HÖGSKOLAN I GÄVLE

Applied Differential Equations 7.5 cr

Differentialekvationer med tillämpningar 7,5 hp

Set by Faculty of Engineering and Sustainable Development

Version	**Set at**	**Valid from**
	9/11/14	**VT2016**

Level	G1F
Education level	First cycle
Course identifier	MAG313
Credits	7.5 cr
Main field of study	Mathematics
Subject group	Mathematics
Disciplinary domain	Natural sciences 100.0 %

Learning outcomes

After completion of the course, the student shall be able to
1. account for and use methods to solve basic first and second order differential equations and associated initial-value problems.
2. demonstrate skills in working with bases in vector spaces
3. use eigenvalues and eigenvectors for matrices, especially regarding solving systems of first-order differential equations
4. solve autonomous systems of first-order linear differential equations.
5. interpret the stability of the solutions to a system of first-order linear differential equations
6. account for and use methods based on power series development of solutions to differential equations
7. account for scientific applications of differential equations and use computer software to establish numerical solutions

Course content

Number sequences, series and power series
Parametric curves
Vector spaces, inner product, linear mappings.
Matrices as linear maps and isometries
Linear first-order differential equations, integrating factor
Second-order differential equations with constant coefficients

	Systems of first-order linear differential equations and their stability Functions in several variables and partial differentiation. The gradient and directional derivatives. The Chain Rule and exact equations of first order. Using mathematical and numerical software to solve differential equations
Teaching	Lectures, tutorials and computer laboration
Prerequisites	Linear Algebra, 7.5 cr and Calculus, 7.5 cr or equivalent.
Examination	Written examination and computer laboration
Grade	A, B, C, D, E, Fx, F
Other regulations	Grading criteria are provided by the course coordinator or examiner at the beginning of the course.
Sustainable environment	Content with sustainable development is not relevant to this course.

Module

0010	Written examination	6 cr	Grade: AF
0020	Computer Laboration	1.5 cr	Grade: UG