DIFFERENTIAL EQUATIONS
SM212 SECOND SEMESTER 2003-2004
Textbook: *Differential equations with Boundary Value Problems, 5th ed.,*
by Dennis G. Zill and Michael R. Cullen.

Certain lessons in this syllabus are marked CP under the page heading. For these lessons, your instructor may ask you to use Maple or the TI92 or another software package to solve and plot, by numerical means, the indicated problem. Many problems need to be solved and plotted by numerical means since these problems may not have an explicit solution written as elementary functions. These problems may help you understand the usefulness of the numerical approach.

LESSON/PAGES	TOPICS	PROBLEMS
1. 2-10	1.1 Introduction to Diff. Eqs	p.10: 1,3,11,15cp,18,40
2. 15-19	1.2 Initial Value Problems	p.19: 1,4,7,8,13,14,26
3. 40-47	2.1 Solution Curves/Direction Fields	p.47: 1,5cp,7cp,15,16
4. 51-57	2.2 Separable variables	p.57: 5,6,7,13,16,25
5. 60-68	2.3 First-order linear	p.69: 5,7,9,26,27
6. 72-78	2.4 Exact equations	p.79: 1,2,4,21,22
7. 86-91,414-415	2.6, 9.1 Numerical Solutions	p.91: 1,2,5CP, p.415: 1,2
8.	review	
9. 96-100	3.1 Applications (growth/cooling)	p.103: 3,7,8,9, 13
10. 100-103	3.1 Applications (mixing/circuits)	p.103: 17,19,20, 23,29
11. 100-103	3.1 Applications (falling body)	p.103: 29,30,31,32
12., 13.	review/Test 1	
14. ,15. 139-151	4.1 IVPs/General solutions	p.151: 1,3,5,11,17,21,23,27,31,35
16,17. 158-163	4.3 Homogeneous w/const. coeffs	p.163: 3,5,12,15,30,43,47
18. 178-186	4.5 Undeter. Coeffs. w/Annihilators	p.186: 2,10,13,17,21
19. 178-186	4.5 Undeter. Coeffs. w/Annihilators	p.186: 25,35,40,43,56,66
20. 188-192	4.6 Variation of Parameters	p.192: 1,2,3,19
21. 216-223	5.1 Springs (Free)	p.229: 1,2,19
22. 216-223	5.1 Springs (Free)	p.229: 11
23. 216-223	5.1 Springs (Free)	p.229: 21,23,25
24. 224-229	5.1 Springs (Forced), Circuits	p.233: 29,36,38,39
25. 224-229	5.1 Springs (Forced), Circuits	p.233: 46,47,53
26, 27.	review/Test 2	

LESSON/PAGES	TOPICS	PROBLEMS
28. 307-312	7.1 Laplace Transform	p.312: 3,10,17,26,38
29. 314-322	7.2 Inverse Laplace/Derivatives	p.322: 3,4,15,18,23,33,34
30. 324-328	7.3 First Translation Theorem	p.333: 3,6,12,15,23,34
31.	review	
32. 328-333	7.3 Unit Step, Second Translation	p.335: 37,39,42,43,47,50,64,66
33. 338-345	7.4 Derivatives/Convolution	p.347: 1,4,7,8,11,12,28,36
34.	review	
35. app3-20	App. II Introduction to matrices	app20:4,14,15,16
36. app3-20	App. II Introduction to matrices	app20:23,31,41,42
37. 354-358	7.6 Systems of Laplace equations	p.358: 1,2,3
38. 126, 354-358	7.6 Application: electrical networks	p.358: 15,20
39. 427-431	9.4 Euler's Method for systems	p.432: 1,8cp (by Euler's method)
40,41.	review/Test 3	
42. 484-488	11.1 Orthogonal Functions	p.488: 1,2,8,10
43. 489-494	11.2 Fourier Series	p.494: 1,3,7,19
44.,45. 494-501	11.3 Fourier Sine and Cosine Series	p.501: 1,2,3,4,11,25, 26
46.	review	
47. 522-525	12.1 Separable PDEs	p.525: 1,10,11
48. 527-528	12.2 Setting up the Heat Equation	p.532: 1,2,3
49. 533-535	12.3 Heat Equation (zero ends)	p.535 1,2,7
50. 533-535	12.3 Heat Equation (insul ends)	p.535 3,4
51.	review	
52. 536-539	12.4 Wave Equation (0 init vel)	p.539: 1,4
53.-58.	Review/Test 4	Review for final

Class web page:
`http://cadigweb.ew.usna.edu/~wdj/teach/sm212.html` You will find the policy statement, some lecture notes, and old hourly and final exams there.

For hints on using the TI92, see
`http://cadigweb.ew.usna.edu/~wdj/teach/sm212_ti92.html`

The Maple code at
`http://cadigweb.ew.usna.edu/~wdj/teach/sm212/sm212_euler.htm` helps with the CPs in lessons 3 and 7.

The Maple code at
`http://cadigweb.ew.usna.edu/~wdj/teach/sm212/sm212_euler_2x2.html` helps with the CPs in lesson 37.