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

Academic Program and Course Description Guide

2025

Academic Program Description Form

University Name: Northern Technical University Iraq

Faculty/Institute: Administrative Technical College/ Mosul

Scientific Department: Statistics and Informatics Techniques

Academic or Professional Program Name: Statistics and Informatics Techniques

Final Certificate Name: Bs.c in Statistics

Academic System: Corse

Description Preparation Date: 22/6/2025

File Completion Date: 29/6/2025

Signature:

Head of Department Name:

Date: 22/6/2025

Signature:

Scientific Associate Name:

Date:

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date: 22/6/2025

Signature:

Approval of the Dean

3

1.Program Vision

The department's vision is to develop a quality graduate population that plays an active role in analysis and decision-making in the information society, by integrating statistics and information technology with the goal .of achieving the future of knowledge

Program Mission .2

It stems from the college's mission through the department's interaction with the rest of the college's departments, with the aim of providing students with aspects of application related to their scientific specialization, which qualifies them to enter the labor market to practice their statistical and informational roles in the field of using systems and applications and contributions to supporting decisions based on scientific .databases

3.Program objectives

1- Achieving the vision, mission, and goals of the university, department, college, and division.
2- Preparing students who are qualified to interact and communicate with the community and who are able to use modern statistical techniques in a manner consistent with the labor market.
3- Qualifying students to use statistical and information tools using modern technologies to enhance the quality of the educational process.
4- Contributing to the development of statistical and information technology by holding seminars, workshops, statistical conferences, and training courses.
5- Establishing academic relations between the department and other academic centers in various fields.

4. Program accreditation

N0 Found

.5Other external influences
N0 Found

6.-Program description				
Credit Hours		Course Name	Course Code	Year/Level
Course system	2	English 2	NTU200	(2025-2024) Second level
Course system	2	Professional Ethics	NTU201	(2025-2024) Second level
Course system	2	Crimes of the Ba'ath Regime in Iraq	NTU203	(2025-2024) Second level
Course system	2	Sports (Optional)	NTU105	(2025-2024) Second level
Course system	2	French	NTU107	(2025-2024) Second level
Course system	4	Principles of Probability	SIT221	(2025-2024) Second level
Course system	4	Sampling Theory	SIT222	(2025-2024) Second level
Course system	4	Linear Algebra	SIT224	(2025-2024) Second level
Course system	4	Principles of Time Series	SIT225	(2025-2024) Second level
Course system	4	Differential Equations	SIT226	(2025-2024) Second level
Course system	4	Numerical Analysis	SIT227	(2025-2024) Second level
Course system	4	General Time Series	50SIT22	(2025-2024) Second level
Course system	4	Probability and Random Variables	SIT2210	(2025-2024) Second level
Course system	4	Calculator Applications (SPSS)	SIT228	(2025-2024) Second level
Course system	4	Data Structures	SIT223	(2025-2024) Second level
Course system	4	Hypothesis Testing	9SIT22	(2025-2024) Second level
Course system	0	Summer Training 1	SIT2211	(2025-2024) Second level

6..Program description				
Credit Hours		Course Name	Course Code	Year/Level
Course system	4	English 3	NTU300	(2025-2024) Third Level
Course system	4	Principles of Mathematical Statistics	SIT310	2025-2024) Third Level
Course system	4	Operations Research	SIT311	2025-2024) Third Level
Course system	4	Linear Regression Analysis	SIT312	2025-2024) Third Level
Course system	4	Principles of Biostatistics	SIT314	2025-2024) Third Level
Course system	4	Reliability	SIT316	2025-2024) Third Level
Course system	4	General Mathematical Statistics	SIT3100	2025-2024) Third Level
Course system	4	Nonlinear Regression Analysis	SIT3120	2025-2024) Third Level
Course system	4	General Biostatistics	SIT3140	2025-2024) Third Level
Course system	4	Computer Applications (R Language)	SIT3121	2025-2024) Third Level
Course system	4	Data Mining	SIT313	(2025-2024) Third Level
Course system	4	Queuing Theory	SIT315	(2025-2024) Third Level

Course system	4	Summer training2	SIT3122	(2025-2024) Third Level

6..Program description				
Credit Hours		Course Name	Course Code	Year/Level
Course system	4	Experimental Design 1	SIT411	(2025-2024) Fourth Leavel
Course system	4	Design of Agricultural Experiments	SIT4110	2025-2024) Fourth Leavel
Course system	4	Random Processes	SIT412	2025-2024) Fourth Leavel
Course system	4	Principles of Statistical Inference	SIT413	2025-2024) Fourth Leavel
Course system	4	Statistical Inference	SIT4130	2025-2024) Fourth Leavel
Course system	4	Nonparametric Methods	SIT414	2025-2024) Fourth Leavel
Course system	4	Multivariate 1	SIT415	2025-2024) Fourth Leavel
Course system	4	Multivariate Randomization	SIT4150	2025-2024) Fourth Leavel
Course system	4	Artificial Intelligence	7SIT41	2025-2024) Fourth Leavel
Course system	2	Research Project	SIT418	2025-2024) Fourth Leavel
Course system	4	Information Theory	SIT416	2025-2024) Fourth Leavel
Course system	4	Machine Learning	SIT419	2025-2024) Fourth Leavel

6..Program description				
Credit Hours		Course Name	Course Code	Year/Level
Bologna track	5	Accounting Principles	TCMM106	(2025-2024) First Level
Bologna track	6	Principles of Mathematics	SIT108	(2025-2024) First Level
Bologna track	2	Democracy and Human Rights	NTU100	(2025-2024) First Level
Bologna track	2	English Language	NTU101	(2025-2024) First Level
Bologna track	5	Principles of Statistics	TCMM105	(2025-2024) First Level
Bologna track	4	Index Numbers	SIT110	(2025-2024) First Level
Bologna track	2	SPSS Applications	SIT109	(2025-2024) First Level
Bologna track	2	Minitab Applications	SIT114	(2025-2024) First Level
Bologna track	5	Statistical Applications	SIT111	(2025-2024) First Level
Bologna track	5	Principles of Economics	TCMM107	(2025-2024) First Level
Bologna track	4	Mathematical Applications	SIT112	(2025-2024) First Level
Bologna track	5	Principles of Management	TCMM104	(2025-2024) First Level
Bologna track	3	Computer	NTU102	(2025-2024) First Level
Bologna track	1	Arabic Language	NTU103	(2025-2024) First Level
Bologna track	4	Introduction in R	SIT113	(2025-2024) الأول

7. Program structure

Notes *	Unit Percentage	Study unit	Number of Courses	Program Structure
Bologna + Courses		27	9	Institutional Requirements
Bologna Track		24	4	College Requirements
Courses only		80	30	Department Requirements
		Nothing	2	Summer Training
				Other

*The possibility of including what was the basic or optional course.

8.Expected learning outcomes of the program.

Knowledge

Graduates of the Department of Statistics and Information Technology are qualified to use a variety of statistical programs, enabling them to:

1 .Possess the ability to provide statistical consultations to researchers, government departments, and institutions in various fields of applied science.

2.**Process and analyze a variety of data statistically, extracting and interpreting statistical indicators**.

3. Prepare reports and statistical studies related to various activities.

4. Possess the ability to use modern statistical software.

5. Contribute to the preparation and verification of computer data entry.

6. Possess the ability to organize training courses in their field of expertise.

7. Qualified to complete their postgraduate studies inside and outside Iraq.

Skills

1. Interpret results in a language understandable to non-experts.
2. Work collaboratively with multidisciplinary teams, such as marketing or IT.
3. Prepare reports and presentations in a professional and clear manner.

Values

1- 1**Accuracy and Objectivity**

a. Commitment to the utmost accuracy in data analysis and interpretation.

b. Objectivity in presenting results without bias or falsification of facts.

2- Confidentiality and Scientific Integrity

a. Respecting the privacy of data and information, especially in studies related to health or individuals.

b. Scientific integrity in documentation, attribution, and avoiding plagiarism or misuse of results.

3- Critical and Logical Thinking

a. Using logical reasoning to interpret phenomena based on evidence.

b. Analyzing problems systematically, not relying solely on intuition.

4- Commitment to Quality and Professionalism

a. a. Providing high-quality statistical work that adheres to academic and professional standards.

b. Attention to detail and work with extreme precision

9. Teaching and Learning Strategies
1- Explain the scientific material to students in detail. 2- Involve students in solving mathematical problems. 3- Discuss and discuss vocabulary related to the topic.

10. .**Evaluation methods**
Weekly, monthly, daily and end of year exams.

11.Faculty

Faculty members

Number of Faculty Members		Requirements/Special Skills (if any)		Specialization		Academic Rank
lecture	property,			private	Public	
	property,			Applied Statistics	Statistics	Assistant Professor
	property,			Applied Statistics	Statistics	Assistant Professor
	property,			Applied Statistics	Statistics	Assistant Professor
	property,			Pure Mathematics	Mathematics	Lecturer
	property,			Applied Statistics	Statistics	Lecturer
	property,			Applied Statistics	Statistics	Lecturer
	property,			Applied Statistics	Statistics	Assistant Lecturer
	property,			Pure Mathematics	Mathematics	Assistant Lecturer

	property,			Media	Media	Assistant Lecturer

12. Professional development

Orientation of new faculty members

Training courses in the field of specialization
Courses on teaching and learning
Courses on how to publish scientific research

Professional development for faculty members

Training courses in the field of specialization
Developing scientific publishing skills

13. Acceptance standard

Central admission

14. The most important sources of information about the program

1- The official website of the university or college
•The primary source for obtaining:
•Program curriculum
•Course descriptions
•Admission and graduation requirements
•Faculty names
•Research projects and graduation topics
2- Student Academic Handbook
•Usually published by the college or department.
•Program objectives
•Expected skills and outcomes
•Graduation requirements
•Assessment and grading system
•Required academic and behavioral values
3- Course Description -1
•Contains details for each subject :
- •Objectives
- •Course Content
- •Skills Acquired
- •Course References

15- Program Development Plan

Responsible authorities	Timeframe	Proposed activities	Theme	
Curriculum Committee, Faculty Members	Continuous	- Revising the curriculum. - Introducing courses such as data analysis, machine learning, and data science.	1- Curriculum Update	

College Administration, Information Technology Unit	Continuous	- Updating laboratories. - Equipping the department with the latest software (such as Python, R, Power BI, and SPSS).	2- Infrastructure Development	
Training and Development Division	Continuous	- Holding workshops for faculty members. - Sending instructors to external courses.	3- Training and Development	
Qualification and Employment Unit	Continuous	- Signing agreements with companies and government institutions. - Implementing summer training programs for students.	4- Linking to the Labor Market	
Scientific Research Committee	Annually	- Supporting applied graduation projects. - Funding joint research with other departments.	5- Scientific Research	
Quality Assurance Division	Each semester	- Periodic program evaluation. - Surveys to measure student and graduate satisfaction.	6- Quality Assurance	

16- Program skills chart

Required learning outcomes of the program															
values				skills				Knowledge				Core or Optional	Course Name	Course Code	Year/Level Course
4C	3C	2C	1C	4B	3B	2B	1B	4A	3A	2A	1A				
												Basic	Accounting Principles	TCMM106	2024-2025 / First Level
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Principles of Mathematics	SIT108	2024-2025 / First Level
												Basic	Democracy and Human Rights	NTU100	2024-2025 / First Level
												Basic	English Language	NTU101	
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Principles of Statistics	TCMM105	2024-2025 / First Level
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Index Numbers	SIT110	
		√	√			√	√			√	√	Optional	SPSS Applications	SIT109	2024-2025 / First Level
		√	√			√	√			√	√	Optional	Minitab Applications	SIT114	

		√	√			√	√			√	√	Basic	Statistical Applications	SIT111	2024-2025 / First Level
		√	√			√	√			√	√	Basic	Principles of Economics	TCMM107	2024-2025 / First Level
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Mathematical Applications	SIT112	2024-2025 / First Level
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Principles of Management	TCMM104	2024-2025 / First Level
												Basic	Computer	NTU102	2024-2025 / Level One
												Basic	Arabic Language	NTU103	2024-2025 / Level One
		√	√			√	√			√	√	Basic	Introduction in R	SIT113	2024-2025 / Level One
												Basic	English 2	NTU200	2024-2025 / Level Two
		√	√			√	√			√	√	Basic	Professional Ethics	NTU201	2024-2025 / Level Two
												Basic	Crimes of the Ba'ath Regime in Iraq	NTU203	2024-2025 / Level Two
												optional	Sports (Optional)	NTU105	2024-2025 / Level Two
												optional	French Language	NTU107	2024-2025 / Level Two

		√	√		√	√	√	√	√	√	√	Basic	Principles of Probability	SIT221	2024-2025 / Level Two
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Sampling Theory	SIT222	2024-2025 / Level Two
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Linear Algebra	SIT224	2024-2025 / Level Two
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Principles of Time Series	SIT225	2024-2025 / Level Two
√	√	√	√	√	√	√	√	√		√	√	Basic	Differential Equations	SIT226	2024-2025 / Level Two
	√	√		√	√		√	√		√	√	Basic	Numerical Analysis	SIT227	2024-2025 / Level Two
√	√	√	√	√	√	√	√	√	√	√	√	Basic	General Time Series	50SIT22	2024-2025 / Level Two
		√	√		√	√	√	√	√	√	√	Basic	Probability and Random Variables	SIT2210	2024-2025 / Level Two
												optional	Data Structures	SIT223	2024-2025 / Level Two
√	√	√	√	√	√	√	√	√	√	√	√	optional	Hypothesis Testing	9SIT22	2024-2025 / Level Two
												Basic	Summer Training 1	SIT2211	2024-2025 / Level Two
												Basic	English Language 3	003NTU	2024-2025 / Level Three

		√	√			√	√			√	√	Basic	Principles of Mathematical Statistics	SIT310	2024-2025 / Level Three
		√	√			√	√			√	√	Basic	Operations Research	SIT311	2024-2025 / Level Three
		√	√			√	√			√	√	Basic	Linear Regression Analysis	SIT312	2024-2025 / Level Three
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Principles of Biostatistics	SIT314	2024-2025 / Level Three
		√	√			√	√			√	√	Basic	Reliability	SIT316	2024-2025 / Third Level
		√	√			√	√			√	√	Basic	General Mathematical Statistics	SIT3100	2024-2025 / Third Level
		√	√			√	√			√	√	Basic	Nonlinear Regression Analysis	SIT3120	2024-2025 / Third Level
√	√	√	√	√	√	√	√	√	√	√	√	Basic	General Biostatistics	SIT3140	2024-2025 / Third Level
												optional	Data Mining	SIT313	2024-2025 / Third Level
	√	√	√	√	√	√	√	√	√	√	√	Basic	Queuing Theory	SIT315	2024-2025 / Third Level
												Basic	Summer Training 2	SIT3122	2024-2025 / Third Level

√	√	√	√		√	√	√		√	√	√	Basic	Experimental Design 1	SIT411	2024-2025 / Third Level
√	√	√	√		√	√	√		√	√	√	Basic	Design of Agricultural Experiments	SIT4110	2024-2025 / Fourth Level
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Random Processes	SIT412	2024-2025 / المستوى الرابع
√	√	√	√		√	√	√		√	√	√	Basic	Principles of Statistical Inference	SIT413	2024-2025 / Fourth Level
√	√	√	√		√	√	√		√	√	√	Basic	Statistical Inference	SIT4130	2024-2025 / Fourth Level
		√	√		√	√	√	√	√	√	√	Basic	Nonparametric Methods	SIT414	2024-2025 / Fourth Level
		√	√		√	√	√	√	√	√	√	Basic	Multivariate 1	SIT415	2024-2025 / Fourth Level
		√	√			√	√			√	√	Basic	Multivariate Random	SIT4150	2024-2025 / Fourth Level
			√				√				√	Basic	Artificial Intelligence	7SIT41	2024-2025 / Fourth Level
													Research Project	SIT418	2024-2025 / Fourth Level
												optional	Information Theory	SIT416	2024-2025 / Fourth Level

			√				√				√	Basic	Machine Learning	SIT419	2024-2025 / Fourth Level

- **Please tick the boxes corresponding to the individual learning outcomes of the program being evaluated**.

Course Description Form

1. Course Name:
Principles of Mathematics
2. Course Code:
SIT124
3. Semester / Year:
The first chapter 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	Theoretical and practical	Data Collection Sources	Student understanding of the lesson	4	Third

answers, discussion					
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,	Theoretical and practical	Correlation and Regression	Student understanding of the lesson	4	Fourteenth

discussion					
		Final Exam		3	] Fifthen

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
8Course 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 ps://www.google.iq/books/edition/In	**,t) Electronic references, websites .....**

ex Numbers in Economic Theory and a/KlKrOobYrWgC?hl=ar&gbpv=1&dq= Index+Numbers&printsec=frontcover	

Course Description Form

13. Course Name:	
Mathematical applications	
14. Course Code:	
SIT112	
15. Semester / Year:	
The first chapter 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	=	Tayler 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, reports...)	Calculus: Early Transcendentals" by James Stewart
Electronic References, Websites	www.khanacademy.org

1. Educational Institution
Technical Administrative College - Mosul /
2. Department
Department of Statistics and Informatics
3.. Course Name/Code
Professional ethics / NTU201
4. Available Attendance Formats
Weekly
5.. Semester/Year
Second cours / second class
6.. Number of Study Hours (Total)
28
7.. Date of Preparation
2025
8.. Course Objectives (General Objectives of the Course)
This course aims to introduce students to the concept of professional ethics and its importance in practical life, with a focus on the principles and values governing professional behavior in various disciplines. The course covers ethical codes, professional responsibility, integrity, honesty, confidentiality, compliance with laws, and the distinction between what is legal and what is ethical. It also discusses the ethical challenges that practitioners may face in the workplace and how to deal with them in a professional manner.
9. Course outcomes, teaching, learning and assessment methods

Assessment Methods	Teaching and Learning Methods	Learning Outcomes (LOs)
- Short written tests - Assignments	- Theoretical lectures - Interactive explanations with real-life examples	1. Understand the basic concepts of professional ethics.
- Midterm exam - Reports	- Interactive explanations + student presentations	2. Analyze ethical issues related to professional practice.
- Homework - Final exam	- Brainstorming and group discussion	3. Apply ethical principles to real-life situations in the workplace.

10.Course structure (theoretical and practical vocabulary)

Assessment Method	Teaching Method	Unit/Or Topic Name	Required Learning Outcomes	Hours	Week
Paper-based test	lecture	Ethics	lent understanding of the lesson	2	First
Group class	lecture	Work and Profession	lent understanding of the lesson	2	Second

discussion					
Submit an analytical paper	lecture	Professional Ethics	lent understanding of the lesson	2	Third
Paper-based test	lecture	Values and Ethics	lent understanding of the lesson	2	Fourth
Group class discussion	lecture	terns of unethical behavior in the profession	lent understanding of the lesson	2	Fifth
Paper-based test	lecture	leans and methods for instilling professional	lent understanding of the lesson	2	Sixth
Summary of an interview with an employee about ethics	lecture	ethics and ethics in administrative professions.	lent understanding of the lesson	2	Seventh
Paper-based	lecture	ofessional Conduct and Work Relationships	lent understanding of the lesson	2	Eighth

test					
Short essay	lecture	ects of employment contracting and administrative work	lent understanding of the lesson	2	Ninth
Group class discussion	lecture	amples of professional ethics ording to administrative specializations	lent understanding of the lesson	2	Tenth
Submit a report + suggestions on the topic	lecture	Creating Initiative	lent understanding of the lesson	2	Eleventh
Group class discussion	lecture	Conflict of Interest in the Workplace	lent understanding of the lesson	2	Twelfth
Group class discussion	lecture	rporate Social and Ethical Responsibility	lent understanding of the lesson	2	Thirteenth
Paper-based test	lecture	porting corruption and unethical behavior	lent understanding of the lesson	2	Fourteenth
			Final Exam		Fifith

11. Curriculum development plan.

1. Improving learning outcomes by aligning educational objectives with national and international academic standards.
2. . Updating academic content to include contemporary ethical issues and practical applications that reflect the challenges of professional reality.
3. . Enhancing students' critical and analytical thinking skills in dealing with diverse ethical situations.
4. Integrating modern teaching techniques and methods (such as case studies, interactive learning, and presentations) to stimulate interaction and participation.
5. Linking the course to the labor market by including realistic situations that enhance students' readiness to address ethical challenges in the actual workplace.
6. Improving assessment tools to ensure accurate measurement of the level of achievement of the intended learning outcomes.
7. Raising awareness of the importance of ethical commitment as an essential part of a student's professional identity.
8. Incorporating values and behavioral dimensions into the assessment process to ensure a balance between cognitive and emotional aspects.

12. Infrastructure

Available	Classrooms, Laboratories, and Workshops
Available	1- Required Textbooks
Al-Juraisi, Khaled Abdul Rahman (2012): Management Ethics from an Islamic and Administrative Perspective, King Fahd National Library, 2nd ed., Riyadh.	2- Main References (Resources)
Ahmed Ali Salem: Professional Ethics and Work Conduct Mohammed Abdullah Al-Zamel: Work Ethics: A Conceptual and Applied Introduction Adel Hassan: Professional Ethics in the Public Service	a) Recommended books and references (scientific journals, reports, etc.)
https://www.e3melbusiness.com/blog/Work-ethics-concept-and-sources Professional Work Ethics https://nejfb.edu.iq/index.php/ejfb/article/view/328 Professional Ethics and Corporate Work Values	b) Electronic references, websites, etc.

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 class. -Discussion and dialogue.	-1Theoretical and practical lectures. -2Use of educational tools (presentations and scientific films.(-3Practical application.	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 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	Term exam		3	Fifteenth

	and practical				

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-ook.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.

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. -2Use of educational tools (presentations and scientific films.(-3Practical 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	**assrooms, laboratories and workshops .are available**
Random samples in scientific research, their types and methods of selection	1- Required textbooks
	2- Main references (sources)
tps://drive.google.com/file/d/0B8ZAGDqoB1d3dlQ2I3VVEzbFk/view?resourcekey=0-tflJW4tVKFYyNig5O9SeuQ	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-Jordan method	=	=
Twelveth	4	=	Partial anchoring Determinant and inverse of the matrix	=	=
Thirteenth	4	=	Trigonometric analysis method	=	=
Fourteenth	4	=	The relationship between Chaos and trigonometric analysis	=	=
Fifteenth	4	=	Chapter exam	=	=

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Numerical analysis / Dr. Nashat Ibrahim Al-Obaidi
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%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

Course Description Form Time Series

1. Educational institution:Technical Administrative College - Mosul		
2. Academic Department: Department of Statistics and Informati 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	Outputs

	methods	
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 workshop**
Available	**1- Required textbooks**
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/ Adnan Majid Abdul Rahman	**2- Main References (Sources)**
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/ Adnan Majid Abdul Rahman	**1) Recommended books and references (scientific journals, reports, etc.)**
https://www.youtube.com/watch?v=G5kJtiDlGwM 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	=	Chapter 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

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,	Theoretical and practical	Basic program dialog boxes and	Student understanding of the lesson	4	Fourth

explanation, questions and answers, discussion		menus			
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 Informati 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	watches	week
Daily and monthly tests	Theoretical and practical	Definition of hypothesis testing + the purpose of studying hypothesis testing + Statistical Hypotheses	Student understanding of the lesson	4	the first
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$\mu\mu$+ Hypothesis testing for means of two independent	Student understanding of the lesson	4	the third

		populations when the two populations are different$(\sigma_1^2, \sigma_2^2(\sigma_1^2, \sigma_2^2)$ known			
Daily and monthly tests	Theoretical and practical	Hypothesis testing for means of two independent populations when the two populations are different$(\sigma_1^2, \sigma_2^2(\sigma_1^2, \sigma_2^2)$ 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 the lesson	4	Ninth
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 worksho**
Available	**1- Required textbooks**
Sports Statistics/Amir Hanna 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=tVeSUnDMCIQ	**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 - theird 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 with real-life examples	1. Define the basic concepts of probability theory and random variables.
- 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 operties of (mass & density) function	Student lerstanding of the lesson	4	First
Derive laws in collaboratio	a lecture	Cumulative distribution function	Student lerstanding of the lesson	4	Second

n with the student					
Derive laws in collaboration with the student	a lecture	Mathematical expectation cent	Student lerstanding of the lesson	4	Third
Derive laws in collaboration with the student	a lecture	Moment generation function and properties	Student lerstanding of the lesson	4	Fourth
Derive laws in collaboration with the student	a lecture	• Mean • Median • Mode Mean deviation	Student lerstanding of the lesson	4	Fifth
Derive laws in collaboration with the student	a lecture	Variance Discrete Uniform and Bernoulli distribution	Student lerstanding of the lesson	4	Sixth
Derive laws in collaboration with the student	a lecture	Binomial distribution	Student lerstanding of the lesson	4	Seventh
Derive laws in collaboration with the student	a lecture	Poisson distribution	Student lerstanding of the lesson	4	Eighth
Derive laws in collaboration with the student	a lecture	Geometric distribution	Student lerstanding of the lesson	4	Tenth
Derive laws in collaboration with the student	a lecture	Negative Binomial distribution	Student lerstanding of the lesson	4	Eleventh
Derive laws in collaboration with the student	a lecture	Hyper geometric distribution	Student lerstanding of the lesson	4	Twelfth
Derive laws in	a lecture	Continuose uniform distribution	Student lerstanding of	4	hirteenth

collaboration with the student			the lesson		
Derive laws in collaboration with the student	a lecture	Normal distribution	Student lerstanding of the lesson	4	urteenth
Derive laws in collaboration with the student	a lecture	Final Exam			Fifith

10. Curriculum development plan.	
Course Development Plan Objectives .1Improve learning outcomes to align with labor market requirements. .2Update 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
Mathmatical Statistics - Amir Hanna Hormuz	2- Main References (Resources)
robability and Mathmatical Statistics - Salah Mabkhout	a) Recommended books and references (scientific journals, reports, etc.)
https://dr-alali.com/wp-ntent/uploads/2020/06/%D9%85%D8%AD%D8A7%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
1. Theoretical and practical lectures. 2. Modern educational means such as scientific presentations and films. 3. Application and practice.
Assessment methods
1. Exams. 2. 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.

12. Infrastructure

D4- Cooperation and working in teams.

11. Course Structure					
Week ILOs	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
First	4	Student understanding of the lesson	Matrices	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	=	=

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.
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. 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 reviews	Analyze and assess the effectiveness of nonlinear models using advanced statistical indicators
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
Participatio n, short quiz	Lecture	Introduction to the course	Understand course objectives and conter	3	1
Short quiz	Interactive lectu	Nonlinear Regression Mod	Distinguish between ty of nonlinear models	3	2
Results analysis, practical exercise	Practical lectu	Transformable Models	Apply transformable models	3	3
Project, report	Case study	Non-transformable Model	Analyze non-transforma models	3	4
Evaluation test	Lecture and discussion	Logarithmic Models	Build logarithmic mod	3	5
Comprehen sive test	Interactive revi	Examples and Application	Solve comprehensive nonlinear model proble	3	6
Short quiz	Lecture	Generalized Linear Model	Understand GLM distributions	3	7
Short quiz	Interactive lectu	Link Functions	Apply link functions	3	8
Analysis, practical exercise	Practical lectu	Generalized Linear Model	Analyze GLM model using software	3	9
Project, report	Lecture and discussion	Logistic Regression Mode	Build logistic regressi model	3	11
Evaluation test	Lecture and discussion	Model Properties	Analyze model propert	3	12
Comprehen	Interactive revi	Parameter Estimation	Estimate model parame	3	13

sive test					
Short quiz	Lecture	Classification Tables and Accuracy Measures	Analyze classificatio tables	3	14
Final exam, project	Comprehensiv review	Final Review and Applicati	Final review and practi 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
Participatio n, simple exercise	Lecture, practic application	Introduction to R and RStuc	Understand R environm and basics	3	1
Practical exercises	Practical application, liv examples	Reading and processing da	Import and clean data w R	3	2
Short quiz	Lecture, direc coding	Mean, standard deviation, variance	Calculate basic statistic indicators	3	3
Code analysis, practical exercise	Lecture, worksh	Functions & Loops	Create functions and u loops	3	4
Short quiz	Practical application, conditional scenarios	if/else structures	Use if/else condition	3	5
Analytical report	Interactive explanation, da application	Bar and pie charts	Graphical and visual analysis	3	6
Practical test, report	Lecture, practic application	ggplot2 basics	Graphing with ggplot	3	7
Applied test	Explanation + di coding	cor, lm, summary	Correlation and regress analysis	3	8

Practical exercises	Lecture, practic exercise	apply family	Programming with apply/sapply	3	9
Case analysis, short quiz	Workshop, rea cases	stringr, substr	Handle text and string c	3	10
Data report	Practical application, analytical case	filter, select, mutate	Organize and transfor tables with dplyr	3	11
Evaluation exercises	Practical discuss multiple examp	Data preprocessing	Prepare and verify modeling data	3	12
Mini project	Analytical explanation, dir implementatio	Modeling using lm	Build a simple statistic model	3	13
Final report	Interactive revie interpretive cod	Goodness of fit and testing	Analyze and interpre 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 Informati 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	watches	week
Daily and monthly tests	Theoretical and practical	Correlations include (Pearson's correlation	Student understanding of	4	the first

		coefficient, Spearman's correlation, pairing, concordance)	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 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 monthly tests	Theoretical and practical	relative risk	Student understanding of the lesson	4	fourteenth

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 worksho**
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, an 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/tal_and_Health_Statistics/eQlOrH6Wsu?hl=ar&gbpv=1&dq=Vital+and+demographic+statistics&printsec=frontcover	**2) Electronic references, websites,.....**

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. 25

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	gle-variable linear ualities with one, two, and multiple variables	dent understanding of the lesson	4	First
Daily and monthly tests	oretical and practical	finition of a convex set	lent understanding of the lesson	4	Second

Daily and monthly tests	oretical and practical	gion of common utions for a system f linear inequalities	lent understanding of the lesson	4	Third
Daily and monthly tests	oretical and practical	near equations in ich the number of uations is equal to e number of variables	lent understanding of the lesson	4	Fourth
Daily and monthly tests	oretical and practical	near equations in ich the number of uations is less than e number of variables	lent understanding of the lesson	4	Fifth
Daily and monthly tests	oretical and practical	Jordan's Difficulty	lent understanding of the lesson	4	Sixth
Daily and monthly tests	oretical and practical	ving a System of Linear Equations	lent understanding of the lesson	4	Seventh
Daily and monthly tests	oretical and practical	Simplex Method for ding Non-Negative Basic Solutions	lent understanding of the lesson	4	Eighth
Daily and monthly tests	oretical and practical	Production planning in the anization and the distribution transportation means along the lines..	lent understanding of the lesson	4	Ninth
Daily and monthly tests	oretical and practical	near models and their forms.	lent understanding of the lesson	4	Tenth
Daily and monthly tests	oretical and practical	The simplex method and its modifications.	lent understanding of the lesson	4	Eleventh
Daily and monthly tests	oretical and practical	nplex and direct algorithm	lent understanding of the lesson	4	Twelfth

Daily and monthly tests	oretical and practical	odified Simplex Algorithm	lent understanding of the lesson	4	Thirteenth
Daily and monthly tests	oretical and practical	ccompanying forms	lent understanding of the lesson	4	ourteenth
	oretical and practical				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 -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.)
ttps://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 costs. Queuing theory studies the behavior and flow of customers in queues and provides mathematical tools for analyzing and 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	oretical and practical	roduction to Queuing Theory	dent understanding	4	First

monthly tests			of the lesson		
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	iting Lines in Public Services	lent understanding of the lesson	4	Eighth
Daily and monthly tests	oretical and practical	Service Rules and Forms	lent understanding of the lesson	4	Ninth
Daily and monthly tests	oretical and practical	Waiting Lines	Student erstanding 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		Fifith

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	2- Main References (Resources)

Dr. Ibrahim Mohammed Al-Ali	
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
Participatio n, short quiz	Lecture, presentation	Introduction to the course	Understand course objectives and uses o nonparametric metho	3	1
Short quiz, practical problems	Interactive lectu	One-sample tests	Identify advantages ar disadvantages of nonparametric methods 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 analyze variable relationships	3	4
Evaluation test, group discussion	Lecture, statisti analysis	Wilcoxon test	Perform sign rank tests analyze related cases	3	5
Comprehen sive test	Interactive revi	Randomness test	Review randomness te and interpret outputs	3	6
Short quiz	Lecture, practi explanation	Mann-Whitney test	Analyze two independ samples using nonparametric tests	3	7
Short quiz, problems	Interactive lectu	Wilcoxon test	Compare two related samples using Wilcox test	3	8
Analytical exercises	Practical lectu	Dispersion tests	Analyze dispersion usi nonparametric tests	3	9
Comprehen sive test	Interactive discussion	Review and training	Comprehensive review previous topics	3	10
Small project, report	Lecture, data analysis	Kruskal-Wallis test	Compare more than tv samples using Kruska Wallis test	3	11
Evaluation test, discussion	Lecture, statisti analysis	Friedman test	Apply Friedman test f related samples	3	12
Practical test	Practical lectu	SPSS Application (Part 1)	Use SPSS for one- and t sample tests	3	13
Short quiz, report	Practical lectu	SPSS Application (Part 2)	Use SPSS for tests wi more than two sample	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 .(films 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	Theoretical	Design and	Student	4	Seventh

monthly tests	and practical	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	understanding of the lesson		
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 table, post-tests, split-plot design for two	Student understanding of the lesson	4	Eleventh

		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%A	b) Electronic references, websites, etc.

1-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%2%A7%D8%B1%D8%A8#google_vignette	

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 i 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		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	
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%20%D8%A7%D9%84%D8%B9%D9%85%D9%84%D9%8A%D8%A7%D8%AA%20%D8%A7%D9%84%D8%AA%D8%B5%D8%A7%D8%AF%D9%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 (Minimum Variance Method)	=	=
Thirteenth	4	=	Bayesian Method	=	=
Fourteenth	4	=	Interval Estimation (General Concepts and Definitions).	=	=
Fifteenth	4	=	Chapter exam	=	=

12. Infrastructure

Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Statistical Inference/ Jalal Al-ssayad
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
Participatio n, short quiz	Lecture, presentation	Introduction to the course	Understand course objectives and uses o nonparametric metho	3	1
Short quiz, practical problems	Interactive lectu	One-sample tests	Identify advantages ar disadvantages of nonparametric methods 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 analyze variable relationships	3	4
Evaluation test, group discussion	Lecture, statisti analysis	Wilcoxon test	Perform sign rank tests analyze related cases	3	5
Comprehen sive test	Interactive revi	Randomness test	Review randomness te and interpret outputs	3	6
Short quiz	Lecture, practi explanation	Mann-Whitney test	Analyze two independ samples using nonparametric tests	3	7
Short quiz, problems	Interactive lectu	Wilcoxon test	Compare two related samples using Wilcox test	3	8
Analytical exercises	Practical lectu	Dispersion tests	Analyze dispersion usi nonparametric tests	3	9
Comprehen sive test	Interactive discussion	Review and training	Comprehensive review previous topics	3	10

Small project, report	Lecture, data analysis	Kruskal-Wallis test	Compare more than tw samples using Kruska Wallis test	3	11
Evaluation test, discussion	Lecture, statisti analysis	Friedman test	Apply Friedman test f related samples	3	12
Practical test	Practical lectu	SPSS Application (Part 1)	Use SPSS for one- and t sample tests	3	13
Short quiz, report	Practical lectu	SPSS Application (Part 2)	Use SPSS for tests wi more than two sample	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
Participatio n, simple exercise	Lecture, classro examples	Review of Linear Algebra a Matrices	Understand basic line algebra concepts and matrices	3	1
Short quiz	Lecture, practic activity	Eigenvalues and Applicatio	Analyze eigenvalues a eigenvectors	3	2
Applied test	Lecture, case stu	Multivariate Data and Applications	Distinguish between ty of multivariate data	3	3
Analytical report	Lecture, R programming	Multiple Linear Regressio	Apply multiple linea regression	3	4
Results analysis,	Lecture, SPS application	Multivariate Analysis of Variance (MANOVA)	Understand and appl MANOVA	3	5

report					
Short quiz	Lecture, case stu	Discriminant Analysis	Perform discriminan analysis	3	6
Practical exercises	Practical application, classroom discussion	Cluster Analysis	Classify observations i groups	3	7
Practical test	Lecture, practic application	Principal Component Analy	Apply Principal Component Analysis (PCA)	3	8
Comparativ e analysis, report	Lecture, interact discussion	Factor Analysis	Compare PCA and Fac Analysis	3	9
Practical assignment	Workshop, R programming	Data Preprocessing	Clean and prepare dat	3	10
Analytical test	Lecture, interpre applications	Statistical Software Output	Read and interpret SP and R outputs	3	11
Evaluation test	Lecture, critic analysis	Optimal Model Selection	Distinguish between mo selection methods	3	12
Presentatio n, discussion	Practical discuss case study	Analysis and Decision-Maki	Connect statistical analy with decision-making	3	13
Comprehen sive test	Classroom revie summary exerci	General Review	Comprehensive review 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, illustrat examples	Introduction to Multivariat Random Variables	Understand the concept the multivariate norm distribution	3	1
Classroom exercises	Lecture, numeri applications	Means and Joint Variance	Understand the propert of mean, variance, an covariance	3	2
Short quiz	Lecture, graphi analysis	Properties of Multivariate Normal Distribution	Apply the multivariat normal distribution	3	3
Results analysis, practical exercise	Lecture, R programming	Estimation Methods (MLE Sample Moments)	Verify and estimate parameters using samp	3	4
Written test	Lecture, case stu	T Distribution and its Proper	Understand the multivar T distribution	3	5
Applied test	Workshop, scenarios	Hypothesis Testing	Differentiate betwee univariate and multivar hypothesis testing	3	6
Analytical	Lecture, programming a	Wishart Distribution	Understand the Wisha distribution and its	3	7

exercises	interpretation		applications		
Mini project	Lab applicatio	Analysis with SPSS/R	Perform advanced tes using software	3	8
Conceptual evaluation test	Interactive discussion	Distribution Comparisons	Compare multivariat distributions	3	9
Software output analysis	Lecture, practic training	Multivariate Covariance Analysis	Analyze covariance ar interpret relationship	3	10
Analytical report	Group worksh	Real Data Analysis	Apply the multivariat normal distribution to r data	3	11
Comprehen sive test	Class review, gr applications	Comprehensive Review	Review concepts and ap comprehensive tests	3	12
Project progress follow-up	Individual guida analytical supp	Applied Project	Prepare final projects a analyze data	3	13
Peer evaluation, oral report	Group presentati	Project Presentations	Present real data analy 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%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

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.