***Eligibility:***

*In order to be eligible for a first cycle course the applicant needs to fulfil the general and specific entry requirements of the programme(s) that has the course included in the study programme.*

**Course specific prerequisites**

The physics toolbox, linear algebra and geometry, introductory mathematical analysis, real analysis and Mechanics I or corresponding course.

**Aim**

* To provide a good understanding of the basic concepts of mechanics, that provides a basis for further physics studies.  
  - To provide training in the translation of a physics problem into a mathematical model, and to analyse this model.

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

Kinematics and dynamics of rigid bodies - the student should use their understanding of particle systems to be able to derive and apply the laws of rotational and translational motion.

Motion in non-inertial systems - The student will gain an understanding of fictitious forces, in particular centrifugal and Coriolis forces in the rotating reference system.

The theory of harmonic motion - the student should be able to apply their knowledge of mathematics to the damped and undamped, free as well as forced harmonic motion.

Analytical Mechanics - The student should have been offered an initial acquaintance with analytical mechanics. The student will be able to study simple particle system using the Lagrange formalism.

Develop communication - Being able to present the basic mechanical concept in writing.

Overall - Knowledge of all the above areas shall be used in problem solving. The student should be able to identify the relevant information in a mechanics and then formulate the problem mathematically using tools from mechanics and mathematics.

**Content**

Plane kinematics of rigid bodies  
Plane kinetics of rigid bodies  
Rotating systems and inertial forces  
Three-dimensional kinematics and dynamics of rigid bodies  
Vibration and time response  
Analytical mechanics

**Organisation**

Lectures and Problem solving sessions

**Literature**

Announced on the course web page.

**Examination**

Written exam and homework problems. The exam may include a problem that makes reference to the project.