Fall 2017 Course Syllabus: Math 331-003

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_F17/

Course Outline		
Lecture	**Sections**	**Topic**
1 (9-7)	3.1-3.3	Intro: Visualizing scalar fields (Calculus III), Linear PDEs, Fourier Series
2 (9-11)	3.4-3.6	Fourier Series
3 (9-14)	3.4-3.6	Fourier Series continued: term-by-term operations
4 (9-18)	1.2-1.3	Heat Equation: 1D Derivation & Boundary Conditions
5 (9-21)	1.3-1.4	Heat Equation: Equilibrium temperature Distribution
6 (9-25)	1.4-1.5	Heat Equation: Equilibrium temperature Distribution; Higher Dimensions
7 (9-28)	2.3	Method of Separation of Variables & Solving Heat Equation in 1D Rod
8 (10-2)	2.4.1-2.4.3	Solving Heat Equation in 1D Rod: Insulated Ends and circular ring
9 (10-5)	2.5.1	Laplace's Equation Inside a Rectangle
10 (10-9)	2.5.2, 2.5.4	Laplace's Equation Inside a Disk; Qualitative properties
11 (10-12)	4.1-4.2, 4.4	Wave Equation: 1D Derivation and Vibrating String with Fixed Ends
12 (10-16)	4.3	Wave Equation: Boundary Conditions and Vibrating String Continued
13 (10-19)	4.5	Wave Equation: Vibrating Membran
14 (10-23)	**Exam Review**	
15 (10-26)	**Midterm Examination**	
16 (10-30)	4.5	Wave Equation: vibration with dissipation
17 (11-2)	5.1-5.4	Sturm-Liouville Eigenvalue Problems: properties; proof of orthogonality
Nov 16	**Last Day to Withdraw**	
18 (11-6)	5.5	Sturm-Liouville Problems: Self-Adjointness, Lagrange Identity; proofs
19 (11-9)	5.6, 5.8	Rayleigh Quotient and Robin Boundary Conditions
20 (11-13)	5.6, 5.8	More Rayleigh Quotient examples; Robin boundary conditions
21 (11-16)	6.1-6.3.2	Finite Difference Numerical Methods for PDEs
22 (11-20)	7.1-7.2	PDE's in 2+1 dimensions
23 (11-21)	7.3	PDE's in 2+1 dimensions: vibration of a rectangular membrane
24 (11-27)	7.7	Vibration of a Circular Membrane
25 (11-30)	7.8	More on Bessel Functions
26 (12-4)	10.1-10.3	Heat Equation on the Line; Fourier Transform derivation
27 (12-7)	10.4, 10.6	Fourier Transform continued
28 (12-11)	**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.