

TEXT: Elementary Differential Equations w/ Boundary Value Problems , 7th Ed. by Boyce and DiPrima (Wiley).

COURSE OVERVIEW: The main goals of this course are to introduce the basic ideas and techniques of differential equations. Single ordinary differential equations of first-order will be the starting point of the course, which will then extend those ideas to higher order equations and systems of equations. Our understanding of complex analysis will be exploited whenever possible, including a proof of Cauchy's theorem on analyticity of solutions to linear differential equations and linking of Fourier series to Laurent series. Links to various applications and also structural issues will be considered. Some visualization of systems will use computer software. Linear algebra concepts will be used, including eigenvalues and eigenvectors. We will look at Fourier series as a tool for solving boundary value problems and simple partial differential equations (time permitting).

GRADING: Grading will be fair and impartial. Points used as the basis of the grade will be:

Hmwk. (80 pts.); Class (20 pts.); projects (50 pts.); Exams (200 pts.); Final exam (150 pts.).

POLICIES: The GMU and TJ Honor codes are in effect at all times and students are expected to be fully aware of its requirements. Group work may be part of the course, in which case group members will truthfully report on non-contributing members. Absence from quizzes and exams must be for a valid reason and requires prior notification except in extreme circumstances.

MATERIAL COVERED

Chapter 1 (all);

Chapter 2 (sections 1-6, 8);

Chapter 3 (all);

Chapter 4 (all);

Chapter 5 (sections 1- 5); extra material on Cauchy's theorem

Chapter 6 (all);

Chapter 7 (all); Extra material on Laplace transform for systems and the resolvent of a square matrix.

Chapter 9 (sections 1-5); extra material on structure of gradient systems and simple Hamiltonian systems.

Chapter 10 (sections 1-4); extra material on complex form for Fourier series.