



Course syllabus

Faculty of Technology

Department of Physics and Electrical Engineering

1NT153 Elevers naturvetenskapliga och tekniska omvärld, åk F-3, 15 högskolepoäng

Pupils' Scientific and Technological Surroundings, preschool class-grade 3, 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 by Faculty of Technology 2013-09-11

The course syllabus is valid from spring semester 2014

Prerequisites

Teacher's certificate or 30 credits in ongoing teacher education.

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
- explain basic concepts in ecology
- identify a number of common Swedish plants and animals, mainly identifiable during the current season, and describe their life cycles
- give an overview over the human senses, organ systems and their functions, and the importance of diet and exercise
- describe the concepts of gravity, friction, balance, center of gravity and equilibrium in relation to the pupils everyday
- describe and explain everyday phenomena related to the solar system, sound, light, water and air
- describe common substances and materials in the environment, their properties and uses

- identify technology in everyday life and society as a starting point for learning
- identify technical solutions in existing designs and apply them in their own design work
- communicate basic technical solutions using speech, writing, pictures and models
- describe important occurrences and processes in the history of technology and the importance of this on people's lives and development of society.

Content

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

The course deals with didactic perspective on pupils learning in selected areas of the sciences and technology and subject theory in science and technology relevant to teaching in grades F-3. The fields of knowledge covered in the course are based on the national governing documents for F-3, for example: ecology and species identification, the human body, basic astronomy, force and motion, properties of substances, matter and phases, technical construction and materials. The course also deals with the history of technology i.e. how people have defined and observed technology throughout history.

How varying approaches and working methods and digital tools and can be used to carry out the teaching of science and technology are illustrated. The course also covers planning the teaching of science and technology, the risk assessment and assessment of pupils knowledge development in relation to the national curriculum.

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).

The students' achievements are assessed through written and oral examinations, the presentation of obligatory assignments as well as the participation in practical exercises and seminars. The assessment criteria to pass the course may be seen above in Objectives.

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

A course evaluation will be carried out and compiled after the course is completed. The compilation will be presented to the current board as well as to the students and filed by the coordinating department.

Required Reading and Additional Study Material

Required reading

Andersson, B. & Nyberg, E. (2006). *Att undervisa om livscyklar i skolår 1-5: kunskapsbas och undervisningsförslag*. Enheten för ämnesdidaktik. 98 p. Internet: <http://gupea.ub.gu.se/handle/2077/10631>

Bjurulf, V. (2011). *Teknikdidaktik*. Stockholm: Norstedts. 210 p. ISBN 9789113028439.

Jakobsson, G. & Jakobsson, L. (2003). *Vardagskemi*. Lund: Studentlitteratur. 297 p. ISBN 9789144068961.

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

Skolverket. (2011). *Kunskapsbedömning i skolan – praxis, begrepp, problem och möjligheter*. 97 p. Internet: www.skolverket.se. ISBN: 9789186529543

Skolverket. (2013). *Nationella styrdokument*. www.skolverket.se/loroplaner-amnen-och-kurser

Sundin, B. (2006). *Den kupade handen: historien om människan och tekniken*. Stockholm: Carlsson. 350 p. ISBN 9173310158

Wickman, P-O. & Persson, H. (2009). *Naturvetenskap och naturorienterande ämnen i grundskolan: en ämnesdidaktisk vägledning till mål, syften och innehåll*. Stockholm: Liber. 288 p. ISBN: 9789147053339

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

Anderberg, B., von Braun, R., Lillieborg, S. & Sandén, B. (2011). *Vårt ett försök. Lärarens bok*. Stockholm: Bonniers. 224 p. ISBN: 9789152308479.

CETIS. (20111107).

Teknik tillsammans. (Teknik tillsammans är ett webbaserat undervisningsmaterial i teknik för barn i förskola till skolår 5.) www.liu.se/cetis/tekniktillsammans/

Karlefors, I., Helldén, G., Jonsson, G. & Vikström, A. (2010). *Vägar till naturvetenskapens värld: ämneskunskaper i didaktisk belysning*. Stockholm: Liber. 221 p. ISBN: 9789147099245.

Minnhagen, P., Norqvist, P., Wiklund, K. & Minnhagen, M. (2010). *ABC-bok för fysiknyfika*. Umeå: Institutionen för fysik. Umeå universitet. 60 p. ISBN 9789174590814

Norvik, H. & Powell, D. (1997). *Försök med teknik. Lärarbok* Stockholm: Liber. 224 p. ISBN: 9789121147801

Persson, H. (2011). *Försök med NO 1-3*. Stockholm: Liber. 176 p. ISBN: 9789147083930.

Persson, H. (1999). *Nyfiken på naturvetenskap*. Stockholm: Almqvist & Wiksell. 192 p. ISBN: 9789121175316.

Persson, H. (2009). *Russinissen: enkla experiment i fysik och kemi*. Järfälla: Hands-on Science Text. 157 p. ISBN: 9789197817806.

Persson, H. (2000). *Försök med biologi. Lärarbok* Stockholm: Almqvist & Wiksell. 176 p. ISBN: 9789147102075

Persson, H. (2010). *Försök med fysik. Lärarbok* Stockholm: Liber. 224 p.

ISBN: 9789147101801

Persson, H. (2011). *Teknikgrytan*. Järfälla: Hands-on Science Text. 157 p.
ISBN:9789186917005

Persson, H. & Alexandersson, S. (2010). *Försök med kemi*. Stockholm: Liber. 176 p.
ISBN: 9789147101795

Rundgren, H. (2009). *Om livet, kärleken & döden*. Stockholm: Sveriges
Utbildningsradio. 85 p.
ISBN: 9125090003.

Optional flora and fauna.