NJIT New Jersey's Science & Technology University

THE COLLEGE OF SCIENCE AND LIBERAL ARTS

THE DEPARTMENT OF MATHEMATICAL SCIENCES

MATH 322-101: Differential Equations for Applications
Spring 2017 Course Syllabus

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. This means that there must not be any forms of plagiarism, i.e., 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.

COURSE INFORMATION

Course Description: An applied science study using differential equations as the vehicle for comprehension of the unknown. Introduction to first-order differential equations and their applications to motion, cooling and electromechanical systems followed by higher order differential equations and their solutions. Study of methods of undetermined coefficients, variation of parameters, and many series and numerical methods. Includes Laplace transforms, matrix methods, and eigenvalue problems.

Number of Credits: 3

Prerequisites: MATH 112 with a grade of C or better or MATH 133 with a grade of C or better or MATH 238 with a grade C or better.

Course-Section and Instructors

Course-Section	Instructor
Math 322-004	Professor P. Milojevic

Office Hours for All Math Instructors: Spring 2017 Office Hours and Emails

Required Textbook:

Title	*Elemenatry Differential Equations w/ BVP*
Author	Edwards, Penney
Edition	6th
Publisher	Pearson
ISBN #	978-0136006138
Technology	Graphing calculator (TI-83 and up)

University-wide Withdrawal Date: The last day to withdraw with a **W** is **Monday, March 27, 2017**. It will be strictly enforced.

COURSE GOALS

Course Objectives

- Derive solutions of separable and linear first-order differential equations.
- Interpret solutions of differential equation models in mechanics, circuits, &c.
- Derive solutions of linear second order equations or systems that have constant coefficents.
- Apply the Laplace transform to solve forced linear differential equations.
- Express the solutions of analytic differential equations in power series.

Course Outcomes

- Prepare students for further study in technological disciplines and more advanced mathematics courses.
- Students have an understanding of the importance of differential equations in the sciences and engineering.

POLICIES

DMS Course Policies: All DMS students must familiarize themselves with, and adhere to, the Department of Mathematical Sciences Course Policies, in addition to official university-wide policies. DMS takes these policies very seriously and enforces them strictly.

Grading Policy: The final grade in this course will be determined as follows:

Homework and Quizzes	15%
Midterm Exam I	25%
Midterm Exam II	25%
Final Exam	35%

Your final letter grade will be based on the following tentative curve.

A	90 - 100	**C**	65 - 74
B+	85 - 89	**D**	55 - 64
B	80 - 84	**F**	0 - 54
C+	75 - 79		

Attendance Policy: Attendance at all classes will be recorded and is **mandatory**. Please make sure you read and fully understand the Math Department's Attendance Policy. This policy will be strictly enforced.

Homework and Quiz Policy: The first lecture of each week, we will have either a quiz on the previous week's material during the first 15 minutes of class OR the homework assigned the previous week will be collected. We will have a total of 10 quizzes/HW collections, of which the lowest one grade will be dropped at the end of the semester. There are no make up quizzes for absences or lateness (except in the case of a valid, documented excuse).

Exams: There will be two midterm exams held in class during the semester and one comprehensive final exam. The final exam will be held during the following week:

Midterm Exam I	Week 5
Midterm Exam II	Week 10
Final Exam Period	May 5 - 11, 2017

The final exam will test your knowledge of all the course material taught in the entire course. Make sure you read and fully understand the Math Department's Examination Policy. This policy will be strictly enforced.

Makeup Exam Policy: There will be **NO MAKE-UP QUIZZES OR EXAMS** during the semester. In the event an exam is not taken under rare circumstances where the student has a legitimate reason for missing the exam, the student should contact the Dean of Students office and present written verifiable proof of the reason for missing the exam, e.g., a doctor's note, police report, court notice, etc. clearly stating the date AND time of the mitigating problem. The student must also notify the Math Department Office/Instructor that the exam will be missed.

Cellular Phones: All cellular phones and other electronic devices must be switched off during all class times.

ADDITIONAL RESOURCES

Math Tutoring Center: Located in Cullimore, Room 214 (See: Spring 2017 Hours)*

***Moving to the Lower Level of the Central King Building (CKB) in Spring 2017.**

Further Assistance: For further questions, students should contact their instructor. All instructors have regular office hours during the week. These office hours are listed on the Math Department's webpage for Instructor Office Hours and Emails.

All students must familiarize themselves with and adhere to the Department of Mathematical Sciences Course Policies, in addition to official university-wide policies. The Department of Mathematical Sciences takes these policies very seriously and enforces them strictly.

Accommodation of Disabilities: Disability Support Services (DSS) offers long term and temporary accommodations for undergraduate, graduate and visiting students at NJIT. If you are in need of accommodations due to a disability please contact Chantonette Lyles, Associate Director of Disability Support Services at 973-596-5417 or via email at lyles@njit.edu. The office is located in Fenster Hall Room 260. For further information regarding self identification, the submission of medical documentation and additional support services provided please visit the Disability Support Services (DSS) website at:

- http://www5.njit.edu/studentsuccess/disability-support-services/

Important Dates (See: Spring 2017 Academic Calendar, Registrar)

Date	Day	Event
January 17, 2017	T	First Day of Classes
January 23, 2017	M	Last Day to Add/Drop Classes
March 12 - 19, 2017	Su - Su	Spring Recess - No Classes - University Open
March 27, 2017	M	Last Day to Withdraw
April 14, 2017	F	Good Friday - No Classes - University Closed
May 2, 2017	T	Friday Classes Meet - Last Day of Classes
May 3 & 4, 2017	W & R	Reading Days
May 5 - 11, 2017	F - R	Final Exam Period

Course Outline

Week	Sections	Topic	Assignment
1		Review of Calculus	Brush up as needed

1	1.1	Differential Equations	1-21 odd
2	1.2	Integrals as General and Particular Solutions	1-4,7,9,11,13
2	1.4	Separable and First Order Equations	1,3,5,9,19,21,23,25
2	1.5	Linear First Order Equation (Integrating Factor)	1-15 odd
3	1.6	Exact Equations and Reduction of Order	31,33,35,37,43,45,47,49,51
4	2.1	Second order linear equations	1,3,5,9,21,23,25,33-41 odd
5		**REVIEW AND EXAM ON CHAPTER 1**	
6	2.3	Homogeneous Equations with Constant Coefficients	1,3,5,9,11,21,23,27,29
7	2.5	Nonhomogeneous Equations,	1,3,5,9,11,21,23,25,31,33,47,49,51,53
		Undetermined Coefficients & Variation of Parameters	
8	2.4	Mechanical Vibrations	1,2,3,4,15
8	2.6	Forced Oscillations and Resonance	1,2
9	3.1	Power Series	1,3,5,7,11,13,15,17,19,21
9	3.2	Series Solutions Near Ordinary Points Regular Singular Points, Euler's Equation	1,3,5,7,9
10		**REVIEW AND EXAM ON CHAPTERS 2 & 3**	
11	4.1	Laplace transforms	1,3,5,11,13,15,23,27,29
11	4.2	Transformation of IVP	1-21 odd
12	4.3	Translation and Partial Fractions	1-21 odd, 27, 29, 31
12	5.1	First Order Systems	1,3,5
13	5.3	Matrices and Linear Systems	1,3,5,11,22, 31, 23, 32, 25, 34 27, 36
13/14	5.4	Eigenvalue Solutions	1-19 odd (but do not show direction fields for the typical solution curves)
14		**REVIEW FOR FINAL EXAM (CUMULATIVE)**	