Math 231, Elementary Differential Equations Fall 2011

Queen's University, Department of Mathematics

Lectures in Jeffrey Hall Rm 128, Tutorials in Jeffrey Hall Rm 225

Instructor: Daniel Offin, 408 Jeffrey Hall, offind@mast.queensu.ca

Webpage and announcements: TBA

Grading: 15 homework, 25 midterm exam, 60 final exam

Office Hour: Tue 10:30-11:30

Recommended Text: Boyce and DiPrima, Elementary Differential Equations and Boundary Value Problems, 8th or 9th Ed.

Class times: Tue 12:30, Thurs 11:30, Fri 1:30 Tutorial: Mon 8:30

Course Overview: Many physical, biological , chemical , engineering etc. systems can be modelled by differential equations or systems of differential equations. Historically this was done starting in the year 1666 when Newton attempted to describe and predict the motions of the planets in the solar system, in gravitational interaction with the sun and each other. By the mid 20th century , every scientific discipline began to use some form of differential equations to model their respective systems. This modelling proceedure requires that we understand the basic theory of the topic of differential equations. In order to make predictions from the models, we need to also understand how the simplest and most elementary differential equations may be solved by exact methods. We also want to see what these solutions mean, both algebraically and geometrically. The topic of linear equations and their solution using Linear Algebra is one of the focal points for the lectures. For more complex systems, we can try to understand how nonlinearity may liimit our ability to get exact solutions, and what we can do to understand the dynamics of the system in the absence of exact solutions.