

Ministry of Higher Education and Scientific research



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 (810:30-12:00)					
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:	<p>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.</p> <p>This semester is dedicated to study some important objects such as: Functions of several variable, Polar coordinates and multiple integral ... etc.</p> <p>The whole semester will be spent studying examples and theorems which depend on foundations of Calculus set theory.</p> <p>Students who successfully complete this course will:</p> <ul style="list-style-type: none"> • 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:	<table border="1"> <tr> <td>Advanced Calculus</td> <td>جیاکاری و تهاوکاری پیشکتهوتوو</td> </tr> <tr> <td>This course is a natural continuation of a</td> <td>ئهم کۆرسه تهاوکاری کۆرسی (جیاکاری و تهاوکاری) یه له</td> </tr> </table>		Advanced Calculus	جیاکاری و تهاوکاری پیشکتهوتوو	This course is a natural continuation of a	ئهم کۆرسه تهاوکاری کۆرسی (جیاکاری و تهاوکاری) یه له
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<p>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.</p> <p>The basic goal is to study the following:</p> <ul style="list-style-type: none"> • 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. 	<p>پۆلى يەك، كە دامەزراوەى ھەموو بواریكى ماتماتیكى پراكتیكى یە وەكو ئامرازىك بۆ شىكارى كېشەكان لە بواری جۆراوجۆر. مەبەستى سەرەكیمان ئەمانى خوارەو لەخۆ دەگریت: • یەك بەدوای یەك و ریزكراوەكانى ژمارە راستیەكان. • نەخشەى چەند گۆراو كە ئەمانە لەخۆ دەگریت: ئامانج و بەردەوامى و داتاشراوى بەشى و تەواوکاری چەندى. • تەواوکاری ھیلی و سەلینراوى گرین و سەلینراوى ستۆك.</p>
<p>12. Student's obligation</p> <p>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.</p> <p>Quizzes and written home assignments 5% Midterm exams 35% Final exam 60%</p>	
<p>13. Forms of teaching</p> <p>1- green board. 2- Datashow.</p>	
<p>14. Assessment scheme</p> <p>1-Examinations 40% (2-3 theoretical exam) 2- Final Exam. 60% (theoretical)</p>	
<p>15. Student learning outcome:</p>	
<p>16. Course Reading List and References:</p> <ol style="list-style-type: none"> 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
<u>Date</u>	<u>Subjects</u>	
Course 1	Infinite Sequence and Series	Suham Hamad Awla 10hours
Week 1	Bounded Non Decreasing Sequences	
Week 2	Infinite series	
Week 3	Telescoping Series Integral Test	
Week 4	Comparison Test	
Week 5	The Ratio and Root Tests Alternating Test	
Week 6	Power Series Taylor and Maclaurin Series The Binomial Series	
Week 7	Introduction, how to study advanced calculus. Chapter One: Functions of several variables.	
Week 8	Level Curve, Graph, Surface and Limit of a Function of Two Variables	
Week 9	Partial Derivatives	
Week 10	Vectors, Dot Product Cross Product	
Week 11	Line and Planes in Space	

	Vector Valued Functions	
Week 12	Directional Derivatives and Gradient Tangent Planes and Differentials	
Week 13	Tangent Plane and Normal Lines Extreme Values and Saddle Points	
Week 14	Lagrange Multipliers	
18. Practical Topics (If there is any)		
<p>19. Examinations:</p> <p>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</p> <p>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?*</p>		
<p>21. Peer review پیداچوونہوہی ھاوہل</p> <p>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. <i>(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).</i></p> <p>نہم کورسبووکه دہبیت لہ لایین ھاوہلنیکی نہکادیمیہوہ سہیر بکریٹ و ناوہروکی بابہتہکانی کورسہکہ پھسہند بکات و جہند ووشہیہک بنوسنیت لہسہر شیاوی ناوہروکی کورسہکہ و واژووی لہسہر بکات. ھاوہل نہو کہسہیہ کہ زانیاری ھہبیت لہسہر کورسہکہ و دہبیت پلہی زانستی لہ ماموستا کہمتر نہبیت.</p>		