

IT NUMBER	MODULE	SCOPE	EXAMINATION
<b>PL: 181202</b> Physics for Engineers <b>PV: 181203</b>	<b>7</b>	<b>8</b>	<b>PL: KL, 90 Min.</b> <b>PV: T</b>
181202a Physics for Engineers	4	5	
181202b Exercises in Physics	3	3	PV

The focus of the Physics for Engineers course is on the mechanics of rigid bodies, elastic bodies and fluids. After completion of the course students are familiar with the fundamental laws of the mechanics of rigid bodies, elastic deformation, fluid mechanics of inviscid and viscous fluids, and acoustic waves. Students are able to recognize the relevant physical laws in a physical problem and can apply them by converting the physical problem into a mathematical setting. This includes strategies to break down a complex physical problem into manageable parts e.g., by finding an adapted coordinate system or by introducing approximations. Students will be able to work their way into new physical subjects and can demonstrate competency in their understanding of scientific information.

#### CONTENTS OF LECTURE

1. Vector calculus, coordinate systems, vector-valued functions
2. Motion in two dimensions
3. Uniform circular motion
4. Newton's laws
5. The gravitational force
6. Work, energy and power, conservation of energy
7. The kinetic frictional force and the drag force
8. Linear momentum, elastic and inelastic collisions
9. Angular momentum and torque
10. Harmonic oscillations
11. Pressure, stress, deformation of solid bodies
12. Hydrostatics
13. Fluid dynamics, Bernoulli's equation
14. Viscosity, the viscous frictional force, the Reynolds number
15. Non-Newtonian fluids
16. Traveling waves and acoustics
17. Reflection and interference of acoustic waves

#### Exercises

Weekly or biweekly exercises complement the lecture on Physics for Engineers. Students are expected to solve them self-dependently (or in learning groups). The exercises are an important building block in the Physics for Engineers course, and the faculty to solve them is indispensable for reaching the learning goal (passing the exams).