Course Specification

(Postgraduate)

Course Title: **Applications on Partial Differential Equations**
Course Code: **MATH667**
Program: **Master Program in Mathematics**
Department: **Mathematics**
College: **Science**
Institution: **University of Tabuk, KSA**
Version: **2**
Last Revision Date: **1/12/1443 H**

Table of Contents

A. General information about the course:

Course Identification	
1. Credit hours:	3 H
2. Course type	
a.	University ☐ College ☐ Department☒ Track☐ Others☐
b.	Required ☐ Elective☒
3. Level/year at which this course is offered: Level-2 or higher	
4. Course general Description	
In this course, we will study some basic fundamentals of Applied Partial Differential Equations. Some important properties, theorems, problems, and applications will be also discussed.	
5. Pre-requirements for this course (if any): None	
6. Co- requirements for this course (if any): None	
7. Course Main Objective(s)	

1. Student continues to mature in their understanding of partial differential equations.
2. Be able to understand the concept of Partial Differential Equations (PDE's).
3. Be able to find complementary function for both homogeneous and non homogeneous partial differential equations of the second and higher order with constant coefficients.
4. Be able to know the applications of Partial Differential Equations (PDE's).
5. Student studies the linear second order equations and their classification.
6. Student studies methods of solution Green's function.
7. Student studies the special analysis of elliptic differential operators in Hilbert space.

1. Teaching mode(mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	45	100 %
2.	E-learning		
3.	Hybrid • Traditional classroom • E-learning		
4.	Distancelearning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours

1.	Lectures	3 H /week
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	
5.	Others (specify)	
	Total	45

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 The students will be able to:			
1.1	Demonstrate the importance of Partial Differential Equations.	K1	Lectures, Group works, Presentations, Classroom discussion, Seminar, Case study, problem solving session	Exams, Quizzes, Research project, presentation, interactive discussion and participation, Surveys.
1.2	Describe the theory of Partial Differential Equations.	K2		
1.3	Enhance the understanding of current topics in Partial Differential Equations.	K3		
2.0	Skills The students will be able to:			
2.1	Applying the Partial Differential Equations in daily life applications	S1	Lectures, Group works, Presentations, Classroom discussion, Seminar, Case study, problem solving session	Exams, Quizzes, Home works, Assignments, Research project, presentation, interactive discussion and participation, Surveys.
2.2	Using Ideas of advance technology for solving Partial Differential Equations.	S3		
3.0	Values, autonomy, and responsibility The students will be able to:			
3.1	Perform work and research results individually or in the group to solve problems in selected topics in	V1	Lectures, Group works, Presentations, Classroom discussion,	Research project, Home works,

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	linear/nonlinear PDEs.		Seminar, Case study, problem solving sessions.	Assignments, presentation, interactive discussion and participation, Surveys.

C. Course Content

No	List of Topics	Contact Hours
1	Partial Differential Equations as mathematical models of physical problem	3
2	Linear Partial Differential Equations	3
3	Second order equations and their classification	3
4	Laplace's equation,	3
5	Physical interpretation	3
6	Minimum principles	3
7	**Mid-Exam #**	---
7	Heat Equation,	3
8	Wave equation	3
9	The Green's function	3
10	Methods of solution Green's function	3
11	Methods of solution Green's function	3
12	Hilbert space,	3
13	Elliptic operators	3
14	Special analysis of elliptic differential operators in Hilbert space	3
15	Special analysis of elliptic differential operators in Hilbert space	3
16+17	**Revision & Final Exam**	
Total		**45**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Home works and Assignments	Weekly basis	20%
2.	Mid-term exam	6th week	25%
3.	Presentation and discussion	During the Semester	15%
4.	Final Exam	At End of Semester	40 %

*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. Haberman. Applied Partial Differential Equations: With Fourier Series and Boundary Value Problems, Pearson (2013) 2.M.Z. Elzanowski,An Introduction to Applied Partial Differential Equations,2003.
Supportive References	1. M. K. Keane, A very Applied Course in Partial Differential Equations, Prentice Hall, Upper Saddler River, NJ, 2002
Electronic Materials	Digital Saudi Arabia
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture Room with capacity of 30 students and equipped with White Board, Library
Technology equipment (projector, smart board, software)	Overhead projector and internet connection.
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Direct and Indirect
Effectiveness of students assessment	Teacher	Direct
Quality of learning resources	Students	Indirect
The extent to which CLOs have been achieved	Teacher, Quality Committee	Direct and Indirect

Assessment Areas/Issues	Assessor	Assessment Methods
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods(Direct, Indirect)

G. Specification Approval Data

Council / Committee	**Approval by the Department Council**
Reference No.	DEPARTMENT COUNCIL NO (26)
Date	**11/9/1444 H**