VISION
2●30
المملكة العربية السعودية
KINGDOM OF SAUDI ARABIA

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	Advanced Calculus
Course Code:	213Math-3
Program:	Mathematics
Department:	Mathematics
College:	College of Science and Arts
Institution:	Najran University

Table of Contents

A. Course Identification

1. Credit hours:	

2. Course type

a. University ☐ College ☐ Department ☒ Others ☐

b. Required ☒ Elective ☐

3. Level/year at which this course is offered: Third

4. Pre-requisites for this course (if any):

112Math 3

5. Co-requisites for this course (if any): N/A

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	3	100%
2	Blended		
3	E-learning		
4	Correspondence		
5	Other		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	Lecture	45
2	Laboratory/Studio	
3	Tutorial	10
4	Others (specify)	
	Total	55
Other Learning Hours*		
1	Study	30
2	Assignments	10
3	Library	10
4	Projects/Research Essays/Theses	
5	Others (specify)	10
	Total	115

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

This Course will Cover partial derivatives, multiple integrals and applications.

2. Course Main Objective

The main objectives of the course is to familiarize the students with the essential concepts and the solutions of partial derivatives and multiple integrals.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge:** By the end of the semester, the students will be able to	
1.1	define the basic concepts about partial Derivatives	L1, L2
1.2	describe appropriate information for applying partial Derivatives and Multiple integral in various scientific fields.	L1, L2
1.3		
1...		
2	**Skills :** By the end of the semester, the students will be able to	
2.1	form tree for partial differential and plot the double integral	L1, L2
2.2	create the solutions of the partial differential and double integral	L1, L2
2.3		
2...		
3	**Competence:**	
3.1	promoting free, creative and critical thinking.	
3.2	working independently.	
3.3	searching for data and information and analyzing them.	
3...		

C. Course Content

No	List of Topics	Contact Hours
1	Functions of Several Variables, Limits and Continuity, Partial Derivatives, Increments and Differentials, Chain Rules	11
2	Directional Derivatives, Tangent Planes and Normal Lines, Extrema of Functions of Several Variables, Lagrange Multipliers	10
3	Double Integrals, Area and Volume, Double Integrals in Polar Coordinates, Surface Area.	9
4	Triple Integrals, Moments and Center of Mass	6
5	Integrals in Cylindrical Coordinates, Spherical Coordinates, Change of Variables and lacobians	9
...		
Total		

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge**		
1.1	define the basic concepts about partial Derivatives	Class motivations and discussions	Homework assignments

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.2	describe appropriate information for applying partial Derivatives and Multiple integral in various scientific fields.	Solved problems method	Collaborative learning and Team work
...			
2.0	**Skills**		
2.1	form tree for partial differential and plot the double integral	Class discussions	Training reports, Quizzes
2.2	create the solutions of the partial differential and double integral	Class discussions	Training reports, Quizzes
...			
3.0	**Competence**		
3.1	promoting free, creative and critical thinking.		
3.2	working independently.		
3.3	searching for data and information and analyzing them.		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Assignment 1	3	
2	Assignment 2	4	
3	Assignment 3	5	
4	Assignment 4	6	
5	Assignment 5	8	
6	Assignment 6	9	
7	Assignment 7	10	
8	Assignment 8	11	

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :
Available at office hours per week and reachable via email and Blackboard

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Nassar Hassan Alsilmy, Calculus III, Part III 2005, Alrushd
Essential References Materials	Earl W. Swokowski: Calculus : The Classic Edition

Electronic Materials	Course videos on YouTube https://www.youtube.com/channel/UCuvZM50DmUYFjo1BNWDR9SA
Other Learning Materials	https://www.youtube.com/channel/UCuvZM50DmUYFjo1BNWDR9SA

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	• **Classrooms number of seats = 20 seat** • **Computer rooms containing at most 21 PCs** **Rooms equipped with modern teaching techniques and different display devices.**
Technology Resources (AV, data show, Smart Board, software, etc.)	**Data show, Smart Board.**
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	**No need**

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching	**Students**	**Electronic Evaluations**
Extent of achievement of course learning outcomes	**Faculty Members**	**Analysis work by Microsoft-Excel**
Quality of learning resources	**Students, Faculty Members**	**Questionnaires**

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	