



**Department of Mathematics College of Science
University of Salahaddin**

Subject: Partial Differential Equations

Course Book – (Year-1)

Lecturer's name: Jabar S. Hassan

Academic Year: 2021/2022

Course Book

1. Course name	Partial Differential Equations and its application
2. Lecturer in charge	Jabar S. Hassan
3. Department/ College	Mathematics/ Science
4. Contact	e-mail : jabar.hassan@su.edu.krd Tel: ()
5. Time (in hours) per week	For Theory: 2
6. Office hours	1 hours
7. Course code	
8. Teacher's academic profile	<p>Name: Dr. Jabar Salih Hassan Work Address: Mathematics Department, College of Science, Salahaddin University-Erbil. Employment: October 2002– up to now: Mathematics Department, College of Science, Salahaddin University-Erbil</p> <p>Qualifications & background</p> <p>1) B. Sc., Salahaddin University-Erbil, College of Science, Mathematics Department, Iraq.</p> <p>2) M. Sc., Al-Mustansiriya University-Baghdad, College of Science, Mathematics Department, Iraq.</p> <p>3) PhD, Missouri University of Science and Technology, Faculty of Science Mathematics and Statistics department , Rolla MO, USA.</p> <p>General specialization: Mathematics. Specific specialization: Differential Equations and Functional Analysis</p> <p>Assignments 2006-2019: Assistant Lecturer, Department of Mathematics, Faculty of Science, Salahaddin University -Erbil, Iraq.</p>

	2020- up to now Lecturer: Department of mathematics, college of science, Salahaddin university.
9. Keywords	Modeling, Wave equation, Diffusion and Heat equation, Some methods
<p>10.Course overview: This course covers the fundamental concepts of PDEs such as how to drive vibration and diffusion models and properties, methods to solve PDEs</p> <p>11. Course objective: The aim of this course is to learn the students Where is the PDEs come from? the fundamental concepts in PDEs. Learn essential idea of Models and their properties. relation between models and PDEs. Furthermore, this course demonstrates major tools to understand the applications in mathematics, physics and engineering.</p>	
<p>12. Student's obligation : You are expected to attend every class for the full class period. If you know in advance that you will not be able to attend, contact me ahead of time. Your enrollment in this course may be terminated due to excessive absences (% 10 per semester).</p>	
<p>13. Forms of teaching Slides, Magic board, discussion and solving problems are in the board and allow students to write the items on the board.</p>	
<p>14. Assessment scheme The students are required to do 2 or 3 closed book exams per year. The exam has 30 marks, the attendance, and classroom activities and quizzes 10 marks. There will be a final exam on 60 marks.</p>	
<p>15. Student learning outcome: The students will learn major mathematical and physical concepts. These concepts will help student to better understand why mathematics play a great role in our real life.</p>	
<p>16. Course Reading List and References: Partial Differential Equations:An Introduction(second edition) Walter A. Strauss John Wiley & Sons, 2007</p>	

17.The Topics: -	Lecturer name
<p>1 Chapter one</p> <p>1.1 Definitions</p> <p>1.2 First order PDEs(transport equations)</p> <p>1.3 Initial/boundary problems</p> <p>1.4 Second order PDEs</p>	
<p>2 Chapter two</p> <p>2.1 The Wave equatoin</p> <p>2.2 Energy</p> <p>2.3 Maximum principl</p> <p>2.4 The Diffusion equatoin</p>	
<p>3. Chapter Three</p> <p>3.1 Separation of variables: Dirichlet Boundary conditoin</p> <p>3.2 The Neumann Boundary condition 3.3</p> <p>3.4 The Robin Boundary condition</p>	
<p>4. Chapter Four</p> <p>4.1 The Coeffiennts of Fourier series</p> <p>4.2 Complex form of the full Fourier series</p> <p>4.3 Orthogonality and general Fourier series</p>	

5 Chapter Five

5.1 Laplaces Equation

5.2- Rectangles and Cubes

6 Chapter Six

6.1 Difference Scheme

6.2 Finite Difference for ODEs

6.3 Finite Difference for PDEs

6.4 Finite Element Method for PDEs

19. Examinations

Apart of exam questions from lecture notes, exercises and home works. In addition, some questions about the subject but not included in the lecture notes for high-level students in the class.

