JÖNKÖPING UNIVERSITY
Jönköping University Enterprise

COURSE SYLLABUS

Pathway Physics 1, 7.5 credits

Pathway Physics 1, 7.5 högskolepoäng

Course Code:	P1PP1F	Education Cycle:	First-cycle level
Confirmed:	Aug 12, 2025	Disciplinary domain:	Natural sciences
Valid From:	Jan 19, 2026	Subject group:	Physics
		Specialised in:	GXX First cycle, in-depth level of the course cannot be classified

Intended Learning Outcomes (ILO)

On completion of the course the student shall:

Knowledge and understanding

1. Demonstrate knowledge of physical quantities and units

2. Demonstrate an understanding of the concepts of force and energy

3. Demonstrate an understanding of the concepts of electromagnetism

4. Demonstrate knowledge of atomic physics

Skills and abilities

5. Show ability to apply newton's laws and conservation of energy

6. Demonstrate skills in using the concepts of torque, momentum, impulse, pressure, heat, temperature, electrostatic forces and fields in calculations

7. Demonstrate skills in calculating current, voltage, potentials and resistance in DC circuits

8. Demonstrate skills in applying the special theory of relativity

9. Demonstrate skills to interpret and carry out basic calculations in nuclear physics

10. Show ability to solve problems concerning motion in two dimensions

11. Show ability to apply theory concerning mechanical oscillations and waves

12. Show ability to perform calculations on electric- and magnetic fields

13. Demonstrate skills concerning electromagnetic induction and alternating currents

14. Demonstrate skills concerning electromagnetic waves and their properties

15. Show ability to solve problems concerning the electron structure of atoms

Judgement and approach

16. Use self and peer reflection on the development of skills and abilities.

17. Critically evaluate relevant information related to the different parts of the course.

18. Approach societal relevance, scientific method, and sustainability.

Content

The course includes the following elements:

The course introduces the basic physics and the science of working with experiments, analysis and interpretation of measurements using models. It also includes societal relevance, scientific method, and sustainability. In addition, the course will provide familiarity with the use of mathematical concepts in physics and algebraic handling of formulas and expressions. The course content includes and corresponds to, but is not limited to, the Swedish upper secondary school course Fysik 1. The horizontal aim is to develop and strengthen student skills for participating in higher education, life-long learning and global citizenship through group work, social engagement, peer learning, reflective learning and autonomous learning whilst developing agency, ability to reconcile tensions and dilemmas, intercultural communication skills, metacognitive skills, information and digital literacy and critical thinking.

The course includes the following topics:

- Units and unit conversions, vectors and scalars, the SI-system
- Velocity and speed, acceleration, laws of motion with constant acceleration
- Newton's laws, normal force, gravitational force, Hooke’s Law, friction, inclined plane
- Work, potential energy, kinetic energy, power and efficiency, conservation of

energy

- Momentum, conservation of momentum, impulse, elastic and inelastic collisions
- Density, pressure, pressure in liquids, Archimedes’ principle
- Thermodynamics; pressure in gases, the ideal gas law, phase transitions and calorimetry
- Electric charges and forces, electric fields, electric current, voltage and

potentials, resistance and resistivity, electrical energy and power

- DC circuits, series and parallel circuits involving resistors
- Nuclides, nuclear reactions, activity and half-life, ionizing radiation
- The special theory of relativity, light speed, time dilation and length contraction, relativistic energy

Type of instruction

Lectures and tutorials, lab work and tutorial sessions.

Language of instruction is in English.

Entry requirements

General entry requirements and High School Diploma and English Language skills corresponding to: English IELTS 5.5 or the equivalent

Examination and grades

The course is graded Pass (G) or Fail (U).

The examination consists of one paper and one written exam. The course is graded pass or fail. The ILOs are assessed by the following means:

Written exam

Laboratory report

Registration of examination:

Name of the Test	Value	Grading
Written Exam	6.5 credits	G/U
Laboratory report	1 credit	G/U

Other information

Qualification Requirements

To obtain the Course Certificate the student shall complete the course requirements of 7.5 credits.

Title of qualification

The course gives you skills equivalent to the Swedish upper secondary school course Kemi 1 for eligibility to programmes at Jönköping University.

Course literature

Please note that changes may be made to the reading list up until eight weeks before the start of the course.