MTH 211 Syllabus

Spring 2022

Course Description

MTH 211. Introduction to Ordinary Differential Equations. Four credits. First-order and linear higher-order differential equations; matrices, determinants, and systems of differential equations; numerical and power series methods of solution; the Laplace transform. Prerequisite: MTH 112. Offered every fall.

Textbooks

1. *Ordinary Differential Equations: From Calculus to Dynamical Systems* by Virginia W. Noonburg
2. Schaum's Outline of Differential Equations
3. Schaum's Outline of Matrix Operations

Course Objectives

Students successfully completing this course should be able to:

1. Solve various types of first order equations, including separable, linear, exact, and Bernoulli equations, and be able to compute integrating factors and use them to solve differential equations and initial value problems.
2. Solve second order linear equations, including the solution of nonhomogenous equations with the methods of undetermined coefficients and variation of parameters, and apply them in various settings, including vibrating springs and circuit problems.
3. Use infinite series to solve nonlinear equations.
4. Compute Laplace transforms and inverse Laplace transforms and use them to solve problems involving step functions and impulse functions.
5. Solve systems of differential equations and apply them to problems like the mixing of solutions.
6. Use matrix methods to solve systems of differential equations and higher-order equations.
7. Solve differential equations numerically, using Euler's method, the modified Euler's method, and Runge-Kutta methods.
8. Understand the theory of differential equations and differential operators, including existence and uniqueness results.

Grading

Point Distribution		Grading Scale		
Quizzes	5%	4.0	$[90, \varnothing)$	
Homework	5%	3.5	$[85, 90)$	Averages are not rounded.
Exam 1	18%	3.0	$[80, 85)$	
Exam 2	18%	2.5	$[75, 80)$	In order to pass the course, your grade on the final exam
Exam 3	18%	2.0	$[70, 75)$	must be at least 50%, regardless of your average.
Final Exam	36%	1.5	$[65, 70)$	
		1.0	$[60, 65)$	
		0.0	$[0, 60)$	

Homework

There will be homework assignments from the textbooks and assignments using Webwork.

Exams

There will be no makeups for quizzes or exams for any reason. Your low quiz grade will be dropped. Your low exam grade will be replaced by your final exam grade if your final exam grade is higher.

No electronic devices of any kind are allowed during exams or quizzes. If it has an electrical current and it's not a pacemaker or insulin pump, it's not allowed. Any violation of this policy will result in immediate failure in the course.

How to Succeed in Differential Equations

1. Do the homework.
2. Do all of the homework problems.
3. Even if it takes two or three hours, do all of the homework problems.
4. When you do a problem, check your answer. If it's incorrect, ask me for help.
5. If you don't know how to start a problem or you get stuck, ask me for help.
6. Come to me for help rather than the Internet. Some sources have correct methods, but others have incorrect, misleading, or stupidly difficult methods.