**SYLLABUS - SM212 Differential Equations (MTWR)**

Spring Semester 2013

Textbook: Differential Equations w/Boundary Value Problems, 8th ed., Dennis Zill

(Problems that are bold, italicized, and starred, i.e. ***25\****, are not in WebAssign and must be done by hand)

| **Module** | **Day/Date** | | | **Reading Assignment** | **Problems** | **Notes** |
| --- | --- | --- | --- | --- | --- | --- |
| **Intro**  **-----**  **1st Order DEs**  **-----**  **2nd Order**  **Homogeneous DEs** | 1 | T | 1/8 | 1.1 Definitions and Terminology | p.10: 1,3, 5,7,9,11,15,19,23,  27,33 | Monday  Schedule |
| 2 | W | 1/9 | 1.2 IVPs | p.17: 1,3,7,9,11,15,17,21,25,33 |  |
| 3 | R | 1/10 | 2.1.1 Direction Fields, Isoclines  2.2 Separable DEs | p.43: 1,3,4  p.51: 1,3,5,7,15,17,25 |  |
| 4 | M | 1/14 | 2.3 1st Order Linear DEs | p.61: 3,5,7,9,25,27 |  |
| 5 | T | 1/15 | 2.6 Euler’s Method | p.79: 1,7 |  |
| 6 | W | 1/16 | 3.1a **APP**: Growth & Decay/Cooling | p.90: 3,5,13,15,19 |  |
| 7 | R | 1/17 | 3.1b **APP**: Electrical Circuits/Air Resistance | p.92: 29,31, 35 |  |
| **Monday, 21 January -- Martin Luther King Day** | | | | | |
| 8 | T | 1/22 | 3.1c **APP**: Mixing | p.91: 21,23,***25*\***,26 | Add Deadline |
| 9 | W | 1/23 | 4.1.1a IVPs/General Solutions/Basic Theory | p.127: 1,4,***5\****,9,13 |  |
| 10 | R | 1/24 | 4.1.1b Basic Theory Continued | p.128: 17,21,23,27,36,40 |  |
| 11 | M | 1/28 | 4.3a Homogeneous Lin Del, Aux Eqn w/Real Unique Roots & w/Repeated Roots | p.137: 3,7,15,17,21,31,37 |  |
| 12 | T | 1/29 | 4.3b Aux Eqn Complex Roots | p.137: 9,11,19,29,33,43,45,47 |  |
| 13 | W | 1/30 | 5.1.1a **APP**: Mass/Spring (Free Undamped Motion) | p.205: 1,3,5,8 |  |
| 14 | R | 1/31 | 5.1.2a **APP**: Mass/Spring (Free Damped Motion) | p.206: 21,23,25,27 |  |
| 15 | M | 2/4 | Review |  |  |
| **16** | T | **2/5** | **Test 1** |  |  |
| **2nd Order Non-Homogeneous DEs**  **-----**  **Introduction to**  **Laplace Transforms** | 17 | W | 2/6 | 4.4a Undetermined Coefficients | p.147: 1,5,11,15,21 |  |
| 18 | R | 2/7 | 4.4b Undetermined Coefficients | p.147: 27,29,33,37 |  |
| 19 | M | 2/11 | 5.1.1b **APP**: Springs (Driven Motion) | p.207: 29,30,31 | Academic  Reserve |
| 20 | T | 2/12 | 5.1.2b **APP**: Electrical Circuits | p.209: 45,47,49; |
| 21 | W | 2/13 | 5.1.2c **APP**: Resonance | p.207: 33,37; |
| 22 | R | 2/14 | 7.1 Laplace Transforms | p.280: 3,9,11,23,25,31,37,39 |
| **Monday, 18 February -- Washington’s Birthday** | | | | | |
| 23 | T | 2/19 | 7.2.1a Inverse Laplace Transforms | p.288: 1,3,5,7,9,11,15, |  |
| 24 | W | 2/20 | 7.2.1b Inverse LTs & Partial Fractions | p.289: 19,23,25,29 | Grades |
| 25 | R | 2/21 | 7.2.2 Laplace Transforms of Derivatives | p.289: 31,33,37,39 | MAPRS |
| 26 | M | 2/25 | 7.3.1a 1st Trans Theorem/Completing Square | p.297: 3,5,7,11,13,15,19 |  |
| 27 | T | 2/26 | 7.3.1b continued | p.298: 21,23,25,27,33(**APP**) |  |
| 28 | W | 2/27 | Review |  |  |
| **29** | R | **2/28** | **Test 2** |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Module** | **Day/Date** | | | **Reading Assignment** | **Problems** | **Notes** |
| **More**  **Laplace Transforms**  **-----**  **Systems of DEs**  **-----**  **Matrix Theory** | 30 | M | 3/4 | 7.3.2a Unit Step Function/2nd Trans Theorem | p.298: 37,39,41,43,45,47 |  |
| 31 | T | 3/5 | 7.3.2b Unit Step Function | p.298: 49,53, 55,57,61,63,67 |  |
| 32 | W | 3/6 | 7.4.2c Derivatives/ Convolution | p.309: 1,3,11,19,21.31,33 |  |
| 33 | R | 3/7 | 7.5 Dirac Delta Function | p.315: 1,3,5,7,9 | Early Sched |
| **11-15 March Spring Break** | | | | | |
| 34 | M | 3/18 | 7.H1 Green’s Function (Impulse Response) - [Handout](file:///O:\SM212%20FA12\SM212Web\Lecture%20Notes\Module%203\Section%207.5H%20Impulse%20HO.pdf) | Assignment 7.H1 |  |
| 35 | T | 3/19 | AIIa Matrix Theory (no inverse) | App-18: 1,6,14 |  |
| 36 | W | 3/20 | AIIb Matrix Inverse/Cramer’s Rule. | App-18: 15,16,24,29 |  |
| 37 | R | 3/21 | AIIc Gaussian Elimination (rref/inv on calc) | App II: 32,36,39, 41 |  |
| 38 | M | 3/25 | 7.6a Systems by LTs | p.319: 1,5,7,11 |  |
| 39 | T | 3/26 | 7.6b **APP**: Coupled Springs | p.319: 13,**14\*** |  |
| 40 | W | 3/27 | 7.6c **APP**: Electrical Networks | p.319: 15, 17 |  |
| 41 | R | 3/28 | Review |  |  |
| **42** | M | **4/1** | **Test 3** |  | Academic  Reserve |
| **Eigenvalues**  **&**  **Eigenvectors**  **-----**  **Fourier Series**  **-----**ꜛ  **Partial DEs**  **&**  **Heat Equation** | 43 | T | 4/2 | AIId Eigenvalues/Vectors (2x2 Matrices) | App-19: 47,48,49 |
| 44 | W | 4/3 | 8.1 Systems of DEs in Matrix Form | p.332: 1,5,7,9,11,21 |
| 45 | R | 4/4 | 8.2.1 Distinct Real Eigenvalues | p.332: 1,3,13 |
| 46 | M | 4/8 | 9.4 Euler’s Method for Systems | p.379: 1,***6\****(use Euler) |  |
| 47 | T | 4/9 | Review |  | Grades |
| 48 | W | 4/10 | 11.2a Fourier Series (FS) | p.430: 1,3,5,13 | MAPRs |
| 49 | R | 4/11 | 11.2b FS-Convergence/Periodic Extension  11.3a Odd/Even Functions | p.431: ***17***\*,18  p.437: 1,3,5,7 | Drop  Deadline |
| 50 | M | 4/15 | 11.3b Fourier Sine/Cos Series (FSS/FCS) | p.437: 13,15,18,25,29 |  |
| 51 | T | 4/16 | 12.1a PDEs, Separation of Variables (1st Order) | p.459: 1,3,5 |  |
| 52 | W | 4/17 | 12.1b PDEs, Separation of Variables (2nd Order) | p.459: 7,9,12 |  |
| 53 | R | 4/18 | 12.3a **APP** Heat Equation (0 Temp Ends) | Handout |  |
| 54 | M | 4/22 | 12.3b **APP** Heat Equation (More Practice) | p.468: 1,2 |  |
| 55 | T | 4/23 | 12.3b **APP** Heat Equation (Insulated Ends) | p.468: ***3***\*,4 |  |
| 56 | W | 4/24 | Review |  |  |
| **57** | R | **4/27** | **Test 4** |  |  |
| **Final Exam** | 58 | M | 4/29 | Review for Final |  |  |
| 59 | T | 4/30 | Review for Final |  |  |
| R | W | 5/1 | Reading Day |  |  |
| F | ? | TBD | Final |  |  |