

## Rensselaer Polytechnic Institute

**Department of Mathematical Sciences**  
**Syllabus** Math 2400 Introduction to Differential Equations  
Spring 2006 Sections 1 – 4 and 9 - 12


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<th>Week</th>
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| 1    | Jan 17 - 20 | 1.3, 2.1 | Terminology. Linear DE  
HW: 1.3 # 1, 5, 7, 11, 18, 20, 25; 2.1 # 2c, 6c, 10c, 13, 16, 20, 30 |
| 2    | Jan 23 – 27 | 2.2, 2.4 | Separation of Variables. Conditions for solutions  
HW: 2.2 # 2, 3, 6, 9, 18, 30abde, 31; 2.4 # 1, 3, 13, 14, 24, 25, 29, 32 |
| 3    | Jan30 - Feb 3 | 3.1 – 3-4 | General properties of second order DE. Real and Complex roots  
HW: 3.1 # 1, 5, 6, 7, 17, 22; 3.2 # 2, 3, 4, 7, 9, 21;3.3 # 3, 4, 17; 3.4 # 10, 12, 17, 18 |
| 4    | Exam 1 Feb 6 – 10 | 3.5 | Repeated roots. Reduction of order  
HW: 3.5 # 1, 12, 28, 30 |
| 5    | Feb 13 -17  | 3.6 | Method of Undetermined Coefficients  
HW: # 3, 4, 6, 9, 10, 13, 14, 15, 17, 28  
3.8, 3.9 These sections are recommended for personal reading |
| 6    | Feb 21 – 24 | 5.5, 3.7 | Euler Equation. Method of Variation of Parameters  
HW: 5.5 #1, 4, 5, 15, 19; 3.7#1, 2, 5, 8, 13, 17, 23 |
| 7    | Feb 27 – Mar 3 | 6.1- 6.3 | Laplace transformation, its properties and applications  
HW: 6.1 # 5, 27; 6.2 # 12, 16, 20, 24; 6.3 # 3, 4, 7, 12, 13, 14, 32 |
| 8    | Exam 2 Mar 6 -10 | 6.4 – 6.6 | Laplace transformation (continued)  
HW: 6.4 #1, 4, 5; 6.5: # 1, 7, 8; 6.6 # 5, 6, 11, 25 |
| 9    | Mar 20 – 24 | 7.3, 7.5 | Linear Systems of DE  
HW: 7.3 # 3, 4, 15, 18; 7.5 # 3a, 5a, 13, 16 |
| 10   | Mar 27 – 31 | 7.6, 7.8 | Complex and repeated eigenvalues  
HW: 7.6 # 3a, 5a, 7, 10; 7.8 # 2a, 11a |
| 11   | Apr 3 - 7    | 10.2-10.4 | Fourier series  
HW: 10.2 # 1, 7, 13, 14, 16; 10.3 # 1, 2, 4, 13, 14; 10.4 # 1, 5, 9, 11, 15 |
| 12   | Apr 10 – 14 | 10.5 -10.7 | Heat conduction in a rod. Vibrating string  
HW: 10.5 # 7, 9, 10 ;10.6 # 5, 11a; 10.7 # 1a, 9, 13, 16 |
| 13   | Exam 3 Apr 17-21 | 10.8, 9.1 | Fourier series applied to Laplace equation. Nonlinear systems  
HW: 10.8 # 1ab, 5, 6ab, 7; 9.1 # 1abc, 3abc, 13 |
| 14   | Apr 24-28   | 9.1, 9.2 | Phase plane analysis. Stability  
HW: 9.2 # 1, 3, 15, 18 |
| 15   | May 1 – 3   | 9.3 | Almost linear systems. Lotka-Volterra Equations  
HW: 9.3 # 1, 3, 4, 13 |

**Grading system:** 20% for each of the 3 exams; HW (20%); Quizzes (8%); Maple projects (8%); Class attendance and participation (4%). The final is optional, it can only improve the student’s grade, and may replace the lowest of the 3 exam Grades.

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