

Course Description Form

1. Course Name:	
Principles of Mathematics	
2. Course Code:	
SIT124	
3. Semester / Year:	
The first semester 2024-2025	
4. Description Preparation Date:	
2025/6/1	
5. Available Attendance Forms:	
Weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
56 hours (4 hours * 14 weeks)	
7. Course administrator's name (mention all, if more than one name)	
Name: Fardous Najeeb Abdullah Mohammad Al-Rawi Email: frdoos_najeeb@ntu.edu.iq	
8. Course Objectives	
Course Objectives	Fundamental Concepts: 1.Understand and apply basic mathematical principles including algebra, trigonometry, and calculus. 2.Develop a strong foundation in mathematical reasoning and problem-solving skills. Analytical Skills: 1.Enhance analytical thinking

	through mathematical modeling and analysis. 2.Learn to formulate and solve problems using mathematical techniques. Computational Proficiency: 3.Gain proficiency in using mathematical software and tools for computation. 4.Develop skills in numerical methods and algorithms relevant to IT applications. Mathematics in IT: 1.Understand the role of mathematics in various IT disciplines such as computer science, data analysis, and network theory. 2.Apply mathematical concepts to solve real-world IT problems. Discrete Mathematics: 3.Introduction to discrete mathematics, including logic, set theory, combinatorics, graph theory, and Boolean algebra. 4.Understand the significance of discrete structures in computer science and IT. Statistics and Probability: 1.Learn the basics of statistics and probability theory. 2.Apply statistical methods to analyze data and make informed
--	---

		decisions in IT contexts. Linear Algebra: 1. Understand and apply concepts of vectors, matrices, and linear transformations. 2. Use linear algebra in applications such as computer graphics, machine learning, and data processing. :Mathematical Communication: 1. Develop the ability to communicate mathematical ideas effectively, both orally and in writing. 2. Interpret and present mathematical data clearly and concisely. Critical Thinking: 1. Foster critical thinking and logical reasoning through mathematical proofs and problem-solving exercises. 2. Encourage independent thinking and the ability to tackle complex mathematical challenges.
9. Teaching and Learning Strategies		
Strategy	The strategies aim to create an engaging and supportive learning environment that encourages active participation and critical thinking, ultimately helping students to develop a strong foundation in mathematics and its applications in IT.	

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Student understanding of the lesson	Groups	Theoretical and practical	Daily and monthly tests
2	4	=	Coordinates	=	=
3	4	=	The rate of change of distance between two points	=	=
4	4	=	Slope of a straight line and its equation	=	=
5	4	=	The function and its graph	=	=
6	4	=	the limit	=	=

7	4	=	Continuity	=	=
8	4	=	Derivative of algebraic functions	=	=
9	4	=	The second derivative and higher orders	=	=
10	4	=	Derivative of implicit functions	=	=
11	4	=	Definite integral	=	=
12	4	=	Indefinite integration	=	=
13	4	=	Differentiation of the exponential function	=	=
14	4	=	Natural logarithm	=	=
15	4	=	week before the 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)					
Main references (sources)			Calculus Part Two Dr. Mohamed Adel Sudan and Dr. Ali Abdullah		

Recommended books and references (scientific journals, reports...)	Calculus: Early Transcendentals" by James Stewart
Electronic References, Websites	www.khanacademy.org

Course description form Principles of Statistics

1. Educational Institution					
Mosul Administrative Technical College					
2. Academic Department					
Statistical and Informatics Techniques					
3. Course Title/Code					
Principles of Statistics / ATC121					
4. Available Attendance Formats					
In-Person					
5. Semester/Year					
First Semester/First Year					
6. Number of Academic Hours (Total)					
4.56					
7. Date this Description Was Prepared					
2025/14/6					
8 .Course outcomes, teaching, learning and assessment methods					
Assessment Methods		Teaching and Learning Methods		Learning Outcomes (LOs)	
- Short Written Tests - Assignments		- Theoretical Lectures - Interactive Explanation with Real-Life Examples		1. Understand the concept of statistical principles.	
- Midterm Exam - Reports		- Demonstration Presentations - Classroom Discussions		2. Uses of statistics in social, administrative, medical, and other diverse fields.	
- Homework - Final Exam		- Practical Classroom Exercises - Solving Hands-on Exercises Using Rules		3. Requirements of statistics and how to calculate them.	
- Homework - Final Exam		- Practical Classroom Exercises - Solving Hands-on Exercises Using Rules		4. Apply mathematical formulas for statistics, and understand scientific terminology and statistical symbols.	
9. Course structure (theoretical and practical vocabulary)					
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	hours	Week
Presentation, explanation, questions and answers, discussion	Theoretical and practical	Definition of Statistics	Student understanding of the lesson	4	First

Presentation, explanation, questions and answers, discussion	Theoretical and practical	Data and Variables	Student understanding of the lesson	4	Second
Presentation, explanation, questions and answers, discussion	Theoretical and practical	Data Collection Sources	Student understanding of the lesson	4	Third
Presentation, explanation, questions and answers, discussion	Theoretical and practical	Data Collection Method	Student understanding of the lesson	4	Fourth
Presentation, explanation, questions and answers, discussion	Theoretical and practical	Tabular Data Presentation	Student understanding of the lesson	4	Fifth
Presentation, explanation, questions and answers, discussion	Theoretical and practical	The mediator and the mode	Student understanding of the lesson	4	Sixth
Presentation, explanation, questions and answers, discussion	Theoretical and practical	Skewness Forms	Student understanding of the lesson	4	Seventh
Presentation, explanation, questions and answers, discussion	Theoretical and practical	Geometric Mean	Student understanding of the lesson	4	Eighth
Presentation, explanation, questions and answers, discussion	Theoretical and practical	Harmonic Mean	Student understanding of the lesson	4	Ninth
Presentation, explanation, questions and answers, discussion	Theoretical and practical	Quarters, Deciles, and Percentiles	Student understanding of the lesson	4	Tenth
Presentation, explanation, questions and answers, discussion	Theoretical and practical	Range and Half-Range	Student understanding of the lesson	4	Eleventh
Presentation, explanation, questions and answers, discussion	Theoretical and practical	Mean Deviation	Student understanding of the lesson	4	Twelfth

Presentation, explanation, questions and answers, discussion	Theoretical and practical	Variance and Standard Deviation	Student understanding of the lesson	4	Thirteenth
Presentation, explanation, questions and answers, discussion	Theoretical and practical	Correlation and Regression	Student understanding of the lesson	4	Fourteenth
		Final Exam		3	Fifteenth

11. Curriculum development plan.

Course Development Plan Objectives

- .1The researcher's ability to perform statistical analysis and interpret results correctly.
- .2The student's ability to illustrate data through graphics using statistical software.
- .3The student's ability to conduct opinion polls and process results.
- .4The ability to acquire the use of mathematical methods and statistical theories.

12. .Infrastructure

Available	Classrooms, Laboratories, and Workshops
Available	1- Required Textbooks
Principles of Statistics, Taha Hussein Al-Zubaidi.	2- Main References (Resources)
Not available	a) Recommended books and references (scientific journals, reports, etc.)
Not available	b) Electronic references, websites, etc.

Course description form Standard Numbers

1. Educational Institution: Administrative Technical College - Mosul
2. Academic Department: Department of Statistics and Informatics

3. Course Title/Code: Standard Numbers/SIT125		
4. Available Attendance Formats: Weekly		
5. Semester/Year: First Semester: 2024-2025		
6. Number of Study Hours (Total): 60 hours (4 hours * 15 weeks)		
7. Date of Preparation: July 1, 2025		
8 Course objectives (general objectives of the course): The course aims to enable the student in statistical applications in the field of economic studies, through which the economic conditions of different countries can be identified by studying the economic changes in the country or countries under stud. To help predict what might happen to various variables in the future, it is also used to measure various phenomena, such as comparing food prices in a given year with those of a previous or future year.		
10· Learning Outcomes, Teaching ,Learning and Assessment Methode		
Evaluation methods	Teaching and learning methods	A- Knowledge and Understanding A1- Defining the concept of index numbers, their types, formulas and mathematical laws. A2- Index numbers and the methodology for their application in economic activities A3- Defining the phenomenon and how to choose its vocabulary . A4- Creating index numbers by specifying the commodities covered and determining the base and comparison period . A5- Using technical and scientific development in the field of record numbers. A6- Index numbers are considered one of the most important statistical analysis tools that reveal the true reality of the level of economic and financial indicators.

Exams and discussions	The theoretical lectures include various mathematical problems.	B. Subject-specific skills B1 - The student's ability to calculate index numbers to explain a particular phenomenon or problem . B2 - The student's ability to compose index numbers is to choose the base period that is used to compose the index number. Usually, the base period precedes the comparison period . B3 - The student's ability to compare prices and quantities of different goods in a specific year with another previous year in order to determine the development that has occurred in production. B4- Studying indices helps in forecasting the .studied phenomenon
Exams and discussions	The theoretical lectures include various mathematical problems.	Teaching and Learning Methods
Exams and discussions	The theoretical lectures include various mathematical problems.	1-theoretical lectures include various computational problems. 2-practical application using statistical programs such as SPSS program.

11. Course Structure

11. Course Structure

Week ILOs	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
First	4	Student understanding of the lesson	Definition of the index + areas of use of the index + index level	Theoretical and practical	Daily and monthly tests
Second	4	=	Composition of numbers (levels method + simple grouping method)	=	=
Third	4	=	Simple index numbers methods (quantity and price levels + the arithmetic mean of the price and quantity levels)	=	=
Fourth	4	=	The simple arithmetic mean formula for prices and quantities + the simple geometric mean formula for price and quantity levels	=	=
Fifth	4	=	Simple assembly method	=	=
VI	4	=	Aggregate arithmetic mean method for price levels and quantities	=	=
Seventh	4	=	Weighted index numbers	=	=

VIII	4	=	Weighted index formulas	=	=
Ninth	4	=	Changes in weights	=	=
The tenth	4	=	Weighted average index numbers using commodity values	=	=
Eleventh	4	=	Standard numbers using a series or moving basis	=	=
Twelveth	4	=	Standard numbers test	=	=
Thirteenth	4	=	Definition of time series	=	=
Fourteenth	4	=	Relative coefficient of change	=	=
Fifteenth	4	=	Components of a time series	=	=
13. Curriculum Development Plan					
Curriculum development based on recent publications of books and references.					
14.. Infrastructun					
Available			Classrooms, Laboratories, and Workshops		
Available			1- Required Textbooks		
Records/Abdul Hussein Zini.			2- Main References (Sources)		
Records/Abdul Hussein Zini.			a) Recommended Books and References (Scientific Journals, Reports, etc.)		
https://www.youtube.com/watch?v=bnXDKMaYLcM&t=106s https://www.google.iq/books/edition/Index_Numbers_in_Economic_Theory_and_a/KlKrOobYrWgC?hl=ar&gbpv=1&dq=Index+Numbers&printsec=frontcover			,t) Electronic references, websites		

Course Description Form

13.	Course Name:
	Mathematical applications
14.	Course Code:
	SIT112
15.	Semester / Year:

The first semester 2024-2025	
16. Description Preparation Date:	
2025/6/1	
17. Available Attendance Forms:	
Weekly	
18. Number of Credit Hours (Total) / Number of Units (Total)	
56 hours (4 hours * 14 weeks)	
19. Course administrator's name (mention all, if more than one name)	
Name: Fardous Najeeb Abdullah Mohammad Al-Rawi Email: frdoos_najeeb@ntu.edu.iq	
20. Course Objectives	
Course Objectives	Fundamental Concepts: 1. Understand and apply basic mathematical principles including algebra, trigonometry, and calculus. 2. Develop a strong foundation in mathematical reasoning and problem-solving skills. Analytical Skills: 1. Enhance analytical thinking through mathematical modeling and analysis. 2. Learn to formulate and solve problems using mathematical techniques. Computational Proficiency: 3. Gain proficiency in using mathematical software and tools for computation. 4. Develop skills in numerical methods and algorithms relevant to IT applications. Mathematics in IT: 1. Understand the role of mathematics in various IT disciplines such as computer science, data analysis, and network theory. 2. Apply mathematical concepts to solve real-world IT problems. Discrete Mathematics: 3. Introduction to discrete mathematics, including logic, set theory, combinatorics, graph theory, and Boolean algebra. 4. Understand the significance of discrete structures in computer science and IT. Statistics and Probability: 1. Learn the basics of statistics and probability theory. 2. Apply statistical methods to analyze data and make informed decisions in IT contexts. Linear Algebra:

			1.Understand and apply concepts of vectors, matrices, and linear transformations. 2.Use linear algebra in applications such as computer graphics, machine learning, and data processing. :Mathematical Communication: 1.Develop the ability to communicate mathematical ideas effectively, both orally and in writing. 2.Interpret and present mathematical data clearly and concisely. Critical Thinking: 1.Foster critical thinking and logical reasoning through mathematical proofs and problem-solving exercises. 2.Encourage independent thinking and the ability to tackle complex mathematical challenges.		
21. Teaching and Learning Strategies					
Strategy		The strategies aim to create an engaging and supportive learning environment that encourages active participation and critical thinking, ultimately helping students to develop a strong foundation in mathematics and its applications in IT.			
22. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Student understanding of the lesson	Exponential function in general	Theoretical and practical	Daily and monthly tests
2	4	=	Properties of exponential function	=	=
3	4	=	Derivative of exponential function	=	=
4	4	=	Integration of exponential function	=	=

5	4	=	Hyperbolic functions	=	=
6	4	=	Derivatives of hyperbolic functions	=	=
7	4	=	Continuity	=	=
8	4	=	Inverse functions	=	=
9	4	=	Properties of inverse functions	=	=
10	4	=	Derivative of inverse functions	=	=
11	4	=	Taylor expansion	=	=
12	4	=	Properties of Taylor expansion	=	=
13	4	=	Methods of integration	=	=
14	4	=	Methods of integration	=	=
15	4	=	Methods of integration	=	=
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					
24. Learning and Teaching Resources					
Required textbooks (curricular books, if any)					
Main references (sources)			Calculus Part Two Dr. Mohamed Adel Sudan and Dr. Ali Abdullah		
Recommended books and references (scientific journals,			Calculus: Early Transcendentals" by James Stewart		

reports...)	
Electronic References, Websites	www.khanacademy.org

Course description form Principles of Probability

1. Educational Institution		
Technical Administrative College - Mosul / Department of Statistics and Informatics		
2. Course Name/Code		
Principles of Probability / SIT221		
3. Available Attendance Formats		
Weekly		
4. Semester/Year		
First and Second / 2024-2025		
5. Number of Study Hours (Total)		
56 hours (4 hours x 14 weeks)		
6. Date this description was prepared		
2025/1/6		
7. Course Objectives (General Course Objectives)		
The course aims to enable students to understand the basics of probability and probability theory and their application in real life.		
8. Course outcomes, teaching, learning and assessment methods.		
assessment methods	teaching and learning methods	Outputs
- Exam. - Solving exercises in class. - Asking questions to students in	- 1 Theoretical and practical lectures. - 2 Use of educational tools (presentations	A- Knowledge A1 - The student is able to understand the basics of probability calculations A2 - and use probability models for some random experiments A3 - Enabling the student to understand how to apply the material in real life A4 - Includes understanding the relationship or

class. -Discussion and dialogue.	and scientific films.(-3Practical application.	relationships contained in the data, interpreting a relationship and its components, interpreting graphs and charts, and interpreting statistical tables.
		B - Skills B1 - Be skilled at solving probability problems B2 - Be skilled at identifying the type of distribution in which the data is distributed. B3 - Be skilled at determining the function of the data based on the shape of the distribution
		C- Values C1- Academic and Ethical Integrity C2- Critical and Analytical Thinking C3- Teamwork and Cooperation C4- Commitment to Quality and Excellence

9. Course structure (theoretical and practical vocabulary)					
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	hours	Week
Daily and monthly tests	Theoretical and practical	Set Theory	Student understanding of the lesson	4	First
Daily and monthly tests	Theoretical and practical	Basic Counting Methods, Permutations	Student understanding of the lesson	4	Second
Daily and monthly tests	Theoretical and practical	Combinations	Student understanding of the lesson	4	Third
Daily and monthly tests	Theoretical and practical	Binomial Expansion Theorem	Student understanding of the lesson	4	Fourth
Daily and monthly tests	Theoretical and practical	Exercises	Student understanding of the lesson	4	Fifth
Daily and monthly tests	Theoretical and practical	Polynomial Theorem	Student understanding of the lesson	4	Sixth
Daily and monthly tests	Theoretical and practical	Exams	Student understanding of the lesson	4	Seventh
Daily and monthly tests	Theoretical and practical	Probability, probability concepts, random experiment, sample/event space, event probability	Student understanding of the lesson	4	Eighth
Daily and monthly tests	Theoretical and practical	Field and field algebra	Student understanding of the lesson	4	Ninth
Daily and monthly tests	Theoretical and practical	Probability axioms, conditional probability	Student understanding of the lesson	4	Tenth
Daily and monthly tests	Theoretical and practical	Independence	Student understanding of the lesson	4	Eleventh
Daily and monthly tests	Theoretical and practical	Random variables and their distributions	Student understanding of the lesson	4	Twelfth
Daily and monthly tests	Theoretical and practical	Probability function for a discrete random variable, distribution function for a discrete random variable	Student understanding of the lesson	4	Thirteenth
Daily and monthly tests	Theoretical and practical	Probability function for a continuous random variable, distribution function for a continuous random variable	Student understanding of the lesson	4	Fourteenth

	Theoretical and practical	Term exam		3	Fifteenth
--	---------------------------	-----------	--	---	-----------

10. Curriculum development plan.

Continuously updating the curriculum to keep pace with labor market developments (Curriculum Update Committee, Scientific Committee), such as:

- 1. Developing curricula that are appropriate for the labor market**
- 2. Holding scientific seminars and conferences aimed at updating curricula**

.3. Monitoring scientific developments in the field of specialization

11. . Infrastructure

Available	Classrooms, Laboratories, and Workshops
Available	1- Required Textbooks
Principles of Probability / Walid Al-Sayfo	2- Main References (Resources)
Probability Theory / Amir Hanna	a) Recommended books and references (scientific journals, reports, etc.)
https://www.noor-book.com/%D9%83%D8%AA%D8%A7%D8%A8-D8%A7%D9%84%D8%A7%D8%AD%D8%B5%D8%A7%D8%A1-%D9%88-D8%A7%D9%84%D8%A7%D8%AD%8%AA%D9%85%D8%A7%D9%84%D8%A7%D8%AA-D8%A7%D9%84%D9%86%D8%B8%D8%B1%D9%8A%D9%87-%D9%88-D8%A7%D9%84%D8%AA%D8%B7%D8%A8%D9%8A%D9%82-pdf	b) Electronic references, websites, etc.

Sampling Theory

1. Educational Institution		
Administrative Technical College - Mosul / Department of Statistics and Informatics		
2. Course Name/Code		
Sampling Theory / SIT222		
3. Available Attendance Formats		
Weekly		
4. Semester/Year		
Second / 2024-2025		
5. Number of Study Hours (Total)		
56 hours (4 hours * 14 weeks)		
6. Date of Preparation		
June 1, 2025		
7. Course Objectives (General Course Objectives)		
The course aims to provide students with the theoretical foundation for studying samples and random sampling.		
8. Course Outcomes and Teaching, Learning, and Assessment Methods		
assessment methods	teaching and learning methods	Outputs
- Exam. - Solving exercises in class. - Asking questions to students in class. - Discussion and dialogue.	-1 Theoretical and practical lectures. -2 Use of educational tools (presentations and scientific films.) -3 Practical application.	A- Knowledge A1- Know the basic concepts of samples A2- Distinguish between sample types and their characteristics A3- Explain sample selection methods A4- Analyze the impact of sample selection on study results
		B - Skills B1 - Cognitive and Intellectual Skills B2 - Applied and Practical Skills B3 - Design a data collection plan using an appropriate sample. Select the most appropriate sampling method. B4 - Use statistical analysis programs and programs such as SPSS or Excel to analyze

		samples and generate results ‘.
		C- Values C1- Academic and Ethical Integrity C2- Critical and Analytical Thinking C3- Teamwork and Cooperation C4- Commitment to Quality and Excellence

9. Course structure (theoretical and practical vocabulary)					
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	hours	Week
Theoretical and practical	Daily and monthly tests	Basic Concepts and Introduction to Sampling	Student understanding of the lesson	4	First
=	=	Simple Random Sampling with Mean	Student understanding of the lesson	4	Second
=	=	Simple Random Sampling with Total	Student understanding of the lesson	4	Third
=	=	Simple Random Sampling with Proportions	Student understanding of the lesson	4	Fourth
=	=	Sample Estimation Methods in Simple Random Sampling	Student understanding of the lesson	4	Fifth
=	=	Stratified Random Sampling	Student understanding of the lesson	4	Sixth
=	=	Methods of Assigning Samples to Strata	Student understanding of the lesson	4	Seventh
=	=	Sample estimation methods in stratified random sampling	Student understanding of the lesson	4	Eighth
=	=	Comparison between simple and stratified random sampling with evidence and examples	Student understanding of the lesson	4	Ninth
=	=	Stratified random sampling for proportions	Student understanding of the lesson	4	Tenth
=	=	General exercises on stratified random sampling	Student understanding of the lesson	4	Eleventh
=	=	Cluster and multistage sampling	Student understanding of the lesson	4	Twelfth
=	=	Systematic sampling (methodology)	Student understanding of the lesson	4	Thirteenth
=	=	Applied sampling topics	Student understanding of the lesson	4	Fourteenth
=	=	Semester exam		3	Fifteenth

10. Curriculum development plan.

Continuously updating the curriculum to keep pace with labor market developments (Curriculum Update Committee, Scientific Committee), such as:

1. Developing curricula that are appropriate for the labor market
2. Holding scientific seminars and conferences aimed at updating curricula
3. Monitoring scientific developments in the field of specialization

11. . Infrastructure	
	available classrooms, laboratories and .workshops are available
Random samples in scientific research, their types and methods of selection	1- Required textbooks
	2- Main references (sources)
https://drive.google.com/file/d/0B8ZAGDqoB1d3dlQ2I3VVEzbFk/view?resourcekey=0-tflJW4tVKFYyNig509SeuQ	a) Recommended books and references (scientific journals, reports, etc.)
	b) Electronic references, websites, etc.

COURSE SPECIFICATION Numerical analysis

1. Teaching Institution	Administrative Technical College/Mosul
2. University Department/Centre	Northern Technical University / Department of Statistics and Informatics Techniques
3. Course title/code	Numerical analysis /SIT227
4. Programme(s) to which it contributes	
5. Modes of Attendance offered	weekly
6. Semester/Year	First and second semester
7. Number of hours tuition (total)	56 hours
8. Date of production/revision of this specification	2025
9. Aims of the Course	
The course aims to enable the student to become familiar with the basics of Numerical analysis and possibility of applying them in practical life .	

10· Learning Outcomes, Teaching ,Learning and Assessment Methode
A- Knowledge and understanding A1) The new student understands the basics of numerical analysis. A2) Study theories and numerical methods. A3)The student's ability to know how to apply the material in free life. A4) It includes studying and solving differential equations using numerical methods.

B- Subject-specific skills B1)To be skilled in using numerical methods. B2)To be skilled in solving all types of equations using numerical methods. B3)To be skilled in using theories and numerical methods to solve equations.
Teaching and Learning Methods
1- Theoretical and practical lectures. 2- Using educational means (scientific presentations and films(3 -Practical application
Assessment methods
-Solving exercises in class. -Asking questions to students in class -Discussion and dialogue
C. Thinking Skills C1. The ability to use mental ability to solve problems C2- Using logical thinking C2. C3. C4.
Teaching and Learning Methods
-Theoretical and practical lectures -Powerpoint presentation. And the screen
Assessment methods
Theoretical and practical tests, semester and final
D. General and Transferable Skills (other skills relevant to employability and personal development) D1. Developing the student's mental abilities D2- Developing skill capabilities

11. Course Structure					
Week ILOs	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
First	4	Student understanding of the lesson	Sources of errors	Theoretical and practical	Daily and monthly tests
Second	4	=	Accounts using computers	=	=
Third	4	=	Rolle's theory	=	=
Fourth	4	=	Mean Value Theorem of Integration	=	=
Fifth	4	=	Teller and Cauchy theory	=	=
VI	4	=	Method of bisection and pseudoposition	=	=
Seventh	4	=	Exams	=	=
VIII	4	=	Newton Raphson's method and the cutter	=	=
Ninth	4	=	Fixed point and rank convergence	=	=
The tenth	4	=	Linear systems	=	=
Eleventh	4	=	The Kaos elimination method and the Kaos-	=	=
12. Infrastructure					
Twelfth	4	=	the matrix	=	=
Thirteenth	4	=	Numerical analysis / Dr. Nashat Ibrahim Al-	=	=
Fourteenth	4	=	The relationship between Chaos and trigonometric analysis	=	Obaidi
Fifteenth	4	=	semester exam	=	=

· OTHER	
Special requirements (include for example workshops, periodicals, IT software, websites)	Numerical analysis / Dr. Nashat Ibrahim Al-Obaidi
Community-based facilities (include for example, guest Lectures , internship , field studies)	https://www.noor-book.com/%D9%83%D8%AA%D8%A7%D8%A7%D9%84%D8%A7%D8%AD%D8%B5%D8%A7%D8%A1-%D9%88-%D8%A7%D9%84%D8%A7%D8%AD%D8%AA%D9%85%D8%A7%D9%84%D8%A7%D8%AA-%D8%A7%D9%84%D9%86%D8%B8%D8%B1%D9%8A%D9%87-%D9%88-%D8%A7%D9%84%D8%AA%D8%B7%D8%A8%D9%8A%D9%82-pdf

Course Description Form Time Series

1.	Educational institution: Technical Administrative College - Mosul
2.	Academic Department: Department of Statistics and Information Technology
3.	Course Name/Code: Time Series/ SIT225
4.	Available attendance formats: Weekly
5.	Semester/Year: First and Second Semesters/2024-2025
6.	Number of study hours (total): 60 hours (4 hours * 15 weeks)
7.	Date this description was prepared: 1/7/2025
8.	Course objectives (general objectives of the course): The course aims to teach the student the general concept of time series, their types and the purpose of studying them. It also studies the most important factors affecting the behavior of the time series, and then analyzes the time series to arrive at a mathematical model that explains the relationship between the two dependent variables (y) and the independent variable (time) (t). The model is then used to determine the behavior of the series in the future.

9. Course outcomes, teaching, learning and assessment methods
Course outcomes

identification Studying the relationship between the time variable and another variable that represents the phenomenon of study to know the changes that affect the phenomenon, such as (increasing and decreasing seasonal effect) and its future prediction.

Its importance Finding the general trend equation for the phenomenon and identifying models that follow the behavior of the phenomenon under study.

How is it determined?: Use mathematical methods and computer programs to analyze time series.

Evaluation methods	Teaching and learning methods	Outputs
Exams and discussions	The theoretical lectures include various mathematical problems.	1- knowledge A1 - Studying the relationship between the time variable and a specific variable to know the changes that occur in the phenomenon from one period to another, such as the presence of (increase, decrease, stability, sharp turn, abnormal values). A2 - Definition of time series and components of time series. A3 - Identify time series models. A4- Time series analysis will lead to tracking the behavior of the phenomenon in the past, identifying current patterns of change, and predicting the future.
Exams and discussions	The theoretical lectures include various mathematical problems.	B - Skills B1 - The student's ability to draw the original time series. B2 - The student's ability to identify the general trend of the time series. B3 - The student's ability to examine

		whether the time series is stationary or not. B4- The student arrived at a mathematical equation to find the general trend of the time series and then predict the future.			
Exams and discussions	The theoretical lectures include various mathematical problems.	C- Values A1- Solve the math problems on the board. A2- Asking oral questions during the lecture. A3- Weekly exams. A4- Monthly exams.			
Course structure(Theoretical and practical vocabulary) .10					
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	watch es	week
Daily and monthly tests	Theoretical and practical	Definition of time series + types + objectives + components	Student understanding of the lesson	4	the first
Daily and monthly tests	Theoretical and practical	Time Series Analysis + Time Series Models	Student understanding of the lesson	4	the second
Daily and monthly tests	Theoretical and practical	Methods for estimating the general trend using a chart (hand drawing method + semi-average method + moving average method)	Student understanding of the lesson	4	the third
Daily and monthly tests	Theoretical and practical	Methods for finding the general trend using equations (1- The semi-average method)	Student understanding of the lesson	4	Fourth
Daily and monthly tests	Theoretical and practical	2- Least squares method	Student understanding of the lesson	4	Fifth
Daily and monthly tests	Theoretical and practical	Methods for changing the general trend equations (changing the base year + changing the equation from annual to monthly or quarterly)	Student understanding of the lesson	4	Sixth

Daily and monthly tests	Theoretical and practical	Predict the general trend + exclude the effect of the general trend	Student understanding of the lesson	4	Seventh
Daily and monthly tests	Theoretical and practical	Methods for calculating seasonal changes (average method + moving average ratio method)	Student understanding of the lesson	4	The eighth
Daily and monthly tests	Theoretical and practical	Seasonal index forecasting + seasonal influence exclusion	Student understanding of the lesson	4	Ninth
Daily and monthly tests	Theoretical and practical	Measuring cyclical and contingent changes	Student understanding of the lesson	4	tenth
Daily and monthly tests	Theoretical and practical	random changes	Student understanding of the lesson	4	eleventh
Daily and monthly tests	Theoretical and practical	Definition of general non-linear trend	Student understanding of the lesson	4	twelfth
Daily and monthly tests	Theoretical and practical	Second and third order curves	Student understanding of the lesson	4	thirteenth
Daily and monthly tests	Theoretical and practical	Semi-logarithmic equation (exponential function)	Student understanding of the lesson	4	fourteenth
Daily and monthly tests	Theoretical and practical	Time series correlation	Student understanding of the lesson	4	fifteenth

11. Curriculum Development Plan

Continuously updating the curriculum to keep pace with developments in the labor market (Curriculum Update Committee, Scientific Committee) such as:

Developing the curriculum based on recent editions of books and references.

12. infrastructure

Available	Classrooms, laboratories and workshops
Available	1- Required textbooks
1- Time series from the applied perspective and Box-Jenkins models / Dr. Abdul Mardi Hamid, Dr. Ahmed	2- Main References (Sources)

Hussein, Dr. Sultan bin Mohammed. 2- Statistical forecasting methods/1 Adnan Majid Abdul Rahman	
1- Time series from the applied perspective and Box-Jenkins models / Dr. Abdul Mardi Hamid, Dr. Ahmed Hussein, Dr. Sultan bin Mohammed. 2- Statistical forecasting methods/1 Adnan Majid Abdul Rahman	1) Recommended books and references (scientific journals, reports, etc.)
https://www.youtube.com/watch?v=G5kItiDIgwM https://www.youtube.com/watch?v=N59FAzXM2E&list=PLyAeZjeZ2X_pPt6UqLjoHbxm_xYkLOp	2) Electronic references, websites,.....

COURSE SPECIFICATION Differential equations

1. Teaching Institution	Administrative Technical College/Mosul
2. University Department/Centre	Northern Technical University / Department of Statistics and Informatics Techniques
3. Course title/code	Differential equations /SIT226
4. Programme(s) to which it contributes	
5. Modes of Attendance offered	weekly

6. Semester/Year	First and second semester
7. Number of hours tuition (total)	56 hours
8. Date of production/revision of this specification	2025
9. Aims of the Course	
The course aims to enable the student to become familiar with the basics of differential equations and possibility of applying them in practical life .	

10. Learning Outcomes, Teaching ,Learning and Assessment Methode
A- Knowledge and understanding A1) The new student understands the basics of differential equations. A2) Study theories and differential equations methods. A3)The student's ability to know how to apply the material in free life. A4) It includes studying and solving differential equations using differential equations methods.
B- Subject-specific skills B1)To be skilled in using differential equations methods. B2)To be skilled in solving all types of equations using differential equations methods. B3)To be skilled in using theories and differential equations methods to solve equations.
Teaching and Learning Methods
1- Theoretical and practical lectures. 2- Using educational means (scientific presentations and films(3 -Practical application
Assessment methods
-Solving exercises in class. -Asking questions to students in class -Discussion and dialogue

C. Thinking Skills C1. The ability to use mental ability to solve problems C2- Using logical thinking .
Teaching and Learning Methods
-Theoretical and practical lectures -Powerpoint presentation. And the screen
Assessment methods
Theoretical and practical tests, semester and final
D. General and Transferable Skills (other skills relevant to employability and personal development) D1. Developing the student's mental abilities D2- Developing skill capabilities

11. Course Structure					
Week ILOs	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
First	4	Student understanding of the lesson	General and specific solution and equation formation	Theoretical and practical	Daily and monthly tests
Second	4	=	Differential equations of first order and first order	=	=
Third	4	=	How to separate variables	=	=
Fourth	4	=	Solving exercises	=	=
Fifth	4	=	Homogeneous equations and methods for solving them	=	=
VI	4	=	Complete equations and methods for solving them	=	=
Seventh	4	=	Integration factor method	=	=
VIII	4	=	Linear differential equations and methods for solving them	=	=
Ninth	4	=	Solving exercises	=	=
The tenth	4	=	Exam	=	=
Eleventh	4	=	Differential equations in the form $F(y/)$	=	=
Twelveth	4	=	Differential equations in the form $F(x,y/)$	=	=
Thirteenth	4	=	Lacrange equation	=	=
Fourteenth	4	=	Solving exercises	=	=
Fifteenth	4	=	Semester exam	=	=

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Differential Equations / Professor Dr. Hassan Mustafa
Special requirements (include for example workshops, periodicals, IT software, websites)	Differential Equations / Professor Dr. Hassan Mustafa
Community-based facilities (include for example, guest Lectures , internship , field studies)	https://www.noor-book.com/%D9%83%D8%AA%D8%A7%D8%A8-%D8%A7%D9%84%D8%A7%D8%AD%D8%B5%D8%A7%D8%A1-%D9%88-%D8%A7%D9%84%D8%A7%D8%AD%D8%AA%D9%85%D8%A7%D9%84%D8%A7%D8%AA-%D8%A7%D9%84%D9%86%D8%B8%D8%B1%D9%8A%D9%87-%D9%88-%D8%A7%D9%84%D8%AA%D8%B7%D8%A8%D9%8A%D9%82-pdf

SIT228 / SPSS

1. Educational Institution					
Technical Administrative College - Mosul / Department of Statistics and Informatics					
2. Course Name/Code					
SPSS /SIT228					
3. Available Attendance Formats					
Weekly					
4. Semester/Year					
First and Second / 2024-2025					
5. Number of Study Hours (Total)					
56 hours (4 hours x 14 weeks)					
6. Date this description was prepared					
2025					
7. Course Objectives (General Course Objectives)					
•Providing students with skills in using SPSS: •Understanding basic statistical concepts •Conducting descriptive statistical analysis •Interpreting statistical results					
8. Course outcomes, teaching, learning and assessment methods.					
assessment methods	teaching and learning methods	Outputs			
- Short written tests - Assignments	- Practical lectures - Interactive explanations with real-life examples	1. Determine the appropriate statistical method.			
- Midterm exam - Reports	- Demonstrations with practical applications - Discussions	2. Use SPSS efficiently.			
- Homework - Final exam	- Practical lab exercises	3. Distinguish between types of variables.			
- Homework - Final exam	Practical lab exercises	4. Manage and test data, and interpret statistical results.			
9. Course structure (theoretical and practical vocabulary)					
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	hours	Week
Presentation, practical implementation, explanation, questions and answers, discussion	Theoretical and practical	SPSS Program Definition	Student understanding of the lesson	4	First
Presentation, practical implementation, explanation, questions and answers, discussion	Theoretical and practical	Program Operation and Program Screen Components	Student understanding of the lesson	4	Second
Presentation, practical implementation, explanation, questions and answers, discussion	Theoretical and practical	Basic Windows and File Types	Student understanding of the lesson	4	Third

Presentation, practical implementation, explanation, questions and answers, discussion	Theoretical and practical	Basic program dialog boxes and menus	Student understanding of the lesson	4	Fourth
Presentation, practical implementation, explanation, questions and answers, discussion	Theoretical and practical	File formatting and data operations	Student understanding of the lesson	4	Fifth
Presentation, practical implementation, explanation, questions and answers, discussion	Theoretical and practical	Data arrangement and case selection	Student understanding of the lesson	4	Sixth
Presentation, practical implementation, explanation, questions and answers, discussion	Theoretical and practical	How to select cases	Student understanding of the lesson	4	Seventh
Presentation, practical implementation, explanation, questions and answers, discussion	Theoretical and practical	Toolbar components	Student understanding of the lesson	4	Eighth
Presentation, practical implementation, explanation, questions and answers, discussion	Theoretical and practical	Statistical Data Analysis	Student understanding of the lesson	4	Ninth
Presentation, practical implementation, explanation, questions and answers, discussion	Theoretical and practical	Data Graphing	Student understanding of the lesson	4	Tenth
Presentation, practical implementation, explanation, questions and answers, discussion	Theoretical and practical	Correlation	Student understanding of the lesson	4	Eleventh
Presentation, practical implementation, explanation, questions and answers, discussion	Theoretical and practical	Regression	Student understanding of the lesson	4	Twelfth
Presentation, practical implementation, explanation, questions and answers, discussion	Theoretical and practical	Data analysis	Student understanding of the lesson	4	Thirteenth
test	Theoretical and practical		test	4	Fourteenth

10. Curriculum development plan.

Continuously updating the curriculum to keep pace with labor market developments (Curriculum Update Committee, Scientific Committee), such as:

1. Developing curricula that are appropriate for the labor market
2. Holding scientific seminars and conferences aimed at updating curricula
3. Monitoring scientific developments in the field of specialization

11. . Infrastructure

Available	Classrooms, Laboratories, and Workshops
Available	1- Required Textbooks

SPSS Book	2- Main References (Resources)
Not Available	a) Recommended books and references (scientific journals, reports, etc.)
Not Available	b) Electronic references, websites, etc.

Course Description Form Hypothesis Testing

1.	Educational institution: Technical Administrative College - Mosul
2.	Academic Department: Department of Statistics and Information Technology
3.	Course Name/Code: Hypothesis Testing/SIT229
4.	Available attendance formats: Weekly
5.	Semester/Year: Second Semester/2024-2025
6.	Number of study hours (total): 60 hours (4 hours * 15 weeks)
7.	Date this description was prepared: 1/7/2025
8.	Course objectives (general objectives of the course): The course aims to enable students to understand the concept of hypothesis testing using the concept of statistical inference, which begins with estimating the parameters of the study population based on a sample drawn from the population under study, in order to achieve the most important requirement, which is making appropriate decisions.
9.	Course outcomes, teaching, learning and assessment methods
	Enabling the student to understand the concept of hypothesis testing with the concept of statistical inference, which begins with estimating the parameters of the study community based on a sample drawn from the studied community in order to achieve the most important requirement, which is

making appropriate decisions.

identification: a test **Hypotheses** It is a scientific method used by a researcher or student to examine an idea or prediction (hypothesis) about a particular phenomenon using data.

Its importance: It is widely used in scientific research, social sciences, medicine, business, cybersecurity, and more.

How is it determined: Helps make informed decisions based on empirical data.

Evaluation methods	Teaching and learning methods	Outputs
Exams and discussions	The theoretical lectures include various mathematical problems.	1- knowledge A1 - Formulating statistical hypotheses. A2 - Testing the statistical method. A3 - Calculate the statistical value. A4- Find the tabular values.
Exams and discussions	The theoretical lectures include various mathematical problems.	B - Skills B1 - Tests related to a single average. B2 - Tests relating the differences between two means. B3 - Tests related to more than one average. B4- Hypothesis tests for the population proportion.
Exams and discussions	The theoretical lectures include various mathematical problems.	C- Values A1- Developing mental abilities. A2- Developing scientific capabilities. A3- Speed of response. A4- Quick thinking.

Course structure **(Theoretical and practical vocabulary)** .10

Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	watch es	week
Daily and monthly tests	Theoretical and practical	Definition of hypothesis testing + the purpose of studying hypothesis testing	Student understanding of the lesson	4	the first

		+ Statistical Hypotheses			
Daily and monthly tests	Theoretical and practical	Level of Significance + Determine Acceptance and Rejection Areas + Comparison and Decision	Student understanding of the lesson	4	the second
Daily and monthly tests	Theoretical and practical	Hypothesis test for population mean μ + Hypothesis testing for means of two independent populations when the two populations are different (σ_1^2, σ_2^2) known	Student understanding of the lesson	4	the third
Daily and monthly tests	Theoretical and practical	Hypothesis testing for means of two independent populations when the two populations are different (σ_1^2, σ_2^2) unknown	Student understanding of the lesson	4	Fourth
Daily and monthly tests	Theoretical and practical	Hypothesis testing if the distribution is known and the size of both samples or one of them is less than 30 observations and if the variances of the two populations are equal	Student understanding of the lesson	4	Fifth
Daily and monthly tests	Theoretical and practical	Hypothesis testing if the distribution is known and the size of both samples or one of them is less than 30 observations if the variances of the two populations are not equal	Student understanding of the lesson	4	Sixth
Daily and monthly tests	Theoretical and practical	Hypothesis tests for population proportion	Student understanding of the lesson	4	Seventh
Daily and monthly tests	Theoretical and practical	Hypothesis tests for the difference between two ratios	Student understanding of the lesson	4	The eighth
Daily and monthly tests	Theoretical and practical	One-Way ANOVA	Student understanding of	4	Ninth

			the lesson		
Daily and monthly tests	Theoretical and practical	Two-Way ANOVA	Student understanding of the lesson	4	tenth
Daily and monthly tests	Theoretical and practical	Definition of non-parametric tests and their types	Student understanding of the lesson	4	eleventh
Daily and monthly tests	Theoretical and practical	Chi-square test (χ^2) (χ^2) Chi-Square Test	Student understanding of the lesson	4	twelfth
Daily and monthly tests	Theoretical and practical	The Spearman's Ranks Correlation Coefficient Test	Student understanding of the lesson	4	thirteenth
Daily and monthly tests	Theoretical and practical	The Friedman Test	Student understanding of the lesson	4	fourteenth
Daily and monthly tests	Theoretical and practical	The Wilcoxon Signed Ranks Test	Student understanding of the lesson	4	fifteenth
11. Curriculum Development Plan					
1– Developing the curriculum based on recent editions of books and references.					
12. infrastructure					
Available		Classrooms, laboratories and workshops			
Available		1- Required textbooks			
Mathematical statistics/Amir Hormuz		2- Main References (Sources)			
Mathematical statistics		1) Recommended books and references (scientific journals, reports, etc.)			
https://www.youtube.com/watch?v=2k3e6DutCuU&t=738s https://www.youtube.com/watch?v=tV_eSUnDMCIQ		2) Electronic references, websites,.....			

Course Description Form Mathematical Statistics SIT310

1. Educational Institution		
Technical Administrative College - Mosul / Department of Statistics and Informatics		
2. Course Name/Code		
Mathematical Statistics SIT310		
3. Available Attendance Formats		
Weekly		
4. Semester/Year		
First and Second - third class / 2024-2025		
5. Number of Study Hours (Total)		
56 hours (4 hours x 14 weeks)		
6. Date of Preparation		
June 1, 2025		
7. Course Objectives (General Objectives of the Course)		
•The student will practice probability density functions for continuous and discrete variables and understand their properties. •The student will be able to calculate probability expectation and moment-generating functions for statistical distributions. •The student will be able to work with probability distributions for continuous and discrete variables. • The student will be able to calculate the above for any statistical distribution mentioned within the curriculum		
8. Course outcomes, teaching, learning and assessment methods		
assessment methods	Teaching and learning methods	Outcomes
- Short written tests - Assignments	- Theoretical lectures - Interactive explanations	1. Define the basic concepts of probability theory and random variables.

	with real-life examples				
- Midterm exam - Reports	- Demonstration presentations - Class discussions		2. Distinguish between types of probability distributions and their properties (e.g., normal, Poisson, binomial).		
- Homework - Final exam	- Practical exercises in class - Hands-on exercises using the rules		3. Calculate the expected values, variance, and standard deviation of random variables.		
9.Course structure (theoretical and practical vocabulary)					
Assessment Method	Teaching Method	Unit/Or Topic Name	Required Learning Outcomes	Hours	Week
Paper-based test	a lecture	• Probability mass function • Probability density function properties of (mass & density) function	Student understanding of the lesson	4	First
Derive laws in collaboration with the student	a lecture	Cumulative distribution function	Student understanding of the lesson	4	Second
Derive laws in collaboration with the student	a lecture	Mathematical expectation and factorial moment	Student understanding of the lesson	4	Third
Derive laws in collaboration with the student	a lecture	Moment generation function and properties	Student understanding of the lesson	4	Fourth
Derive laws in collaboration with the student	a lecture	• Mean • Median • Mode Mean deviation	Student understanding of the lesson	4	Fifth
Derive laws in collaboration with the student	a lecture	Variance Discrete Uniform and Bernoulli distribution	Student understanding of the lesson	4	Sixth
Derive laws in collaboration with the student	a lecture	Binomial distribution	Student understanding of the lesson	4	Seventh

Derive laws in collaboration with the student	a lecture	Poisson distribution	Student understanding of the lesson	4	Eighth
Derive laws in collaboration with the student	a lecture	Geometric distribution	Student understanding of the lesson	4	Tenth
Derive laws in collaboration with the student	a lecture	Negative Binomial distribution	Student understanding of the lesson	4	Eleventh
Derive laws in collaboration with the student	a lecture	Hyper geometric distribution	Student understanding of the lesson	4	Twelfth
Derive laws in collaboration with the student	a lecture	Continuous uniform distribution	Student understanding of the lesson	4	Thirteenth
Derive laws in collaboration with the student	a lecture	Normal distribution	Student understanding of the lesson	4	Fourteenth
Derive laws in collaboration with the student	a lecture	Final Exam			Fifth

10. Curriculum development plan.

Course Development Plan Objectives

- .1 Improve learning outcomes to align with labor market requirements.
- .2 Update academic content to align with recent developments in statistics and programming.

.3Promote the use of technology and interactive methods in education . .4Support the practical and applied aspects of the course using software tools. .5Enhance the efficiency of assessments to reflect the student's actual level.	
11. Infrastructure	
Available	Classrooms, Laboratories, and Workshops
Available	1- Required Textbooks
Mathematical Statistics - Amir Hanna Hormuz	2- Main References (Resources)
Probability and Mathematical Statistics - Salah Mabkhout	a) Recommended books and references (scientific journals, reports, etc.)
https://dr-alali.com/wp-content/uploads/2020/06/%D9%85%D8%AD%D8%A7%D8%B6%D8%B1%D8%A7%D8%A9%8A-8.pdf	b) Electronic references, websites, etc.

COURSE SPECIFICATION Analysis of Linear Regression

1. Teaching Institution	Administrative Technical College/Mosul
2. University Department/Centre	Northern Technical University/ Department of Statistics and Informatics Techniques
3. Course title/code	Analysis of Linear Regression / SIT312
4. Programme(s) to which it contributes	

5. Modes of Attendance offered	weekly
6. Semester/Year	First semester
7. Number of hours tuition (total)	56 hours
8. Date of production/revision of this specification	2024/1/8
9. Aims of the Course	The course aims to enable the student to become familiar with simple and multiple linear regression analysis, in terms of theory and application in real life as well as scientific researches.

10· Learning Outcomes, Teaching ,Learning and Assessment Methode
A- Knowledge and Understanding A1-The student should be familiar with the linear regression model A2- That the student understands regression terminology A3- The student should estimate the regression parameters and study their properties A4- To test the significance of the regression parameters
B. Subject-specific skills B1 - The student should be able to statistically analyze the impact B2 - The student should derive estimates of regression parameters B3 - To deal with real phenomena
Teaching and Learning Methods
- Theoretical and practical lectures. - Modern educational means such as scientific presentations and films. - Application and practice.
Assessment methods
- Exams. - Homework.

3. Class assignments.
C. Thinking Skills C1- Stimulating curiosity and the desire to explore statistical relationships between variables. C2- Enhancing the ability to analyze and interpret results logically. C3- Increase confidence in using statistical tools to analyze data. C4- Motivating students to make decisions based on statistical results
Teaching and Learning Methods
1. Active learning. 2. Student-based teaching. 3. Cooperative learning.
Assessment methods
1. 1. Reports and seminars. 2. 2. Analysis of the researchs.
D. General and Transferable Skills (other skills relevant to employability and personal development) D1- The ability to analyze information. D2- Speaking and listening. D3- Organization and time management skills. D4- Cooperation and working in teams.

		12. Infrastructure			
		Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER		1. Al-Rawi, Khashia Mahmoud, (1987), Introduction to Regression Analysis, Directorate of Dar Al-Kutub for printing and publishing, 2009.	
11.	Course Structure				
Week	Special requirements (include for example workshops, periodicals, IT software, websites)			2. Cleophas, T. J., & Zwinderman, A. H. (2018). “Regression Analysis in Medical Research: For Starters and 2nd Levelers” . New York: Springer.	
	First	4	Student understanding of the lesson	Theoretical and practical	Daily and monthly tests
	Second	4	=	Eigen Values and Vectors	=
	Third	4	=	Normal Distribution and its properties	=
	Fourth	4	=	Simple Linear Regression Concept	=
	Fifth	4	=	Regression Parameters Estimation by OLS	=
	VI	4	=	Exercises	=
	Seventh	4	=	Exam	=
	VIII	4	=	Regression Parameters Estimation by MLE	=
	Ninth	4	=	Properties of Estimators	=
	The tenth	4	=	Multiple Linear Regression Concept	=
	Eleventh	4	=	Analysis assumptions	=
	Twelfth	4	=	Hypothesis testing	=
	Thirteenth	4	=	ANOVA	=
	Fourteenth	4	=	Exercises	=
	Fifteenth	4	=	Exam	=

	3. Hoffmann, J. P. (2021). “Linear Regression Models: Applications in R”. Crc Press. 4. Martin, P. (2022). “Linear regression: An introduction to Statistical Models”. Sage.
Community-based facilities (include for example, guest Lectures , internship , field studies)	5. Arkes, J. (2023). “Regression Analysis: A Practical Introduction”. Taylor & Francis. 6. Gentle, James E., (2007), “Matrix Algebra: Theory, Computations, and Applications in Statistics”, Springer-Verlag, New York. 7. Hogg, R. V., McKean, J., & Craig, A. T., (2019), “Introduction to Mathematical Statistics”, 8th Edition, Pearson Education.

Course Description Template Nonlinear Regression Analysis

1. Educational Institution		
College of Administrative Technology-Mosul		
2. Department		
Department of Statistics and Informatics Techniques		
3. Course Name / Code		
Nonlinear Regression Analysis / SIT3120		
4. Attendance Forms Available		
In-Person		
5. Semester / Academic Year		
Second Semester / Third Year		
6. Total Hours		
3 Hours		
7. Date of Preparing this Description		
2025/6/15		
8. Course Objectives		
- Enable students to distinguish between linear and nonlinear regression models. - Develop the student's ability to apply different types of nonlinear models to real-world data. - Train students to transform and analyze models that cannot be linearly transformed. - Equip students to use software tools (like R or SPSS) to implement nonlinear regression analysis. - Enhance students' skills in interpreting the effectiveness of nonlinear models using advanced statistical measures. - Enable students to apply Generalized Linear Models (GLM) and logistic regression to various types of data.		
9. Course Learning Outcomes (LOs), Teaching & Learning Methods, and Assessment		
Assessment Methods	Teaching & Learning Methods	Learning Outcomes (LOs)
Short quizzes, theoretical questions	Traditional lectures, interactive discussions	Distinguish between linear and nonlinear models
Practical exercises, evaluation projects	Practical learning, case studies, group projects	Apply nonlinear models to real-world data
Evaluation tests, analysis reports	Software demonstrations, results analysis, interactive	Analyze and assess the effectiveness of nonlinear models using advanced statistical indicators

	reviews				
Theoretical tests, evaluation projects	Lectures, software applications, interactive reviews	Understand generalized linear models and logistic regression for different data types			
10.Course Structure (Theoretical and Practical)					
Assessment Method	Teaching Method	Unit/Topic	Intended Learning Outcomes	Hours	Week
Participation, short quiz	Lecture	Introduction to the course	Understand course objectives and content	3	1
Short quiz	Interactive lecture	Nonlinear Regression Models	Distinguish between types of nonlinear models	3	2
Results analysis, practical exercise	Practical lecture	Transformable Models	Apply transformable models	3	3
Project, report	Case study	Non-transformable Models	Analyze non-transformable models	3	4
Evaluation test	Lecture and discussion	Logarithmic Models	Build logarithmic models	3	5
Comprehensive test	Interactive review	Examples and Applications	Solve comprehensive nonlinear model problems	3	6
Short quiz	Lecture	Generalized Linear Models	Understand GLM distributions	3	7
Short quiz	Interactive lecture	Link Functions	Apply link functions	3	8
Analysis, practical exercise	Practical lecture	Generalized Linear Models	Analyze GLM models using software	3	9
Project, report	Lecture and discussion	Logistic Regression Models	Build logistic regression model	3	11
Evaluation test	Lecture and discussion	Model Properties	Analyze model properties	3	12
Comprehensive test	Interactive review	Parameter Estimation	Estimate model parameters	3	13
Short quiz	Lecture	Classification Tables and Accuracy Measures	Analyze classification tables	3	14
Final exam, project	Comprehensive review	Final Review and Application	Final review and practical application	3	15

11. Course Development Plan	
Objectives of the Development Plan:	
1. Align the course with modern statistical applications in different sectors. 2. Strengthen the practical side by including case studies and real data sets. 3. Expand the use of statistical software in practical training. 4. Improve the diversity of assessment methods (practical tasks, reports, discussions, projects). 5. Connect course content with market requirements for statistical data analysts. 6. Support ethical practices when working with data and interpreting results. 7. Update references to include the latest research and modern applications.	
12. Infrastructure	
Classrooms, Laboratories, Workshops	Available
Required Textbooks	Al-Rawi, Khasha Mahmoud (1987). Introduction to Regression Analysis. Directorate of Books and Printing, University of Mosul, Iraq.
Main References (Sources)	
Recommended Books and References	1. Al-Sinjary, Adnan Mostafa. (2022). Comparison of Some Estimation Methods for Multivariate Generalized Linear Mixed Models. Ph.D. Dissertation, Al-Mustansiriyah University. 2. Dobson, A. J., & Barnett, A. G. (2018). "An introduction to generalized linear models". CRC press 3. Gallant, A. R. (1987). "Nonlinear statistical models". John Wiley & Sons. 4. Gujarati, D. N. (2004). "Basic econometrics4 .”th Edition. The McGraw–Hill Companies. USA. 5. Gujarati, D. (2011). "Econometrics by example". Macmillan .Palgrave Macmillan. London. UK. 6. Hardin, J. W., & Hilbe, J. M. (2018). "Generalized linear models and

	extensions”. 4th Edition. Stata press .
Electronic References, Websites, etc.	

Course Description Template Computer Application (R Language)

13. Educational Institution
College of Administrative Technology-Mosul
14. Department
Department of Statistics and Informatics Techniques
15. Course Name / Code
Computer Application (R Language) / SIT3121
16. Attendance Forms Available
In-Person
17. Semester / Academic Year
Second Semester / Third Year
18. Total Hours
3 Hours
19. Date of Preparing this Description
2025/6/15
20. Course Objectives
• Master the R environment and its fundamental tools for data handling and statistical computing. • Enable students to import, clean, and process real datasets. • Train students to write equations, custom functions, loops, and conditional structures in R. • Develop the student’s ability to apply R in real-world analytical tasks and generate visualizations. • Strengthen skills in interpreting analytical results and delivering programming solutions effectively. • Equip students to design and implement small analytical projects using R.
21. Course Learning Outcomes (LOs), Teaching & Learning Methods, and Assessment

Assessment Methods	Teaching & Learning Methods	Learning Outcomes (LOs)
Short quizzes, practical exercises, mini project	Introductory lectures, practical learning, real data case studies	Master the R environment, import and process data
Programming exercises, analysis reports, code evaluation	Interactive lectures, coding workshops, group projects	Write custom equations and functions in R
Evaluation tests, coding project, oral presentation	Lectures, problem-based learning (PBL), practical application using R	Use loops and if/else conditions for advanced analytical tasks
Final project, presentation, peer assessment	Applied projects, collaborative learning, guidance sessions	Apply R to real-world analytical projects and deliver effective programming solutions

22.Course Structure (Theoretical and Practical)

Assessment Method	Teaching Method	Unit/Topic	Intended Learning Outcomes	Hours	Week
Participation, simple exercise	Lecture, practical application	Introduction to R and RStudio	Understand R environment and basics	3	1
Practical exercises	Practical application, live examples	Reading and processing data	Import and clean data into R	3	2
Short quiz	Lecture, direct coding	Mean, standard deviation, variance	Calculate basic statistical indicators	3	3
Code analysis, practical exercise	Lecture, workshop	Functions & Loops	Create functions and use loops	3	4
Short quiz	Practical application, conditional scenarios	if/else structures	Use if/else conditions	3	5
Analytical report	Interactive explanation, data application	Bar and pie charts	Graphical and visual analysis	3	6
Practical test, report	Lecture, practical application	ggplot2 basics	Graphing with ggplot2	3	7
Applied test	Explanation + direct coding	cor, lm, summary	Correlation and regression analysis	3	8
Practical exercises	Lecture, practical exercise	apply family	Programming with apply/sapply	3	9
Case analysis, short quiz	Workshop, real cases	stringr, substr	Handle text and string operations	3	10

Data report	Practical application, analytical case	filter, select, mutate	Organize and transform tables with dplyr	3	11
Evaluation exercises	Practical discussion multiple examples	Data preprocessing	Prepare and verify modeling data	3	12
Mini project	Analytical explanation, direct implementation	Modeling using lm	Build a simple statistical model	3	13
Final report	Interactive review interpretive code	Goodness of fit and testing	Analyze and interpret model results	3	14

23. Course Development Plan

Objectives of the Development Plan:

8. Align course outcomes with current market demands for data analysts and programmers.
9. Enhance practical sessions with real-world cases and diverse data sources.
10. Integrate modern tools such as RStudio and relevant libraries like ggplot2, dplyr, stringr.
11. Improve the balance between theory, coding practice, and result interpretation.
12. Diversify assessment tools to include coding exercises, peer reviews, and mini-projects.
13. Encourage collaborative learning and project-based teamwork.
14. Promote academic honesty and responsible data handling.
15. Update reading materials with the latest books and online resources.

24. Infrastructure

Classrooms, Laboratories, Workshops	Available
--	------------------

Required Textbooks	
---------------------------	--

Main References (Sources)	
----------------------------------	--

Recommended Books and References	1. James, G., Witten, D., Hastie, T., & Tibshirani, R., (2013), “An introduction to statistical learning”, New York: springer. 2. Pathak, M. A., (2014), “Beginning data science with R”, Springer. 3. Pearson, R. K., (2018), “Exploratory data analysis using R”,
---	--

	CRC Press. 4. Tattar, P. N., Ramaiah, S., & Manjunath, B. G., (2016), “ A Course in Statistics with R ”, John Wiley & Sons.
Electronic References, Websites, etc.	

Course Description Form Biostatistics

1.	Educational institution: Technical Administrative College - Mosul
2.	Academic Department: Department of Statistics and Information Technology
3.	Course Name/Code: Biostatistics/ SIT314
4.	Available attendance formats: Weekly
5.	Semester/Year: First and Second Semesters/2024-2025
6.	Number of study hours (total): 60 hours (4 hours * 15 weeks)
7.	Date this description was prepared: 1/7/2025
8.	Course objectives (general objectives of the course): The course aims to enable the student to identify health statistics that show the general health status in the country by studying the most important statistical measures used in vital statistics, which include: (death statistics, birth statistics, fertility statistics, and other health and population statistics)
9.	Course outcomes, teaching, learning and assessment methods Course outcomes identification: Biostatistics is a branch of statistics that deals with the application of statistical methods to biological, medical, and health data. It is primarily used in the design of clinical studies, the analysis of research results, and the interpretation of data related to public health and biomedicine. Its importance Biostatistics is a crucial tool in analyzing health and medical data, helping researchers and decision makers make accurate, evidence-based decisions.

How is it determined? Biostatistics is defined as an applied science used when biological or medical data are analyzed to make accurate scientific decisions in health and research.

Evaluation methods	Teaching and learning methods	Outputs
Solve math problems on the board	The theoretical lectures include various mathematical problems.	1- knowledge A1 - Planning in the educational, health, economic and social fields. A2 - Organizing and improving public and private services. A3 - Measuring the scientific and cultural level of society. A4- Local and international comparisons.
Solve math problems on the board	The theoretical lectures include various mathematical problems.	B - Skills B1 - The student's ability to find mortality statistics that include (crude death rate, infant mortality, stillbirth rate). B2 - The student's ability to find fertility statistics that include (general fertility rate, fertility rate by age groups) B3 - The student's ability to find disease statistics that include (the incidence rate of a certain disease, the prevalence rate of the disease, and the mortality rate). B4- Finding the relative risk, testing the compatibility between two laboratories.
Solve math problems on the board	The theoretical lectures include various mathematical problems.	C- Values A1- Developing mental abilities. A2- Quick thinking. A3- Developing scientific capabilities. A4- Speed of response.

Course structure **(Theoretical and practical vocabulary)** .10

Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	watch es	week
Daily and	Theoretical	Correlations include	Student	4	the first

monthly tests	and practical	(Pearson's correlation coefficient, Spearman's correlation, pairing, concordance)	understanding of the lesson		
Daily and monthly tests	Theoretical and practical	Death statistics	Student understanding of the lesson	4	the second
Daily and monthly tests	Theoretical and practical	Fertility statistics	Student understanding of the lesson	4	the third
Daily and monthly tests	Theoretical and practical	Disease statistics	Student understanding of the lesson	4	Fourth
Daily and monthly tests	Theoretical and practical	Definition of life tables	Student understanding of the lesson	4	Fifth
Daily and monthly tests	Theoretical and practical	Regular life schedules	Student understanding of the lesson	4	Sixth
Daily and monthly tests	Theoretical and practical	Clinical life tables	Student understanding of the lesson	4	Seventh
Daily and monthly tests	Theoretical and practical	Tests related to standard deviation and variance	Student understanding of the lesson	4	The eighth
Daily and monthly tests	Theoretical and practical	Test of homogeneity of variances between two independent estimates	Student understanding of the lesson	4	Ninth
Daily and monthly tests	Theoretical and practical	Test of equality of several variances	Student understanding of the lesson	4	tenth
Daily and monthly tests	Theoretical and practical	Use of the test χ^2 χ^2 Chi-square test to compare two rates (goodness of fit)	Student understanding of the lesson	4	eleventh
Daily and monthly tests	Theoretical and practical	Measures of the relationship between life factors	Student understanding of the lesson	4	twelfth
Daily and monthly tests	Theoretical and practical	Significance of difference between rates (comparison between several rates)	Student understanding of the lesson	4	thirteenth
Daily and	Theoretical	relative risk	Student	4	fourteenth

monthly tests	and practical		understanding of the lesson		enth
Daily and monthly tests	Theoretical and practical	Laboratory tests	Student understanding of the lesson	4	fifteen th
11. Curriculum Development Plan					
1- Developing the curriculum based on recent editions of books and references.					
12. infrastructure					
Available		Classrooms, laboratories and workshops			
Available		1- Required textbooks			
Principles of Vital Statistics, L Tables, Population Census		2- Main References (Sources)			
1-Biostatistics/Imad Touma. 2- Biostatistics using SPSS/Assistant Professor Jassim Mohammed Ali, and Professor Dr. Wissam Malik Daoud.		1) Recommended books and references (scientific journals, reports, etc.)			
https://www.youtube.com/watch?v=fto9Z-sRNwo&list=PLykWDuh5NXEbEfZTLpe9aXLPKRuf8B6i0 https://www.youtube.com/watch?v=MHXHgPPB0CI https://www.google.iq/books/edition/%D8%A7%D9%84%D8%A5%D8%AD%D8%B5%D8%A7%D8%A1_%D8%A7%D9%84%D8%AD%D9%8A%D9%88%D9%8A_%D8%A8%D8%A5%D8%B3%D8%AA%D8%AE%D8%AF/dVFmDwAAQBAJ?hl=en&gbpv=1&dq=%D8%A7%D9%84%D8%A7%D8%AD%D8%B5%D8%A7%D8%A1+%D8%A7%D9%84%D8%AD%D9%8A%D9%88%D9%8A&printsec=frontcover https://www.google.iq/books/edition/		2) Electronic references, websites,.....			

tal and Health Statistics/eQlOrH6Wsug ?hl=ar&gbpv=1&dq=Vital+and+demogr phic+statistics&printsec=frontcover	
---	--

Course description form Operations Research

1. Educational Institution					
Administrative Technical College / Mosul					
2. Academic Department					
Department of Statistical and Information Technology					
3. Course Title/Code					
Operations Research / SIT311					
4. Available Attendance Forms					
In-Person					
5. Semester/Year					
First Semester / Third Year					
6. Number of Class Hours (Total)					
7. Date of Preparation					
June 15, 2025					
8. Course Objectives (General Objectives of the Course)					
The course aims to provide students with knowledge of operations research, its methods, and its applications in the field of decision-making assistance in management and in all other scientific branches. This course uses mathematical models to solve administrative and economic problems, as well as many scientific problems that can be formulated in the form of examples.					
9. Course Outcomes and Methods of Teaching, Learning, and Evaluation.					
Assessment Methods	Teaching and Learning Methods,	Outcomes			
- Short written tests - Assignments	- Theoretical lectures - Interactive explanations with real-life examples	Contributing to bringing the problem, whatever it may be, closer to reality.			
- Midterm exam - Reports	- Demonstration presentations - Class discussions	Developing specific mathematical models that reflect the components of the problem			
- Homework - Final exam	- Practical exercises in class - Hands-on exercises using the rules	Presenting the model within a set of mathematical relationships and providing various opportunities (alternatives) for the decision-making process, thus contributing to the interpretation of the problem's elements and the factors influencing it			
10. Course structure (theoretical and practical vocabulary)					
Assessment Method	Teaching Method	Unit/Or Topic Name	Required Learning Outcomes	Hours	Week

Daily and monthly tests	oretical and practical	le-variable linear inequalities with one, two, and multiple variables	dent understanding of the lesson	4	First
Daily and monthly tests	oretical and practical	definition of a convex set	dent understanding of the lesson	4	Second
Daily and monthly tests	oretical and practical	gion of common solutions for a system of linear inequalities	dent understanding of the lesson	4	Third
Daily and monthly tests	oretical and practical	near equations in which the number of equations is equal to the number of variables	dent understanding of the lesson	4	Fourth
Daily and monthly tests	oretical and practical	near equations in which the number of equations is less than the number of variables	dent understanding of the lesson	4	Fifth
Daily and monthly tests	oretical and practical	Jordan's Difficulty	dent understanding of the lesson	4	Sixth
Daily and monthly tests	oretical and practical	ving a System of Linear Equations	dent understanding of the lesson	4	Seventh
Daily and monthly tests	oretical and practical	Simplex Method for finding Non-Negative Basic Solutions	dent understanding of the lesson	4	Eighth
Daily and monthly tests	oretical and practical	roduction planning in the organization and the distribution transportation means along the lines..	dent understanding of the lesson	4	Ninth
Daily and monthly tests	oretical and practical	near models and their forms.	dent understanding of the lesson	4	Tenth

Daily and monthly tests	oretical and practical	The simplex method and its modifications.	dent understanding of the lesson	4	Eleventh
Daily and monthly tests	oretical and practical	implex and direct algorithm	dent understanding of the lesson	4	Twelfth
Daily and monthly tests	oretical and practical	modified Simplex Algorithm	dent understanding of the lesson	4	Thirteenth
Daily and monthly tests	oretical and practical	ccompanying forms	dent understanding of the lesson	4	fourteenth
	oretical and practical				Fifth

10. .Curriculum development plan.

Continuously updating the curriculum to keep pace with labor market developments (Curriculum Update Committee, Scientific Committee), such as:

- 1.Developing curricula that are appropriate for the labor market
2. .Holding scientific seminars and conferences aimed at updating curricula
- 3.Monitoring scientific developments in the field of specialization –1

11. Infrastructure

Classrooms, Laboratories, and Workshops	Classrooms, Laboratories, and Workshops
1- Required Textbooks	1- Required Textbooks
Introduction to Operations Research Dr. Ibrahim Mohammed Al-Ali	2- Main References (Resources)
Lecture on Operations Research / Hani Arab	a) Recommended books and references (scientific journals, reports, etc.)
https://uodiyala.edu.iq/uploads/PDF/20ELIBRARY%20UODIYALA/collect%20EL3/%D8%A8%D8%AD%D9%8%D8%AB%20%D8%A7%D9%84%D8%B9%D9%85%D9%84%D9%8A%D8%A7%D8%AA%20BUS322.pdf	b) Electronic references, websites, etc.

Course description form Queuing theory

1. Educational Institution		
Technical Administrative College - Mosul /		
2. Department		
Department of Statistics and Informatics		
3.. Course Name/Code		
Queuing theory/ SIT315		
4. Available Attendance Formats		
Weekly		
5.. Semester/Year		
First / Theird class		
6.. Number of Study Hours (Total)		
56 hours (4 hours x 14 weeks)		
7.. Date of Preparation		
2025		
8.. Course Objectives (General Objectives of the Course)		
The primary goal of queuing theory is to analyze and optimize queuing systems to increase efficiency and reduce co Queuing theory studies the behavior and flow of customers in queues and provides mathematical tools for analyzing predicting the performance of these systems.		
9. Course outcomes, teaching, learning and assessment methods		
assessment methods	Teaching and learning methods	Outcomes

- Short written tests - Assignments	- Theoretical lectures - Interactive explanations with real-life examples	Key performance indicators are: Average waiting time in line Average time spent in the system Average number of customers in line Average number of customers in the system
- Midterm exam - Reports	- Demonstration presentations - Class discussions	Resource Optimization and Planning Determine the optimal number of servers to reduce wait times while maintaining efficiency. Optimize resource allocation across multiple service stations. Analysis of the impact of increased demand or reduced staffing on system performance..
- Homework - Final exam	- Practical exercises in class - Hands-on exercises using the rules	Capacity Analysis Knowing the maximum number of customers that can be accommodated before service quality deteriorates. Determining the saturation point at which the system becomes inefficient.

9. Course outcomes, teaching, learning and assessment methods

assessment methods	Teaching and learning methods	Outcomes	assessment methods	Teaching and learning methods	Outcomes
Daily and monthly tests	oretical and practical	roduction to Queuing Theory	dent understanding of the lesson	4	First
Daily and monthly tests	oretical and practical	es of Homogeneous and erogeneous Poisson Processes	lent understanding of the lesson	4	Second
Daily and monthly tests	oretical and practical	Queuing Theory	lent understanding of the lesson	4	Third
Daily and monthly tests	oretical and practical	Elements and racteristics of Queuing Models	lent understanding of the lesson	4	Fourth
Daily and monthly tests	oretical and practical	Service Distribution	lent understanding of the lesson	4	Fifth
Daily and monthly tests	oretical and practical	hs, Deaths, and Some Waiting Line Models	lent understanding of the lesson	4	Sixth
Daily and monthly tests	oretical and practical	Waiting Line Models	lent understanding of the lesson	4	Seventh
Daily and monthly tests	oretical and practical	ting Lines in Public Services	lent understanding of the lesson	4	Eighth
Daily and monthly	oretical and practical	Service Rules and Forms	lent understanding of the lesson	4	Ninth

tests					
Daily and monthly tests	oretical and practical	Waiting Lines	Student understanding of the lesson	4	Tenth
Daily and monthly tests	oretical and practical	Customer Behavior	lent understanding of the lesson	4	Eleventh
Daily and monthly tests	oretical and practical	rk Analysis in a Specific System	lent understanding of the lesson	4	Twelfth
Daily and monthly tests	oretical and practical	-line service system, one service center	lent understanding of the lesson	4	Thirteenth
Daily and monthly tests	oretical and practical	ting lines as a random context for the model	lent understanding of the lesson	4	Fourteenth
			Fanal Exam		Fifth

11. Curriculum development plan.

Continuously updating the curriculum to keep pace with labor market developments (Curriculum Update Committee, Scientific Committee), such as:

1. .Developing curricula that are appropriate for the labor market
2. Holding scientific seminars and conferences aimed at updating curricula
3. Monitoring scientific developments in the field of specialization

12. Infrastructure

Available	Classrooms, Laboratories, and Workshops
Available	1- Required Textbooks
Introduction to Operations Research Dr. Ibrahim Mohammed Al-Ali	2- Main References (Resources)
Queue Theory / Sameh Mohamed	a) Recommended books and references (scientific journals, reports, etc.)
https://www.youtube.com/watch?v=7meshy6zRkU	b) Electronic references, websites, etc.

Course Description Template Nonparametric Methods

26.	Educational Institution
	College of Administrative Technology-Mosul
27.	Department
	Department of Statistics and Informatics Techniques
28.	Course Name / Code
	Nonparametric Methods / SIT414
29.	Attendance Forms Available
	In-Person

30. Semester / Academic Year					
First Semester / Fourth Year					
31. Total Hours					
3 Hours					
32. Date of Preparing this Description					
2025/6/15					
33. Course Objectives					
• Enable students to understand and apply nonparametric tests in data analysis. • Develop the ability to select the appropriate test based on data characteristics. • Enhance students’ skills in analyzing and interpreting nonparametric statistical results. • Train students to use statistical software to apply and analyze nonparametric tests.					
34. Course Learning Outcomes (LOs), Teaching & Learning Methods, and Assessment					
Assessment Methods		Teaching & Learning Methods		Learning Outcomes (LOs)	
Short quizzes, theoretical questions		Traditional lectures, interactive lessons		Understand the theoretical basis of nonparametric tests and identify when they are appropriate alternatives to parametric tests.	
Practical exercises, small projects		Practical learning using statistical software, case studies		Apply nonparametric tests for one sample, two samples, or more using real data.	
Report analysis, evaluation tests		Practical lectures, group discussions		Analyze and interpret results of nonparametric tests in various contexts.	
Software projects, oral presentations		Workshops, collaborative learning		Use statistical software (such as SPSS or R) to apply and analyze nonparametric tests.	
35.Course Structure (Theoretical and Practical)					
Assessment Method	Teaching Method	Unit/Topic	Intended Learning Outcomes	Hours	Week
Participation, short quiz	Lecture, presentation	Introduction to the course	Understand course objectives and uses of nonparametric methods	3	1
Short quiz, practical problems	Interactive lecture	One-sample tests	Identify advantages and disadvantages of nonparametric methods and apply tests for one sample	3	2
Practical exercise, result analysis	Practical lecture	Goodness-of-fit tests	Apply goodness-of-fit tests and interpret results	3	3
Short project, report	Lecture, discussion	Independence tests	Use independence tests to analyze variable relationships	3	4

Evaluation test, group discussion	Lecture, statistical analysis	Wilcoxon test	Perform sign rank tests and analyze related cases	3	5
Comprehensive test	Interactive review	Randomness test	Review randomness test and interpret output	3	6
Short quiz	Lecture, practical explanation	Mann-Whitney test	Analyze two independent samples using nonparametric tests	3	7
Short quiz, problems	Interactive lecture	Wilcoxon test	Compare two related samples using Wilcoxon test	3	8
Analytical exercises	Practical lecture	Dispersion tests	Analyze dispersion using nonparametric tests	3	9
Comprehensive test	Interactive discussion	Review and training	Comprehensive review of previous topics	3	10
Small project, report	Lecture, data analysis	Kruskal-Wallis test	Compare more than two samples using Kruskal-Wallis test	3	11
Evaluation test, discussion	Lecture, statistical analysis	Friedman test	Apply Friedman test for related samples	3	12
Practical test	Practical lecture	SPSS Application (Part 1)	Use SPSS for one- and two-sample tests	3	13
Short quiz, report	Practical lecture	SPSS Application (Part 2)	Use SPSS for tests with more than two samples	3	14

36. Course Development Plan	
Objectives of the Development Plan: 16. Develop the content to focus on real examples and interpreting statistical results in practical contexts. 17. Include case studies and real datasets for analysis using nonparametric methods. 18. Train students to use modern software (such as R and Python) to apply nonparametric tests instead of manual calculation only. 19. Reduce reliance on traditional lectures and increase use of problem-based learning (PBL), teamwork, and interactive classroom activities.	
37. Infrastructure	
Classrooms, Laboratories, Workshops	Available

Required Textbooks	
Main References (Sources)	
Recommended Books and References	5. Adam, Ameen Ibrahim. (2005). Basic Statistical Principles in Applied Nonparametric Methods. King Fahd National Library, Saudi Arabia. 6. Corder, Gregory & Foreman, Dale. (2020). Nonparametric Statistics: A Step-by-Step Approach (Translated by Waseem bin Salman Nasir). King Fahd National Library, Saudi Arabia. (Original work published 2014) 7. Bagdonavičius, V., Kruopis, J., & Nikulin, M. S. (2011). Non-Parametric Tests for Complete Data. ISTE/Wiley. 8. Kolassa, J. E. (2020). An Introduction to Nonparametric Statistics. CRC Press. 9. Kvam, P., Vidakovic, B., & Kim, S. J. (2022). Nonparametric Statistics with Applications to Science and Engineering with R. John Wiley & Sons.
Electronic References, Websites, etc.	

Course description form Experimental Design and Analysis

1. Educational Institution
Technical Administrative College - Mosul / Department of Statistics and Informatics
2. Course Name/Code
Experimental Design and Analysis / SIT411
3. Available Attendance Formats
Weekly
4. Semester/Year
First and Second / 2024-2025
5. Number of Study Hours (Total)
56 hours (4 hours x 14 weeks)

6. Date of Preparation					
June 1, 2025					
7. Course Objectives (General Objectives of the Course)					
Teach students how to design various experiments regarding the homogeneity of experimental units, as well as to analyze the data obtained from those experiments.					
8. Course outcomes, teaching, learning and assessment methods					
assessment methods		Teaching and learning methods		Outcomes	
.Exam - Solving - exercises in .class Asking - questions to students in .class Discussion and - .dialogue		Theoretical -1 and practical .lectures Use of -2 educational tools (presentations and scientific Practical -3 .application		A- Knowledge A1- The student will be able to understand the basics of experimental design and analysis. A2- The student will be able to use mathematical models for randomized experiments. A3- The student will be able to understand how to apply the material in real life.	
				B - Skills B1 - Be skilled at solving problems and .designing and analyzing experiments B2 - Be skilled at identifying the type of .design B3 - Be skilled at identifying optimal .solution methods in analysis of variance	
				C- Values C1- Academic and Ethical Integrity C2- Critical and Analytical Thinking C3- Teamwork and Cooperation C4- Commitment to Quality and Excellence	

9. Course structure (theoretical and practical vocabulary)					
Assessment Method	Teaching Method	Unit/Or Topic Name	Required Learning Outcomes	Hours	Week
Daily and monthly tests	Theoretical and practical	Simple Crossover Design Analysis of Variance Table Factorial Experiments Factorial Coefficients, Single Effects, and Interaction	Student understanding of the lesson	4	First
Daily and monthly tests	Theoretical and practical	A factorial experiment using a completely randomized design. Design and implementation of the experiment. Organizing the results of the experiment in multivariate tables. Mathematical model. Hypothesis testing for single and crossed effects. Analysis of variance table. Post-hoc tests.	Student understanding of the lesson	4	Second
Daily and monthly tests	Theoretical and practical	Three-factor factorial experiment A factorial experiment that is applied in a randomized complete block design.	Student understanding of the lesson	4	Third
Daily and monthly tests	Theoretical and practical	Design and implement the experiment. Organize the results of the experiment in multi-way tables. Mathematical model. Test hypotheses for single and combined effects.	Student understanding of the lesson	4	Fourth
Daily and monthly tests	Theoretical and practical	Analysis of variance table for post-tests	Student understanding of the lesson	4	Fifth
Daily and monthly tests	Theoretical and practical	Three-factor factorial experiment A factorial experiment applied in a Latin square design	Student understanding of the lesson	4	Sixth

Daily and monthly tests	Theoretical and practical	Design and implementation of the experiment Organizing the results of the experiment in multivariate tables Mathematical model Hypothesis testing for single and cross-effects Analysis of variance table Cross-sectional experiments	Student understanding of the lesson	4	Seventh
Daily and monthly tests	Theoretical and practical	One-off split design	Student understanding of the lesson	4	Eighth
Daily and monthly tests	Theoretical and practical	Its uses, advantages, and disadvantages. Random distribution, applying complete plots in a completely randomized design. Experiment planning and implementation. Mathematical model. Hypothesis testing and analysis of variance table. Post-experiment tests	Student understanding of the lesson	4	Ninth
Daily and monthly tests	Theoretical and practical	Application of complete plots in randomized complete block design, planning and implementation of the experiment, mathematical model, hypothesis testing tests and analysis of variance table, post-experimental tests	Student understanding of the lesson	4	Tenth
Daily and monthly tests	Theoretical and practical	Applying whole plots in the Latin square design, planning and implementing the experiment, the mathematical model, testing hypotheses and an analysis of variance	Student understanding of the lesson	4	Eleventh

		table, post-tests, split-plot design for two times			
Daily and monthly tests	Theoretical and practical	Application of complete plots in a completely randomized design, application of complete plots in a completely randomized sector design, application of complete plots in a Latin square design	Student understanding of the lesson	4	Twelfth
Daily and monthly tests	Theoretical and practical	Analysis of covariance // its uses, planning the experiment using a completely randomized design, tabulating the results, the mathematical model	Student understanding of the lesson	4	Thirteenth
Daily and monthly tests	Theoretical and practical	Hypothesis testing and ANOVA table Finding the estimated regression equation Testing the hypothesis of the regression coefficient, correlation coefficient and testing its hypothesis), integration // (its use, its scale and ,its disadvantages	Student understanding of the lesson	4	Fourteenth
	Theoretical and practical	Final Exam			Fifith

10. Curriculum development plan.

Continuously updating the curriculum to keep pace with labor market developments (Curriculum Update Committee, Scientific Committee), such as:

1. Developing curricula that are appropriate for the labor market
2. Holding scientific seminars and conferences aimed at updating curricula
3. Monitoring scientific developments in the field of specialization

11. Infrastructure

Available	Classrooms, Laboratories, and Workshops
Available	1- Required Textbooks
Design and Analysis of Agricultural Experiments / Dr. Khasha Mahmoud Al-Rawi and Dr. Abdul Aziz Muhammad Khalaf Allah	2- Main References (Resources)
Design and Analysis of Experiments – Dr. Muhammad Muhammad Al-Tahir Al-Imam	a) Recommended books and references (scientific journals, reports, etc.)

https://www.noor-ok.com/tag/%D8%A7%D9%84%D8%5%D8%AD%D8%B5%D8%A7%D8%A1-D8%A7%D9%84%D8%AD%D9%8A%D9%88%D9%8A-D9%88%D8%AA%D8%B5%D9%85%D9%8A%D9%85-D8%A7%D9%84%D8%AA%D8%AC%DA7%D8%B1%D8%A8#google_vignette	b) Electronic references, websites, etc.
---	--

Course description form / Random processes

1. Educational Institution		
Technical Administrative College - Mosul / Department of Statistics and Informatics		
2. Course Name/Code		
Random processes / SIT412		
3. Available Attendance Formats		
Weekly		
4. Semester/Year		
First and Second / 2024-2025		
5. Number of Study Hours (Total)		
56 hours (4 hours x 14 weeks)		
6. Date of Preparation		
June 1, 2025		
7. Course Objectives (General Objectives of the Course)		
The course aims to enable the student to learn the basics of randomness and the possibility of applying it in practical life.		
8. Course outcomes, teaching, learning and assessment methods		
Outcomes	Outcomes	Outcomes
-Exam. -Solving exercises in class. -Asking questions to students in class. -Discussion and dialogue.	-1Theoretical and practical lectures. -2Use of educational tools (presentations and scientific films.(-3Practical application.	- A- Knowledge - A1- Understanding the basics of probability - A2- Distinguishing different models of stochastic processes - A3- Analyzing the properties of stochastic processes - A4- Mathematical modeling of random phenomena
		- B - Skills - B1 - Analytical and Mathematical Skills - B2 - Mathematical Modeling Skills - B3 - Critical Thinking and Problem-Solving Skills - B4 - Programming and Computing Skills,

		such as the Use of Softwares Like MATLAB
		C - Values C1 - Academic and Ethical Integrity C2 - Critical and Analytical Thinking C3 - Teamwork and Collaboration C4 - Commitment to Quality and Excellence

9.Course structure (theoretical and practical vocabulary)					
Assessment Method	Teaching Method	Unit/Or Topic Name	Required Learning Outcomes	Hours	Week
Theoretical and practical	Daily and monthly tests	Introduction to Stochastic Processes	Student understanding of the lesson	4	First
=	=	Definitions with Examples of Stochastic Processes	Student understanding of the lesson	4	Second
=	=	Markov Chains	Student understanding of the lesson	4	Third
=	=	Upper-order Transition Probabilities	Student understanding of the lesson	4	Fourth
=	=	Classification of Markov Chains	Student understanding of the lesson	4	Fifth
=	=	Aerodynamic Case with Examples	Student understanding of the lesson	4	Sixth
=	=	Random Walks	Student understanding of the lesson	4	Seventh
=	=	Counting Operations and the Random Property	Student understanding of the lesson	4	Eighth
=	=	Poisson Process and Its Properties	Student understanding of the lesson	4	Ninth
=	=	Interarrival Times and Their Probability Distribution	Student understanding of the lesson	4	Tenth
=	=	Branching Processes	Student understanding of the lesson	4	Eleventh
=	=	Extinction Probabilities	Student understanding of the lesson	4	Twelfth
=	=	Random Processes in Queues	Student understanding of the lesson	4	Thirteenth
=	=	Random Processes in Queuing Models	Student understanding of the lesson	4	Fourteenth
=	=	Final Exam	Student understanding of the lesson		Fifth

10. Curriculum development plan.

Continuously updating the curriculum to keep pace with labor market developments

(Curriculum Update Committee, Scientific Committee), such as: 1. Developing curricula that are appropriate for the labor market 2. Holding scientific seminars and conferences aimed at updating curricula 3. Monitoring scientific developments in the field of specialization	
11. Infrastructure	
متوفرة	Classrooms, Laboratories, and Workshops
Stochastic Processes / Immanuel Barzin	1- Required Textbooks
	2- Main References (Resources)
file:///C:/Users/PC/Downloads/Noor-book.com%20%D8%A7%D9%84% %B9%D9%85%D9%84%D9%8A%D8 A7%D8%AA%20%D8%A7%D9%84% 8%AA%D8%B5%D8%A7%D8%AF%D 9%81%D9%8A%D8%A9.pdf	a) Recommended books and references (scientific journals, reports, etc.)
	b) Electronic references, websites, etc.

SPECIFICATION Principal of Statistical Inference

1. Teaching Institution	Technical college of Management/Mosul
2. University Department/Centre	Northern Technical University/ Department of Statistics and Informatics Techniques
3. Course title/code	Principal of Statistical Inference / SIT413
4. Programmed to which it contributes	
5. Modes of Attendance offered	weekly
6. Semester/Year	First and second semester
7. Number of hours tuition (total)	4x14 = 56
8. Date of production/revision of this specification	2025

10· Learning Outcomes, Teaching ,Learning and Assessment Methods
A- Knowledge and Understanding: A1- The new student understands the basics of Point Estimation A2- Properties of Good Point Estimator. A3- The student's ability to know how to apply the subject in free life A4- It includes monitoring or relationships related to data, interpreting the relationship and its components, interpreting shapes and graphs, interpreting statistical tables.
B- Subject-specific skills. B1 - Be skilled in solving estimation problems. B2 - He should be skilled in knowing the type of distribution in which the data is distribute and applying the estimation methods. B3 - Be skilled in determining the function of the data through distribution

Teaching and Learning Methods
1- Theoretical and practical lectures. 2- Using blended style of teaching. 2- Using educational means (scientific presentations and films(3 -Practical application
Assessment methods
-Solving exercises in class. -Asking questions to students in class -Discussion and dialogue - Using the google classroom.
C. Thinking Skills C1. The ability to use mental ability to solve problems C2- Using logical thinking C2. C3. C4.
Teaching and Learning Methods
-Theoretical and practical lectures -Power-point presentation. And the screen
Assessment methods
Theoretical and practical tests, semester and final
D. General and Transferable Skills (other skills relevant to employability and personal development) D1. Developing the student's mental abilities D2- Developing skill capabilities D2. D3.

D4.

11. Course Structure					
Week ILOs	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
First	4	Student understanding of the lesson	Estimation Theory(General concepts and definitions)	Theoretical and practical	Daily and monthly tests
Second	4	=	Point Estimation, properties of good point estimation	=	=
Third	4	=	Unbiasedness, consistency(closeness)	=	=
Fourth	4	=	Efficiency, Mean Square Error	=	=
Fifth	4	=	Fisher Information, Cramer	=	=
VI	4	=	Minimum Variance Bound	=	=
Seventh	4	=	Exams	=	=
VIII	4	=	Sufficiency, Factorization Theorem, Completeness	=	=
Ninth	4	=	Rao-Blackwell Theorem ,	=	=
The tenth	4	=	Exponential Family of Distribution Methods of Point Estimation - Moments Method	=	=
Eleventh	4	=	Maximum Likelihood Method - Properties of M.L.E	=	=
Twelfth	4	=	Least Square Method	=	=
12. Infrastructure					
Thirteenth	4	=	Bayesian Method	=	=
Fourteenth	4	=	Statistical Inference/ Jalal Al-ssayad		
Required reading:			(Concepts and Definitions).		
CORE TEXTS					
Fifteenth	4	=	Semester exam	=	=

· COURSE MATERIALS · OTHER	
Special requirements (include for example workshops, periodicals, IT software, websites)	Mathematical statistics / Amir Hanna
Community-based facilities (include for example, guest Lectures, internship, field studies)	https://archive.org/details/00147-pdf

Course Description Template Nonparametric Methods

38. Educational Institution
College of Administrative Technology-Mosul
39. Department
Department of Statistics and Informatics Techniques
40. Course Name / Code
Nonparametric Methods / SIT414
41. Attendance Forms Available
In-Person
42. Semester / Academic Year
First Semester / Fourth Year
43. Total Hours
3 Hours
44. Date of Preparing this Description
2025/6/15
45. Course Objectives
• Enable students to understand and apply nonparametric tests in data analysis. • Develop the ability to select the appropriate test based on data characteristics. • Enhance students' skills in analyzing and interpreting nonparametric statistical results. • Train students to use statistical software to apply and analyze nonparametric tests.

46. Course Learning Outcomes (LOs), Teaching & Learning Methods, and Assessment					
Assessment Methods		Teaching & Learning Methods	Learning Outcomes (LOs)		
Short quizzes, theoretical questions		Traditional lectures, interactive lessons	Understand the theoretical basis of nonparametric tests and identify when they are appropriate alternatives to parametric tests.		
Practical exercises, small projects		Practical learning using statistical software, case studies	Apply nonparametric tests for one sample, two samples, or more using real data.		
Report analysis, evaluation tests		Practical lectures, group discussions	Analyze and interpret results of nonparametric tests in various contexts.		
Software projects, oral presentations		Workshops, collaborative learning	Use statistical software (such as SPSS or R) to apply and analyze nonparametric tests.		
47.Course Structure (Theoretical and Practical)					
Assessment Method	Teaching Method	Unit/Topic	Intended Learning Outcomes	Hours	Week
Participation, short quiz	Lecture, presentation	Introduction to the cours	Understand course objectives and uses of nonparametric metho	3	1
Short quiz, practical problems	Interactive lect	One-sample tests	Identify advantages and disadvantages of nonparametric methods and apply tests for one sam	3	2
Practical exercise, result analysis	Practical lectu	Goodness-of-fit tests	Apply goodness-of-fit t and interpret results	3	3
Short project, report	Lecture, discuss	Independence tests	Use independence tests to analyze variable relationships	3	4
Evaluation test, group discussion	Lecture, statisti analysis	Wilcoxon test	Perform sign rank tests to analyze related case	3	5
Comprehensive test	Interactive revi	Randomness test	Review randomness te and interpret output	3	6
Short quiz	Lecture, practic explanation	Mann-Whitney test	Analyze two independ samples using nonparametric tests	3	7
Short quiz, problems	Interactive lect	Wilcoxon test	Compare two related samples using Wilcox test	3	8
Analytical exercises	Practical lectu	Dispersion tests	Analyze dispersion us nonparametric tests	3	9
Comprehensive test	Interactive discussion	Review and training	Comprehensive review of previous topics	3	10

Small project, report	Lecture, data analysis	Kruskal-Wallis test	Compare more than two samples using Kruskal-Wallis test	3	11
Evaluation test, discussion	Lecture, statistical analysis	Friedman test	Apply Friedman test for related samples	3	12
Practical test	Practical lecture	SPSS Application (Part 1)	Use SPSS for one- and two-sample tests	3	13
Short quiz, report	Practical lecture	SPSS Application (Part 2)	Use SPSS for tests with more than two samples	3	14

48. Course Development Plan

Objectives of the Development Plan:

20. Develop the content to focus on real examples and interpreting statistical results in practical contexts.
21. Include case studies and real datasets for analysis using nonparametric methods.
22. Train students to use modern software (such as R and Python) to apply nonparametric tests instead of manual calculation only.
23. Reduce reliance on traditional lectures and increase use of problem-based learning (PBL), teamwork, and interactive classroom activities.

49. Infrastructure

Classrooms, Laboratories, Workshops	Available
--	------------------

Required Textbooks	
---------------------------	--

Main References (Sources)	
----------------------------------	--

Recommended Books and References	10. Adam, Ameen Ibrahim. (2005). Basic Statistical Principles in Applied Nonparametric Methods. King Fahd National Library, Saudi Arabia. 11. Corder, Gregory & Foreman, Dale. (2020). Nonparametric Statistics: A Step-by-Step Approach (Translated by Waseem bin Salman Nasir). King Fahd National Library, Saudi Arabia. (Original work published 2014) 12. Bagdonavičius, V., Kruopis, J., &
---	---

	Nikulin, M. S. (2011). Non-Parametric Tests for Complete Data. ISTE/Wiley. 13.Kolassa, J. E. (2020). An Introduction to Nonparametric Statistics. CRC Press. 14.Kvam, P., Vidakovic, B., & Kim, S. J. (2022). Nonparametric Statistics with Applications to Science and Engineering with R. John Wiley & Sons.
Electronic References, Websites, etc.	

Course Description Template Multivariate Analysis

50. Educational Institution
College of Administrative Technology-Mosul
51. Department
Department of Statistics and Informatics Techniques
52. Course Name / Code
Multivariate Analysis / SIT401
53. Attendance Forms Available
In-Person
54. Semester / Academic Year
First Semester / Fourth Year

55. Total Hours					
3 Hours					
56. Date of Preparing this Description					
2025/6/15					
57. Course Objectives					
• Provide students with theoretical foundations of linear algebra related to multivariate data analysis. • Develop students' ability to select and apply appropriate multivariate statistical analysis methods. • Enhance students' skills in using statistical software (such as SPSS and R) to perform advanced multivariate procedures and interpret outputs. • Equip students with skills to analyze large and complex datasets and understand relationships among variables using techniques like Principal Component Analysis (PCA).					
58. Course Learning Outcomes (LOs), Teaching & Learning Methods, and Assessment					
Assessment Methods		Teaching & Learning Methods		Learning Outcomes (LOs)	
Short quizzes, computational assignments		Theoretical lectures, visual explanations, classroom exercises		Understand the basic concepts of linear algebra (matrices, eigenvalues) and apply them in multivariate analysis.	
Applied exercises, result reports		Practical lab learning, interactive lessons, programming workshops		Implement multiple and multivariate regression techniques using SPSS and R.	
Analytical project, oral presentation		Case studies, group projects, programming workshops		Apply advanced analysis techniques (PCA, factor analysis) on real datasets.	
Critical report, evaluation test		Classroom discussions, critical analysis of software outputs		Evaluate the adequacy of multivariate models and interpret results while considering ethical aspects.	
59.Course Structure (Theoretical and Practical)					
Assessment Method	Teaching Method	Unit/Topic	Intended Learning Outcomes	Hours	Week
Participation, simple exercise	Lecture, classroom examples	Review of Linear Algebra and Matrices	Understand basic linear algebra concepts and matrices	3	1
Short quiz	Lecture, practical activity	Eigenvalues and Applications	Analyze eigenvalues and eigenvectors	3	2
Applied test	Lecture, case study	Multivariate Data and Applications	Distinguish between types of multivariate data	3	3
Analytical report	Lecture, R programming	Multiple Linear Regression	Apply multiple linear regression	3	4

Results analysis, report	Lecture, SPSS application	Multivariate Analysis of Variance (MANOVA)	Understand and apply MANOVA	3	5
Short quiz	Lecture, case study	Discriminant Analysis	Perform discriminant analysis	3	6
Practical exercises	Practical application, classroom discussion	Cluster Analysis	Classify observations into groups	3	7
Practical test	Lecture, practical application	Principal Component Analysis	Apply Principal Component Analysis (PCA)	3	8
Comparative analysis, report	Lecture, interactive discussion	Factor Analysis	Compare PCA and Factor Analysis	3	9
Practical assignment	Workshop, R programming	Data Preprocessing	Clean and prepare data	3	10
Analytical test	Lecture, interpret applications	Statistical Software Output	Read and interpret SPSS and R outputs	3	11
Evaluation test	Lecture, critical analysis	Optimal Model Selection	Distinguish between model selection methods	3	12
Presentation, discussion	Practical discussion case study	Analysis and Decision-Making	Connect statistical analysis with decision-making	3	13
Comprehensive test	Classroom review summary exercise	General Review	Comprehensive review of multivariate analysis	3	14

60. Course Development Plan	
Objectives of the Development Plan:	
24.Introduce new applications such as multivariate time series analysis and Big Data analytics.	
25.Link the course to real-world problems and datasets from fields like economics, health, education, and marketing.	
26.Use methods like problem-based learning (PBL) and teamwork on projects.	
27.Add updated books and research that focus on multivariate statistics applications using software.	
61. Infrastructure	
Classrooms, Laboratories, Workshops	Available
Required Textbooks	

Main References (Sources)	
Recommended Books and References	Rencher, A. C., & Christensen, W. F., (2012), "Methods of Multivariate Analysis", 3rd Edition, John Wiley & Sons. Anderson, T.W., (2003), "An Introduction to Multivariate Statistical Analysis", 3rd Edition, John Wiley and Sons, U.S.A.
Electronic References, Websites, etc.	

Course Description Template Random Multivariate

62. Educational Institution
College of Administrative Technology-Mosul
63. Department
Department of Statistics and Informatics Techniques
64. Course Name / Code
Random Multivariate / SIT4150
65. Attendance Forms Available
In-Person
66. Semester / Academic Year

Second Semester / Fourth Year					
67. Total Hours					
3 Hours					
68. Date of Preparing this Description					
2025/6/15					
69. Course Objectives					
• Enable students to understand and apply the multivariate normal distribution in data analysis. • Develop skills for parameter estimation and hypothesis testing in multivariate data. • Enhance students’ ability to analyze complex data and interpret statistical test results. • Train students to use statistical software for multivariate data analysis.					
70. Course Learning Outcomes (LOs), Teaching & Learning Methods, and Assessment					
Assessment Methods		Teaching & Learning Methods		Learning Outcomes (LOs)	
Theoretical tests, oral questions, short quizzes		Traditional lectures, interactive lessons, case studies		Understand the characteristics of the multivariate normal distribution and apply it in data analysis.	
Practical exercises, analytical reports, small projects		Practical lectures, workshops using R/SPSS		Estimate parameters (mean, variance, covariance) in multivariate distributions.	
Evaluation tests, presentation of results, final project		Case analysis, group-based applied learning, field examples		Conduct multivariate hypothesis testing and interpret results.	
Analytical project, software skill assessment		Practical learning, data simulation, direct application		Use statistical software to analyze distributions and estimate parameters.	
71.Course Structure (Theoretical and Practical)					
Assessment Method	Teaching Method	Unit/Topic	Intended Learning Outcomes	Hours	Week
Preliminary test	Lecture, illustra examples	Introduction to Multivaria Random Variables	Understand the concep the multivariate norm distribution	3	1
Classroom exercises	Lecture, numeri applications	Means and Joint Variance	Understand the proper of mean, variance, ar covariance	3	2
Short quiz	Lecture, graphi analysis	Properties of Multivariat Normal Distribution	Apply the multivaria normal distribution	3	3
Results analysis, practical exercise	Lecture, R programming	Estimation Methods (ML Sample Moments)	Verify and estimate parameters using samp	3	4
Written test	Lecture, case stu	T Distribution and its Proper	Understand the multiva T distribution	3	5

Applied test	Workshop, scenarios	Hypothesis Testing	Differentiate between univariate and multivariate hypothesis testing	3	6
Analytical exercises	Lecture, programming and interpretation	Wishart Distribution	Understand the Wishart distribution and its applications	3	7
Mini project	Lab application	Analysis with SPSS/R	Perform advanced tests using software	3	8
Conceptual evaluation test	Interactive discussion	Distribution Comparison	Compare multivariate distributions	3	9
Software output analysis	Lecture, practical training	Multivariate Covariance Analysis	Analyze covariance and interpret relationships	3	10
Analytical report	Group workshop	Real Data Analysis	Apply the multivariate normal distribution to real data	3	11
Comprehensive test	Class review, group applications	Comprehensive Review	Review concepts and apply comprehensive tests	3	12
Project progress follow-up	Individual guidance and analytical support	Applied Project	Prepare final projects and analyze data	3	13
Peer evaluation, oral report	Group presentation	Project Presentations	Present real data analysis projects	3	14

72. Course Development Plan	
Objectives of the Development Plan: 28. Include case studies and analysis of multidimensional datasets from fields such as health, economics, and environment. 29. Integrate advanced content like the Wishart distribution, multivariate T distribution, and multivariate covariance analysis. 30. Apply interactive teaching methods such as project-based learning and active learning. 31. Train students to critically evaluate model results and not rely blindly on software outputs.	
73. Infrastructure	
Classrooms, Laboratories, Workshops	Available
Required Textbooks	

Main References (Sources)	
Recommended Books and References	Anderson, T.W. (2003). An Introduction to Multivariate Statistical Analysis (3rd ed.). John Wiley & Sons. Gentle, James E. (2007). Matrix Algebra: Theory, Computations, and Applications in Statistics. Springer-Verlag. Hogg, R. V., McKean, J., & Craig, A. T. (2019). Introduction to Mathematical Statistics (8th ed.). Pearson Education. McDonald, R.P., & Ho, M.H.R. (2002). Principles and Practice in Reporting Structural Equation Analyses. Psychological Methods, 7(1): 64–82.
Electronic References, Websites, etc.	

COURSE SPECIFICATION Machine learning and data science

1. Teaching Institution	Administrative Technical College/Mosul
2. University Department/Centre	Northern Technical University / Department of Statistics and Informatics Techniques
3. Course title/code	Machine learning and data science /SIT419
4. Programme(s) to which it contributes	
5. Modes of Attendance offered	weekly
6. Semester/Year	First and second semester

7. Number of hours tuition (total)	56 hours
8. Date of production/revision of this specification	2025

10· Learning Outcomes, Teaching ,Learning and Assessment Methode
A- Knowledge and understanding A1) The new student understands the basics of Machine learning and data science . A2) Study theories and Machine learning and data science A3)The student's ability to know how to apply the material in free life. A4) It incl Operations Research udes studying and Machine learning and data science using methods.
B- Subject-specific skills B1)To be skilled in using Machine learning and data science. B2)To be skilled in solving all types of equations using Machine learning and data science B3)To be skilled in using theories and Machine learning and data science .
Teaching and Learning Methods
1- Theoretical and practical lectures. 2- Using educational means (scientific presentations and films(3 -Practical application
Assessment methods
-Solving exercises in class. -Asking questions to students in class -Discussion and dialogue

C. Thinking Skills	
C1. The ability to use mental ability to solve problems	
C2- Using logical thinking	
C2.	
C3.	
C4.	
Teaching and Learning Methods	
-Theoretical and practical lectures -Powerpoint presentation. And the screen	
Assessment methods	
Theoretical and practical tests, semester and final	
D. General and Transferable Skills (other skills relevant to employability and personal development)	
D1. Developing the student's mental abilities	
D2- Developing skill capabilities	
D2.	
D3.	
D4.	

11. Course Structure					
Week ILOs	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
First	4	Student understanding of the lesson	Data science	Theoretical and practical	Daily and monthly tests
Second	4	=	Big data	=	=
Third	4	=	data analysis	=	=
Fourth	4	=	Types of data analysis	=	=
Fifth	4	=	Data science life cycle	=	=
VI	4	=	Core areas and skills in data science	=	=
Seventh	4	=	Data science applications	=	=
VIII	4	=	Exam	=	=
Ninth	4	=	The concept of machine learning	=	=
The tenth	4	=	Supervised learning	=	=
Eleventh	4	=	Unsupervised learning	=	=
Twelveth	4	=	The difference between supervised, non-supervised and reinforced learning	=	=
Thirteenth	4	=	Transfer learning	=	=
Fourteenth	4	=	Solving exercises	=	=
Fifteenth	4	=	Exam	=	=

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Machine learning and data science / written by Milad Wazzan Translated by Dr. Alaa Toaima
Special requirements (include for example workshops, periodicals, IT software, websites)	Machine learning and data science/ written by Milad Wazzan Translated by Dr. Alaa Toaima
Community-based facilities (include for example, guest Lectures , internship , field studies)	https://www.noor-book.com/%D9%83%D8%AA%D8%A7%D8%A7%D9%84%D8%A7%D8%AD%D8%B5%D8%A7%D8%A1-%D9%88-%D8%A7%D9%84%D8%A7%D8%AD%D8%AA%D9%85%D8%A7%D9%84%D8%A7%D8%AA-%D8%A7%D9%84%D9%86%D8%B8%D8%B1%D9%8A%D9%87-%D9%88-%D8%A7%D9%84%D8%AA%D8%B7%D8%A8%D9%8A%D9%82-pdf

Form Principles of Economics

1. Teaching Institution	Administrative Technical College / Mosul
2. University/Department/Centre	Northern Technical University / Department of Statistics and Informatics
3. Course title/code	Principles of Economics /
4. Modes of Attendance offered	Blended education
5. Semester/Year	The First
6. Number of hours tuition (total)	(15*4) 60 hours per year
7. Date of production/revision of this specification	20/ 06 /2025

9. Course Structure					
Week ILOs	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
The First	4	Economic Concepts	Economic Concepts	Theoretical	Discussion and Questions
The Second	3	Demand theory	Market equilibrium	Theoretical	Discussion and Questions
	1	Exam.		Exam.	Exam.
The Third	4	Supply and equilibrium theory	Market equilibrium	Theoretical	Discussion and Questions
The Fourth	3	Elasticities of demand and supply	Elasticities	Theoretical	Discussion and Questions
	1	Exam.		Exam.	Exam.
Fifth	4	Consumer demand and utility	Consumer demand theory	Theoretical	Discussion and Questions
VI	1	Exam.		Exam.	Exam.
	3	Production function	Production Theory	Theoretical	Discussion and Questions
seventh	3	Production Costs in the short run	Production Costs	Theoretical	Discussion and Questions
	1	Exam.		Exam.	Exam.
VIII	3	Production Costs in the long run	Production Costs	Theoretical	Discussion and Questions
	1	Exam.		Exam.	Exam.
ninth	4	Perfectly Competitive Market (aggregate analysis)	Markets	Theoretical	Discussion and Questions
The tenth	4	Perfectly competitive market (at the unit level)	Markets	Theoretical	Discussion and Questions
eleventh	1	Exam.			Exam.
	3	Pure Monopoly Market	Markets	Information economics	Information economics
twelveth	3	Information economics	Information economics	Theoretical	Discussion and Questions
	1	Exam.			Exam.
Thirteenth	3	The general level of prices	Inflation theory	Theoretical	Discussion and Questions
	1	Exam.			Exam.
Fourteenth	3	Aggregate supply and demand	Aggregate Equilibrium	Theoretical	Discussion and Questions
	1	Exam.			Exam.
Fifteenth	1	sustainable development	Sustainable Development	Theoretical	Discussion and Questions
	2	Sustainable development goals			
	1	Exam.			Exam.

11. Infrastructure:

Sources:

* Salvatore, D., & Diulio, E. A. (2011), Schaum's Outline of Principles of Economics, McGraw-Hill

* Salvatore, Dominic (1992), Theories of Unit Economics: Theories and Questions, Schaum's Abstracts Series, Office of University Publications, Algeria..

* Delio, Eugene A., Macroeconomic Theory, Schaum's Outline Series, International House for Publishing and .Distribution, Cairo, Egypt

12. Curriculum development plan:

1. The current century is witnessing economic problems that differ from previous traditional problems due to the changes that have occurred as a result of climate change and the emergence of alternative energy generated from renewable resources such as the sun, air, and wind, and the diminishing role of oil and gas, in addition to information technology. Therefore, it is necessary to develop curricula and courses related to economic studies.
2. Focusing on future studies based on scientific analysis of reality, in order to predict the economic future of the region and the global economy, and to equip students with the skills of analysis, thinking, and creativity in solving current and future problems and making appropriate decisions regarding those problems.