Department of Mathematics

College of Education

University of Salahaddin

Subject: Advanced Calculus

Course Book – (Year 2)

Lecturer's name: Suham Hamad Awla

Academic Year: 2023/2024

Course Book

1. Course name	**Advanced Calculus**
2. Lecturer in charge	**Suham Hamad Awla**
3. Department/ College	**Mathematics/Education**
4. Contact	**e-mail:suham.awla1@su.edu.krd** **Tel: (optional)07507612458**
5. Time (in hours) per week	**Theory: 8** **Discussion: 2**
6. Office hours	**Sunday: Group A (10:30-12:00)** **Sunday: Group B (8:30-10:30)** **Wednesday: GroupA (8:30-10:00)** **Wednesday: GroupB (10:30-12:00)**
7. Course code	
8. Teacher's academic profile	**2007-2011 BSc. Of Mathematics Department in College of Education at Salahaddin –University Hawler Erbil Kurdistan Region Iraq** **2013-2015 MSc of the mathematic Department at Salahaddin University**
9. Keywords	**Functions, Derivatives, Integrals and series**

10. Course overview:

Advanced Calculus is often a student's first exposure to the world of pure mathematics. While this course has many applications, Advanced 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: Functions of several variable, Polar coordinates and multiple integral … etc.

The whole semester will be spent studying examples and theorems which depend on foundations of Calculus set theory.

Students who successfully complete this course will:

- Partial Derivatives.
- Directional derivatives.
- Double integrals in rectangular and polar form.
- Triple Integrals in rectangular cylindrical and spherical coordinates.
- Green theorem and Stokes' theorem.
- Infinite sequence and series.
- power series and Taylor series.
- vectors.

11. Course objective:

Advanced Calculus	**جیاکاری و تەواوکاری پێشکەوتوو**
This course is a natural continuation of a	**ئەم کۆرسە تەواوکەری کۆرسی (جیاکاری و تەواوکاری) یە لە**

	previous course (Calculus) taught in first class, which is based in every field of applied sciences as instrument for the solution of problems of varies fields. The basic goal is to study the following: • Sequences and series of real numbers. • Functions of several variables which include: limits, continuity, partial derivatives, and multiple integrals. • Line integrals, Green's Theorem and Stokes' Theorem.	**پۆلی یەك، كە دامەزراوەی هەموو بواریّكی ماتماتیكی پراكتیكی یە وەكو ئامرازیّك بۆ شیكاری كێشەكان لە بواری جۆراوجۆر.** **مەبەستی سەرەكیمان ئەمانی خوارەوە لەخۆ دەگریّت:** • **یەك بەدوای یەك و ریزكراوەكانی ژمارە راستیەكان.** • **نەخشەی چەند گۆڕاو كە ئەمانە لەخۆ دەگریّت: ئامانج و بەردەوامی و داتاشراوی بەشی و تەواوكاری چەندی.** • **تەواوكاری هێلی و سەلێنراوی گرین و سەلێنراوی ستۆك.**

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.

Quizzes and written home assignments 5%
Midterm exams 35%
Final exam 60%

13. Forms of teaching

1- green board.
2- Datashow.

14. Assessment scheme

1-Examinations 40% (2-3 theoretical exam)
2- Final Exam. 60% (theoretical)

15. Student learning outcome:

16. Course Reading List and References:

1. Calculus with analytic geometry, George F. Simmons, 1985, by Mc-Grawhill, Inc.
2. Calculus, Howard Anton, 1995, by Anton text books, Inc.

3. THOMAS' CALCULUS, Weir Hass, 2005, Pearson Education, Inc. 11th edition.

17. The Topics:		**Lecturer's name**
Date	**Subjects**	Suham Hamad Awla 10hours
Course 2 Week 1	**Chapter Two**: Multiple Integral Double integrals	
Week 2	Area, Moments and Centre of Mass	
Week 3	Polar Coordinates	
Week 4	Graphs in polar coordinates	
Week 5	Length, area and surface area	
Week 6	Double Integral in Polar Form	
Week 7	Triple Integral in Rectangular Coordinates	
Week 8	Triple Integral in Cylindrical and Spherical Coordinates	
Week 9	Substitutions in Double Integral (Jacobian)	
Week 10	Line Integrals	
Week 11	Green's Theorem	
Week 12	Surface Integral	
Week 13	Stokes' Theorem	
Week 14	Divergent Theorem	
18. Practical Topics (If there is any)		

19. Examinations:

1. Compositional:

In this type of exam the questions usually starts with explain how, what are the reasons for…?, why…?, how…?

With their typical answers

Examples should be provided

2. Statements and their proves:

In this type of exam the questions usually starts with writing the statements of the special name of the our lecture and its proves, also given some statements which one prove or disprove?*

21. Peer review پێداچوونەوەی هاوەڵ

This course book has to be reviewed and signed by a peer. The peer approves the contents of your course book by writing few sentences in this section.

(A peer is person who has enough knowledge about the subject you are teaching, he/she has to be a professor, assistant professor, a lecturer or an expert in the field of your subject).

ئەم کۆرسبووکە دەبێت لەلایەن هاوەڵێکی ئەکادیمیەوە سەیر بکرێت و ناوەرۆکی بابەتەکانی کۆرسەکە پەسەند بکات و جەند ووشەیەک بنووسێت لەسەر شیاوی ناوەرۆکی کۆرسەکە و واژووی لەسەر بکات.

هاوەڵ ئەو کەسەیە کە زانیاری هەبێت لەسەر کۆرسەکە و دەبیت پلەی زانستی لە مامۆستا کەمتر نەبێت.