Ma221-2024 fall

Differential Equations

Text: Zill, "DEs with BVPs", 9e or 8edition

Midterm exams run during lecture periods in lecture classes.

Recitations 10%

Hw 15%

No.	Date	Topics		Practice problems	Due Tuesdays 11:59 pm	Wk
R1	3-Sep	Integration review: by parts and substitution			Hw01 Bonus due 9/3.	
L1	4-Sep	Intro to DEs, IVP, non-uniqueness		1.1: 7,13,15,20,29; 1.2: 25	Hw01 due 9/10, 11:59 pm	1
L2	6-Sep	Direction field, autonomous, phase portrait		2.1: 21,22,23,24,27,38,39,40		
L3	9-Sep	Separable eqns		2.2: 3,6,11,23,34		
R2	10-Sep	1.1: 1, 11. 1.2:15		1.1: 2,16,28,32; 1.2: 15,16	Hw02 due 9/17	2
		1st order linear eqns: integrating factor		2.3: 23,25,27	Hw02 bonus due 9/17	
L4	11-Sep	1st order linear eqns: variation of parameter		2.3: 29, 31, 33, 35		3
L5	13-Sep	Exact eqns, integrating factor		2.4: 4, 5,6,23,27,30		
L6	16-Sep	Bernoulli eqn.		2.5: 15-22, 37, 38.		
R3	17-Sep	2.3: 27		2.3: 26,28,32,42	Hw03 due 9/24	
L7	18-Sep	Modeling with DE	1.3	1.3: 2,3,4,5,7,9,15,17	Hw03 bonus due 9/24	4
L8	20-Sep	General theory for linear ODEs	4.1	4.1: 5,15,20,24,35		
L9	23-Sep	Reduction of order	4.2, 4.3	4.2: 12, 23.		5
R4	24-Sep	2.3: 35; 2.4: 5		2.3: 43; 2.4: 12,28; 2.5: 16	Hw04 due 10/1	
Ex-1	25-Sep	1st-order ODEs. L1-L7, Hw 01-03	**15%**		Hw04 bonus due 10/1	
L10	27-Sep	Constant coeff, homogeneous eqn (real roots)		4.3: 1,3,5,7,31, 34,35,49,57		
L11	30-Sep	Constant coeff, homogeneous eqn (comp roots)	4.3			
R5	1-Oct	4.1: 17; 4.3: 35		4.1: 18, 20; 4.3: 4,6,32	Hw05 due 10/8	
L12	2-Oct	Nonhomogeneous eqns: undetermined coeff	4.4	4.4: 3,7,9,15,22,23,27,31	Hw05 bonus due 10/8	
L13	4-Oct	Undetermined coefficients	4.4			6
L14	7-Oct	Variation of parameters		4.6: 2,3,7,10,13,21,22,24		
R6	8-Oct	4.4: 17; 4.6: 9		4.4: 12,16,22; 4.6:2,8	Hw06 due 10/15	
L15	9-Oct	Variation of parameters		4.6: 1,3,4,5,6,10,12,23	Hw06 bonus due 10/15	
L16	10-Oct	Cauchy-Euler equations	4.7	4.7: 1,2,5,7,20,21,23,24,30		7
L17	14-Oct	Modeling	3.1, 5.1	3.1: 1,2,23,24,25		
R7	15-Oct	4.6: 7; 4.7: 5		4.4, 4.6, 4.7	Hw07 due 10/22	
				5.1: 3,4,18,20,22,31, 37-41	Hw07 bonus due 10/22	
L18	16-Oct	Power series solutions	6.2	6.2: 3-10		

L19	18-Oct	Bessel equation				
L20	21-Oct	Review to Exam 2				8
R8	22-Oct	4.6; 4.7		4.4, 4.6, 4.7	Hw08 due 10/29	
Ex-2	23-Oct	Linear ODEs. L8-L16, Hw 04-07	**15%**		Hw08 bonus due 10/29	
L21	25-Oct	Linear Systems **(Ma293 starts)**		8.1, 8.2		
L22	28-Oct	Linear Systems		8.2: 1-8, 19-24, 33-38.		9
R9	29-Oct	8.1: 11, 12; 8.2: 5, 21, 35			Hw09 due 11/05	
L23	30-Oct	Orthogonal fnctns, Fourier trig series	11.1,11.2	11.1: 1,2,9-12; 11.2: 1-10, 15-16	Hw09 bonus due 11/05	
L24	1-Nov	Two-point BVPs, 4 simplest Eigenvalue problems		5.2: 9-14, 27-28, 31-32.		
L25	4-Nov	PDEs: separation of variables; Heat eqn		12.1: 1-11; 12.2: 1-6; 12.3: 1-6		10
R10	5-Nov	5.2: 1; 12.3: 1			Hw10 due 11/12	
L26	6-Nov	Heat eqn	12.3	12.3: 8	Hw10 bonus due 11/12	
L27	8-Nov	Heat eqn		Ch12 Review 1-4		
L28	11-Nov	Wave eqn - derivation, separation od variables	12.4	12.4: 1-10		11
R11	12-Nov	12.4: 1			Hw11 due 11/19	
L29	13-Nov	Wave eqn		12.4: 13-18	Hw11 bonus due 11/19	
L30	15-Nov	Wave eqn, d'Alembert solution				
L31	18-Nov	Laplace transform. Inverse transform; derivatives	7.1, 7.2	7.1: 1-10; 19-32, 37-38.		12
R12	19-Nov	7.1: 1; 7.2: 13, 31		7.2: 1-16, 31-38	Hw12 due 11/26	
L32	20-Nov	Translation theorems, step functions	7.3	7.3: 1-18, 21-32, 37-54, 67-68.	Hw12 bonus due 11/26	
L33	22-Nov	Delta-functional as derivative of step-function	7.5	7.5: 1-10, 15		
L34	25-Nov	Laplace transform continued				13
R13	26-Nov	7.3: 21, 67; 7.5: 3, 4			Hw13 due 12/03	
		Thanksgiving Recess			Hw13 bonus due 12/03	
L35	2-Dec	Exam 3 Review: PDEs and LT (L21-L34, Hw 8-13)				14
R14	3-Dec	12.3: 4			Hw14 due 12/10	
Ex-3	4-Dec	Systems, PDEs and LT. L21-L29, Hw 09-13	**15%**		Hw14 bonus due 12/10	
L36	6-Dec	PDEs review				
L37	9-Dec	LT for systems of ODEs	7.6	7.6: 1-6		15
R15	10-Dec	4.2: 3 - solve by different methods;Ch12 Review: #5		3.2: 1, 2, 3, 5, 8,15,18,19,21		
L38	11-Dec	Nonlinear modeling: pendulum, etc.	3.2, 5.3	4.2: 7, 9, 13,15.		

Final Exam (cumulative) **30%**

The syllabus may be modified. Last update: 08/27

Grading: A: 90+
A- : 86-90%
B+: 82-86%
B: 78-82%
B-: 74-78%
C+: 70-74%
C: 66-70%
C-: 64-66%
D+: 62-64%
D: 60-62%
F: 0-60%

bonuses can be earned for class activity, bonus HWs, and the bonus problems in the final exam

No curve! Earn bonuses!