



Faculty of Health, Science and Technology  
Physics

# Syllabus

## Physics Preparatory C

<b>Course Code:</b>	FYBX33
<b>Course Title:</b>	Physics Preparatory C <i>Fysik Bas C</i>
<b>Credits:</b>	7.5
<b>Degree Level:</b>	Preparatory
<b>Progressive Specialisation:</b>	( )

**Major Field of Study:**

### Course Approval

The syllabus was approved by the Faculty of Health, Science and Technology 2019-02-18, and is valid from the Autumn semester 2019 at Karlstad University.

### Prerequisites

General entry requirements and upper secondary level Physics 1 or previous enrollment in Physics Preparatory B (7.5 ECTS credits), and upper secondary level Mathematics 3 or previous enrollment in Mathematics Preparatory B (7.5 ECTS credits), or equivalent

### Learning Outcomes

Upon completion of the course, students should be able to:

- plan and conduct experimental investigations based on a given question and present the results orally and in writing,
- describe and analyse as well as mathematically process mechanical and electromagnetic waves and some applications in these areas,
- describe, use, and explain Bohr's atomic model,
- explain the structure of the atom using quantum physics concepts and relevant experimental measuring methods,
- demonstrate insight into the special relativity theory on the basis of physical phenomena like time

dilation and length contraction,

- discuss the equivalence of mass and energy,
- give an account of ionised radiation, radioactive disintegration, fission and fusion, and use the mass energy equivalence for calculations in nuclear physics, and
- discuss environmental and ethical issues, especially in relation to nuclear physics.

### **Content**

The course includes the following:

- Harmonic oscillation, resonance, mechanical waves, acoustics.
- Light, reflection, refraction, interference and diffraction, polarisation.
- Einstein's postulate, time dilation, and relativistic energy.
- Accounts of the structure of atoms, relations between energy levels and atomic spectra, and knowledge about the photon concept.
- The structure of the atom and the nucleus of the atom.
- Absorption and emission of electromagnetic radiation, energy quantisation.
- Wave particle duality.
- Nuclear reactions, ionised radiation, and calculation of radiation dose.
- Laboratory work related to the above.

Instruction is in the form of lectures, exercises, and laboratory sessions.

### **Reading List**

See separate document.

### **Examination**

Assessment is based on written exams, tests, hand-in assignments, presentations, and lab reports. Laboratory sessions are mandatory.

### **Grades**

One of the grades Fail (U) or Pass (G) is awarded in the examination of the course (see Dnr C2010/729)

### **Quality Assurance**

Follow-up relating to learning conditions and goal-fulfilment takes place both during and upon completion of the course in order to ensure continuous improvement. Course evaluation is partly based on student views and experiences obtained in accordance with current regulations and partly on other data and documentation. Students will be informed of the result of the evaluation and of any measures to be taken.

### **Course Certificate**

A course certificate will be provided upon request.

### **Additional information**

The local regulations for studies at the Bachelor and Master levels at Karlstad University stipulate the obligations and rights of students and staff.

The course corresponds in part to upper secondary level Physics 1 and 2 for natural science and technology programmes.