Syllabus for

Academic year 2011/2012 >

TME010 - Mechanics

Syllabus adopted 2011-02-16 by Head of Programme (or corresponding)
Owner: TKAUT
7,5 Credits
Grading: TH - Five, Four, Three, Not passed
Education cycle: First-cycle
Major subject: Automation and Mechatronics Engineering, Mechanical Engineering
Department: 42 - APPLIED MECHANICS

Teaching language: Swedish

Credit distribution

Course module				Sp1	Sp2	Sp3	Sp4	Summer course	No Sp	Examination dates		
0105	Project	1,5 c	Grading: UG		1,5 c							
0205	Examination	6,0 c	Grading: TH		6,0 c					Tue 13/12-2011 am M,	Thu 12/04-2012 am V,	Thu 30/08-2012 am M

In programs
TKAUT AUTOMATION AND MECHATRONICS ENGINEERING, Year 2 (compulsory)
TKDES INDUSTRIAL DESIGN ENGINEERING, Year 2 (compulsory)
TKIEK INDUSTRIAL ENGINEERING AND MANAGEMENT - Production engineering, Year 2 (elective)

Examiner:
Univ lektor Per-Åke Jansson

Course evaluation:
https://document.chalmers.se/doc/208646461

Eligibility:
For single subject courses within Chalmers programmes the same eligibility requirements apply, as to the programme(s) that the course is part of.

Course specific prerequisites
The student should have the necessary background in calculus and linear algebra corresponding to the fundamental courses within the programme, in particular integrals, ordinary differential equations and vector algebra. Basic skills in the use of MATLAB are also expected.

Aim
The aim of the course is to give a basic understanding of the fundamental concepts and laws of classical mechanics and how to apply them to simple problems in statics and dynamics. The course should also give the ability to communicate with engineers from other disciplines.

Learning outcomes *(after completion of the course the student should be able to)*

- draw free-body diagrams for a material system in equilibrium, and to formulate and solve the governing equations of equilibrium · describe the meaning of Newton's laws, including the concept of inertial frames of reference
- apply Newton's second law to solve problems for a particle in rectilinear as well as curvilinear motion
- solve simple engineering problems, including determination of bearing reactions, for a rigid body rotating about a fixed axis

- apply methods of work and energy to solve problems for particles, systems of particles, and rigid bodies in motion

Content

Statics: Force systems. Equilibrium; conditions of equilibrium, free-body diagrams, constraints, constraining forces, statically determinate and indeterminate systems. Centre of mass, centre of gravity. Friction. Dynamics of particles: Kinematics. Newton's laws. Work, energy, linear and angular momentum. Energy and momentum methods, in particular conservation laws. Vibrations. Systems of particles. Dynamics of rigid bodies: Moment of inertia. Rotation about a fixed axis.

Organisation

The teaching will be based on lectures, problem solving sessions, supervision of project work, and consultations.

Literature

Grahn/Jansson: Mekanik, Studentlitteratur, 2002.

Examination

Project (1,5 hec) Written exam (6 hec)