# Math 2400 - Introduction to Differential Equations

**Department of Mathematical Sciences**

**Syllabus**

**Math 2400** Introduction to Differential Equations  
**Spring 2007** Sections 1 – 4 and 9 – 12  
(Syllabus updated on January 11, 2007)


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<th>Week</th>
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| 1    | Jan 16-19 | 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, 33 |
| 2    | Jan 22-26 | 2.2, 2.4 | Separation of variables. Conditions for solutions  
HW: 2.2 # 2, 3, 6, 9, 18, 30a-e, 31; 2.4 # 1, 3, 13, 14, 24, 25, 29, 32 |
| 3    | Jan 29-Feb 2 | 3.1 – 3.4 | Properties of 2nd order linear DE. Real and complex roots  
HW: 3.1 # 1, 5, 6, 7, 17, 22; 3.2 # 2, 3, 5, 7, 9, 21; 3.4 # 10, 12, 17, 18 |
| 4    | Feb 5 – 9 | 3.5 | Repeated roots. Reduction of order  
HW: 3.5 # 1, 12, 14, 28, 30 |
| 5    | Feb 12 – 16 | 3.6 | Method of Undetermined coefficients  
HW: 3.6 # 3, 4, 6, 9, 10, 13, 14, 15, 17, 28  
These sections are recommended for personal reading |
| 6    | Feb 20 – 23 | 3.7, 5.5 | Method of Variation of Parameters. Euler Equation  
HW: 3.7 # 1, 2, 5, 8, 13, 17, 23; 5.5 # 1, 4, 5, 15, 19 |
| 7    | Feb 26 –Mar 2 | 6.1 – 6.3 | Laplace transformation, its properties and applications  
HW: 6.1 # 5, 27; 6.2 # 12, 16, 20, 22; 6.3 # 3, 7, 12, 13, 14, 27, 32 |
|      | Exam 2 on March 1 |           | Laplace transformation (continued)  
HW: 6.4 # 1, 3, 4, 6; 6.5 # 1, 7, 10; 6.6 # 5, 6, 11, 25a |
| 9    | Mar 19 – 23 | 7.3, 7.5 | Linear systems of DE  
HW: 7.3 # 3, 4, 15, 18, 21; 7.5 # 3a, 5a, 13, 16 |
| 10   | Mar 26, 30 | 7.6, 7.8 | Complex and repeated eigenvalues  
HW: 7.6 # 3a, 5a, 7, 10; 7.8 # 2a, 5a, 7a |
| 11   | Apr 2 – 6 | 10.2 – 10.4 | Fourier Series  
HW: 10.2 # 7, 13, 14, 16; 10.3 # 1, 2, 4, 13, 14; 10.4 # 1, 5, 9, 11, 15, 25a |
| 12   | Apr 9 – 13 | 10.5 – 10.7 | Heat conduction in a rod. Vibrating string  
HW: 10.5 # 7, 9, 10; 10.6 # 2, 11a, 13a; 10.7 # 1a, 13, 16 |
| 13   | Exam 3 Apr 16 – 20 | 10.8, 9.1 | Applications to Laplace equation. Nonlinear systems  
HW: 10.8 # 1ab, 5, 6ab, 7, 9.1 # 1abc, 3abc, 13 |
| 14   | Apr 23 – 27 | 9.1, 9.2 | Phase plane Analysis. Stability  
HW: 9.2 # 1, 3, 15, 18 |
| 15   | Apr 30 –May 2 | 9.3 | Almost linear systems. Lotka-Volterra Equations  
HW: 9.3 # 1, 4, 10, 16 |

**Grading system:** 20% for each of the 3 exams; HW (20%); Quizzes (9%); Maple projects (7%); Class attendance and participation (4%). The final exam is optional, it can only improve the student's grade, and may replace the lowest of the 3 exam grades.

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