Course Specification
(Postgraduate)

Course Title:	**Partial Differential Equations**
Course Code:	**202606-3**
Program:	**Master of applied mathematics**
Department:	**Mathematics and Statistics**
College:	**Science**
Institution:	**Taif university**
Version:	1
Last Revision Date:	**20/10/2023**

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A. General information about the course:

1. Course Identification:

1. Credit hours: (3)				
2. Course type				
A.	☐University	☐College	☐Department	☐Track
B.	☒ Required		☐ Elective	
3. Level/year at which this course is offered: Level 1/First Year				
4. Course general Description:				
Dalembert method to solve partial differential equations (wave equation on the real number set – bounded interval- the space). Laplace method to solve the partial differential equations with initial conditions. Fourier method to solve the partial differential equations with initial conditions. Separation variables Method to solve the wave- heat and Laplace equations in polar- spherical and cylindrical coordinates. Super position principle to solve non-homogeneous partial differential with initial conditions. Green function for partial differential equations. Solutions the nonlinear partial differential equations.				
5. Pre-requirements for this course (if any)**:**				
None				
6. Pre-requirements for this course (if any)**:**				
None				
7. Course Main Objective(s):				
The student will be taught as follows: 1. **Study Dalembert method to solve partial differential equations** 2. **Study Laplace method to solve the partial differential equations with initial conditions** 3. **Study Fourier method to solve the partial differential equations with initial conditions.** 4. **Study separation variables Method to solve the wave- heat and Laplace equations in polar- spherical and cylindrical coordinates** 5. **Study separation variables Method to solve the Laplace equations in polar- spherical and cylindrical coordinates** 6. **Study super position principle to solve non-homogeneous partial differential with initial conditions.** 7. **Study Green function for partial differential equations. Solutions the nonlinear partial differential equations.**				

2. Teaching Mode: (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	√	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**	**45**
2.	**Laboratory/Studio**	NA
3.	**Field**	NA
4.	**Tutorial**	NA
5.	**Others (specify)……**	NA
	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**			
1.1	**Recognize** Dalembert method to solve partial differential equations.	K1	Lectures, group discussion `	Exams, Quizzes, Assignments
1.2	**Describe** Laplace method to solve the partial differential equations with initial conditions.	K3	Lectures, group discussion	Exams, Quizzes, Assignments
2.0	**Skills**			
2.1	**Apply** Separation variables Method to solve the wave- heat and Laplace equations in polar- spherical and cylindrical coordinates.	S1	Lectures, group discussion	Exams, Quizzes, Assignments, report

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
2.2	**Demonstrate** Green function for partial differential equations. Solutions the nonlinear partial differential equations.	S5	Lectures, group discussion	Exams, Quizzes, Assignments, report
3.0	**Values, autonomy, and responsibility**			
3.1	**Participate** effectively within groups and independently.	V1	Lectures, group discussion	Exams, Quizzes, Assignments, report
3.2	**Give** responsibility for learning importance and continuing personal and professional development.	V2	Lectures, group discussion	Exams, Quizzes, Assignments, report

C. Course Content:

No	List of Topics	Contact Hours
1.	Dalembert method to solve partial differential equations	9
2.	Laplace method to solve the partial differential equations with initial conditions.	9
3.	Fourier method to solve the partial differential equations with initial conditions..	9
4.	Separation variables Method to solve the wave- heat and Laplace equations in polar- spherical and cylindrical coordinates.	6
5.	Super position principle to solve non-homogeneous partial differential with initial conditions.	6
6.	Green function for partial differential equations. Solutions the nonlinear partial differential equations.	6
Total		**45**

D. Students Assessment Activities:

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	**Quizzes and HomeWorks**	**Continues**	**10 %**
2.	**Midterm exam**	**8th -9th**	**20 %**
3.	**Final exam**	**16th**	**70%**

*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	**Introduction to Partial Differential Equations. ISBN-13: 978-0691043616 ISBN-10: 0691043612**
Supportive References	**Partial Differential Equations: Second Edition ISBN-13: 978-0821849743 ISBN-10: 0821849743**
Electronic Materials	**https://www.amazon.com/Partial-Differential-Equations-Graduate-Mathematics/dp/0821849743**
Other Learning Materials	**None**

2. Educational and Research Facilities and Equipment Required:

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms
Technology equipment (Projector, smart board, software)	Data show, Blackboard, Maple and MATLAB software
Other equipment (Depending on the nature of the specialty)	Wi-Fi internet connections

F. Assessment of Course Quality:

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	**Students**	**Indirect**
Effectiveness of students assessment	**Students**	**Indirect**
Quality of learning resources	**Students**	**Indirect**
The extent to which CLOs have been achieved	**Peer reviewer**	**Direct**
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval Data:

COUNCIL /COMMITTEE	**Department of Mathematics and Statistics**

REFERENCE NO.	
DATE	**20/10/2023**

قسم الرياضيات والإحصاء
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