



## Course syllabus

Faculty of Technology

Department of Physics and Electrical Engineering

1NT154 Elevers naturvetenskapliga och tekniska omvärld, påbyggnad till åk 4-6, 15 högskolepoäng

Pupils' Scientific and Technological Surroundings, grade 4-6, 15 credits

### **Main field of study**

Biology, Physics, Chemistry, Technology

### **Subject Group**

Educational Sciences/Theoretical Subjects

### **Level of classification**

First Level

### **Progression**

G1F

### **Date of Ratification**

Approved 2014-03-18

Revised 2015-06-10 by Faculty of Technology.

The course syllabus is valid from autumn semester 2015

### **Prerequisites**

At least one of the following courses: 2LU09U, 1NT153, 1NT31U or equivalent.

## Objectives

After completing the course, students will be able to

- show they have acquired both knowledge of the subject and its didactics and an insight into current research and development required for professional practice
- demonstrate the ability to independently and together with others plan and develop teaching and designing assessment in order to promote each student's learning
- relate natural science and technology to historical, cultural, social, ethical and aesthetic dimensions.

After completing this module the students will be able to:

- explain the evolution of life and how organisms adapt to different habitats
- identify a number of common Swedish plants and animals, mainly identifiable during the current season, and describe their life cycles
- account for human organs, organ systems their functions and interactions
- explain the key principles of ecology and how they, together with the environment affects different ecosystems
- plan and problematize sex education

- explain basic chemical concepts and connections
- show insights into the cycling of matter, food chemistry and chemicals in the home and community
- describe basic physical concepts and relationships with a focus on Solar system, different ways to measure time, force and motion, liquids and gases, thermodynamics, meteorology, electricity, magnetism, sound, light and energy
- plan and propose models to introduce students in problem solving, design and documentation
- describe how technological systems are established and changed and how they affect society
- demonstrate basic laboratory skills
- use experiments to test scientific and everyday models
- describe some common everyday concepts in science and how they can be challenged to a more scientific understanding
- perform risk assessments associated with teaching in an outdoor environment and safely handle chemicals and laboratory/technical equipment for experiments /investigations
- give examples of scientific discoveries and their significance, cultural descriptions, opportunities for integration of subjects and opportunities for teaching that promotes scientific conceptualization and understanding.

## Content

The course consist of 3.75 credits Biology, 3.75 credits Physics, 3.75 credits Chemistry and 3.75 credits Technology.

The course will broaden and deepen knowledge and skills in the subjects of biology, physics, chemistry, and technology related to the national governing documents, grade 4-6.

The course focuses on the systematic classification of plants and animals and the grounds therefor. Advanced studies of ecosystem and its function related to species identification are included. The content of theory has consistently an evolutionary perspective. The course also deals with the human biology related to health, relationships and ethics.

The course deals with fundamental chemical concepts. The cycling of matter, food chemistry and chemicals in the home and community are central to the course.

The teaching of physics deals with different ways to measure time, energy conversions and energy flows, weather phenomena, simple electrical circuits and properties of magnets. Furthermore, the teaching should help students broaden and deepen their knowledge of force and motion, heat, liquids and gases as well as in sound and light.

This course includes sections where the students make constructions in different materials or deconstruct and analyse existing technology. The course highlights different phases in technological development work as well as linking this to the documentation of technology and the different ways of communicating technological knowledge and solutions. Ordinary technical systems and how these are changed over time and reasons for this are treated.

How varying approaches and working methods including digital tools to carry out the teaching of science and technology are illustrated. The course also covers the planning of teaching, assessment, evaluation and grading of pupils knowledge of science and technology. It also deals with scientific discoveries and their importance, and cultural descriptions of scientific phenomena.

## Type of Instruction

The course is a combination of campus meetings and work through Internet based

platform. Various instruction methods are used during the course such as lectures, seminars, field trips and experiments.

### Examination

The course is assessed with the grades Fail (U), Pass (G) or Pass with Distinction (VG).

Assessment of student performance is made through written test and oral examinations and presentation of mandatory assignments and participation in practical exercises and seminars. For a passing grade (G), the objectives has to be achieved. Grade Pass with Distinction will be given if more than half of the points that can be graded as Pass with Distinction are achieved.

### Course Evaluation

During the course or in close connection to the course, a course evaluation is to be carried out. The result and analysis of the course evaluation are to be communicated to the students who have taken the course and to the students who are to participate in the course the next time it is offered. The course evaluation is carried out anonymously. The compiled report will be filed at the Faculty.

### Required Reading and Additional Study Material

#### Required reading

Andersson, B. (2011). *Att utveckla undervisning i naturvetenskap: kunskapsbygge med hjälp av ämnesdidaktik*. Lund: Studentlitteratur. 297 p.

ISBN: 9789144068961

Bjurulf, V. (2011). *Teknikdidaktik*. Stockholm: Norstedts. 210 p.

ISBN 9789113028439

Jakobsson, G. & Jakobsson, L. (2003). *Vardagskemi*. Lund: Studentlitteratur. 297 p.

ISBN 9789144068961

Nordenmark, L. (2011). *Sex och samlevnad i skolan*. Lund: Studentlitteratur. 167 p

ISBN: 9789113032290

Pleijel, H. (2013). *Ekologi - en introduktion*. Lund: Gleerups. 192 p.

ISBN 9789140681256

Skolverket. (2011). *Diagnoser i NO årskurs 1-6, DINO*. Internet:

[www.skolverket.se/bedomning](http://www.skolverket.se/bedomning)

Skolverket. (2011). *Kunskapsbedömning i skolan –praxis, begrepp, problem och möjligheter*. 97 p. Internet: [www.skolverket.se](http://www.skolverket.se).

ISBN: 9789186529543

Skolverket. (2013). *Nationella styrdokument*. [www.skolverket.se/laroplaner-amnen-och-kurser](http://www.skolverket.se/laroplaner-amnen-och-kurser)

Östklint, O., Johansson, S. & Anderberg, E. (2012). *Fysik för lärare*. Lund:

Studentlitteratur. 311 p. ISBN 9789144076652

Additional literature will be provided through web sites. Pages 100 (approx).

Literature and sample collections related to their chosen themes. Pages 100 (approx).

IFE, Copied material, Linnæus University, current year. Pages 100 (approx).

#### Reference literature

Sundin, B. (2006) "Den kupade handen: historien om människan och tekniken".

Stockholm: Carlsson. 350 p. ISBN 9173310158

Optional identification literature for species studies.