MAT 430 - Differential Equations

Catalog Description:

(S) Introduction to ordinary differential equations, including first and second order equations, systems of equations, Laplace transforms, and applications. Prerequisite: a grade of C- or better in MAT 236. Fulfills: LASR. (3 cr. hr.)

Course Goals / Objectives:

- Proficiency in solving various types of ordinary differential equations
- Knowledge of applications of ordinary differential equations

Required topics:

- First order differential equations: direction fields and solution curves, existence and uniqueness of solutions, solving separable, homogeneous, linear, exact, and some special types of equations such as Bernoulli, elementary applications of first order equations such as exponential growth and decay, population, heating and cooling, and mixing
- Linear second order differential equations: linear dependence and independence of solutions, the Wronskian, linear homogeneous equations with constant coefficients, non-homogeneous linear equations and the method of undetermined coefficients, applications of second order equations such as electrical circuits and forced vibrations
- Introduction to systems of differential equations
- Laplace Transforms: Laplace transforms and inverse transforms, using the Laplace transforms to solve linear differential equations

Optional topics:

- Variation of parameters
- Numerical methods
- Series solutions to differential equations
- Computer algebra systems