



# HÖGSKOLAN I GÄVLE

## Applied Mechanics II 7.5cr

*Tillämpad mekanik II 7,5hp*

Set by Faculty of Engineering and Sustainable Development

### Version

**Set at**

**Valid from**

10/11/13

**HT2014**

<b>Level</b>	G2F
<b>Education level</b>	First cycle
<b>Course identifier</b>	FYG500
<b>Credits</b>	7.5cr
<b>Main field of study</b>	Physics
<b>Subject group</b>	Physics
<b>Disciplinary domain</b>	Natural sciences 100.0%

### Learning outcomes

After completing the course the student will be able to:

1. starting from a problem, make idealizations, with motivations a put up a mechanical model and with mathematical and numerical methods analyze the model for different parameter values, as well as interpret and critically evaluate the results
2. describe the differences between reality and the mathematical model, and understand the relationship between observations and model building
3. analyze the mathematical model using numerical and symbolic computing tools in order to effectively investigate and visualize the characteristics of the system
4. set up and solve advanced problems concerning three-dimensional mechanical structures
5. understand and calculate lattices in two and three dimensions
6. understand and perform shear force diagrams and torque charts for the calculation of beams
7. manage and calculate friction in elementary machine elements
8. solve problems of linear and angular momentum associated with rigid bodies
9. understand and explain gyroscopic forces.

### Course content

Statics:

In-depth studies in advanced three-dimensional force systems

In-depth studies in advanced equilibrium equations in three dimensions  
 Lattices in two and three dimensions  
 Calculation of beams with force diagrams and torque charts  
 Flexible cables  
 Fluidal statics  
 Application of friction in machine elements: wedge, screw, plate, flexible belt, rolling  
 In-depth studies in virtual work

Dynamics:  
 Kinematics and kinetics of rigid bodies  
 Equations of motion  
 Translation and rotation  
 Relative acceleration  
 Work, energy, momentum and angular momentum  
 Gyroscopes and precession  
 Vibrations in rigid bodies

<b>Teaching</b>	Lectures, tutorials and practicals. Instruction is also given in the form of demonstrations and supervision associated with lab assignments and exercises. Participation in the laboratory and associated instruction is compulsory.
<b>Prerequisites</b>	Bachelor's degree with a major in Electrical Engineering, or Physics 30 credits and Mathematics 30 credits or equivalent.
<b>Examination</b>	Written exam test and lab assignments.
<b>Grade</b>	A, B, C, D, E, Fx, F
<b>Other regulations</b>	Criteria for final grade will be given at the beginning of the course.
<b>Sustainable environment</b>	Content with sustainable development is not relevant to this course.

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