NJIT New Jersey's Science & Technology University

THE COLLEGE OF SCIENCE AND LIBERAL ARTS

THE DEPARTMENT OF MATHEMATICAL SCIENCES

MATH 322-001: Differential Equations for Applications
Fall 2016 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 322-001	Professor R. Plastock

Office Hours for All Math Instructors: Fall 2016 Office Hours and Emails

Required Textbook:

Title	*Differential Equations with Boundary-Value Problems, 8th + Enhanced WebAssign*
Author	Dennis G. Zill and Warren S. Wright
Edition	8th
Publisher	Pearson
ISBN #	978-1133540809
Technology	Laptop Computer

University-wide Withdrawal Date: The last day to withdraw with a **W** is **Monday, November 7, 2016**. 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.
- Determine the behavior of solutions near critical points of planar systems.
- 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:

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. **NOTE**: This curve may be adjusted slightly at the end of the semester.

A	90 - 100	**C**	60 - 69
B+	85 - 89	**D**	50 - 59
B	80 - 84	**F**	0 - 49
C+	70 - 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.

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

Midterm Exam I	Week 5
Midterm Exam II	Week 10
Final Exam Period	December 16 - 22, 2016

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: Fall 2016 Hours)

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: Fall 2016 Academic Calendar, Registrar)

Date	Day	Event
September 6, 2016	T	First Day of Classes
September 12, 2016	M	Last Day to Add/Drop Classes
November 7, 2016	M	Last Day to Withdraw
November 22, 2016	T	Thursday Classes Meet
November 23, 2016	W	Friday Classes Meet
November 24 - 27, 2016	R - Su	Thanksgiving Holiday, University Closed
December 14, 2016	W	Last Day of Classes
December 15, 2016	R	Reading Day
December 16 - 22, 2016	F - R	Final Exam Period

Course Outline

Week	Section	Topic
1	Review of Calculus	Differentiation, integration, Partial differentiation
2	1.1,.1.2, 1.3	Initial value probs.,Differential Equations
3	2.1,2,2,2.3,2.4	Separable Equations, Linear Equations, Exact equations

4	2.5,3.1,3.2,3,3	Solutions, Linear and Nonlinear Models Second order linear equations
5	4,1,4,2,4,3	Linear Equations, Homogeneous Equations
	REVIEW	
	MIDTERM EXAM I	
6	4.4,4.5, 4.6	Undetermined Coefficients, Variation of Parameter
7	5.1,5,2,5.3	Linear Models, Spring/Mass Systems, Nonlinear Models
8	6.1, 6.2,6.3	Power Series, Solutions about Ordinary and Singular Points
9	7.1, 7.2, 7.3	Laplace Transforms, Inverse Transforms
10	**REVIEW**	
	MIDTERM EXAM 2	
11	8.1,8.2	Homogeneous Linear Systems
12	8.3	Nonhomogeneous Linear Systems
13	9.1	Numerical Solutions, Euler Methods
14	9.2	Runga-Kutta Methods
15	Review	REVIEW FOR FINAL EXAM
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FINALS	**FINAL EXAM WEEK:**	**DECEMBER 16 - 22, 2016**

Updated by Professor R. Plastock - 8/28/2016
Department of Mathematical Sciences Course Syllabus, Fall 2016