اعتماد
NCAAA

VISION 2030
المملكة العربية السعودية
KINGDOM OF SAUDI ARABIA

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	Partial Differential Equations
Course Code:	343Math -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: Fifth

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

241Math-3, 213Math -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	---
4	Others (Exams)	3
	Total	48
Other Learning Hours*		
1	Study	30
2	Assignments	10
3	Library	10
4	Projects/Research Essays/Theses	---
5	Others (0.h)	15
	Total	113

* 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 introduces the solutions for different classes of first and second order partial differential equations.

2. Course Main Objective
The main objectives of the course is to familiarize the students with the essential concepts and the solutions of partial differential equations.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge:** By the end of the semester, the students will be able to	
1.1	memorize the basic concepts about partial differential equations effectively.	
1.2	list the solutions of partial differential equations in a sequential way.	
1.3		
1...		
2	**Skills :** By the end of the semester, the students will be able to	
2.1	determine the appropriate method for solving the partial differential equations	
2.2		
2.3		
2...		
3	**Competence:** By the end of the semester, the students will be able to	
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	**Introduction:** Basic Concepts and Definitions, Mathematical Problems, Linear Operators, Superposition Principle, Initial and boundary conditions.	9
2	**Method of Characteristics :** First-Order(Linear- Quasi-Linear – Nonlinear) with constant and variable coefficients.	9
3	**Inverse Operators:** Linear equations with constant coefficients.	6
4	**Method of Separation of Variables:** Hyperbolic Equation , Parabolic Equation , Elliptic Equation, Cylindrical Coordinates, Spherical Coordinates, Nonhomogeneous Problems.	12
5	**Integral Transforms:** Laplace Transform, Fourier Transform. **Green's Functions.**	9
...		
Total		**45**

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	memorize the basic concepts about partial differential equations effectively.	Class motivations and discussions	Quiz Written Exam
1.2	list the solutions of partial differential equations in a sequential way.	Class motivations and discussions	Quiz Written Exam
...			
2.0	**Skills**		
2.1	determine the appropriate method for solving the partial differential equations	Class discussions	Training reports, Quiz
2.2			
...			
3.0	**Competence**		
3.1	working independently.	Project method	oral presentation
3.2	working on team work	Project method	oral presentation
3.3			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Exercises, Homework& Assignments	Open	10%
2	Oral Exam and Rubrics	14th Week	5%
3	Quizzes	Open	5%
4	Written Test(1)	7th Week	15%
5	Written Test(2)	13th Week	15%
6	Final Exam	End of Semester	50%

*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 :

- Introducing the course syllabus, grading scale and the distribution of marks for the course in the first lecture of the course.

- Arrangements for availability of teaching staff for individual student consultations and academic advice (include amount of time teaching staff are expected to be available each week).

- Office hours for a teaching staff for one hour weekly

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	المعادلات التفاضلية الجزئية ، أس فارلو ، ترجمة مها عواد الكبيسي، جامعة عمر المختار، البيضاء، 2005. **Linear Partial Differential Equations for Scientists and Engineers, Tyn Myint U and Lokenath Debnath.**
Essential References Materials	**Partial Differential Equations and MATHEMATICA, P. K. Kythe, P. Puri and M. R. Schaferkotter.**
Electronic Materials	https://www.youtube.com/playlist?list=PLF6061160B55B0203 https://www.youtube.com/watch?v=zt4-hHmOm7I&list=PLGCj8f6sgswntUil8yzohR_qazOfYZCg_ https://www.youtube.com/watch?v=vR5kR0ZyNKY&list=PLlXfTHzgMRUK56vbQgzCVM9vxjKxc8DCr&index=37
Other Learning Materials	**MATHEMATICA or MATLAP**

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** **Peer Reviewer**	**Electronic Evaluations** **Questionnaires**
Extent of achievement of course learning outcomes	**Peer Reviewer**	**Analysis work by Microsoft-Excel**
Quality of learning resources	**Students, Peer Reviewer**	**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	