



## 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**

<b>Level</b>	G1F
<b>Education level</b>	First cycle
<b>Course identifier</b>	MAG313
<b>Credits</b>	7.5 cr
<b>Main field of study</b>	Mathematics
<b>Subject group</b>	Mathematics
<b>Disciplinary domain</b>	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.

<b>Module</b>	0010	Written examination	6 cr	Grade: AF
	0020	Computer Laboration	1.5 cr	Grade: UG