ENGR I1100: Introduction to Engineering Analysis

MW, 5-6:15 pm, 161 Steinman Hall
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Course website: http://www-ce.ccny.cuny.edu/nir/classes/engr/

Catalog description: Function of matrices, application to systems of ordinary differential and difference equations. Definitions and basic properties of Legendre, Bessel, and other special functions. Common problems in partial differential equations and solution by separation of variables. Eigenfunction expansions. Fourier integral. Applications of Laplace and Fourier transforms. Prereq: Math 39200. 3 HR./WK.; 3 CR.

Learning goals:
(1) Recognize and solve linear ordinary differential equations of first order or with constant coefficients;
(2) Apply series methods to solve boundary-value differential equation problems;
(3) Pose and solve simple partial differential equations describing physical phenomena such as heat flow and waves.

Textbook: Francis B. Hildebrand, *Advanced Calculus for Applications* (Prentice-Hall, 2nd Ed., 1976). We will cover chapters 1-2, 4-5, 8-9.

Assignments and grading:
Grades will be based on the following weighting:
25% − homework assignments
15% − first exam
20% − second exam
40% − final exam.

Homework should be submitted in class on the due date. To get credit, you must explain your solution method and show your work clearly. Late homework will not be accepted, except with a documented emergency. Exams are open-book and notes (only).

Course schedule (tentative)

M Jan 31	ODEs (1)
W Feb 2	
M Feb 7	
W Feb 9	
M Feb 14	Laplace Transform (2)
W Feb 16	
W Feb 23	Exam 1
M Feb 28	Power Series Methods (4.1-4.7)
W Mar 2	
M Mar 7	Bessel Functions (4.8-4.11)
W Mar 9	
M Mar 14	Legendre Polynomials (4.12-4.14)
W Mar 16	
M Mar 21	Sturm-Liouville Problems (5.1-5.8)
W Mar 23	
M Mar 28	Fourier Series (5.10-5.12)
W Mar 30	
M Apr 4	Fourier-Bessel Series; Legendre Series; Fourier Transforms (5.13-5.15)
W Apr 6	
M Apr 11	Introduction to PDEs (8)
W Apr 13	Exam 2
W Apr 27	
M May 2	Solution to heat flow equation (9.1-9.8)
W May 4	
M May 9	Solution to wave equation (9.9-9.13)
W May 11	
M May 16	Integral transform solutions (9.14-9.18)
W May 18	
Final: W May 25, 6 pm	

Homework problems

1] 1: 3b, 7, 10, 13(c, g), 19a, 20a, 22c, 23, 33f, 35(d, f), 41, 61a, 65	Due 16/2
2] 2: 4(a, e), 7, 26a, 33(b, f), 41a, 45a, 50(a, e)	Due 23/2
3] 4: 1(b, c), 7, 11(a, b), 15	Due 9/3
4] 4: 27(a, b), 30(a, e), 39c, 46(c, h), 49	Due 16/3
5] 4: 56, 57, 58b, 73, 74	Due 23/3
6] 5: 3, 7, 16, 22b, 24, 31, 32, 36, 38	Due 30/3
7] 5: 49(b, e), 54, 57b	Due 6/4
8] 5: 71, 80, 83a, 90	Due 13/4
9] 8: 5f, 11, 23h	Due 4/5
10] 9: 3, 9, 15, 16, 24, 29, 37, 43a	Due 11/5
11] 9: 52, 58, 62, 72, 73	Due 18/5
12] 9: 80, 83, 95, 115	Due 25/5