

Syllabus for SM315 Partial Differential Equations

Fall Semester, 2007-2008

TEXT: Applied Partial Differential Equations, 4th Edition, Richard Haberman

Module	Day/Date			Reading Assignment	Homework	Notes	
I. Fourier Series	1	Mon	8/20	Introduction, Classification of PDE's	Handout		
	2	Wed	8/22	2.3 Sep. of Variables/Heat Eqn	(55) 1a,2a,3a		
	3	Fri	8/24	2.3 (Appendix) Orthogonality	Proof (Handout)		
	4	Mon	8/27	3.1 Fourier Series 3.2 Convergence of FS.	(95) 1abc, 2ab (plot using L=1)		
	5	Wed	8/29	3.3 Fourier Sin/Cos Series	(114) 1abc, 2a, 6a		
	6	Fri	8/31	3.4 Differentiation of FS	(125) 4ab, 5		
	---	Mon	9/3	Labor Day			
	7	Tue	9/4	3.5 Integration of FS	(131) 2ab	Mon Sched.	
	8	Wed	9/5	MATLAB Introduction/Review	MATLAB Problem		
II Heat Equation $\frac{\partial u}{\partial t} = k \frac{\partial^2 u}{\partial x^2}$ (Parabolic PDE)	9	Fri	9/7	1.1 Derivation of Heat Equation 1.2 Boundary/Initial Conditions 1.3 Equilibrium of Heat Equation	(14) 1, 2 (19) 1adfh, 3		
	10	Mon	9/10	2.3 1D Heat Eqn w/T=0 at Ends	(55) 1cf, 2abd		
	11	Wed	9/12	2.3 Worked Examples	(55) 3b, 7a*b*		
	12	Fri	9/14	2.4 Heat Equation w/Insulated Ends	(69) 1b, 2*		
	13	Mon	9/17	2.4 Heat Equation in Circular Ring	(69) 3, 6		
	14	Wed	9/19	Team Problem Session	Handout 1, 2		
	15	Fri	9/21	MATLAB Session	Handout 3, 4**		
	16	Mon	9/24	8.1/8.2 Ht Eqn w/T ≠ 0 Ends	(352) 1abc	Ac Res	
	17	Wed	9/26	8.1/8.2 Ht Eqn w/non-Zero Source	(352) 1df	Ac Res	
	18	Fri	9/28	Team Problem Session	Handout 5**,6	Ac Res	
	19	Mon	10/1	Test 1			
III LaPlace's Equation $\nabla^2 u = 0$ (Elliptic PDE) Wave Equation $\frac{\partial^2 u}{\partial t^2} = \omega^2 \frac{\partial^2 u}{\partial x^2}$ (Hyperbolic PDE) Bessel Functions	20	Wed	10/3	2.5 Heat Equation (2D - 3D)	TBD		
	21	Fri	10/5	2.5 Laplace's Eqn in a Rectangle	MATLAB Project		
	---	Mon	10/8	Columbus Day			
	22	Wed	10/10	2,5 Continued/MATLAB	MATLAB Project	6 Wk Grades	
	23	Fri	10/12	4.2/4.3 Derivation of Wave Eqn	(138) 1ab*, 2		
	24	Mon	10/15	4.4 Vibrating String/Fixed Ends	Handout Problem 1, 2		
	25	Wed	10/17	Klein Gordon Equation	Handout Problem 3		
	26	Fri	10/19	Telegraph Equation	Handout Problem 4		
	27	Mon	10/22	8.3 Non Homogeneous Wave Problem	Handout Problem 5		
	28	Wed	10/24	7.3 Vibrating Rectangular Membrane	(287) 4a		
	29	Fri	10/26	7.3 (cont)	(287) 5		
	30	Mon	10/29	7.7 Vibrating Circular Membrane		Ac Res	
	31	Wed	10/31	7.7 Bessel Functions	(315) 1	Ac Res	
	32	Fri	11/2	7.8 More on Bessel Functions	(315) 10	Ac Res	
	33	Mon	11/5	Test Review		12 Wk Grades	
34	Wed	11/7	Test 2				
35	Fri	11/9	Test Review/ MATLAB Project				
IV Numerical Methods Projects	---	Mon	11/12	Veterans' Day			
	36	Wed	11/14	6.2 Finite Difference Eqn's	(228) 4		
	37	Fri	11/16	6.2 Finite Difference Eqn's	(228) 5	Select Project	
	38	Mon	11/19	6.3 FD Schemes/Heat Eqn 6.4 FD Schemes/Heat Eqn 2D	(256) 1, 2 (259) 5	OPINFO	
	39	Wed	11/21	6.5 FD Schemes/Wave Eqn	TBD	Early Sched	
	---	Fri	11/23	Thanksgiving Holiday			
	40	Mon	11/26	6.6 FD Schemes/Laplaces Eqn	TBD		
	41	Wed	11/28	Project Work			
	42	Fri	11/30	Project Work			
	43	Mon	12/03	Presentation Groups 1, 2			
44	Wed	12/05	Presentation Groups 3, 4				