



Course Specification

(Postgraduate Programs)

Course Title: Partial Differential Equations I

Course Code: Math 615

Program: Master of Science in Mathematics

Department: Mathematics

College: College of Science and Humanities

Institution: Prince Sattam Bin Abdulaziz University

Version: V3

Last Revision Date: Dec 2024

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A. General information about the course:

1. Course Identification:

1. Credit hours: 3(3,0,0)				
2. Course type				
A.	☐ University	☐ College	☒ Department	☐ Track
B.	☒ Required		☐ Elective	
3. Level/year at which this course is offered: Level 2				
4. Course general Description:				
The space of test functions $C_0^\infty(\Omega)$. The space of distributions and its topology. The convolution product of two distributions. Existence theorem for linear equations with constant coefficients. The space of tempered distributions and Fourier transforms. Sobolev spaces.				
5. Pre-requirements for this course (if any):				
Nil				
6. Co-requirements for this course (if any):				
Nil				
7. Course Main Objective(s):				
To provide an in-depth knowledge in spaces of test functions and distributions, derivatives of distribution and its properties, convolution products of distribution, tempered distributions, Fourier transform of tempered distribution, Sobolev spaces and its simple properties.				

2. Teaching Mode: (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	3 hours a week	100%
2	E-learning		
3	Hybrid - Traditional classroom - E-learning		
4	Distance learning		

3. Contact Hours: (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures (16 X 3)	48
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	
5.	Others (specify).....	
	Total	48

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods:

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Gain an in-depth knowledge about the advanced concepts underlying test functions and distributions, fourier transforms and Sobolev spaces.	K1	1. Class Room Lectures 2.Interactive sessions	1. Two Internal Exams 2.At least two Quiz 3. End Semester Exam
1.2	Recall and reproduce theorems in test functions and distributions, convolution of distributions, Fourier transforms and Sobolov spaces.	K2	3.Group discussion and task	
2.0	Skills			
2.1	Apply test functions and distributions to solve problems.	S1	Application oriented exercise during lecures	Exams
2.2	Develop problem solving skills on convolution products, Fourier transforms and Sobolev spaces.		Group and Induvial task Inquiry based learning	Application oriented Assignment/HW
3.0	Values, autonomy, and responsibility			
...				

C. Course Content:

No	List of Topics	Contact Hours
1.	Test Functions	6
2.	Distributions	6
3.	Derivatives of distributions	6
4.	Distribution with compact support	6
5.	Convolution of distributions	6
6.	Tempered distributions	6
7.	Fourier transforms of tempered distribution.	6



8	Sobolov spaces and its properties	6
Total		48

D. Students Assessment Activities:

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Mid Term Exam I	6	15%
2.	Quiz (Atleast 2 quiz)	4 & 10	10%
3.	Mid Term Exam II	13	15%
4.	Continuous Assessment – Homework, Assignment, Attendance etc.	--	10%
5.	End Semester Exam	17	50%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities:

1. References and Learning Resources:

Essential References	1. Partial Differential Equations, by Lawrence C Evans, American Mathematical Society.
Supportive References	
Electronic Materials	
Other Learning Materials	Lecture notes by the Department

2. Educational and Research Facilities and Equipment Required:

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms with Smartboards with seating facilities for at least 30 students
Technology equipment (Projector, smart board, software)	Smartboard, Internet Connection for Blackboard
Other equipment (Depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students, Graduates	Course Evaluation and Program Evaluation Survey (Indirect)

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of Students assessment	Program Leaders	Peer review (Direct)
Effectiveness of students' assessment	Students	Indirect
Quality of learning resources	Students, Graduates	Indirect (Program Evaluation and Alumni Survey)
Other	Faculty	Indirect (Survey)

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval Data:

COUNCIL /COMMITTEE	DEPARTMENT COUNCIL MEETING 4
REFERENCE NO.	ITEM 4
DATE	OCT 2024

