



# SG2151 Modern Multibody Dynamics 8.0 credits

Modern flerkroppsdynamik

This is a translation of the Swedish, legally binding, course syllabus.

## Establishment

Course syllabus for SG2151 valid from Autumn 2008

## Grading scale

A, B, C, D, E, FX, F

## Education cycle

Second cycle

## Main field of study

## Specific prerequisites

## Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

## Intended learning outcomes

After the course the students should have the techniques needed to deal with modeling mechanical systems, such as robots, vehicles, space satellites and other multibody systems. The student will also be made aware of the requirements of carrying out and presenting numerical solutions of such problems.

## Course contents

Techniques for dealing with multiple coordinate systems and complex kinematics. The geometric ideas and the computer algebra (Maple is used) needed for such problems are introduced. Dyads and rotations. Kane's equations. The rigid body and its inertia dyad. Redundant variables and non-holonomic systems. Analysis of constraint forces. Kane's method is interpreted in terms of the geometry of the configuration manifold for such systems. Techniques of symbolic manipulations are introduced for deriving equations of motion using Kane's method. Emphasis is on problems that occur in modern practice and that require multiple coordinate systems for their formulation.

## Course literature

Lesser, M. 1995. **The Analysis of Complex Nonlinear Mechanical Systems: A Computer Algebra Assisted Approach**. World Scientific.

## Examination

- TEN1 - Examination, 8.0 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

## Other requirements for final grade

Project work.

## Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.