Department of Earth Sciences & Petroleum

College of Science

University of Salahaddin-Erbil

Subject: Mathematics

Course Book: 1st geology class

Lecturer's name: Namam Jalal Mahmoud

Academic Year: 2023-2024

Course Book

1. Course name	**Mathematics**
2. Lecturer in charge	**Namam Jalal Mahmoud**
3. Department/ College	**Geology / Science**
4. Contact	**e-mail: namam.mahmood@su.edu.krd** **Tel:**
5. Time (in hours) per week	**Theory: 3 hrs**
6. Office hours	
7. Course code	
8. Teacher's academic profile	**4/1/2010** Awarded M.Sc. in Mathematics, Department of Mathematics, College of Science, University of Salahaddin-Erbil, Iraq. **13/7/2010** Assistant lecturer at Department of Mathematics, College of Science, University of Salahaddin-Erbil, Iraq. **1999** Awarded B.Sc. in Mathematics, Department of Mathematics, College of Science, University of Salahaddin-Erbil, Iraq.
9. Keywords	Functions, Derivatives, Integral, Measures of Central Tendency, Measures of Variation, Histogram, Frequency polygon, Cumulative frequency graph or Ogive.

10. Course overview:

This course is one semesters and is designed to acquaint you with calculus principles and introduction to statistics. The general purpose of calculus is to study of change, in the same way that geometry is the study of shape and algebra is the study of operations and their application to solving equations. It has two major branches, differential calculus (concerning rates of change and slopes of curves) and integral calculus (concerning accumulation of quantities and the areas under and between curves); these two branches are related to each other by the fundamental theorem of calculus. In the extension we study the basic concepts of Statistics and including statistical tables and charts to perform simple statistical analyses for small samples.

11. Course objective:

Calculus was first invented to meet the mathematical needs of scientists of the sixteenth and seventeenth centuries, needs that mainly mechanical in nature. Nowadays it is a tool used almost everywhere in the modern world to describe change and motion. Its use is widespread in science, engineering, medicine, business, industry, and many other fields. The objective of this course is to introduce the fundamental ideas of the differential and integral calculus of functions of one variable. Important objectives of the calculus sequence are to develop and strengthen the students' problem-solving skills and to teach them to read, write, speak, and think in the language of mathematics. In particular, students learn how to apply the tools of calculus to a variety of problem situations. One of the primary objectives of any mathematics course is to help students learn to think about problems mathematically and to solve problems independently. Working in small groups, doing the lab activities, and talking about problems with other students are all strategies to assist the student in achieving these objectives.

12. Student's obligation

- **a.** Students reign a commitment to come on time and remain in the classroom for the duration of scheduled classes.
- **b.** Nothingness speaks students with each other during lecture.
- **c.** All devices must be turned off.
- **d.** When teacher ask question, Students will be to raise your hand before answer his question.
- **e.** Students own an obligation to write tests and final examinations at the times scheduled by the teacher or the College. assignments, with optional seminars

13. Forms of teaching

I give a copy of my lecture notes to students before coming lecturer time. First I remember students about previous lecture, and then I start new lecture. At the end of the lecture give homework for the next lecture. During this proses I am use presentation and whiteboard

14. Assessment scheme

The academic year contain two obligatory exams and one optional exam with average 30% degree and 10% Quizzes. The other 60% will be reserved for the final exam

15. Student learning outcome:

By the end of this course, students should

- Be able to work with functions represented in a variety of ways: graphical, numerical, analytical, or verbal
- Understand the connections among these representations
- Understand the meaning of the derivative in terms of a rate of change and local linear approximation.
- Be able to use derivatives to solve a variety of problems

- Understand the meaning of the definite integral
- Be able to use integrals to solve a variety of problems
- Understand the relationship between the derivative and the definite integral as expressed in both parts of the fundamental theorem of calculus
- Be able to Collect the data and present them by frequencies table and drawing statistical Charts and finding mean, mod, median and variance from the data.
- Study the properties and characteristics of the data

16. Course Reading List and References:

[1] **Robert T. Smith and Roland B. Minton, (2007)**, Calculus: Early Transcendental Functions, Third Edition, Publishing by McGraw-Hill, a business unit of the McGraw-Hill companies, Inc.

[2] Calculus, Schaum's outline series

[3] Any other books about Calculus.

[4] Hogg, R. V., Graig, A. T., (1978), Introduction to mathematical Statistics, 4th edition

[5] Spiegel, M. R. (1998), Theory and Problems of Statistics (Schaum's Outline), 2nded.

17. The Topics:	**Lecturer's name**
Chapter One: Introduction to Set of Numbers; Absolute value (Definition, Examples, Properties), Intervals, Functions (Definition, Examples), the Domain of a Function, The Range of a Function, The Graph of a Function. **Chapter Two**: Trigonometric Functions, Exponential and natural Logarithmic Function (Definition, Examples, Properties). **Chapter Three**: Limit of function (Definition, Examples, Theorems), Limit at infinity, **Chapter Four:** The Derivative (Definition, Examples), The Rule of Derivative, Chain Rule, Higher Derivative, Derivatives of Trigonometric Function, Rules of	

Differentiation, Differentiation of Exponential and Logarithmic Function. **Chapter Five :** Integration Techniques, Integration by Parts, Integration by Substitution, Integration by Partial Fractions. **Chapter six :** Introduction to statistics (Definition of statistics, Data, population and sample, Descriptive and Inferential statistics, Classification of Variable (Qualitative and Quantitative), Types of Quantitative Variable(Discrete and continuous), Level of measurements (Nominal, Ordinal, Interval and Ratio). **Chapter seven**: Frequency distribution (Categorical and Grouped frequency distribution), Construction of frequency distribution table, definitions of some concepts (class frequency, class boundaries, mid-point, relative and cumulative frequency. **Chapter eight**: Graphs of Frequency Distributions (Histogram, Frequency polygon, Cumulative frequency graph or Ogive. Pie Chart) **Chapter nine**: Measures of Central Tendency (Mean, Mode, Median), Measures of Variation (Range, Variance and Standard deviation), Linear regression	
18. Practical Topics (If there is any)	
19. Examinations: Questions in the examination will be arranged the matching mode by way of the examples and exercises that I give delivered in the lecture notes. Sometimes will be having extra mark in examination for worthy students. Many of the questions will be taken from References.	
20. Extra notes: Answers of examination will be finding in the board's declaration geology department after every examination.	
21. Peer review	