



Course Summary

Course Instructor	Hayder Majeed Abbas				
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Title	Partial Differential Equations				
Course Coordinator					
Course Objective	Educate the student what is the partial differential equations and methods of solutions and applications in science				
Course Description	Solutions of partial differential equations and applications in heat equations, wave equations and Laplace equations.				
Textbook	1. Elementary Differential Equations and Boundary Value Problems <i>William E. Boyce and Richard C. Di Prima, 2001</i>				
References	1. Partial Differential Equations and Boundary Value Problems with Maple , Second Edition, <i>George A. Articolo, 2009</i>				
Course Assessments	Term Tests	Laboratory	Quizzes	Project	Final Exam
	As (40%)		As (5%)	As (5%)	As (50%)

Course Weekly Outlines

Week	Topics Covered	Lab. Experiment Assignments
1	General concepts of first-order partial differential equations	
2	Formulation of first-order partial differential equations	
3	Solution of quasi linear partial differential equations	
4	Solution of linear partial differential equations	
5	Cauchy problem (integral surface passing through given curve)	
6	Normal surface on given family from surfaces	
7	Complete integral and solution of nonlinear p.d.e.	
8	System of first-order p.d. equations	
9	Charpit's method to solve nonlinear p.d.e.	
10	Special cases of charpit's method	
11	Jacobi's method to solve nonlinear p.d.e.	
12	The complement solution of homogeneous P.d.e with constant coefficients	
13	The complement solution of non-homogeneous P.d.e with constant coefficients	
14	The particular solution of non-homogeneous P.d.e	
15	Solutions of Lagrange equations P.d.e with non constant coefficients	
16	Definition Fourier series	
17	Fourier convergence theorem	
18	Even and Odd functions	
19	Heat Conduction equation with homogeneous boundary conditions	
20	Heat Conduction equation with Non homogeneous boundary condition	
21	Bar with insulated Ends	
22	Heat Conduction equation with heat source	
23	Vibrations of an elastic string	

24	Elastic string with nonzero initial displacement	
25	Elastic string with nonzero initial velocity	
26	General problem for the elastic sting	
27	Dirichlet problem for Laplace equation in rectangle and polar coordinates	
28	Dirichlet problem for a circle	
29	Neumann problem for rectangle and circle	
30	Two-Dimensional heat flow and Laplace's equation	