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SYLLABUS

MA 313 Differential Equations (3) Spring 1998

MWF 10:00 -10:50 Room H 39A

Instructor : Mi-Soo B Smith

Office Hour Information: Henry Hall 018
or by appointment [call Ext.681 or (H)528-1978]

Textbook: Differential Equations, an Introduction (1991)
by Daniel A Marcus, Wm. C. Brown Publishers ISBN 0-697-05957-X

Course Description: Study of ordinary differential equations leading to solutions by series. Introduction to partial differential equations.
Prerequisites: MA211 Calculus II or consent of instructor

Objectives: The main objective of this course is to introduce general theories and methods to solve first order , and higher order ordinary differential equations. Major topics include Linear Differential Equations (focused on the first and the second ordser) and Laplace Transformations . The course will prepare for partial differential equations, transform methods, and boundary value problems.

Course Evaluation: Quizzes and Mid-Terms (40%)
Homework & Attendance (30%) Final Examination (30%)

Course Outline

This is a tentative one, as the course progresses, we may need to adjust.

The First Order Differential Equations [Chapters 1 and 2] (5 weeks)

Chapter 1 First order Diferential equations, The methods Based on Separation of Variables [Read and report §1.2]

Chapter 2 Additional Methods for First-Order Equations [Skip §2.6]
Separable equations, Homogeneous and non-homogeneous equations
Exact D.E., Integrating factors, Bernoulli Equation, Riccati Equation
sketching solutions, orthogonal and oblique trajectories.

The Higher Order Differential Equations (4 weeks)

Chapter 3 Homogeneous Linear Equations [May skip §3.5]

Chapter 4 Nonhomogeneous Linear Equations , Existence and Uniqueness of Solutions, general solutions of Linear Homogeneous and Non-homogeneous Second Order Differential Equations. Finding Particular solutions, Reduction of Order. Cauchy Euler's Differential Equations, Variation of Parameters, the Method of Undetermined Coefficients, Applications to RLC Circuits and Forced Damped Spring or Oscilation

Laplace transforms (4 weeks)

Chapter 6 Laplace transforms
Calculating Laplace Transformations, Shifts and Inverse Laplace Transforms. Laplace Transforms of derivatives and integrals, the Unit Step Function Dirac's symbol Convolution, and Laplace Transform of Periodic Functions

Further Topics (for the remaining weeks)

Selected Topics from Power Series Methods (Chapters 7) and Introduction to Partial Differential Equations (Chapter 9)