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**Department of Mathematics**

**College of Education**

**Salahaddin University-Erbil**

**Subject: calculus I**

**Course Book – 1st Year**

**Lecturer's name: Ivan Dler Ali**

**Academic Year: 2022- 2023 First Semester**

**Course Book**

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| **1. Course name** | **Calculus** |
| **2. Lecturer in charge** | **Ivan Dler Ali** |
| **3. Department/ College** | **Mathematics/Education** |
| **4. Contact** | **e-mail:**Ivan\_Dler@yahoo.com**Tel:( optional )** |
| **5. Time(in hours) per week**  | **Theory: 4 Hours per a week**  |
| **6. Office hours** |  |
| **7. Course code** |  |
| **8. Teacher's academic profile**  | 2004-2008 BSc. In mathematics Department of Mathematics College of Education Salahaddin University -Erbil Kurdistan Region Iraq 2012-2014 MSc in Graph Theory Department of Mathematics Salahaddin University  |
| **9. Keywords** | **Inequality, limit, continuous, Function , Differentiation and Integration** |
| **10. Course overview:**Calculus is often a student’s first exposure to the world of mathematics. While this course has many applications, Calculus is mainly study of mathematical structure such as Real numbers, limit, continuity… etc. This semester is dedicated to study some important objects such as: Inequality, absolute value, function, limit, continuous, also theorems which depend on foundations of calculus and set theory. |
| **11. Course objective:**Students will be able to apply the concepts and methods described in the syllabus, they will be able to solve problems using calculus, they will know a number of applications of calculus.The basic goal is to study the following:* Inequality of real numbers.
* Functions of several variables which include: limits, continuity.
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| **12. Student's obligation**Tests will be closed book, closed notes: you cannot receive help on the tests from anyone except me. Home works are also to be pledged. We may deviate from this slightly during the semester and allow you to discuss questions with your classmates, but assume you are to work alone (and without answer guides!) unless you hear otherwise.. |
| **13. Forms of teaching**The essence of the teaching program is prepared on papers. Elaborations and explanations of the details are done on black and white board. For the student to a achieve a level of excellence in this subject, the following points should be given most consideration:* Class attendance on regular basis for the purpose of learning and doing class work.
* Active participation in class discussions.
* Reviewing the lecture notes and topics on weekly basis, noting the ambiguous points, if any and requesting clarification during instructor office hours.
* Giving adequate and sufficient priority of papers, pencils, erase for writing lecture and daily tests.
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| **14. Assessment scheme**The student must provide the following quizzes and exams during the course:

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| Annual Effort (40 %) | Final Exam (60 %) | Total |
| Quizzes and written home assignments | Midterm Exam (Theoretical) | Theoretical |  |
| **10%** | **30%** | **60%** | **100%** |

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| **15. Student learning outcome:**Upon completing this course you should be able to: * explain the basic properties of the real number system.
* apply theorems of analysis to real functions of one variable.
* prove basic analysis results.
* write correct and coherent mathematical proofs.
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| **16. Course Reading List and References‌:**1. Calculus, HOWARD ANTON, IRL BIVENS, STEPHEN DAVIS.2012, 10th edition.
2. THOMAS’ CALCULUS, Weir Hass, 2005, Pearson Education, Inc. 12th edition.
3. THOMAS/ FINNEY, George B.Thomas, Ross L. Finney. 1996. 9th edition
4. Calculus with analytic geometry, George F. Simmons, 1985, by Mc-Grawhill, Inc.
5. Calculus, Howard Anton, 1995, by Anton text books, Inc
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| **17. Course program:**

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|  **First semester** 8 week (Classes + Exam)  |
| Week 1-3 | * Real number and real line
* Rules for inequalities
* Intervals
* Solving Inequalities
* Absolut value and some properties
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| Week 4-5 | * Functions.
* Common function
* Domain and Rang
* Even and odd functions
* Operations function
* Invers function
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| Week 6-7 | * Limit
* Precise definition of a limit
* Some basic limit
* Sandwich theorem One - sided limits
* Infinite Limits
* Precise Definition of Infinite Limits
* Some basic of limit
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| Week 8 | * Asymptotes
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| **19. Examinations:**1-Compostional: In this type of exam the questions usually starts with explain how, what are the reasons for…?why…?How…?With their typical answersExamples should be provided2-True or False type of exams:In this type of exam a short sentence about a specific subject will be provided, and then students will comment on the trueness or falseness of this particular sentences. Examples should be provided.3- Multiple choices: In this type of exam there will be a number of phrases next or below a statement students will match the correct phrase. Examples should be provided |