

Differential Equations
 SM212 Fall Semester 2008-2009
 Textbook: *Differential equations with Boundary Value Problems, 7th ed.*,
 by Dennis G. Zill and Michael R. Cullen.

Some quizzes and hour exams may require use of the USNA Mathematical Tables in lieu of a calculator. Your instructor will determine this.

LESSON PAGES	SECTION/TOPIC	PROBLEMS
2-10	1.1 Introduction to differential equations	p. 10: 1,2,13,19,27,29
13-16	1.2 Initial value problems	p. 17: 1,9,13,14,17,25,26
44-50; 53-58	2.2 Separation of variables; 2.3 Linear equations	p. 50: 1,6,7,17,25; p.60: 3,5,10,23,27,28
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85-87	3.1 Applications of linear models: Cooling and mixing	p. 89: 13,17,21,25
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189-191	5.1.3 Mass-spring system with external force	p. 194: 31,39
87-88,192-193	5.1.4 Series electrical circuits	p. 194: 45,47,53 Review
256-258	7.1 Laplace transform	p. 261: 5,7,11,25,31,38
262-265	7.2.1 Inverse LT	p. 269: 5,15,23,27
265-269	7.2.2 Solving DE's using LT's	p. 269: 33,35,39
270-274	7.3.1 First translation theorem	p. 278: 5,9,11,15,21,29
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274-277	7.3.2 Unit step function in a DE Review	p. 278: 65,71,73
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292-294	7.5 Dirac delta function	p. 295: 1,3,9,11
295-297	7.6 Solving systems of DE's using LT's Review Test 2	p.299: 1,3,14

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App-10-App-14	Appendix II.2 Solving linear systems by row reduction	p. App-18: 31,35,39
App-10-App-14	Appendix II.2 Matrix inverse by row reduction	p. App-18: 41,45
App-14-App-18	Appendix II.3 Cramer's rule, eigenvalues and eigenvectors	p. App-18: 47,49,53
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304-310	8.1 Systems of DE's	p. 310: 1,11,13,17,21,23
311-315	8.2.1 Linear systems with real, distinct eigenvalues	p.324: 1,3,5,7
320-324	8.2.3 Linear systems with complex eigenvalues	p.324: 33,35,37,39
329-332	8.3.2 Nonhomogeneous systems by variation of parameters	p.332: 11,13,15,29
109-110,297-298	3.3,7.6 Electrical networks	p. 299: 15,16; p. 332: 33
353-355	9.4 Euler's method for linear systems and higher order DE's	p.357: 1,9 (use Euler's method with $h = 0.1$)
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398-402	11.1 Orthogonal functions	p.402: 1,10,12,17
403-405	11.2 Fourier series	p.407: 1,3,5,9
405-407	11.2 Convergence of FS's	p. 407: Graph FS(x) for 7,11; 17,19
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	Review	
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	Final examination review	

Class web page:

<http://www.usna.edu/Users/math/wdj/teach/sm212/>

You will find the policy statement, typed lecture notes, and old hourly and final exams there.

For hints on using the TI92, see

http://www.usna.edu/Users/math/wdj/teach/sm212_ti92.html

For hints on using SAGE to solve DEs (and systems of DEs) using Euler's method, see

<http://modular.math.washington.edu/sage/doc/tut/node15.html>

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Computer projects (for sections taught by Prof Joyner): Five are due. They are found at the end of each lecture marked “(with SAGE examples)” at <http://www.usna.edu/Users/math/wdj/teach/sm212/index.html#notes> They are designed to be very simple, and based on an example given in that lecture. If you read the lecture and get stuck on the syntax, just print out what you tried and bring it in. Each lecture has 1 exercise at the end. Do any five. Though you can get help in installing SAGE from others, you must work on your own for the CPs. No collaboration. You can hand in an incorrect CP and later redo it for full credit. Follow

http://www.usna.edu/Users/math/wdj/teach/sm212/sm212_sage.html

for the format of submitting an assignment.

You can do 5 more for extra credit for a total of 10. Everything is due the last day of class, though I recommend you hand it in sooner.

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