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**Department of Geology**

**College of Science**

**University of Salahaddin-Erbil**

**Subject: Mathematics**

**Course Book : 1st geology** **class**

**Lecturer's name: Faiza Abdullah Shareef**

**Academic Year: 2021-2022**

**Course Book**

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| **1. Course name** | **Mathematics**  |
| **2. Lecturer in charge** | **Faiza Abdullah Shareef** |
| **3. Department/ College** | **Geology / Science** |
| **4. Contact** | **e-mail: Faiza.shareef@su.edu.krd** |
| **5. Time (in hours) per week**  | **2 & 1 hours(tutorial)** |
| **6. Office hours** |  **2** |
| **7. Course code** |  |
| **8. Teacher's academic profile**  | Master degree since 2016 in Functional analysis.Assistant lecturer since 2020 .Academic staff member of Mathematics Department/ Collage of Science/ University of Salahaddin |
| **9. Keywords** |  |
| **10. Course overview:**  This lecture of mathematics is one semester and is designed to acquaint you with calculus principles. The general purpose of calculus is to study of change, in the same way that [geometry](https://en.wikipedia.org/wiki/Geometry) is the study of shape and [algebra](https://en.wikipedia.org/wiki/Algebra) is the study of operations and their application to solving equations. It has two major branches, [differential calculus](https://en.wikipedia.org/wiki/Differential_calculus) (concerning rates of change and slopes of curves) and [integral calculus](https://en.wikipedia.org/wiki/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](https://en.wikipedia.org/wiki/Fundamental_theorem_of_calculus).  |
| **11. Course objective:**A primary objective of a course in calculus is to provide a bridge for the student from high-school or lower-division mathematics courses to upper-division mathematics. The student will be challenged to grow in mathematical maturity, and to develop and strengthen problem-solving skills. Beyond the content of individual courses, the major in mathematics is designed to prepare students for the 21st century by helping students to become problem solvers, effective communicators, users of appropriate technology, and team players. In this course, students will be engaged in a variety of activities which will help them to move toward achieving these goals.  |
| **12. Student's obligation**The attendance students in class and the attendance of two exams is required , assignments, with optional seminars  |
| **13. Forms of teaching**I use the projector (datashow ) in my lectures to explain the topics and I give lecture notes to the students and with use the black board.  |
| **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
* 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
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| **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 out line series
3. Any other books about Calculus.

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| **17. The Topics:** | **Lecturer's name** |
| Calculus**Chapter One:** Introduction to Set of Numbers; Absolute value (Definition, Examples, Properties), Intervals. The Inequality (Definition, Examples, Properties), Functions ( Definition, Examples), Type of Functions. The Domain of a Function, The Range of a Function, The Graph of a Function.**Chapter Two**: Trigonometric Functions ,Exponential and Logarithmic Function, The Natural Logarithmic Function (Definition, Examples, Properties).**Chapter Three**: Limit of function (Definition, Examples, Theorems), Continuous function (Definition, Examples), Limit at infinity, Limits of trigonometric functions, Squeez theorem and continuity.**Chapter Four:** The Derivative (Definition, Examples), The Rule of Derivative, Chain Rule, Higher Derivative, Implicit Differentiation. Periodic Function, Derivatives of Trigonometric Function,Rules of Differentiation, Differentiation of Exponential and Logarithmic Function.**Chapter Five :** Integration Techniques, Integration by Parts, Trigonometric Integrals, Integration by Substitution, Partial Fractions. |  |
| **18. Practical Topics (If there is any)** |  |
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| **19. Examinations:**Sample Examinations include the internal lecture notes (75%) and some questions outside the lecture notes with a low score (25%). |
| **20. Extra notes:** |
| **21. Peer review**   |