Fall 2016 Course Syllabus: Math 331-004

NJIT Academic Integrity Code: All Students should be aware that the Department of Mathematical Sciences takes the University Code on Academic Integrity at NJIT very seriously and enforces it strictly. Unless explicit instructions for group work are given, all assignments should represent your individual effort. There must not be any forms of plagiarism, copying of homework, class projects, or lab assignments, or any form of cheating in quizzes and exams. Under the University Code on Academic Integrity, students are obligated to report any such activities to the Instructor. Any indications of violation of the Academic Integrity Code will be forwarded to the Dean of Students.

Course Title:	**Introduction to Partial Differential Equations**
Textbook:	Applied Partial Differential Equations by Richard Haberman (5th Ed) *Pearson Prentice-Hall*, ISBN: **978-0321797056**
Prerequisites:	(Math 211 or Math 213) and Math 222, with a grade of C or higher
Website:	http://web.njit.edu/~matveev/Courses/M331_F16/

Course Outline		
Lecture	**Sections**	**Topic**
1 (1-18)	3.1-3.3	Intro to PDEs; Review: ODEs, Calculus III, Fourier Series
2 (1-23)	3.4-3.6	Fourier Series and term-by-term operations
3 (1-25)	1.2-1.3	Heat Equation: 1D Derivation & Boundary Conditions
4 (1-30)	1.3-1.4	Heat Equation: Equilibrium temperature Distribution
5 (2-1)	1.4-1.5	Heat Equation: Equilibrium temperature Distribution; Higher Dimensions
6 (2-6)	2.3	Method of Separation of Variables & Solving Heat Equation in 1D Rod
7 (2-8)	2.4.1-2.4.2	Solving Heat Equation in 1D Rod: Insulated Ends
8 (2-13)	2.4.3	Heat Equation in a Circular Ring
9 (2-15)	2.5.1	Laplace's Equation Inside a Rectangle
10 (2-20)	2.5.2, 2.5.4	Laplace's Equation Inside a Disk; Qualitative properties
11 (2-22)	4.1-4.2, 4.4	Wave Equation: 1D Derivation and Vibrating String with Fixed Ends
12 (2-27)	4.3	Wave Equation: Boundary Conditions and Vibrating String Continued
13 (3-1)	4.5, 5.1	Wave Equation: Vibrating Membrane and Introduction to Chapter 5
14 (3-6)	**Exam Review**	
15 (3-8)	**Midterm Examination**	
March 13-17	**Spring Break**	
16 (3-20)	5.2-5.4	Sturm-Liouville Eigenvalue Problems
17 (3-22)	5.5	Sturm-Liouville Problems: Self-Adjointness and proofs of properties
3-27	**Last Day to Withdraw**	
18 (3-27)	5.6, 5.8	Rayleigh Quotient and Robin Boundary Conditions
19 (3-29)	5.6, 6.1	More Rayleigh Quotient examples; Chapter 6: Finite Differences
20 (4-3)	6.2-6.3.2	Finite Difference Numerical Methods for PDEs
21 (4-5)	6.3.4, 7.1-7.2	Finite differences: stability analysis; PDE's in 2+1 dimensions
22 (4-10)	7.1-7.3	PDE's in 2+1 dimensions: vibration of a rectangular membrane
23 (4-12)	7.7	Vibration of a Circular Membrane
24 (4-17)	7.8	More on Bessel Functions
25 (4-19)	10.1-10.3	Heat Equation on the Line; Nonhomogeneous Problems
26 (4-24)	10.4-10.5	Eigenfunction Expansion; Heat Equation on a Half-Line
27 (4-26)	10.6	Fourier Transform: Applications
28 (5-1)	**Final Exam Review**	

Grading Policy

Assignment Weighting	
Homework	15 %
Quiz	15 %
Midterm Exam	30 %
Final Exam	40 %

Tentative Grading Scale	
A	87 -- 100
B+	81 – 86
B	75 – 80
C+	68 – 74
C	62 – 67
D	55 – 61
F	0 – 54

Course Policies

Email: it is important that you regularly check your NJIT email account for class assignments and announcements from your instructor. Rutgers students should email the instructor their preferred email address at the start of the semester.

Homework and Quizzes: Homework problem sets will be emailed by the instructor each week, and may include problems requiring basic MATLAB coding. Homework is in general due each Wednesday; late work is not accepted. Short quizzes will also be given about once per week, on a pre-announced topic.

Attendance: attendance in this class is mandatory.