



**Department of Computer Science and
Information Technology**

College of Science

University of Salahaddin

Subject: Calculus

Course Book – (1st Year)

Lecturer's name Shno O. Ahmed

Academic Year: 2020/2021

Course Book

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| 1. Course name | Calculus |
| 2. Lecturer in charge | Shno Othman Ahmed |
| 3. Department/ College | Computer Science and Information Technology / Science |
| 4. Contact | e-mail: Othman_shno@yahoo.com Tel: (optional) |
| 5. Time (in hours) per week | Theory: 6 Practical: |
| 6. Office hours | Wednesday : 8:30 am – 11:30 pm Group -CS- Wednesday : 11:30 am – 2:30 am Group -IT- |
| 7. Course code | |
| 8. Teacher's academic profile | |
| 9. Keywords | |
| 10. Course overview: | Calculus is considered as a fundamental tool in many fields of study including science, business, and engineering. This course emphasizes the concepts of differential and integral calculus and provides experience in the methods and applications of these concepts. All concepts will be studied graphically, numerically and analytically. |
| 11. Course objective | The basic goal of this course is to teach the students more than they have studied at their higher school and to extend their knowledge about new objects in mathematic like complex numbers , functions ,derivative , integration and so on. And to make contact of these subjects with their life and the applications in the computer science to enable them to solve their problems in programming , database , compiler , computation statistic ... etc. |
| 12. Student's obligation | <ol style="list-style-type: none"> 1- Attendance. 2- Assignment 3- Homework 4- There examinations will be given, each 40%. 5- Final exam 60%. |

13. Forms of teaching

- 1- data show
- 2- whiteboard

14. Assessment scheme

- 1- Attendance 2%
- 2- Homework :3%
- 3- There examinations will be given, each 35%.
- 4- Final exam 60%.

15. Student learning outcome:**&%%RSHTRE&

- 1- Students will read, interpret, and use the vocabulary, symbolism, and basic definitions used in Calculus, including set of numbers , domain and range of function of one and two variables,....
- 2- Students will use the facts, formulas, and techniques learned in this course to solve the problems in calculus.

16. Course Reading List and References:

- [1] Howard Anton, Calculus with Analytic Geometry (Fifth Edition), 1995.
- [2] Thomas, Calculus (Eleventh Edition).
- [3] James Stewart, Calculus (Seventh Edition), 2012

17. The Topics:

Lecturer's name

Week 1: Introduction: Mathematical background such as real numbers, rules for Inequality, intervals.

Week 2-3: Function of one variable, domain and range of functions, Graphing of function.

Week 4-5:
Limits: introduction ,Type of limits, Continuity of functions

Week 6-9: Derivation: Mathematical definition of derivation, The Differentiation Rules, L'hospital rule, Curve Sketching, Maxima and Minima , The _first derivative test, The second derivative test ,Application of derivation.

Week 10-15: Integration: Area under a curve, indefinite integral, Definite integral. Techniques of integration, application of definite integrals.

Week 16-20: Functions two variable, What is a Partial Differential Equation, First-Order Linear Equation, Initial and Boundary Conditions, Types of Second-Order Equations

Shno o. ahmed
(6 hrs)

Week 21-28:

Ordinary Differential Equation.

18. Practical Topics (If there is any)**Question:** Given $c > d$, Determine which of the following are true or false:

1) $3c < 3d$

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2) $c/d < d/c$

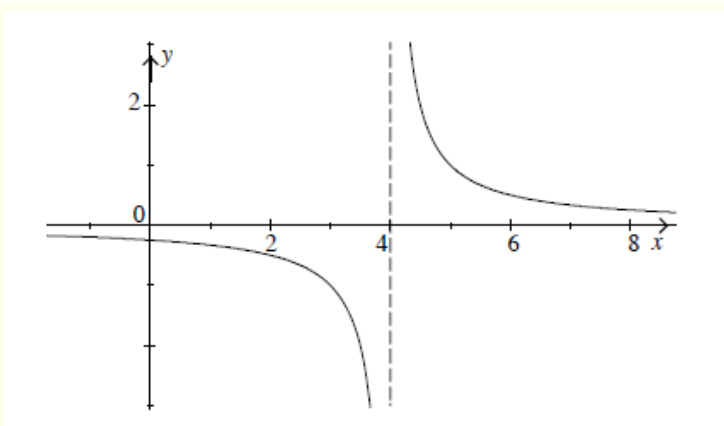
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3) $d^2 > c^2$

☐**Question :** Solve the following inequalities:

1- $|7-2x| < 1$

2- $x^2+x-1 \leq 5$

Question: Find the domain and the range of the followingDomain = $\{x: x \neq 4\}$ Range = $\{y: y \neq 0\}$ **20. Extra notes:**