

MAT 305 - Calculus IV, Spring 2008

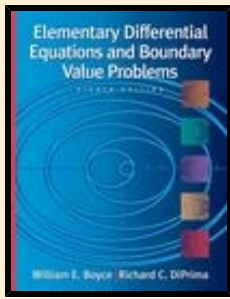
Monday, Wednesday 5:20-6:40 p.m. in Physics P112

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Office Hours: Monday 6:45-7:45 p.m., Wednesday 6:45-8:45 p.m. in Math Tower 3-102

Recitation: Thursday 5:20pm- 6:15pm
T.A.: Luoying Weng, lweng@math.sunysb.edu
Office Hours: N/A

Textbook: Boyce, DiPrima : Elementary Differential Equations and Boundary Value Problems, Wiley, 8th Edition



What is this course about?

Observables in natural and physical sciences are subject to change. The rate of change (with respect to time/location/etc.) may depend on many parameters, quite often including the observable itself. In a mathematical model, this leads to *differential equations*. We will study different kinds of differential equations and the methods used to solve them. We will cover : first order equations, second order linear equations (both homogeneous and non-homogeneous), power series solutions, systems of first order linear equations, some basic partial differential equations and methods used to solve them including

Fourier series. (This will roughly be Chapters 2, 3, 5, 7, and 10 of Boyce and DiPrima.) A tentative [syllabus](#) will be updated according to the progress of the class.

Prerequisites: This is an upper division's course. Knowledge of basic calculus (Fundamental Theorem, Separable Differential Equations) is expected, knowledge of material from MAT 203/205 is beneficial, especially for the last part of the course on partial differential equations.

Grading Policy: Your grade will be determined by your scores on

- Midterm 1 : 20%
- Midterm 2 : 20%
- Final : 40%
- Recitations : 20%

Homework: Homework problems will be assigned weekly (see [syllabus](#)). They are due the next week at the beginning of the recitation. One problem will be graded each week. You get 5 points if you (reasonably) attempt to solve at least 50% of the problems and 5 points if you solve the graded problem correctly. You are expected to participate in recitations. The T.A. will assign a recitation grade at the end of the course based on your graded homework problems and your performance in recitations classes.

Exam Schedule :

Midterm 1 : Wednesday, March. 5th, 5:20-6:40 p.m. in Physics P112
Midterm 2 : **Note change!!!** Wednesday, April 16th, 5:20-6:40 p.m. in Physics P112

Final Exam : Monday, May 19, 5:00-7:30 p.m.

Students with Disabilities: If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, ECC (Educational Communications Center) Building, room 128, (631) 632-6748. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential. Students requiring emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information, go to the following web site. <http://www.ehs.stonybrook.edu/fire/disabilities.asp>

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Topics and Assignments

Week	Topics	Assignments
Jan 28-30	Introduction and Review : Chapter 1, Section 2.1	<u>Problems with a (*) are not compulsory!</u>
Feb 4-6	First Order Differential Equations Methods of Solving Differential Equations : 2.2, 2.6 Existence of Solutions : 2.4	Section 1.3: 5, 6 Section 2.1: 14, 15, 17, 19, 30 Section 2.2: 3, 6, 9, 25, 29 Section 2.4: 4 Section 2.6: 4, 5, 18, 19, 21 due February 14th
Feb 11-13	Second Order Differential Equations Homogeneous Equations Fundamental Solutions : 3.1, 3.2	Section 3.1: 4, 6, 10, 15, 20, 22, Section 3.2: 4, 5, 13, 18, 28, 29, 33 due February 21th
Feb 18-20	Constant Coefficient Equations Complex and Repeated Roots : 3.4, 3.5 Non-homogeneous Equations : 3.6	Section 3.4: 7, 12, 18, 19, 26a Section 3.5: 1, 6, 10, 24, 27, 31* Section 3.6: 3, 7 due February 28th
Feb 25-27	Second Order Inhomogeneous Equations Variation of Parameters : 3.7 Linear Independence and the Wronskian : 3.3	Section 3.4: 27, 38 Section 3.5: 28, 31 Section 3.6: 13, 15, 17 Section 3.7: 2, 7, 10, 15, 17, 28*, 30 due March 6th
Mar 3-5	MIDTERM 1 (Wednesday, March 5th) Power Series Solutions Review of Series : 5.1	Read (twice!) Section 5.1, do problems 2,8,13 Read Section 5.2 due March 13th
Mar 10-12	Series Solutions Ordinary Points : 5.2, 5.3	

Mar 24-26	Series Solutions Regular Singular Points and Euler Equations : 5.4, 5.5, 5.6	Section 5.1: 13, 14, 17, 19, 23, 24, 28 Section 5.2: 4, 7, 8, 9, 21 Section 5.3: 1, 5, 6, 12, 22 Section 5.4: 5, 6, 18, 19 Section 5.5: 1, 10, 15, 18 Section 5.6: 1, 3, 9, 10, 13 due April 3rd
Mar 31-Apr 2	Regular Singular Points : 5.6, 5.7 Bessel's Equations : 5.8	Section 5.3: 12 read Sections 5.5 and 5.7, parts about Equal Roots Section 5.7: 3, 4, 6, 12, 13, 16 Section 5.8: 1, 3, 6, 8 due April 10th
Apr 7-9	Bessel's equations, continued: 5.8	
Apr 14-16	The Laplace Transform Definition and solution of IVPs : 6.1, 6.2 MIDTERM 2 (Wednesday, April 16th)	Read Sections 6.1 and 6.2 Section 6.1: 5, 7, 17, 19 Section 6.2: 5, 8, 14, 16, 22, 27* due April 24th
Apr 23	Discontinuous functions : 6.3, 6.4	Section 6.3: 2, 9, 14, 18 Section 6.4: 3, 7, 9, 15 due May 1st
Apr 28-30	Impulse functions and convolution : 6.5, 6.6 Partial Differential Equations Boundary value problems: 10.1	Section 6.5: 4, 6, 16 (part (d) is optional) Section 6.6: 6, 7, 9, 10, 14, 17 due May 8th
May 5-7	Fourier series, even and odd functions : 10.3, 10.4 Partial Differential Equations The heat equation and separation of variables : 10.5 The heat equation : 10.6 The wave equation : 10.7	
May 19	FINAL EXAM (Monday, May 19) Note the time: 5:00-7:30 p.m. !!!	

This page last modified by Pawel Nurowski
Tuesday, 29-Jan-2008 11:30:12 EST
Email corrections and comments to nurowski@math.sunysb.edu