
15. Semester / Year:
The first course/2023/2024
16. Description Preparation Date:
17/2/2024
17.Available Attendance Forms:
Classrooms of department statistical and informatics
18.Number of Credit Hours (Total) / Number of Units (Total)
(3) theoretical hours and (1) discussion hours/number of units: 3
19. Course administrator's name (mention all, if more than one name)
Name: Dr.Khalida Ahmed Mohammed Email: khalida@uomosul.edu.iq **Name :Naam Salem Email:naamsalem@uomosul.edu.iq**
20.

Course Objectives	**Explain all the functions related of reliability. Define the importance lifetime distributions then compute all the function related of(reliability ,MTTF,median time to failure ,mode design life…ext).Compute reliability function of systems(series,parallel and companied).** ●

21. 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 by by taking applied examples in the field of engineering reliability

22. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First	**3(T) +1(D)**	The reliability function, mean time to failure ,hazard function bathtubcurve	The related reliability functions	Blackboard	Daily, semester and final exams - Duties Student participation

Second	**3(T) +1(D)**	The conditional reliability–design life and failure mode,their relationship of all these function and examples	The related reliability functions	Blackboard	Daily, semester and final exams - Duties Student participation
Third	**3(T) +1(D)**	Constant failure rate–The exponential reliability function – Failure with CFR– Memorylessness– Failure modes– Failure modes with CFR	The exponential distribution and their related functions	Blackboard	Daily, semester and final exams - Duties Student participation
Fourth	**3(T) +1(D)**	Failure on demand– redundancy and CFR model – applications	Failure modes and exponential distribution	Blackboard	Daily, semester and final exams - Duties Student participation
Fifth	**3(T) +1(D)**	Time dependent failure models-The Weibull distribution-Design median and mode-Burn-in screening	Weibull distribution (Time dependent failure rate)	Blackboard	Daily, semester and final exams - Duties Student participation
Sixth	**3(T) +1(D)**	Semester exam		Blackboard	Daily, semester and final exams - Duties Student participation
seventh	**3(T) +1(D)**	Failure modes-Identical Weibull process	Failure modes	Blackboard	Daily, semester and final exams - Duties Student participation
Eghith	**3(T) 1(D)**	Derive all the characteristic functions related to the reliability of time dependent models	The Weibull distribution (Time dependent failure rate)	Blackboard	Daily, semester and final exams - Duties Student participation

nineth	**3(T) +1(D)**	Redundancy with failure rate–and Application	Redundancy and Weibull distribution	Blackboard	Daily, semester and final exams - Duties Student participation
Tenth	**3(T) +1(D)**	Reliability system. Serial configuration., Parallel configuration.	Reliability system	Blackboard	Daily, semester and final exams - Duties Student participation
Eleventh	**3(T) +1(D)**	Combined series–parallel systems–redundancy High levels verses low–level	Reliability system	Blackboard	Daily, semester and final exams - Duties Student participation
Tweleveth	**3(T) +1(D)**	System structure function ,minimal cut and minimal paths(optimal)	Reliability system	Blackboard	Daily, semester and final exams - Duties Student participation
Thirteenth	**3(T) +1(D)**	Complex systems	Reliability system	Blackboard	Daily, semester and final exams - Duties Student participation

23. Course Evaluation

Semester Exam 40% ,Final Exam 60%

24. Learning and Teaching Resources

Required textbooks (curricular books, if any)	An introduction to reliability
Main references (sources)	Charles,E.E(1997),An introduction to reliability Einginnering
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:

Applications in Intelligent Techniques

2. Course Code:

CMSI24-F6171

3. Semester / Year:

Course 1\ 2023–2024

4. Description Preparation Date:

20\ 02\ 2024

5. Available Attendance Forms:

Attendance+Examination

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

2

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

Name: Ass. Prof. Dr. Osamah Basheer Shukur
Email: drosamahannon@uomosul.edu

8. Course Objectives

The course aims to provide the student with intelligent methods in non-traditional computing

9. Teaching and Learning Strategies

Developing students on classification, clustering, and statistical and smart machine learning methods

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
18/09/2024	2		**An Introduction to machine learning**	**H.W**	Assignment
25/09/2024	2		**An Introduction to regression, prediction, and classification**	**H.W**	
02/10/2024	2		**Decision trees**	**H.W**	
09/10/2024	2		**Random forest**	**H.W**	
16/10/2024	2		**SVM and SVR**	**H.W**	
23/10/2024	2		**Back Propagation Neural Net**	**H.W**	
30/10/2024	2		**Perceptron Neural Net, and Convolution Neural Net**	**H.W**	Assignment
06/11/2024	2		**Matlab toolboxes for NN and programming commands**	**H.W**	Exam
13/11/2024	2		**An Introduction to Genetic Algorithms**	**H.W**	Assignment
20/11/2024	2		**Natural Language Fuzzy system: introduction Fuzzy inference system**	**H.W**	
27/11/2024	2		**Fuzzy inference system**	**H.W**	
04/12/2024	2		**Adaptive neuro- Fuzzy inference system**	**H.W**	
11/12/2024	2		**An Introduction to Genetic**	Assignment	Exam

			Algorithms with application		

11.Course Evaluation	
30 for mid-course exam, 70 for final exam	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	**Dangeti, P. (2017). *Statistics for machine learning*. Packt Publishing Ltd.** **Campesato, O. (2020). *Artificial intelligence, machine learning, and deep learning*. Mercury Learning and Information.**
Electronic References, Websites	

Course Description Form

1. Course Name:	
Data mining (1)	
2. Course Code:	
CMSI24-F3241	
3. Semester / Year:	
Course 2\ 2023–2024	
4. Description Preparation Date:	
20\ 02\ 2024	
5. Available Attendance Forms:	
Attendance+Examination	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2 + 2 Practice	
7. Course administrator's name (mention all, if more than one name)	
Name: Ass. Prof. Dr. Osamah Basheer Shukur Email: drosamahannon@uomosul.edu	Name: Lec. Dr. Nur Nawzat
8. Course Objectives	
Introducing the basic concepts in data mining from a statistical point of view	
9. Teaching and Learning Strategies	
Developing students on data mining, classification, and clustering by using statistical and machine learning methods	
10. Course Structure	

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

		Outcomes			
31/01/2024	2		**Data Mining, definition, and introduction,**	**H.W**	Assignment
07/02/2024	2		**Types of Data, Contingency Table**	**H.W**	
14/02/2024	2		**Histogram, Scatter plot, and Box-plot., Quintiles and Probability Plot,**	**H.W**	
21/02/2024	2		**Goodness of fits, Graph in Multivariate Variables,**	**H.W**	
28/02/2024	2		**Data Transformations,**	**H.W**	
06/03/2024	2		**Box-Cox Transformation,**	**H.W**	
13/03/2024	2		**Measures of distance, Measures of Similarity**	**H.W**	Assignment
20/03/2024	2		**Clustering, definition and introduction,**	**H.W**	Exam
27/03/2024	2		**Hierarchical methods for clustering,**	**H.W**	Assignment
03/04/2024	2		**Non- Hierarchical methods for clustering, R codes and their uses.**	**H.W**	
10/04/2024	2		**Time Series Analysis**	**H.W**	
17/04/2024	2		**Computer packages for statistical analysis**	**H.W**	
24/04/2024	2		**Real data and application**	Assignment	Exam

11.Course Evaluation	
40 for mid-course exam, 60 for final exam	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	**Giudici, P. (2005). *Applied data mining: statistical methods for business and industry.* John Wiley & Sons.** **Nisbet, R., Elder, J., & Miner, G. (2009). *Handbook of statistical analysis and data mining applications.* Academic press.**
Electronic References, Websites	

Course Description Form

1. Course Name:	
Data Security	
2. Course Code:	
CMSI23-F3261	
3. Semester / Year:	
Second semester	
4. Description Preparation Date:	
February 25th 2024	
5. Available Attendance Forms:	
Class, Electronic and Lab	
6. Number of Credit Hours (Total) / Number of Units (Total)	
Lecture hours: 2 hours, Credit: 2 Credits	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Luma Alharbawee Email: Luma.akram@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	Information security refers to a set of security procedures and tools that broadly protect an organization's sensitive information from misuse, unauthorized access, disruption, or destruction. Information security includes physical and environmental security, access control, and cybersecurity. An information security policy encompasses a set of security tools, solutions, and processes that keep an organization's information secure across devices and locations, helping protect against cyberattacks or other disruptive events. 1. To introduce the basic concepts and terminology of cryptography. 2. To prepare us for the modern study of cryptography. 3. Application security, cloud security, encryption, vulnerability management, disaster recovery, incident response, infrastructure security.
9. Teaching and Learning Strategies	
	Information security is currently considered an extremely important matter for all companies to protect and conduct their business. Studies have shown that leaders of

Strategy	information security teams seek to enhance the level of security of their companies and reduce the number of security breaches by taking several measures, including cooperation with the information security department and raising the level of security awareness in those areas. Companies. Information security can be defined as providing a system to protect and secure circulated data and information from being hacked, stored, and then tampered with or lost. Information security tasks are determined by some basic points: Determine the organization's security policies and procedures. Maintaining the confidentiality of assets used within the company. Network monitoring and detection from a security perspective and detecting hacking attempts before they occur. Maintaining the normal workflow within the organization. Some believe that the spread of the Internet has helped companies keep up with everything new and obtain information easily and quickly. But at the same time, this wide spread of information has made it easy to obtain, hack, and then tamper with and exploit.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	2	Introduction to cryptography	Lecture_01	Lecture	Homework
Week 2	2	The need for information security	Lecture_02	Lecture	Homework
Week 3	2	Types of encryption keys	Lecture_03	Lecture	Homework
Week 4	2	Mathematical background of cryptography	Lecture_04	Lecture	Homework
Week 5	2	Classic encryption techniques I	Lecture_05	Lecture	Homework
Week 6	2	Classical encryption techniques II	Lecture_06	Lecture	Homework
Week 7	2	Manage private and public encryption keys	---	---	Test
Week 8	2	DES encryption, example of DES encryption	Lecture_07	Lecture	Homework
Week 9	2	Midterm test	Lecture_08	Lecture	Homework
Week 10	2	Hash function	Lecture_09	Lecture	Homework
Week 11	2	Digital signature and verification policies	Lecture_10	Lecture	Homework
Week 12	2	Biometrics for network security	Lecture_11	Lecture	Homework
Week 13	2	Intrusion detection system	Lecture_12	Lecture	Homework
Week 14	2	Website security	Lecture_13	Lecture	Homework
Week 15	2	Mobile phone and network security	Lecture_14	Lecture	Homework
Week 16	3	The exam is final	---	---	Test

11. Course Evaluation

Quizzes: 2 (worth 10%)
Assignments: 2 (worth 10%)
Open-book exams: 1 (worth 10%)
Reports: 1 (worth 10%)
Midterm Exam: 1 (worth 10%)
Final Exam: 1 (worth 50%)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	تكنولوجيا امنية المعلومات وانظمة الحماية
Main references (sources)	Introduction To Cyber Security
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	https://courses.cs.duke.edu/summer04/cps001/lectures/Lecture15.

Course Description Form

1. Course Name:	
Probability and random variables (1) / second stage	
2. Course Code:	
CMSI24-F2111	
3. Semester / Year:	
The first academic course	
4. Description Preparation Date:	
2024/11/2	
5. Available Attendance Forms:	
Classrooms in the Department of Statistics and Informatics	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2 theoretical hours and 2 discussion hours/number of units: 3	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr.Safwan Nathem Rashed Email: safwan75nathem@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• To develop the student's problem-solving skills by getting acquainted with sets theory and some of its basic theories and understanding its laws • Developing the student's abilities on counting methods to reach sets theory as well as the binomial expansion law • Developing skills in applying probability theory and understanding its axioms, its laws and application • Identify the random experiment and the accidents that will appear in the experiment in order to obtain a sample space • Learn about independent events and how to identify them, in addition to conditional probability and its connection to Bayes' theory • Provide a solid foundation for advanced work on probability and its

	applications, and is essential to understanding many applied fields

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in introducing this unit is to encourage students to participate in the exercises, while improving and expanding their critical thinking skills at the same time by getting acquainted with the theory of probability and random variables, in the first part and expanding the student's mind. This will be achieved through classes and interactive educational programs to learn about sets theory and counting methods for it, and through learning about random experiment and sample space in forming sets, as well as using basic probabilistic laws in application in its various forms, which will be the basis for the student for his future stages.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	2 theoretical + 2 discussion	Introduction of the Probability and Basic set theory.	Introduction of the Probability and Basic set theory.	Blackboard and PowerPoint	Daily and monthly exams
Week 2	2 theoretical + 2 discussion	Basic Set theory, definitions of set theory.	Basic Set theory, definitions of set theory.	Blackboard and PowerPoint	Daily and monthly exams
Week 3	2 theoretical + 2 discussion	Some Fundamental Theorems, Fundamental laws of set theory with theorems.	Some Fundamental Theorems, Fundamental laws of set theory with theorems.	Blackboard and PowerPoint	Daily and monthly exams
Week 4	2 theoretical + 2 discussion	Sequence and limits, with theorems.	Sequence and limits, with theorems.	Blackboard and PowerPoint	Daily and monthly exams
Week 5	2 theoretical + 2 discussion	Mid-term Exam + Field and σ-Field and Power of the set.	Mid-term Exam + Field and σ-Field and Power of the set.	Blackboard and PowerPoint	Daily and monthly exams
Week 6	2 theoretical + 2 discussion	Techniques of Counting, Tree Diagrams and Arrangement	Techniques of Counting, Tree Diagrams and Arrangement	Blackboard and PowerPoint	Daily and monthly exams
Week 7	2 theoretical + 2 discussion	Techniques of Counting, Permutations.	Techniques of Counting, Permutations.	Blackboard and PowerPoint	Daily and monthly exams
Week 8	2 theoretical + 2 discussion	Techniques of Counting, Combinations with theorems.	Techniques of Counting, Combinations with theorems.	Blackboard and PowerPoint	Daily and monthly exams
Week 9	2 theoretical + 2 discussion	Combinations and Binomial theorem and Multinomial Expansion.	Combinations and Binomial theorem and Multinomial Expansion.	Blackboard and PowerPoint	Daily and monthly exams
Week 10	2 theoretical + 2 discussion	Mid-term Exam + Probability Introduction, Random Experiment, Events Kinds, Sample Space and Probability a law.	Mid-term Exam + Probability Introduction, Random Experiment, Events Kinds, Sample Space and Probability a law.	Blackboard and PowerPoint	Daily and monthly exams
Week 11	2 theoretical + 2 discussion	Axiomatic Approach of Probability.	Axiomatic Approach of Probability.	Blackboard and	Daily and monthly exams

				PowerPoint	
Week 12	2 theoretical + 2 discussion	Probabilistic models according to the basic laws of set theory with theorems.	Probabilistic models according to the basic laws of set theory with theorems.	Blackboard and PowerPoint	Daily and monthly exams
Week 13	2 theoretical + 2 discussion	Independent events, Conditional Probability.	Independent events, Conditional Probability.	Blackboard and PowerPoint	Daily and monthly exams
Week 14	2 theoretical + 2 discussion	Conditional Probability and Bayes law	Conditional Probability and Bayes law	Blackboard and PowerPoint	Daily and monthly exams
Week 15	2 theoretical + 2 discussion	Mid-term Exam + Bayes' theorem.	Mid-term Exam + Bayes' theorem.	Blackboard and PowerPoint	Daily and monthly exams

11. Course Evaluation

Endeavor score: 40. Exam score. Course: 60. Final score: 100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1-Introduction to probability theory ,Dr.dhafir H. Rasheed,1999,2-nd edition ,Baghdad university 2-probability , Dr.kubais S. A Fahady Dr. Pirlanty J. shamoon, Ministry of Higher Education and Scientific Research University of Mosul
Main references (sources)	1- A first course in probability, Sheldon Ross, 2010, Eighth edition. 2- Probability, schume series
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	https://www.khanacademy.org/math/statistics-probability/random-variables-stats-library https://www.khanacademy.org/math/statistics-probability https://www.coursearena.io/topic/free-probability-theory courses

Course Description Form

1. Course Name:
Probability and random variables (2) / second stage
2. Course Code:
CMSI24-F2211
3. Semester / Year:
The second academic course
4. Description Preparation Date:
2024/11/2
5. Available Attendance Forms:
Classrooms in the Department of Statistics and Informatics
6. Number of Credit Hours (Total) / Number of Units (Total)
2 theoretical hours and 2 discussion hours/number of units: 3
7. Course administrator's name (mention all, if more than one name)
Name: Dr.Safwan Nathem Rashed Email: safwan75nathem@uomosul.edu.iq
8. Course Objectives

Course Objectives	• Developing the student's problem-solving skills by identifying random, intermittent and continuous variables based on group theory. • Developing the student's abilities on counting methods to reach the probability mass function and study its properties, as well as the probability density function and study its properties. • Developing skills in finding the distribution function for each of the probability mass function and the probability density function based on random variables and distinguishing between functions. • Developing the student's role in benefiting from the generated functions and developing problem-solving skills through these functions. • Identify some of the distributions commonly used in various fields of operation, including intermittent and continuous ones. • To provide a solid foundation for advanced work on probabilities and their applications, essential to an understanding of many applied fields

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in the introduction of this unit is to encourage students to participate in the exercises, while improving and at the same time expanding their critical thinking skills through the theory of probability and discrete and continuous random variables obtained drawing on the theory of groups from the first part Expanding the mental and mental mind for students. This will be achieved through classes and interactive educational programs to identify the quality of random variables and their intermittent and continuous probabilistic functions as well as the distribution function and study the characteristics of cases, with identification of finding functions generated from mathematical expectation, variance and moments with the moment-generating function, with identification of some common probability distributions discontinuous and continuous, as well as the use of basic probability laws in application in their various forms, which will be the basis for the student for his future stages.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	2 theoretical + 2 discussion	Introduction in the Probabilities and The concept random variables.	Probabilities and random variables.	Blackboard and PowerPoint	Daily and monthly exams
Week 2	2 theoretical + 2 discussion	Probability mass function, Discrete random variable.	Discrete random variable.	Blackboard and PowerPoint	Daily and monthly exams
Week 3	2 theoretical + 2 discussion	Probability density function, Continuous random variable.	Continuous random variable.	Blackboard and PowerPoint	Daily and monthly exams
Week 4	2 theoretical + 2 discussion	Distribution function, discrete and continuous variables.	Distribution function	Blackboard and PowerPoint	Daily and monthly exams
Week 5	2 theoretical + 2 discussion	Properties of mass and density functions for discrete and continuous variables.	Properties of mass and density functions	Blackboard and PowerPoint	Daily and monthly exams
Week 6	2 theoretical + 2 discussion	Properties of distribution functions for discrete and continuous variables.	Properties of distribution functions	Blackboard and PowerPoint	Daily and monthly exams
Week 7	2 theoretical + 2 discussion	Mid-term Exam + Laws and notes on finding the probability value of functions of discrete and continuous random variables.	Laws and notes on finding discrete and continuous random variables.	Blackboard and PowerPoint	Daily and monthly exams
Week 8	2 theoretical + 2 discussion	Generating function, Mathematical Expectation and Variance with Properties.	Generating function, Mathematical Expectation	Blackboard and PowerPoint	Daily and monthly exams
Week 9	2 theoretical + 2 discussion	Mathematical Expectation and Variance of (p.m.f and p.d.f) for discrete and continuous variables.	Mathematical Expectation and Variance	Blackboard and PowerPoint	Daily and monthly exams
Week 10	2 theoretical + 2 discussion	Generating function, Moment, Central Moment and Non-Central Moment.	Generating function,	Blackboard and PowerPoint	Daily and monthly exams
Week 11	2 theoretical + 2 discussion	Moment Generating function and Characteristic function, discrete and continuous variables.	Moment Generating function	Blackboard and PowerPoint	Daily and monthly exams
Week 12	2 theoretical +	Mid-term Exam + Some	Some discrete	Blackboard	Daily and monthly

	2 discussion	discrete probability distributions.	probability distributions.	and PowerPoint	exams
Week 13	2 theoretical + 2 discussion	Finding the generating functions for the discrete distributions	Finding the generating functions for the discrete distributions	Blackboard and PowerPoint	Daily and monthly exams
Week 14	2 theoretical + 2 discussion	Some continuous probability distributions.	Some continuous probability distributions.	Blackboard and PowerPoint	Daily and monthly exams
Week 15	2 theoretical + 2 discussion	Mid-term Exam + Finding the generating functions for the continuous distributions	the generating functions for the continuous distributions	Blackboard and PowerPoint	Daily and monthly exams

11. Course Evaluation

Endeavor score: 40. Exam score. Course: 60. Final score: 100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1-Introduction to probability theory ,Dr.dhafir H. Rasheed,1999,2-nd edition ,Baghdad university 2-probability , Dr.kubais S. A Fahady Dr. Pirlanty J. shamoon, Ministry of Higher Education and Scientific Research University of Mosul
Main references (sources)	1- A first course in probability, Sheldon Ross, 2010, Eighth edition. 2- Probability, schume series
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	https://www.khanacademy.org/math/statistics-probability/random-variables-stats-library https://www.khanacademy.org/math/statistics-probability https://www.coursearena.io/topic/free-probability-theory courses

Course Description Form

1. Course Name:
Sampling Theory I
2. Course Code:
CMSI22-F2121
3. Semester / Year:
First semester / year 2023-2024
4. Description Preparation Date:
2024-2-2
5. Available Attendance Forms:
Attendance in the classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
Number of study hours (3) / Number of units (2)
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Rikan Abdulazeez Ahmed Email: rikan.ahmed@uomosul.edu.iq
8. Course Objectives

Course Objectives	**The student will acquire skills, methods, and modern techniques in dealing with different data and sampling methods according to the special cases of each study and choosing the best methods to reach the optimal results from the sample.**

9. Teaching and Learning Strategies	
Strateg	Work on explaining the methods of collecting samples Reaching the correct and optimal estimation of statistical measurements Disseminating the sample results to the community Benefiting from the studied sample and applying it to future studies and research

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Introduction to sampling, some statistical definitions, and basic concepts of probability	Definitions, terms, and laws of estimation. Definition of probability and its limits	Classroom + blackboard + data show	discussion

2	3	Simple random sampling and a method of estimating the arithmetic mean of the population with evidence and optimization	Point estimation, concept and application Estimating the period of concept and implementation	Classroom + blackboard + data show	discussion
3	3	Simple random sampling and the method of estimating the total number of the population with evidence and examples	Explaining the estimation of the arithmetic mean with proofs. Explaining the estimation of the grand sum with proofs	Classroom + blackboard + data show	discussion
4	3	Proofs and examples	Explanation of the proof of Theorem 1 with result 1 with examples Explanation of the proof of Theorem 2 with result 2 with examples	Classroom + blackboard + data show	Homework
5	3	General exercises on simple random sampling	solving exercises	Classroom + blackboard + data show	discussion
6	3	First exam	First exam	Classroom	exam
7	3	General exercises on simple random sampling	solving exercises	Classroom + blackboard + data show	discussion
8	3	Evidence of lineage sampling	Proof of Theorem 3 / Proof of Theorem 4	Classroom + blackboard + data show	discussion
9	3	Preview the percentage of more than two characteristics	Proof of the theorem 5 applied examples	Classroom + blackboard + data show	discussion
10	3	Preview the percentage of more than two characteristics by excluding missing information	Proof of the theorem 6 applied examples	Classroom + blackboard + data show	Homework
11	3	Estimating the	Proof of Theorem 7 Proof	Classroom + blackboard + data	Homework

		arithmetic mean and the total sum to examine the percentage of items that possess a certain characteristic	of Theorem 8	show	
12	3	General exercises on the method of examining ratios	Solve a set of exercises	Classroom + blackboard + data show	discussion
13	3	Estimating the variance to sample the ratio of two variables	Explanation of the proof of Theorem 9 applied example	Classroom + blackboard + data show	discussion
14	3	Second exam	Second exam	Classroom	exam
15	3	General Review	Solve practical exercises	Classroom + blackboard + data show	discussion

11. Course Evaluation

10 marks for the first exam
10 marks for the second exam
5 marks daily exam
15 reporting grades
60 final exam

12. Learning and Teaching Resources

Required textbooks (curricular books any)	
Main references (sources)	Tillé, Yves. Sampling and estimation from finite populations. John Wiley & Sons, 2020. Cochran, William G. *Sampling techniques*. John Wiley & Sons, 1977
Recommended books and references (scientific journals, reports…)	https://www.tandfonline.com/doi/abs/10.1198/tas.2007.s89?journalCode=utas_0 Sampling Methods: Exercises and Solutions
Electronic References, Websites	

Course Description Form

1. Course Name:
Sampling Theory I
2. Course Code:
CMSI22-F2121
3. Semester / Year:
First semester / year 2023-2024
4. Description Preparation Date:
2024-2-2
5. Available Attendance Forms:
Attendance in the classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
Number of study hours (3) / Number of units (2)
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Rikan Abdulazeez Ahmed Email: rikan.ahmed@uomosul.edu.iq
8. Course Objectives

Course Objectives	**The student will acquire skills, methods, and modern techniques in dealing with different data and sampling methods according to the special cases of each study and choosing the best methods to reach the optimal results from the sample.**

9. Teaching and Learning Strategies	
Strateg	Work on explaining the methods of collecting samples Reaching the correct and optimal estimation of statistical measurements Disseminating the sample results to the community Benefiting from the studied sample and applying it to future studies and research

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Stratified random sampling	Explaining the general concept, symbols, and ways to define them	Classroom + blackboard + data show	discussion
2	3	The mathematical aspect of stratified sampling	Explain the proofs of Theorems 1-2 and the proofs of their corresponding results	Classroom + blackboard + data show	discussion

3	3	Estimating sample size in stratified sampling	Explanation of theoretical methods	Classroom + blackboard + data show	discussion
4	3	Practical application	Explain applied examples from practical reality	Classroom + blackboard + data show	Homework
5	3	Theoretical comparison between simple random sampling and stratified sampling	Explaining the theoretical aspect with practical examples	Classroom + blackboard + data show	discussion
6	3	First exam	First exam	Classroom	exam
7	3	Stratified random sampling for percentages	Explaining the general concept with the mathematical and applied aspect	Classroom + blackboard + data show	discussion
8	3	Estimating the ratio between two variables in stratified sampling	General definitions of ratio with an explanation of the mathematical and applied aspects	Classroom + blackboard + data show	discussion
9	3	Estimation by regression method in stratified random sampling	The theoretical aspect of the concept of estimation using regression method	Classroom + blackboard + data show	discussion
10	3	Estimation by regression method in stratified random sampling	The practical and applied aspect of estimation using the regression method	Classroom + blackboard + data show	Homework
11	3	Systematic Sampling	Explaining the mathematical method and the method, indicating the symbols used and the theoretical aspects	Classroom + blackboard + data show	Homework
12	3	Systematic Sampling	Practical procedure for inspection	Classroom + blackboard + data show	discussion
13	3	Comparison between sampling methods	Theoretical comparison between simple, stratified, and systematic random sampling methods, with an explanation of their applied method	Classroom + blackboard + data show	discussion
14	3	Second exam	Second exam	Classroom	exam
15	3	General Review	Solve practical exercises	Classroom + blackboard + data	discussion

				show	

11. Course Evaluation
10 marks for the first exam 10 marks for the second exam 5 marks daily exam 15 reporting grades 60 final exam

12. Learning and Teaching Resources	
Required textbooks (curricular books any)	
Main references (sources)	Tillé, Yves. Sampling and estimation from finite populations. John Wiley & Sons, 2020. Cochran, William G. *Sampling techniques*. John Wiley & Sons, 1977
Recommended books and references (scientific journals, reports…)	https://www.tandfonline.com/doi/abs/10.1198/tas.2007.s89?journalCode=utas...0 Sampling Methods: Exercises and Solutions
Electronic References, Websites	

Course Description Form

1. Course Name:
Linear Algebra
2. Course Code:
CMSI23-F2151
3. Semester / Year:
2023-2024 , THE FIRST COURSE
4. Description Preparation Date:
10/06/2023
Available Attendance Forms:
Classrooms in the department and classroom

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

150/6

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

Name: Dr. Alla Abd Alsttar
Email: allahamoodat.uomosul.edu.iq

7. Course Objectives

Course Objectives	1- The student discusses vector spaces and related abstract concepts. 2- The student is familiar with the algebraic concepts and terminology of matrices and determinants and inverses, and uses creative thinking in the use of elementary transformation methods. 3-Learn about systems of linear equations and their applications. 4-Recognize the basis and dimension of vector spaces

8. 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 types of simple experiments involving some sampling activities that are interesting to the students

9. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Definition	Definition of matrices and types	The blackboard	
2	4	Algebraic processes	Algebraic processes on matrices	The blackboard	
3	4	Determinants	Determinants, Determinant solution methods	The blackboard	
4	4	properties	properties of the determinant	The blackboard	Quizze
5	4	Inverse matrix	Inverse matrix using the matrices method (the adjoint of matrix)	The blackboard	
6	4	Inverse matrix	Inverse matrix using Gaussian deletion method	The blackboard	
7	4	The properties	The properties of the inverse matrix	The blackboard	
8	4	Linear equations,	Linear equations, Methods	The	Mid-term Exam

			of solving linear equations in the case of m = n	**blackboard**	
9	4	Method of matrices	Method of matrices to solve linear equations in the case of m> n	**The blackboard**	
10	4	rank	rank of matrix, The canonical form	**The blackboard**	**Quizz**e
11	4	equivalent matrices	equivalent matrices, Relationship of ranks and linear equations m>n	**The blackboard**	
12	4	Relationship of ranks and linear equations	Relationship of ranks and linear equations m=n	**The blackboard**	
13	4	Latent roots	Latent roots of order (2x2), (3x3)	**The blackboard**	
14	4	Vector and Algebraic processes	Vector and Algebraic processes on vector, Euclidean length and Euclidean distance	**The blackboard**	
15	4	Linear Composition	Linear Composition	**The blackboard**	
16		**Preparatory week before the final Exam**	**Preparatory week before the final Exam**		

10. Course Evaluation

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

11. Learning and Teaching Resources

Required textbooks (curricular books, if any)	الجبر الخطي، عبد المجيد حمزة ولميعة باقر
Main references (sources)	Elementary and Intermediacies Algebra (2)—Mark Dugopolski
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Scientific research method
2. Course Code:
CMSI23-F2261
3. Semester / Year:
Second course / 2023−2024
4. Description Preparation Date:
14/2/2024
5. Available Attendance Forms:
My attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
2 hours/2 units
7. Course administrator's name (mention all, if more than one name)
Name: Mahmoud Mohammed Taher Jader Al-Abadi Email: Mahmood81_tahr@uomosul.edu.iq

8. Course Objectives

Course Objectives	• Introducing students to the modern scientific method and the beginning of scientific theory. • .Learn about the general concepts of the scientific method and the assumptions of the scientific method. • .Explaining the concept of scientific research, its types, objectives and characteristics • Access to the scientific research curriculum • Knowledge of the characteristics of a successful researcher, data collection tools, and methods for selecting a study sample. • Knowing the steps for conducting scientific research and how to write it. • Learn about ways to document various sources and references. • Introducing the student to the methods of scientific research, the elements of the research plan, and the characteristics of scientific thinking, and enabling him to write scientific research that is consistent with the correct method of scientific research.

9. Teaching and Learning Strategies

Strategy	1. The student should be able to explain the characteristics of scientific research and its importance. 2. The student should be able to describe the methods and basics of scientific research 3. The student should link research methods and the appropriate tools for them. 4. The student must adhere to the ethics and morals of scientific research. 5. Students acquire skills in constructing scientific research using scientific research tools. 6. Enabling the student to diagnose problems and reach a solution according to the scientific method. 7. Enabling the student to read correctly and carefully and choose the appropriate information to solve problems. 8. Being able to prepare a scientific research plan according to the correct scientific foundations. 9. Enabling the student to write scientific research according to the correct scientific foundations.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First	2	The modern scientific method, science and knowledge, the beginning of scientific theory building scientific theory, the functions of scientific theory and its steps	The modern scientific method	writing board Data show	

Second	2	Scientific laws, conditions for scientific laws, steps of the scientific method, risks facing scientific research	Scientific laws	writing board Data show	Homework
Third	2	General concepts of the scientific method, assumptions of the scientific method for natural phenomena, goals of science, thought and thinking methods	General concepts of the scientific method	writing board Data show	Homework
Fourth	2	Introduction, the concept of scientific researc types of scientific research	Introduction, the concept scientific research	writing board Data show	Homework
Fifth	2	Objectives of scientific research, characteristics of scientific research, steps for preparing scientific research	Objectives and characteristics of scientific research	writing board Data show	Homework
Sixth	2	Scientific research methods, historical metho survey method, case study method, experimental method, statistical method, content analysis method	Modern scientific method	writing board Data show	Daily exam
Seventh	2	Characteristics of a successful researcher, typ of research, tools for collecting data in scienti research, questionnaire	Characteristics of a successful researcher	writing board Data show	Homework
Eighth	2	Semester exam	Semester exam	Semester exam	Semester exam
Ninth	2	Types of questionnaire in scientific research, observation method, interview method, testin	Types of questionnaires i scientific research	writing board Data show	Homework
Tenth	2	Sample selection methods in scientific researc steps for selecting a research sample	the sample	writing board Data show	Homework
Eleventh	2	Types of samples, probability sample, non-probability sample	Types of samples, probability sample	writing board Data show	Homework
Twelveth	2	Collecting and analyzing information, reading conditions for reading in research	Collect and analyze information	writing board Data show	Homework
Twelfth	2	Methods of documenting scientific research sources and references, the importance of documentation, types of documentation, the most important methods of documenting sources and references	Methods of documenting scientific research source and references	writing board Data show	Homework
Thirteenth	2	The difference between sources and reference types of references, the importance of sources and references in scientific research, a list of sources and references for scientific research, other controls for writing a list of sources and references for scientific research.	Methods of documenting scientific research source and references:	writing board Data show	Daily exam
Fourteenth	2	Documentation methods that can be relied up by the scientific researcher: Harvard method, MAL method, PAP method	Documentation methods that can be relied upon by the scientific researcher	writing board Data show	Homework

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)	إبراهيم، مروان عبد المجيد. (2000). أسس البحث العلمي لإعداد الرسائل الجامعية. مؤسسة الوراق.
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

25.	Course Name:
	Linear Algebra
26.	Course Code:
	CMSI24-F2151
27.	Semester / Year:
	2023−2024
28.	Description Preparation Date:
	10/06/2023

29. Available Attendance Forms:
Classrooms in the department and classroom
30.Number of Credit Hours (Total) / Number of Units (Total
3 Theoretical 1 Discussion of units 3
31. Course administrator's name (mention all, if more than one name)
Name: Hyllaa Anas Abdual-majeed Email: hyllaa.77@uomosul.edu.iq
32. Course Objectives

Course Objectives	1- The student discusses vector spaces and related abstract concepts. 2- The student is familiar with the algebraic concepts and terminology of matrices and determinants and inverses, and uses creative thinking in the use of elementary transformation methods. 3-Learn about systems of linear equations and their applications. 4-Recognize the basis and dimension of vector spaces

33. 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 types of simple experiments involving some sampling activities that are interesting to the students

34. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Definition	Definition of matrices and types	The blackboard	
2	4	Algebraic processes	Algebraic processes on matrices	The blackboard	
3	4	Determinants	Determinants, Determinant solution methods	The blackboard	
4	4	properties	properties of the determinant	The blackboard	Quizze

5	4	Inverse matrix	Inverse matrix using the matrices method (the adjoint of matrix)	The blackboard	
6	4	Inverse matrix	Inverse matrix using Gaussian deletion method	The blackboard	
7	4	The properties	The properties of the inverse matrix	The blackboard	
8	4	Linear equations,	Linear equations, Methods of solving linear equations in the case of m = n	The blackboard	Mid-term Exam
9	4	Method of matrices	Method of matrices to solve linear equations in the case of m> n	The blackboard	
10	4	rank	rank of matrix, The canonical form	The blackboard	Quizze
11	4	equivalent matrices	equivalent matrices, Relationship of ranks and linear equations m>n	The blackboard	
12	4	Relationship of ranks and linear equations	Relationship of ranks and linear equations m=n	The blackboard	
13	4	Latent roots	Latent roots of order (2x2), (3x3)	The blackboard	
14	4	Vector and Algebraic processes	Vector and Algebraic processes on vector, Euclidean length and Euclidean distance	The blackboard	
15	4	Linear Composition	Linear Composition	The blackboard	
16		Preparatory week before the final Exam	Preparatory week before the final Exam		

35. Course Evaluation

40 marks, 60, end-of-course exam, total out of 100

36. Learning and Teaching Resources

Required textbooks (curricular books, if any)	الجبر الخطي، عبد المجيد حمزة ولميعة باقر
Main references (sources)	Elementary and Intermediacies Algebra (2)—Mark Dugopolski
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Numerical Analysis II
2. Course Code:
CMS123-F2231
3. Semester / Year:
Second Semester -2024
4. Description Preparation Date:

01/06/2023

5. Available Attendance Forms:

Classrooms within the department،classroom

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

2 Theoretical 2 Practical Number of units 3

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

Name: D.Norsal Ahmed Zeen Alabiden
Email: zeennorsal@uomosul.edu.iq
Nada Nazar Mohammed nada-nazar1984@uomosul.edu.iq
Israa abduljwaad saleh israa.alameen81@uomosul.edu.iq

8. Course Objectives

Course Objectives	**1- Introduce the student to the basic concepts of numerical methods used in statistics to solve mathematical problems that arise in various fields. And it's a continuation of numerical analysis I.** **2- The student should be familiar with numerical differentiation and numerical integration.** **3- The student discusses the initial value problems of ordinary differential equations and the numerical solution of differential equations**

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, computer labs, weekly assignments, quizzes, and projects.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week1	4	Interpolation	Interpolation (Linear , quadratic,nth)	Blackboard	
Week2	4	Newton for dividing differences method .	Linear interpolation Using polynomial – Newton for dividing differences .	Blackboard	
Week3	4	quadratic Interpolation using Newton's	quadratic Interpolation – using Newton's	Blackboard	

Week4	4	method nth -interpolation using Newton's method	polynomial of dividing differences interpolation of nth – using Newton's polynomial of dividing differences	Blackboard	
Week 5	4	LaGrange method	Numerical differentiation of interpolants – Application on LaGrange interpolants	Blackboard	**Quizzes**
Week6	4	Numerical differentiation of functions	Numerical differentiation of functions using Forward, Backward, and Central divided differences	Blackboard	
Week7	4	Comparing accuracy of numerical differentiation approaches	approaches	Blackboard	
Week8	4	numerical differentiation	Tylor's Expansion, Comparing accuracy of numerical differentiation approaches.	Blackboard	
Week 9	4	numerical differentiation	High-order numerical differentiation	Blackboard	
Week 10	4	Perform numerical integration of functions.	Analysis of errors in derivation Numerical	Blackboard	**Mid-term exam**
Week 11	4	Simpson's rule	Numerical integration - Trapezoidal rule.	Blackboard	
Week 12	4	Romberg integration	Numerical integration - Simpson's rule.	Blackboard	
Week 13	4	Gaussian integration	Numerical		

Week 14 Week 15 Week 16	4 4	double integral. Newton-Cotes **the final Exam**	integration - Romberg integration. Numerical integration – Gaussian integration. Numerical double integral. - Newton-Cotes Quadrature Formula **the final Exam**	Blackboard Blackboard Blackboard	**Quizzes**

11. Course Evaluation	
Pursuit score of 40: Exam score of 60: Final score of 100	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	Stoyan, Gisbert, and Agnes Baran. Elementary numerical mathematics for programmers and engineers. Basel, Switzerland: Springer International Publishing, 2016 Conte, Samuel Daniel, and Carl De Boor. Elementary numerical analysis: an algorithmic approach. Society for Industrial and Applied Mathematics, 2017.
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name: :
Numerical Analysis I
2. Course Code:
CMS123-F2131
3. Semester / first
Semester Year: 1-2024
4. Description Preparation Date:
01/06/2023

5. Available Attendance Forms

: Classrooms within the department،classroom

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

2 Theoretical 2 Practical Number of units 3

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

Name: D. Norsal Ahmed Zeen Alabiden
Email: zeennorsal@uomosul.edu.iq

Nada Nazar Mohammed nada-nazar1984@uomosul.edu.iq

Israa abduljwaad saleh israa .alameen81@uomosul.edu.iq

8. Course Objectives

Course Objectives	**1-The student should be familiar with the numerical methods used Statistics to solve mathematical problems that arise in various fields.** **2-Discuss basic numerical techniques, algorithms and their applications, in solving linear and nonlinear equations** **3-Identify interpolation and integration methods for a function.**

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, computer labs, assignments , quizzes, and projects.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	4	Understand the basic concepts and principles of numerical methods. Recognizing sources of errors in numerical.	**Sources** of errors in numerical computations	Blackboard	
Week 2	4	Roots of nonlinear equations	Roots of nonlinear equations –Root locating using	Blackboard	

			graphs		
Week 3	4	intermediate value theorem	Roots of nonlinear equations – Root locating using the intermediate value theorem	Blackboard	Quizze
	4	Bisection Algorithm		Blackboard	
Week 4			Solving nonlinear equations – Bisection Algorithm		
	4	Secant Algorithm.		Blackboard	
	4	Newton-Raphson's Algorithm.	Solving nonlinear equations – Secant Algorithm	Blackboard	
Week 5	4	Nonlinear equations -Newton-Raphson's Algorithm	Solving-nonlinear equations-Newton-Raphson's Algorithm.	Blackboard	
Week 6			Newton-Raphson's Algorithm		
Week 7	4	Gaussian elimination Method.	Solving a system of nonlinear equations – Multidimensional Newton-Raphson's Algorithm.	Blackboard	Mid-term exam
	4	Gauss-Jordan method	Solving a system of linear equations– Review of direct method Gaussian elimination.	Blackboard	
Week 8	4	linear equations– Review of direct method –inverse matrix	Solving a system of linear equations– Review of direct method Gauss-Jordan	Blackboard	
	4	Triangular factorization method.	Solving a system of linear equations– Review of direct method –inverse matrix	Blackboard	
Week 9	4			Blackboard	Quizze

Week 10 Week 11 Week 12 Week 13 Week 14 Week 15	4 4 4	Jacobi iterative method Gauss-Seidel iterative method. Interpolation. Quadratic interpolation. **the final Exam**	Solving a system of linear equations– Review of direct method , Triangular factorization Solving a system of linear equations Jacobi iterative method Solving a system of linear equations– Gauss -Seidel iterative Method. Interpolation-The direct approach. The direct approach Quadratic interpolation **the final Exam**	Blackboard Blackboard Blackboard	

11. Course Evaluation

Pursuit score of 40: Exam score of 60: Final score of 100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	Conte, Samuel Daniel, and Carl De Boor. Elementary numerical analysis: an algorithmic approach. Society for Industrial and Applied Mathematics, 2017. Stoyan, Gisbert, and Agnes Baran. Elementary numerical mathematics for programmers and engineers. Basel, Switzerland: Springer International Publishing, 2016
Recommended books and references (scientific journals, reports…)	

Electronic References, Websites	

نموذج وصف المقرر

1. اسم المقرر :
طرائق تدريس
2. رمز المقرر
CMSI24-F2171
3. الفصل / السنة /
الكورس الاول السنة 2023 – 2024

4. تاريخ إعداد هذا الوصف
2023 / 11 / 1
5. أشكال الحضور المتاحة
القاعات الدراسية في القسم
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)
2 ساعة - 2 وحدة
7. اسم مسؤول المقرر الدراسي (اذا اكثر من اسم يذكر)
الاسم: د. محمد قاسم يحيى الاوجار الآيميل : mqy.alawjar@uomosul.edu.iq
8. اهداف المقرر

اهداف المادة الدراسية	**تعريف الطالب بخصائص وصفات وواجبات المدرس الناجح واهداف تدريس العلوم المختلفة .**

9. استراتيجيات ا عليم والتعلم

الاسترا يجية	

10. بنية المقرر

العلم والتفكير	**2023/ 10 / 11**	
التفكير الاستقرائي والقياس	**2023/ 10 / 18**	
مستويات المعرفة	**2023/ 10 / 25**	
الحقائق	**2023/ 11 / 01**	
المفاهيم والمدركات	**2023/ 11 / 08**	
عملية تكوين المدركات	**2023/ 11 / 15**	
كيف تساعد الطالب في تكوين المدركات	**2023/ 11 / 22**	
انوع المدركات (المبادئ ، النظريات ، الافكار)	**2023/ 11 / 29**	
افكار واهداف عامة في تدريس العلوم	**2023/ 12 / 06**	
الاعراض السلوكية او الوظيفية	**2023/ 12 / 13**	
موقف علماء النفس ورجال التربية من الاعراض السلوكية	**2023/ 12 / 20**	
تدريس العلوم في ضوء تصنيف بلوم	**2023/ 12 / 27**	
طرق تدريس العلوم	**2024/ 01 / 03**	

11. تقييم المقرر

اليومي	الفصلي	السعي	النهائي	

10	30	40	60	

12. مصادر ا تعلم والتدريس	
الكتب المقررة ا مطلوبة (المنهجية أن وجدت)	-
المراجع الرئيسة (المصادر)	**مجموعة محاضرات مختارة م كتب طرائق التدريس و عم النفس التربوي**
الكتب والمراجع ا ساندة التي يوصى بها (المجلات العلمية، التقارير ....)	-
المراجع الإلكترونية ، مواقع الا رنيت	-

Course Description Form

Course Name:
Teaching methods
13. Course Code:
CMSI24-F2171
14. Semester / Year:
The first course for the year 2023-2024
15. Description Preparation Date:

1/11/2023	
16.	Available Attendance Forms:
Classrooms in the department	
17.	Number of Credit Hours (Total) / Number of Units (Total)
2 hours - 2 units	
18.	Course administrator's name (mention all, if more than one name)
Name: Dr. Muhammad Qasim Yahya Al-Alawjar Email: mqy.alawjar@uomosul.edu.iq	
19.	Course Objectives
Course Objectives : Introducing the student to the characteristics, qualities and duties of a successful teacher and the goals of teaching various sciences.	
20.	Teaching and Learning Strategies
21.	Course Structure

Week		Required Learning Outcomes			Evaluation method
		easurement			
The process of forming perceptions					
How to help the student in forming perceptions					
Types of perceptions (principles, theories, ideas)					
General ideas and goals in teaching science					

				023	
Behavioral or functional symptoms				12/13/2023	
The position of psychologists and educators on behavioral symptoms				12/20/2023	
Teaching science in light of Bloom's taxonomy				12/27/2023	
Methods of teaching science				03/01/2024	

22. 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

23. 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 Form

1. Course Name:

Data Structure

2. Course Code:

CMSI21-F2161

3. Semester / Year:

Second semester

4. Description Preparation Date:

February 25th 2024

5. Available Attendance Forms:

Class, Electronic and Lab

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

Lecture hours: 2 hours, Credit: 2 Credits

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

Name: Dr. Luma Alharbawee
Email: Luma.akram@uomosul.edu.iq

8. Course Objectives

Course Objectives	1. Study the types of graphic structures used to store data in memory 2. Provide knowledge of basic data structures and their applications. 3. Understand the importance of data structures in the context of writing effective programs. 4. Obtaining the proper systematic arrangement of the data 5. Speed up the execution of operations and save time and space inside the memory. 6. Consume less resources to perform operations on data (Edit, Delete, Update).

9. Teaching and Learning Strategies

Strategy	Data structures allow data to be stored systematically for durability and reusability. Proper implementation of data structure facilitates ease of computing and processing of data as required. In software, there are thousands of programs running in the background and each computer program uses data structure to improve efficiency with space and time complexity. Its correctness decides the efficiency of data and code. Data structure, along with algorithms, is the cornerstone of writing code for computers. The problem solver makes the most of the data structure and algorithm during execution.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	2	Introduction to data structures	Lecture_01	Lecture	Homework
Week 2	2	Definition, advantages, disadvantages, field of application	Lecture_02	Lecture	Homework
Week 3	2	Dynamically allocated arrays One dimensional matrix Definition: An operation on a one dimensional set Use MATLAB to define a one-dimensional matrix	Lecture_03	Lecture	Homework
Week 4	2	Defining a matrix in MATLAB, using instructions to manipulate the matrix Two-dimensional array Definition: Operation on a 2D array Use MATLAB to define a two-dimensional matrix Matrix definition in MATLAB, Using instructions to manipulate the	Lecture_04	Lecture	Homework

		array			
Week 5	2	Stack data structure Definition, how to do push and pop Stack application Converting from Infix to Postfix using Stack	Lecture_05	Lecture	Homework
Week 6	2	Use MATLAB to define the stack data structure Defining stack using MATLAB, and defining push and pop in MATLAB	Lecture_06	Lecture	Homework
Week 7	2	Queue data structure Definition and how to do insertion and deletion in the waiting list Use MATLAB to define the queue data structure Define queue using MATLAB, Define the insertion and deletion function MATLAB	---	---	Test
Week 8	2	Trees: Non-Linear data structure Advantages of trees Tree Representations Binary Search Trees	Lecture_07	Lecture	Homework
Week 9	2	Midterm exam	Lecture_08	Lecture	Homework
Week 10	2	Linked Lists	Lecture_09	Lecture	Homework
Week 11	2	Graphs	Lecture_10	Lecture	Homework
Week 12	2	Applications -sparse matrix representation and operations, polynomials representation and addition.	Lecture_11	Lecture	Homework
Week 13	2	Concept of search and sort – linear search, binary search, selection sort, insertion sort, quick sort.	Lecture_12	Lecture	Homework
Week 14	3	Final Exam	---	---	Test

11. Course Evaluation

Quizzes: 2 (worth 10%)
Assignments: 2 (worth 10%)
Open-book exams: 1 (worth 10%)
Reports: 1 (worth 10%)
Midterm Exam: 1 (worth 10%)
Final Exam: 1 (worth 50%)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	DATASTRUCTURE USING C++ (MODULE)
Main references (sources)	Introduction to Smalltalk - Chapter 11 - Stacks, queues, linked lists, trees, and graphs Ó Ivan Tomek 9/17/00
Recommended books and references (scientific journals, reports...)	CSE373: Data Structures & Algorithms Lecture 4: Dictionaries; Binary Search Trees

Course Description Form

1. Course Name:
Time Series Analysis
2. Course Code:
CMSI23-F2141
3. Semester / Year:
The first course
4. Description Preparation Date:
2022/10/2
5. Available Attendance Forms:
Classrooms
6. Number of Credit Hours (Total) / Number of Units (Total)
(2) theoretical hours and (2) discussion hours/number of units: 3
7. Course administrator's name (mention all, if more than one name)
Name: Ph.D. Najlaa Saad Ibrahim Email: najlaa.s.a@uomosul.edu.iq Name: Rehad Emad Slewa Email: alshamany@uomosul.edu.iq
8. Course Objectives

Course Objectives	• Among the most important time series are those related to economic indicators and annual sales of companies in all aspects of their activities, education, population size, and the like. The change that occurs in the values of the time series variable or the values of its variables is a function of time that can be represented graphically. • Using time series data to look ahead and predict future change through the facts of yesterday and today. • The use of time series in control systems, through which the production process is

	controlled and knowledge of whether the product conforms to the required specifications or not. Then the right decision can be taken and errors in the production process can be corrected. • Building software systems for electronic control of production processes and specifications.

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 by taking time series of a specific phenomenon and analyzing it using the Minitab program and predicting its future values.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
2022/10/2	**2(T) +2(D)**	Definition of time series and their applications, and definition of the main components of time series.	Introduction to time series	Blackboard	Daily and monthly exams
2022/10/9	**2(T) +2(D)**	Hand smoothing method and averaging the two halves of the chain method	Methods for determining the general linear trend	Blackboard	Daily and monthly exams
2022/10/16	**2(T) +2(D)**	moving average method	Methods for determining the general linear trend	Blackboard	Daily and monthly exams
2022/10/23	**2(T) +2(D)**	least squares method	Methods for determining the general linear trend	Blackboard	Daily and monthly exams
2022/10/30	**2(T) +2(D)**	Second and third order curves method	Methods for determining the general nonlinear trend	Blackboard	Daily and monthly exams
2022/11/6	**2(T) +2(D)**	half logarithmic equation method	Methods for determining the general nonlinear trend	Blackboard	Daily and monthly exams
2022/11/13	**2(T) +2(D)**	Two ways to exclude the effect (multiplication model - addition model)	Excluding the effect of the general trend	Blackboard	Daily and monthly exams
2022/11/20	**2(T) +2(D)**		Semester exam	Blackboard	Daily and

					monthly exams
2022/11/27	**2(T) +2(D)**	Measuring seasonal changes using the simple ratio method and excluding its effect	Seasonal changes	Blackboard	Daily and monthly exams
2022/12/4	**2(T) +2(D)**	Measuring seasonal changes using the ratio method to the general average and excluding its effect	Seasonal changes	Blackboard	Daily and monthly exams
2022/12/11	**2(T) +2(D)**	Measuring seasonal changes using the method of ratio to the general trend and excluding its effect	Seasonal changes	Blackboard	Daily and monthly exams
2022/11/18	**2(T) +2(D)**	How to measure periodic changes and exclude their impact	Periodic changes	Blackboard	Daily and monthly exams
2022/12/25	**2(T) +2(D)**	How to measure random changes and exclude their effect	Random changes	Blackboard	Daily and monthly exams

11. Course Evaluation

Attendance and participation: 5 marks. Daily exam: 5 marks. Discussion: 10 marks. Semester exam: 20 marks

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	1- al-Mashhadani, M. H. & Eifan M.M." From the methods of statistics (indices and time series)" 2- Box, G., Jenkins, G., Reinsel ,G. and Ljung G.," Time Series Analysis Forecasting and control", Copyright Year: 2016. 3- Liu, L.,"Time Series Analysis and Forecasting ", Copyright Year: 2006. 4- Wei , W.S. " Time Series Analysis : Univariate and Multivariate Methods ", Copyright Year: 1990
Recommended books and references (scientific	

journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Data Base
2. Course Code:
CMSI23-F2241
3. Semester / Year:
The second course
4. Description Preparation Date:
2023/2/21
5. Available Attendance Forms:
Classrooms and laboratory
6. Number of Credit Hours (Total) / Number of Units (Total)
(2) theoretical hours and (2) practical hours/number of units: 3
7. Course administrator's name (mention all, if more than one name)
Name: Ph.D. Najlaa Saad Ibrahim Email: najlaa.s.a@uomosul.edu.iq Name: Shaima Shakib Muhammad Email: **shymshak@uomosul.edu.iq** Name: Hisham Yassin Abbas Email: hisham.alameen@uomosul.edu.iq
8. Course Objectives

Course Objectives	1. The ability to interact with future systems. One of the most important goals of database design is to plan the database to allow modifications and improvements to it without the need to modify application programs or reorganize files. 2. Designing the data so that it is free of repetition and can be retrieved, modified and added to without the problems that can occur with the presence of repetition in it. 3. Reducing the total cost of storage requirements. 4. The physical and logical organization of data so that it can meet expected inquiries at the appropriate speed, as well as unplanned inquiries or to produce non-routine reports

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, computer labs, assignments, quizzes, and projects.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
21/2/2023	2(T) +2(P)	Introduction and important concepts in the database. Database properties. Definition of Access 2010. Features of Access 2010	Introduction to databases	Blackboard and PowerPoint	Daily and monthly exams
28/2/2023	2(T) +2(P)	Access 2010 interface components	Getting to know the Access 2010 interface	Blackboard and PowerPoint	Daily and monthly exams
7/3/2023	2(T) +2(P)	Create a database. Table design	Configure a database	Blackboard and PowerPoint	Daily and monthly exams
14/3/2023	2(T) +2(P)	Types of fields available when creating tables.	Fields in Access	Blackboard and PowerPoint	Daily and monthly exams
21/3/2023	2(T) +2(P)	Learn about field properties	Field properties in Access	Blackboard and PowerPoint	Daily and monthly exams
28/3/2023	2(T) +2(P)	Add a new field. Move to a record with the mouse	Operations performed on fields	Blackboard and PowerPoint	Daily and monthly exams
4/4/2023	2(T) +2(P)	Preview specific records using the filter. Change the order of records in tables. Specify a primary key	Operations performed on records	Blackboard and PowerPoint	Daily and monthly exams
11/4/2023	2(T) +2(P)	Relationships between tables (linking tables). Conditions for creating relationships. Steps to create relationships between tables. Types of table relationships. View table relationships. Delete the relationship between tables. Relationship mistakes	Relationships in databases	Blackboard and PowerPoint	Daily and monthly exams
18/4/2023	2(T) +2(P)	Definition of queries. Methods for estimating queries: First: the query wizard	Inquiries	Blackboard and PowerPoint	Daily and monthly exams
25/4/2023	2(T) +2(P)		Semester exam	Blackboard and PowerPoint	Daily and monthly exams
2/5/2023	2(T) +2(P)	Methods for estimating queries: Second:	Query design	Blackboard and	Daily and monthly exams

		Designing queries		PowerPoint	
2023/5/9	2(T) +2(P)	Definition of models. And methods for creating models	Models	Blackboard and PowerPoint	Daily and monthly exams
2023/5/16	2(T) +2(P)	Definition of report. Ways to create reports. Preview reports and print reports	Reports	Blackboard and PowerPoint	Daily and monthly exams

11. Course Evaluation

Attendance and participation: 5 marks / Daily exam: 5 marks / Report: 5 marks / Practical: 15 marks / Semester exam: 20 marks

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	1- Adrien W. and Nelson E. "Database Design" by Hsoub Academy, v1.0, first edition. 2- Aswad, Firas Muhammad and Lazim, Ali al-Hur "Databases" 3- Abou Elela ,M. 'Microsoft Office 2010 Professional"
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

25.	Course Name:
	Differential Equation/Second phase
26.	Course Code:
	CMSI24-F2251
27.	Semester / Year:
	The second course/2023/2024
28.	Description Preparation Date:
	17/2/2024
29.	Available Attendance Forms:
	Classrooms of department statistics and informatics
30.	*Number of Credit Hours (Total) / Number of Units (Total)*
	(3) theoretical hours and (1) discussion hours/number of units: 3
31.	*Course administrator's name (mention all, if more than one name)*
	Name: Dr.Khalida Ahmed Mohammed *Email: khalida@uomosul.edu.iq*
32.	*Course Objectives*

Course Objectives	● *1. Definition of the differential equation and the most important special elements.* ● *2. Identify the most important types of differential equations and how to find general and specific solutions to them.*

33. 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 by taking time series of a specific phenomenon and analyzing it using the Minitab program and predicting its future values.*

34. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First	**3(T) +1(D)**	*Identifying differential equations, concepts and terminology, and extracting differential equations from the general solution*	*Introduction to differential equations*	Blackboard	Daily, semester and final exams - Duties Student participation
Second	**3(T) +1(D)**	*Finding the solution to first-order and first-order equations by separating the variables, finding the solution to linear equations, and finding the conversion of equations to linear equations.*	*Solving equations of first order and first degree*	Blackboard	Daily, semester and final exams - Duties Student participation
Third	**3(T) +1(D)**	*Homogeneous differential equations and perfect differential equations*	*Finding general and specific solutions*	Blackboard	Daily, semester and final exams - Duties Student participation
Fourth	**3(T) +1(D)**	*transforming incomplete differential equations to complete equations using integration factors*	*Solve examples of this type*	Blackboard	Daily, semester and final exams - Duties Student participation
Fifth	**3(T) +1(D)**	*Differential equations of higher order and first order, reducing the higher order and then solving the equation*	*How to reduce the rank of the equation and find the solution using direct integration*	Blackboard	Daily, semester and final exams - Duties Student participation
Sixth	**3(T) +1(D)**	*Differential equations in which the independent variable does not*	*Higher order and first order equations*	Blackboard	Daily, semester and final exams - Duties Student participation

		appear			
seventh	***3(T) +1(D)***	*Differential equations in which the dependent variable does not appear*	*Higher order and first order equations*	Blackboard	Daily, semester and final exams - Duties Student participation
Eghith	***3(T) 1(D)***		*Semester exam*	Blackboard	Daily, semester and final exams - Duties Student participation
nineth	**3(T) +1(D)**	Linear differential equations with fixed coefficients and order n and finding their general solution	Differential equations with constant coefficients	Blackboard	Daily, semester and final exams - Duties Student participation
Tenth	**3(T) +1(D)**	Euler's equation and finding its solution	Euler's equation	Blackboard	Daily, semester and final exams - Duties Student participation
Eleventh	**3(T) +1(D)**	Finding the general and specific solution for differential equations with fixed coefficients	Higher degree differential equations with examples	Blackboard	Daily, semester and final exams - Duties Student participation
Tweleveth	**3(T) +1(D)**	Differential equations that can be solved with respect to the independent variable	Higher degree equations	Blackboard	Daily, semester and final exams - Duties Student participation
Thirteenth	**3(T) +1(D)**	Differential equations that can be solved with respect to the dependent variable	Higher degree equations	Blackboard	Daily, semester and final exams - Duties Student participation

35. Course Evaluation

Semester Exam 40% ,Final Exam 60%

36. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Methods for solving differential equations / written by Khaled Al-Samarrai
Main references (sources)	Engineering Mathematics / Written by Khaled Abdel Hamid Al-Nouri
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Elementary Statistics I**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**STAT101**				
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level	UGI		**Semester of Delivery**	1	
Administering Department	STAT		**College**	CSM	
Module Leader	Khairy Badal Rasheed		**e-mail**	Khairy-stat@uomosul.edu.iq	
Module Leader's Acad. Title	Lecture		**Module Leader's Qualification**	Msc.	
Module Tutor	Shaimaa Waleed Mahmood		**e-mail**	shaimaa.waleed@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	10/06/2023		**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- Give the learner the statistical skills that enable him to work in the fields of statistic, calculating measures of statistic. 2- The subject of statistics is a digital language and an art to express the

	variables and numbers accurately, and thus enables the student to benefit from this subject in the statistics and the programs that are important to him in most fields of life. 3- Statistics course aims to develop ways and means of thinking and how to deal with various problems. 4- Trying to think in sound ways and methods, specifically in solving problems and thus improving and developing society.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Understand the fundamental concepts and principles of statistics, including data types, measurement scales, and sampling methods. 2- Interpret and analyze data using descriptive statistical measures, such as measures of central tendency (mean, median, mode) and measures of variability (range, variance, standard deviation). 3- Apply probability theory to analyze and make predictions about uncertain events, including calculating probabilities and understanding the laws of probability. 4- Utilize basic principles of statistical inference to draw conclusions about a population based on sample data, including hypothesis testing and confidence intervals. 5- Apply appropriate statistical techniques for analyzing relationships between variables, including correlation analysis and simple linear regression. 6- Understand and interpret the results of statistical software output and graphical representations. 7- Communicate statistical findings and interpretations effectively, both orally and in written form. 8- Develop critical thinking and problem-solving skills in the context of statistical analysis and interpretation.
Indicative Contents المحتويات الإرشادية	1- familiarize students with the basics of statistics, its fields of application. 2- the statistical method in scientific research, methods of data collection. 3- classification and presentation for the purpose of obtaining the necessary information to make appropriate decisions and the possibility of using this data in prediction, in addition to developing students. 4- skills in research design method. 5- bringing the student to a level where he has the ability to interpret the results and turn them into a practical reality.

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 types of simple experiments involving some sampling activities that are interesting to the students in the statistical methods.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
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	82	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	20% (20)	5 and 10	LO #1, #2 and #4
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Report	1	10% (10)	13	All
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	
	Material Covered
Week 1	Definition and importance of statistics
Week 2	Statistical method in scientific research Statistical Notation Types of statistics
Week 3	Data types and methods of collection
Week 4	Types of Samples
Week 5	Frequency distributions (importance and types)
Week 6	Presentation of data Frequency distribution (Tabular presentation)
Week 7	Cumulative distribution
Week 8	Graphical presentation
Week 9	Measures of Central tendency for ungrouped data
Week 10	Measures of Central tendency for grouped data
Week 11	Properties of central tendency measures
Week 12	Measures of dispersion (variation) for ungrouped data Measures of dispersion (variation) grouped data
Week 13	Properties of dispersion measurements
Week 14	Pearson and spearman correlation
Week 15	Preparatory week before the final Exam
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	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	Elementary Statistics (2007), Allan Bluman.	Yes
Recommended Texts	Basics of Statistics (1995), Jarkko Isolalo.	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	**Elementary Statistics II**	**Module Delivery**	
Module Type	**Core**	☒ **Theory**	
Module Code	**STAT107**	☒ **Lecture**	
ECTS Credits	**7**	☐ **Lab**	
SWL (hr/sem)	**175**	☒ **Tutorial**	
		☐ **Practical**	
		☐ **Seminar**	

Module Level	UGI	**Semester of Delivery**	2
Administering Department	STAT	**College**	CSM
Module Leader	Khairy Badal Rasheed	**e-mail**	Khairy-stat@uomosul.edu.iq
Module Leader's Acad. Title	Lecture	**Module Leader's Qualification**	Msc.
Module Tutor	Shaimaa Waleed Mahmood	**e-mail**	shaimaa.waleed@uomosul.edu.iq
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	10/06/2023	**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	5- Give the learner the statistical skills that enable him to work in the fields of engineering, calculating probabilities and linear equations. 6- The subject of statistics is a digital language and an art to express the variables and numbers accurately, and thus enables the student to benefit

	from this subject in the engineering and arithmetic transactions that are important to him in most fields of life. 7- Statistics course aims to develop ways and means of thinking and how to deal with various problems. 8- Trying to think in sound ways and methods, specifically in solving problems and thus improving and developing society.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	9- Understand the fundamental concepts and principles of statistics, including data types, measurement scales, and sampling methods. 10- Interpret and analyze data using descriptive statistical measures, such as measures of central tendency (mean, median, mode) and measures of variability (range, variance, standard deviation). 11- Apply probability theory to analyze and make predictions about uncertain events, including calculating probabilities and understanding the laws of probability. 12- Utilize basic principles of statistical inference to draw conclusions about a population based on sample data, including hypothesis testing and confidence intervals. 13- Apply appropriate statistical techniques for analyzing relationships between variables, including correlation analysis and simple linear regression. 14- Understand and interpret the results of statistical software output and graphical representations. 15- Communicate statistical findings and interpretations effectively, both orally and in written form. 16- Develop critical thinking and problem-solving skills in the context of statistical analysis and interpretation.
Indicative Contents المحتويات الإرشادية	6- familiarize students with the basics of statistics, its fields of application. 7- the statistical method in scientific research, methods of data collection 8- classification and presentation for the purpose of obtaining the necessary information to make appropriate decisions and the possibility of using this data in prediction, in addition to developing students. 9- skills in research design method. 10- bringing the student to a level where he has the ability to interpret the results and turn them into a practical reality.

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 types of simple experiments involving some sampling activities that are interesting to the students in the statistical methods.

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	82	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	20% (20)	5 and 10	LO #1, #2 and #4
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Report	1	10% (10)	13	All
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	
	Material Covered
Week 1	Multiple correlation coefficient
Week 2	Partial correlation coefficient
Week 3	Simple linear regression
Week 4	Multiple linear regression
Week 5	Testing of hypotheses
Week 6	Type one and two error
Week 7	Z –test (one sample)

Week 8	Z –test (two samples)
Week 9	t –test (one sample)
Week 10	t –test (two samples)
Week 11	t –test (paired samples)
Week 12	Confidence Intervals
Week 13	ANOVA{Analysis of variance (part 1) }
Week 14	ANOVA{Analysis of variance (part 1) }
Week 15	Preparatory week before the final Exam
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	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	Elementary Statistics (2007), Allan Bluman.	Yes
Recommended Texts	Basics of Statistics (1995), Jarkko Isolalo.	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	**Calculus I**			**Module Delivery**	
Module Type	**Basic**			☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	**STAT102**				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level		UGI	**Semester of Delivery**		1
Administering Department		STAT	**College**	CSM	
Module Leader	Dr. Heyam Abed Al-Majeed Hayawi		**e-mail**	he.hayawi@uomosul.edu.iq	
Module Leader's Acad. Title		Assistant Prof.	**Module Leader's Qualification**		Ph.D.
Module Tutor	Rehad Emad Slewa		**e-mail**	alshamany@uomosul.edu.iq	
Peer Reviewer Name			**e-mail**	E-mail	
Scientific Committee Approval Date		10/06/2023	**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	The goal of this course is to help you understand the subject of calculus and demonstrate its fundamental role in various scientific fields, particularly in Statistics. Throughout the course, you will explore the two major concepts of calculus: the derivative and the integral, both of which have numerous practical applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understanding Calculus, sketch a graph of an equation, find the intercepts of a graph, and find the domain and range of a function. 2. Understanding the types of functions, such that one-to-one, even and odd, and trigonometric. Able to solve trigonometric equations. 3. Able to define limits and continuity of functions and effectively evaluate them, Understand the properties associated with limits. 4. Define the derivative as a generalization of the slope of the tangent line to a curve. Gain an understanding of convenient formulas that allow us to calculate the derivative of almost any function we encounter. Acquire knowledge of convenient rules for evaluating derivatives. 5. Being able to find the absolute maximum and minimum values of a given function and identify its extrema. 6. Learning how the fundamental theorem of calculus and how differentiation and integration are inverse operations of each other.
Indicative Contents المحتويات الإرشادية	**Part A - Preliminaries** Understanding the concept of limits; Evaluating limits algebraically and graphically; One-sided limits and infinite limits; Defining continuity and its properties; Identifying discontinuities and types of discontinuities. [18 hrs.] **Part B - Derivatives** Basic rules and techniques of differentiation; Derivatives of exponential, logarithmic, and trigonometric functions; Derivatives of exponential, logarithmic, and trigonometric functions; Applications of Differentiation (Optimization problems). [36 hrs.] **Part C - Fundamental Theorem of Calculus** Understanding the connection between differentiation and integration and evaluating definite integrals using the Fundamental Theorem of Calculus. [6 hrs.] **Part D - Integration** Antiderivatives and indefinite integrals; Definite integrals and their properties; Techniques of integration, including substitution and integration by parts; Applications of Integration, including Area under a curve and the average value of a function, the average value of a function. [30 hrs.]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Preparing Prerequisite Knowledge, begin each topic with real-world examples and applications to demonstrate the relevance and practicality of calculus to Encourage students to explore how calculus concepts are applied in various fields, such as statistics and computer science. Providing timely feedback on student work to identify, address errors, and reinforce learning through quizzes. Promoting collaborative learning by assigning problem-solving tasks. Encourage students to work together, explain concepts to their peers, and engage in collaborative problem-solving.

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	82	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	20% (20)	5, 12	LO #1- #4
	Assignments	4	10% (10)	3,6,10, and 13	LO #3, #4

	Report	1	10% (10)	13	All
Summative assessment	**Midterm Exam**	2hr	10% (10)	8	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	A Preview of Calculus - Reviewing Graphs and Types of Functions.
Week 2	Review-Functions and Trigonometry
Week 3	Limits and continuity of functions
Week 4	Concept of Derivatives and the fundamental rules of Differentiation
Week 5	Product, Quotient, and Chain Rules
Week 6	Extrema on an Interval, Increasing and Decreasing Functions
Week 7	Concavity and Points of Inflection
Week 8	Mid-term Exam + Curve Sketching and Linear Approximations
Week 9	Applications-Optimization Problems
Week 10	Antiderivatives and Basic Integration Rules
Week 11	The Fundamental Theorem of Calculus
Week 12	Basic Rules and Techniques of Integration
Week 13	Differentiation and Integration of Exponential and Natural Logarithmic Functions
Week 14	The area under the region and between two curves.
Week 15	Volume-The Disk Method
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	مبادئ الرياضيات - التفاضل والتكامل، (1980)، علي عزيز علي وعبد الرزاق علي الحسوان وعادل زينل حسين	Yes
Recommended Texts	The Great Courses Study Workbook for Understanding Calculus Problems, Solutions, and Tips by Bruce H. Edwards, PhD Professor of Mathematics, University of Florida, 2010.	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	**Calculus II**			**Module Delivery**	
Module Type	**Basic**			☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	**STAT108**				
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level	UG1		**Semester of Delivery**	2	
Administering Department	STAT		**College**	CSM	
Module Leader	Dr. Heyam Abed Al-Majeed Hayawi		**e-mail**	he.hayawi@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Prof.		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Rehad Emad Slewa		**e-mail**	alshamany@uomosul.edu.iq	
Peer Reviewer Name			**e-mail**	E-mail	
Scientific Committee Approval Date	10/06/2023		**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	The goal of this course is to the goal of this course is to further your understanding and appreciation of calculus as calculus I.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Being able to use the integration techniques such as integration by parts, trigonometric Substitution, and partial Fractions. 2. Gaining the ability to evaluate improper integrals where one of the limits of integration is infinite or not continuous. 3. Understanding the moments and centers of mass. Being able to find the balancing point of a planar area, or lamina. 4. Understanding the infinite series and their connection to the functions. 5. Defining infinite series is perhaps the most important topic in Calculus II. The concept of infinite series is based on sequences. 6. Being able to approximate a function with a polynomial to linear form. 7. Defining vectors and their properties.
Indicative Contents المحتويات الإرشادية	**Part A - Techniques of Integration** In this part, students learn various techniques to evaluate integrals more effectively. They explore methods such as integration by substitution, integration by parts, and trigonometric and hyperbolic substitutions. They also delve into partial fraction decomposition, which involves breaking down rational functions into simpler fractions. [42 hrs.] **Part B - Infinite Series** Infinite series plays a significant role in Calculus II. Students investigate the convergence and divergence of series and learn about important series, such as geometric series. Additionally, they encounter power series and Taylor series, which expand functions as infinite polynomials. [30 hrs.] **Part C - Vectors** Vectors and their properties are examined in this part. Students learn about vector operations, including addition, subtraction, and scalar multiplication. They explore the dot product and cross product, understanding their geometric and algebraic interpretations. [12 hrs.] **Part D - Moments, Centers of Mass** The students understand how to calculate moments using the cross-product and explore the concept of moments in different contexts. Students study the definition of the center of mass.[6 hrs.]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Preparing Prerequisite Knowledge, begin each topic with real-world examples and applications to demonstrate the relevance and practicality of calculus to Encourage students to explore how calculus concepts are applied in various fields, such as statistics and computer science. Providing timely feedback on student work to identify, address errors, and reinforce learning through quizzes. Promoting collaborative learning by assigning problem-solving tasks. Encourage students to work together, explain concepts to their peers, and engage in collaborative problem-solving.

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	82	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	15% (15)	5, 12	LO #1- #4
	Assignments	4	15% (15)	3,6,10, and 13	LO #3, #4
	Report	1	10% (10)	13	All
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	
Week	**Material Covered**
Week 1	Basic Functions of Calculus and Limits.
Week 2	Trigonometric Integrals
Week 3	Integration by Parts,
Week 4	Integration by Trigonometric Substitution
Week 5	Integration by Partial Fractions
Week 6	applications of Integration methods
Week 7	Mid-term Exam + Improper Integrals
Week 8	Moments, Centers of Mass, and Centroids
Week 9	Sequences and Limits
Week 10	Infinite Series—Geometric Series
Week 11	Series, Divergence, and
Week 12	Taylor Polynomials and Approximations
Week 13	Power Series and Intervals of Convergence
Week 14	Vectors in the Plane
Week 15	The Dot Product of Two Vectors
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	NO	No

Recommended Texts	Understanding Calculus II: Problems, Solutions, and Tips, by Professor Bruce H. Edwards, University of Florida, 2013.	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	Demography			**Module Delivery**	
Module Type	Core			☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	STAT109				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		UGI	**Semester of Delivery**		2
Administering Department		STAT	**College**		CSM
Module Leader	Dr. Noor Nawzat Ahmed		**e-mail**		nooalior@uomosul.edu.iq
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	Dr. Noor Nawzat Ahmed		**e-mail**		nooalior@uomosul.edu.iq
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date		10/06/2023	**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	Preparing the student to work in various statistics departments so that he begins collecting and disseminating demographic, social, and mathematical information in a scientific manner

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. The student learns to study social and medical data related to the population because they are the source of all economic and non-economic activities, whether cultural, social, health, etc., and that these activities are linked and affect each other. 2. .2The student will learn how to obtain demographic data and methods for detecting and correcting errors to which demographic data are exposed. 3. .3The student will learn how to conduct a census and population survey, as well as be able to make population predictions 4. .4The student must master the composition and analysis of routine life tables, clinical tables, and calculation of life expectancy rates 5. .5Calculate severity metrics and analyze survival data
Indicative Contents المحتويات الإرشادية	1. .1Introduction to population statistics, sources of population data, types of population societies, calculating demographic indicators, and calibrating rates (13 hours) 2. .2Methods for detecting errors in demographic data and methods for revising demographic data (12hr) 3. .3Population forecasting (12hr) 4. .4Construct and analyze usual and clinical life tables (12hr) 5. .5Calculating life rates and measures of the relationship between life factors, relative risk, its types and rates, and analyzing survival data and survival patterns. (14hr)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy to be adopted is to encourage students to learn how to obtain and analyze demographic data and to expand and refine their critical thinking skills through lectures and through reports that the students will prepare.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	87	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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**	1	10% (10)	5 and 10	LO #1, #2 and #4
	Assignments	4	20% (20)	2 and 12	LO #3, #4 and #5
	Report	1	10% (10)	13	LO #3, and #4
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction of Demography- Sources of Population Data
Week 2	Benefits of Statistical Demography
Week 3	Age, gender, and economic composition of the population
Week 4	Population pyramid
Week 5	Demographic indicators and the rates on which studies are based
Week 6	Methods of adjusting rates
Week 7	Study of data evaluation, age and gender composition, and detection of errors related to demographic data
Week 8	Methods for refining demographic data

Week 9	Matching mathematical functions for population forecasting
Week 10	Building regular life schedules
Week 11	Construct clinical life tables - Analysis of life tables
Week 12	Life rates - Measures of the relationship between life factors
Week 13	Relative risk, its types and rates - Midterm Exam
Week 14	Relative risk, its types and rates
Week 15	Analysis of survival data and survival pattern
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	"DEMOGRAPHY"- lecture node- UNIVERSITY OF AGRICULTURE, ABEOKUTA COLLEGE OF NATURAL SCIENCES DEPARTMENT OF STATISTICS	No
	الاحصاء الديموغرافي/عبد الحسين الزيني	Yes
Recommended Texts		No
Websites	Introduction to Demography / www.population-europe.eu	

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	**MATLAB programming**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory**	
Module Code	**STAT110**			☒ **Lecture**	
ECTS Credits	**5**			☒ **Lab**	
SWL (hr/sem)	**125**			☐ **Tutorial**	
				☐ **Practical**	
				☐ **Seminar**	
Module Level	UGI	**Semester of Delivery**	2		
Administering Department	STAT	**College**	CSM		
Module Leader	Hyllaa Anas Abdul-Majeed	**e-mail**	hyllaa.77@uomosul.edu.iq		
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	MSc.		
Module Tutor		**e-mail**			
Peer Reviewer Name		**e-mail**			
Scientific Committee Approval Date	10/06/2023	**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. 1- Perform complex calculations very quickly 2. 2- Derivation of logarithms 3. 3- Simulation and design of various systems in all branches of science and industry 4. 4- Data analysis and exploration

	5. 5- Drawing in two and three dimensions (2D-3D) 6. 6-solve problems that are difficult for the researcher to do in the usual ways
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Know the basic axioms of the MATLAB language. 2. The ability to operate the system and identify its windows. 3. The ability to write and implement simple programs. 4. The ability of the MATLAB program to perform mathematical operations on vectors or matrices. 5. Identify ready-made instructions for solving problems or programming them. 6. The possibility of writing programs in the MATLAB language when the classical methods fail to solve them. 7. 8. The possibility of solving problems in MATLAB language, including numerical solutions 9. Develop skill in dealing with programs similar to MATLAB. 10. Encourage the student to look at books and extract information from them 11. One of the most important outputs is building a basic base for the student to move to future stages of subjects in which probability theory is a basis.
Indicative Contents المحتويات الإرشادية	Part - Introduction to the MATLAB Introduction to the MATLAB program and the Windows program, clarifying some important instructions and commands, writing data in the program, matrices in the matlab program, and creating matrices based on the instructions. [12 hrs] Part - Create matrices in MATLAB Writing the matrix in the program, some instructions used in the matrix, creating a row, column, or vector matrix with consecutive elements, some other instructions for creating matrices finding the inverse, determinant, and rank of the matrix in matlab, and reshaping matrices. [12 hrs] Part – Algebraic operations in matlab Algebraic operations on matrices in matlab, matrix elevation, finding the square root of a matrix and also boolean signs in matlab. [12 hrs] Part - Boolean directives in MATLAB Using (and), (or) between arrays whose elements are (1,0), and how to write input and output statements. [12 hrs] Part - Writing programs in MATLAB language And how to write a simple program based on writing the program using (for -end), drawing in MATLAB, conditional cases (if-end), using dashes (for the end) and (if the end) together. [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in providing solutions to some of the problems that the student faces in solving them when they cannot be solved by classical methods, by programming these solutions to reach the best solution depending on the programming language, including the MATLAB language that is commonly used in scientific departments, including statistics, and in the applied fields of the market Work as well as gain skills in developing solutions by encouraging students to participate in exercises, while improving and expanding critical thinking skills at the same time. This will be achieved through classes and interactive educational programs by identifying the directives of the MATLAB language

	program and getting to know the system of the system so that the student acquires the skill n programming to benefit from in the field of his studies, primary and higher

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	15% (15)	3 and 9	LO #1, #2 AND #4, #5, #6
	Assignments	2	15% (15)	4 and 12	LO #3, #4 and #7
	Report	1	10% (10)	13	LO #9
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #10
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to the MATLAB program and the Windows program, clarification of some important instructions and commands, and writing data in the program
Week 2	Matrices in the MATLAB program, and methods of writing the matrix in the program
Week 3	Some instructions used in the matrix
Week 4	Creates a row, column, or matrix vector with consecutive elements, and Create matrices based on instructions
Week 5	Mid-term Exam + Some other instructions for creating matrices
Week 6	Finding the inverse, determinant, and rank of a matrix in MATLAB , and reshaping matrices
Week 7	Adding new elements to the matrix, deleting some elements of the matrix, and changing the values of some elements of the matrix and submatrix
Week 8	Algebraic operations on matrices in the MATLAB program, raising the matrix, finding the square root of the matrix and also logical signs in the MATLAB program
Week 9	Using (and), (or) between matrices whose elements are (1,0), and how to write input and output sentences
Week 10	loops, and how to write a simple program
Week 11	Writing the program using (for -end)
Week 12	Mid-term Exam +Drawing in MATLAB
Week 13	Conditional (if-end) cases
Week 14	Using the (for-end) and (if-end) conditionals together
Week 15	use loop(while-end)
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to MATLAB and its main windows and writing data in the program
Week 2	Lab 2: Application examples for Matrices in the MATLAB program, and methods of writing the matrix in the program
Week 3	Lab 3: Application examples for Some instructions used in the matrix
Week 4	Lab 4: Application examples for Creates a row, column, or matrix vector with consecutive elements, and Create matrices based on instructions
Week 5	Lab 5: Application examples for Some other instructions for creating matrices
Week 6	Lab 6: Application examples for Finding the inverse, determinant, and rank of a matrix in MATLAB, and reshaping matrices
Week 7	Lab 7: Application examples for Adding new elements to the matrix, deleting some elements of the matrix, and changing the values of some elements of the matrix and submatrix
Week 8	Lab 8: Application examples for Algebraic operations on matrices in the MATLAB program, raising the matrix, finding the square root of the matrix and also logical signs in the MATLAB program
Week 9	Lab 9: Application examples for Using (and), (or) between matrices whose elements are (1,0), and how to write input and output sentences
Week 10	Lab 10: Application examples for loops, and how to write a simple program
Week 11	Lab 11: Application examples for Writing the program using (for -end)
Week 12	Lab 12: Application examples for Drawing in MATLAB
Week 13	Lab 13: Application examples for Conditional (if-end) cases
Week 14	Lab 14: Application examples for Using the (for-end) and (if-end) conditionals together
Week 15	Lab 15: Application examples for use loop(while-end)

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		
Recommended Texts	"تطبيقات MATLAB الحلول العددية" ، ياسين احمد الشبول، 2004	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	**Computer**	**Module Delivery**	
Module Type	**Basic**	☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOM103**		
ECTS Credits	**3**		
SWL (hr/sem)	**75**		

Module Level	UGI	**Semester of Delivery**	2
Administering Department	STAT	**College**	CSM
Module Leader	Dr. Alla Abd AlStaar Hamoodat	**e-mail**	allahamoodat@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Dr.
Module Tutor	Dr. Alla Abd AlStaar Hamoodat	**e-mail**	allahamoodat@uomosul.edu.iq
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date	10/06/2023	**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	5. Improved Communication: Fast communication can help increase productivity, allow for better business decisions and facilitate company expansion into new regions or countries. The movement of information within organizations or companies has become instantaneous. Employees can easily transfer data across departments without any interruption. Tools such as email, electronic fax, mobile phones, and text messages enhance the movement of information data between employees, customers, and business

	partners or suppliers, allowing for greater connectivity across internal and external structures. 6. • Improved Communication: Fast communication can help increase productivity, allow for better business decisions and facilitate company expansion into new regions or countries. The movement of information within organizations or companies has become instantaneous. Employees can easily transfer data across departments without any interruption. Tools such as email, electronic fax, mobile phones, and text messages enhance the movement of information data between employees, customers, and business partners or suppliers, allowing for greater connectivity across internal and external structures. 7. Work: Streamlined workflow systems, shared storage, and collaborative workspaces can increase business efficiency and allow employees to process a greater level of work in a shorter period of time. Information technology systems can be used to automate routine tasks, to facilitate data analysis and to store data in a way that can be easily retrieved for future use. Technology can also be used to answer customer questions through email, in a real-time chat session, or through a phone routing system that connects the customer to an available customer service agent. 8. Cost Reduction and Economic Efficiency: Communication technology and social technology have made business promotion and product launch affordable. Many small businesses have found ways to use social technology to increase their brand awareness and get more customers for less. In business, factors such as operating cost play an important role in business development and growth. So when companies use information technology to reduce operating costs, the return on investment will increase, which will lead to business growth.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Enhancing the ability of information technology to adapt and respond to the multiple, renewable and constantly changing needs of all parties benefiting from the outputs of the information system, especially the university leaders in the researched university, and thus enables information technology to carry out its work efficiently and effectively. Predicting the studied phenomenon in the future by means of Box-Jenkins model. 2. Employing information technologies in the axes of the educational process worked to build a bridge of vital communication between faculty members and all sources of the educational process, and this necessarily means facilitating the teacher's task in delivering information to the student within an interactive technical environment, and information technologies provide multiple sources in order to obtain information Whether it is from sources within the university or from the Internet and the educational technologies it contains.
Indicative Contents المحتويات الإرشادية	Although the information technology specialization is one of the most demanded fields currently in all global markets, some specializations range from stagnant to saturated and required, so you should study the market well before choosing a specialization. But if you are looking for the best majors that have a future in the field of information technology, then they are as follows: Network security major in programming - software engineering - 3D printing - data science major - Artificial Intelligence - Computer Science - Aerospace Engineering

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to encourage student' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials by Using appropriate teaching strategies and methods and teaching aids to develop thinking skills.

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

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	12	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**75**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	All
	Assignments	2	10% (10)	2 and 12	All
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	All
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Getting to know the computer and the history of its stages of development - indicating the types of computers - installing the computer - defining the physical parts
Week 2	Data entry units and data output units to the computer - The central processing unit and its tasks
Week 3	Primary and secondary memories - Types of displays
Week 4	Software
Week 5	Computer operating systems
Week 6	Low-level languages and high-level languages
Week 7	Service application software
Week 8	Getting to know the Word program - How to open or run the program - Transforming the Word program

	interface - Word program menus.
Week 9	Home Toolbar - Home Page Insert Menu - Toolbar - Insert Menu - Page Layout
Week 10	Microsoft Excel - the most common uses of the Excel program - opening the Excel program - closing the Excel program - an explanation of the main toolbar of the Excel program
Week 11	Entering data in Excel program - how to navigate in a worksheet - inserting a function from the ready-made functions into a cell - examples - shading cells - clearing cells
Week 12	The basics of building a POWER POINT presentation - entering the program and the program interface - creating a new presentation
Week 13	Open a presentation file - save a presentation - insert a new slide - add shapes to the slide - slide margins - slide design - add animations to the slide
Week 14	Internet - services provided by the Internet - keywords, comprehensive search engines
Week 15	Create an E-mail
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Lab 1	Word applications
Lab 2	Applications on Excel
Lab 3	PowerPoint applications
Lab 4	E-mail applications

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Fundamentals of Information Technology	Yes
Recommended Texts	Glend Gay and Ronald B., "Information Technology", 3 rd Ed, CSEC,OUP Oxford,2019.	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	**Linear Algebra**	**Module Delivery**	
Module Type	**Basic**	☒ **Theory**	
Module Code	**STAT104**	☒ **Lecture**	
ECTS Credits	**6**	☐ **Lab**	
SWL (hr/sem)	**150**	☒ **Tutorial**	
		☐ **Practical**	
		☐ **Seminar**	

Module Level	UGI	**Semester of Delivery**	1
Administering Department	STAT	**College**	CSM
Module Leader	Hyllaa Anas Abdul-Majeed	**e-mail**	hyllaa.77@uomosul.edu.iq
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	MSc.
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date	10/06/2023	**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- The student discusses vector spaces and related abstract concepts. 2- The student is familiar with the algebraic concepts and terminology of matrices and determinants and inverses, and uses creative thinking in the use of elementary transformation methods. 3-Learn about systems of linear equations and their applications. 4-Recognize the basis and dimension of vector spaces.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Algebraic operations on matrices and calculating determinants. 2- Solve linear systems. 3 - Learn about vector spaces and algebraic operations on them. 4- Self-learning method 5- One of the most important outputs is building a base for the student to move to the basic stages of subjects in which matrices and linear equations are the basis. 6- Encourage the student to look at books and extract information from them
Indicative Contents المحتويات الإرشادية	Part (1) - Definition of matrix, its types, algebraic operations on matrices and determinants, methods of finding the determinant and their properties. [13 hours] Part (2) - inverse and methods of finding the inverse of a matrix and its properties. [11 hours] Part (3) - Linear Equations and Methods for Solving Linear Equations. [14 hours] Part (4) - rank of matrix, The canonical form and equivalent matrices, and rank relation with equations. [14 hours] Part (5) - Latent roots, vectors, algebraic operations on vectors, linear composition, distance and Euclidean length. [11 hours]

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 types 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/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	87	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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**	2	20% (20)	3 and 8	LO #1and #2
	Assignments	2	10% (10)	2 and 12	LO #1, #2 and#4
	Report	1	10% (10)	13	LO #4, #5and#6
Summative	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #2

assessment	**Final Exam**	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Definition of matrices and types
Week 2	Algebraic processes on matrices
Week 3	Determinants, Determinant solution methods
Week 4	properties of the determinant
Week 5	Mid-term Exam + Inverse matrix using the matrices method (the adjoint of matrix)
Week 6	Inverse matrix using Gaussian deletion method
Week 7	The properties of the inverse matrix
Week 8	Linear equations, Methods of solving linear equations in the case of m = n
Week 9	Method of matrices to solve linear equations in the case of m> n
Week 10	rank of matrix, The canonical form
Week 11	equivalent matrices, Relationship of ranks and linear equations m>n
Week 12	Mid-term Exam + Relationship of ranks and linear equations m=n
Week 13	Latent roots of order (2x2), (3x3)
Week 14	Vector and Algebraic processes on vector, Euclidean length and Euclidean distance
Week 15	Linear Composition
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	الجبر الخطي، عبد المجيد حمزة ولميعة باقر	Yes
Recommended Texts	Elementary and Intermediacies Algebra (2)—Mark Dugopolski	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	**Basics Programming**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**STAT103**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		UGI	**Semester of Delivery**		1
Administering Department		STAT	**College**		CSM
Module Leader	Shyma Shakeeb Mohammd		**e-mail**		shymshak@uomosul.edu.iq
Module Leader's Acad. Title		Assistant Lecturer	**Module Leader's Qualification**		MSc.
Module Tutor	Husham Y. A. Alameen		**e-mail**		hisham.alameen@uomosul.edu.iq
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date		10/06/2023	**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	The objective is to learn the student the fundamental of programming through

أهداف المادة الدراسية	practical application using the C++ programming language. In this course, students will learn about: The basic programming and OOPs concepts. Creating C++ programs, Tokens, expressions and control structures in C++. Arranging same data systematically with arrays. Classes and objects in C++. Constructors and destructors in C++. Files management and templates in C++. Handling exceptions to control errors.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	After completing this course, the student will have acquired basic information in the science of computer programming through the following outcomes for learning this module, and these outcomes are: 1. Understand tokens, expressions, and control structures. 2. Explain arrays and strings and create programs using them. 3. Describe and use constructors and destructors. 4. Understand and employ file management. 5. Demonstrate how to control errors with exception handling. 6. Use functions and pointers in C++ program. 7. Describe OOPs concepts.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Introduction C++ and Basic programming</u> Understanding Language Features, history, covers C++ statements and expressions, constants, variables, operators, and how to control execution flow in applications. Exploring C++ Types, describes C++ built-in types, aggregated types, type aliases, initializer lists, and conversion between types. Rules of C++ programming, structure of C++ program, C++ Tokens (Identifiers, Keywords, Constants, Operators, Special characters), C++ data types (Basic, Derived, User defined). Console I/O statements (cin, cout), programs to perform various calculations, programs to implement various operators. [15 hrs] Arrays and Control statements: definition, advantages, array types, single dimension, double dimension, declaration, accessing array data, implementation of array operations. Conditional control statements, if-else, switch-case, loops, while, do while, for. Implementing programs on conditional & loops, break, continue, go to keywords. [15 hrs] <u>Part B – Functions and Object-oriented programming</u> Gives a thorough description of the fundamental characteristics of the object-oriented C++ programming language. In addition, students are introduced to the steps necessary for creating a fully functional C++ program. Many examples are provided to help enforce these steps and to demonstrate the basic structure of a C++ program. [15 hrs] Describes how to declare and call standard functions. This will also teach students to use standard classes, including standard header files. In addition,

	students work with string variables for the first time in this topic. Explains the use of streams for input and output, with a focus on formatting techniques. Formatting flags and manipulators are discussed, as are field width, fill characters, and alignment. [7 hrs] Introduces operators needed for calculations and selections. Binary, unary, relational, and logical operators are all examined in detail. Also, describes the statements needed to control the flow of a program. These include loops with while, do-while, and for; selections with if-else, switch, and the conditional operator; and jumps with goto, continue, and break. [15 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 types 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/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	87	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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**	2	10% (10)	5 and 10	LO #1, #2 and #4
	Assignments	2	10% (10)	2 and 12	All

	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	All
Summative assessment	**Midterm Exam**	2hr	10% (10)	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
Week 1	Structure of Simple C++ Programs
Week 2	Fundamental Types: characters identifiers, variable declaration, constants.
Week 3	Operators for fundamental types: Binary Arithmetic Operators, Unary Arithmetic Operators Relational Operators, Logical Operators.
Week 4	Arithmetic operations: converting arithmetic types, implicit type conversions, performing usual arithmetic type conversions, more type conversions.
Week 5	Arrays: defining arrays, initializing arrays, class arrays, multidimensional arrays, member arrays.
Week 6	Library files " header"
Week 7	Assign statements
Week 8	Conditional statements
Week 9	Control Flow: loops, the for statement, the while statement, the do-while statement, selections with if-else.
Week 10	Control Flow to complete: else-if chains, conditional expressions, selecting with switch, jumps with break, continue, and go to.
Week 11	The Standard Class string: defining and assigning strings, concatenating strings, comparing strings, inserting and erasing in strings, searching and replacing in strings, accessing characters in strings.
Week 12	Input and Output with Streams: streams, formatting and manipulators, formatted output of integers, formatted output of floating-point numbers, output in fields, output of characters.
Week 13	Functions: significance of functions in C++, defining functions, return value of functions, passing arguments, inline functions.
Week 14	Functions: default arguments, overloading functions, recursive functions.
Week 15	Strings, and Boolean values, formatted input, formatted input of numbers, unformatted input/output.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: An introduction to installing programs on a computer, C++ installation with its libraries.
Week 2	Lab 2: Characters identifiers
Week 3	Lab 3: Variables declaration
Week 4	Lab 4: Constants
Week 5	Lab 5: Arithmetic operations
Week 6	Lab 6: library files " header"
Week 7	Lab 7: Assign statement
Week 8	Lab 8: "if "conditional statements
Week 9	Lab 9: "if – else "conditional statements
Week 10	Lab 10: Array
Week 11	Lab 11:" for loop"
Week 12	Lab 12:"while loop"
Week 13	Lab 13: Functions
Week 14	Lab 14: Functions
Week 15	Lab 15: String

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Introduction to C++, Brian Gregor, Research Computing Services. Part 1	NO
Recommended Texts	How To Program, 2016, Pule & Harvey (10 Edition)	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	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded

(0 – 49)	**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	**English Language I**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOM102**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level		UGI	**Semester of Delivery**		2
Administering Department		STAT	**College**	CSM	
Module Leader	Hajer Akram Jasim Ali		**e-mail**	hajerakram@uomosul.edu.iq	
Module Leader's Acad. Title		Asst. lecturer	**Module Leader's Qualification**		MSc.
Module Tutor	None		**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date		11/06/2023	**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 writing skills.
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 dictionary, reading (communication). Everyday English (social expressions) [9 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 the USA. Social expressions about every day English. [8 hrs] Past tenses, simple past and past continuous, practice, Reading and listening, regular and irregular verbs. Vocabulary: about N.- V.- Adj. endings. Everyday English (time expressions). [6hrs] Grammar: the quantities, also about Something/someone/somewhere, practices. Reading: about markets, practices. [6 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in developing the four skills: The skill of speaking, The skill of reading, The skill of writing, The skill of listening, Also, it enables the students for the use 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)	17	**Unstructured SWL (h/w)**	1

الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
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**	2	20% (20)	4,9 and 11	LO #1, #2 and #5
	Assignments	2	10% (10)	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

	Material Covered
Week 1	Reading passage: Are You Getting Enough Sleep?
Week 2	• Building Vocabulary • Doing exercises: A • Words to remember Ask Students (According to attendance list) to write a short paragraph or report related to their field and use technical terminologies to enhance their English within their major
Week 3	• Reading passage: Mika's Homestay in London. • Students would explain their assignments about their major.
Week 4	• Building Vocabulary • Doing exercises: A-B • Words to remember Ask Students (According to attendance list) to write a short paragraph or report related to their field and use technical terminologies to enhance their English within their major.
Week 5	• Reading passage: It's Not Always Black and White. • Students would explain their assignments about their major.
Week 6	• Building Vocabulary • Doing exercises: A • Words to remember

	Ask Students (According to attendance list) to write a short paragraph or report related to their field and use technical terminologies to enhance their English within their major.
Week 7	• Reading passage: Helping Others. • Students would explain their assignments about their major. •
Week 8	• Building Vocabulary • Doing exercises: A • Words to remember Ask Students (According to attendance list) to write a short paragraph or report related to their field and use technical terminologies to enhance their English within their major.
Week 9	• Reading passage: Generation Z: Digital Nations. • Students would explain their assignments about their major.
Week 10	• Building Vocabulary • Doing exercises: A-B • Words to remember Ask Students (According to attendance list) to write a short paragraph or report related to their field and use technical terminologies to enhance their English within their major.
Week 11	• Reading passage: How to Be a Successful Businessperson. • Students would explain their assignments about their major.
Week 12	Mid-term Exam.
Week 13	• Building Vocabulary • Doing exercises: A • Words to remember Ask Students (According to attendance list) to write a short paragraph or report related to their field and use technical terminologies to enhance their English within their major.
Week 14	• Reading passage: The Growth of Urban Farming. • Students would explain their assignments about their major.
Week 15	• Building Vocabulary • Doing exercises: A-B • Words to remember Ask Students (According to attendance list) to write a short paragraph or report related to their field and use technical terminologies to enhance their English within their major.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	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	Select Readings Teacher-approved readings for today's students pre-intermediate 2nd Ed. By: Linda Lee + Eric Gundersen	Yes
Recommended Texts	Select Readings Elementary	Yes
Websites	https://www.libgen.is/search.php?req=select+readings+pre-intermediate&open=0&res=25&view=simple&phrase=1&column=def	

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
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