Course Specification

(Postgraduate)

Course Title: Numerical **Partial Differential Equations I**
Course Code: **Math 615**
Program: *Enter Program Name.*
Department: **Mathematics**
College: **College of Science and Humanities in Alkharj**
Institution: **Prince Sattam bin Abdulaziz University**
Version: **2024**
Last Revision Date: *Pick Revision Date.*

Table of Contents

A. General information about the course:

1. Course Identification:

1. Credit hours: (.....)				
2. Course type				
A.	☐University	☐College	☐Department	☐Track
B.	☒ Required		☐Elective	
3. Level/year at which this course is offered: (.....)				
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)**:**				
6. Pre-requirements for this course (if any)**:**				
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, Sobolov spaces and its simple properties.				

2. Teaching Mode: (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom		
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**	
2.	**Laboratory/Studio**	
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)……**	
	Total	

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 basic concepts underlying test functions and distributions, fourier transforms and Sobolev spaces.**	**K4**	1. Class Room Lectures 2.Interactive sessions 3.Exclusive Office Hours for clearing doubts in small groups	1. Two Internal Exams 2.At least two Quiz 3. End Semester Exam
1.2	**Prove and apply the properties and theorems in test functions and distributions, convolution of distributions, Fourier transforms and Sobolov spaces.**	**K1**		
…				
2.0	**Skills**			

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
2.1	**Contrast the concept of test functions and distributions.**	**S1**		
2.2	**Develop problem solving skills on convolution products, Fourier transforms and Sobolev spaces.**			
3.0	**Values, autonomy, and responsibility**			
3.1				
3.2				
...				

C. Course Content:

No	List of Topics	Contact Hours
1.	Test Functions	6
2.	Distributions	3
3.	Derivatives of distributions	6
3.	Distribution with compact support	3
4.	Convolution of distributions	6
5.	Tempered distributions	6
6.	Fourier transforms of tempered distribution.	6
7.	Sobolov spaces and its properties	6
Total		**42**

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	

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 Peer Review/Class Room Observation	Indirect
Effectiveness of students assessment	Independent member teaching staff	Check marking by an independent member

Assessment Areas/Issues	Assessor	Assessment Methods
		teaching staff of samples of student work.
Quality of learning resources	Students	Indirect
The extent to which CLOs have been achieved	Faculty Member Quality Unit of College and department	Direct Learning outcomes assessment.
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval Data:

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	