Board of Teacher Education
Physics

Syllabus

Science and Technology for grade F-3

Course Code:	LPGG14
Course Title:	Science and Technology for grade F-3 *Naturvetenskap och teknik F-3*
Credits:	22.5
Degree Level:	Undergraduate level
Progressive Specialisation:	First cycle, has less than 60 credits in first-cycle course/s as entry requirements (G1F)

Major Field of Study:

Course Approval
The syllabus was approved by the Board of Teacher Education 2017-09-04, and is valid from the Spring semester 2018 at Karlstad University.

Prerequisites
LPGG01, LPGG02, and LPGG06 completed

Learning Outcomes
The aim of the course is to create a joyful and reflecting approach to science and technology. Students are expected to develop skills, knowledge and insights in biology, physics, chemistry, technology and the subject-specific teaching methodologies for teaching, developing and evaluating these subjects in pre- and primary school.

Module 1 Biology, chemistry and aesthetic learning processes, 7.5 ECTS cr
Upon completion of the module, students should be able to:
1) give an account of the flora and fauna in the surroundings and categorize, group and classify them
2) describe the structures of some ecological systems
3) describe our organs and organ systems and give an account of how they function and interact
4) discuss how different factors such as food, sleep, hygiene and exercise can contribute to health as well as ill health
5) describe the content of food in relation to the importance of nutrients and metabolism
6) describe the structure of matter
7) give an account of risk assessment based on current legislation and ability to act adequately in case of incidents and accidents in the classroom
8) plan and conduct laboratory experiments on the basis of current regulations and steering documents and give an account of how these can contribute to learners' learning
9) describe and demonstrate how role play and visual narration can be used to develop children's knowledge of science and technology.

Module 2 Physics, technology and aesthetic learning processes 7.5 ECTS cr

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

1) give an account of the concept energy and different forms of energy
2) give an account of the concepts force, pressure and density and how they are manifested in daily life
3) give an account of the celestial bodies in our solar system and explain how the sun, earth and moon move in relation to one another and give rise to different seasons
4) describe some common constellations
5) perform simple meteorological observations
6) identify physical phenomena and technical solutions in everyday life and on the basis of these conduct experiments, make constructions and perform aesthetically
7) discuss the role and importance of science and technology in society
8) create and construct with the help of different techniques, materials and tools and document different constructions using sketches and models
9) discuss how the close environment/outdoor environment can be used a learning environment for children
10) illustrate science and technology concepts through play and games
11) discuss the learners' understanding of science and technology in terms of subject-specific education theories.

Module 3 Cycles and Processes in the Surroundings 7.5 ECTS cr
Upon completion of the module, students should be able to:

1) give an account of some common materials and and the different properties of materials
2) describe simple technical systems
3) give an account of some natural cycles and our participation in them
4) discuss the different measures required to create a sustainable society
5) illustrate sustainability aspects in society with the help of sketches and models
6) give an account of and discuss the principles of assessing learners in science and technology in relation to curricula.

Content
The course is thematically organised in three modules each of 7.5 ECTS cr. Instruction is based on classes, seminars, laboratory sessions, performance, group tasks and excursions. Throughout the course, issues of diversity, gender, subject-specific teaching methodology and sustainable development are treated.

Module 1 Biology, chemistry and aesthetics 7.5 ECTS cr
The focus is on the body. The importance of attending to our health and wellness is treated from a natural science perspective. Flora and fauna are treated and basic biological and chemical concepts are defined and described.

Content:
-Flora and fauna in the surroundings and their classification with the help of classification keys
-The plant and animal cell
-The relation between ecosystem organisms, evolution and diversity
-The human body and health
-The chemistry of food
-The structure of matter in the form of a simple particle model, its origin and transformations
-Laboratory safety, risk assessment
-Planing and conducting laboratory sessions in school
-Visual narration as a tool to describe science and technology

Module 2 Physics, technology and aesthetics 7.5 ECTS cr
The module is based on an exploratory a investigative method to approach physical phenomena and technical constructions with the help of aesthetic performance/demonstration

Content:
-Energy, energy conversion and temperature
-Everyday physical phenomena such as force, pressure, density, sound and light
-Light and colour perception through experiments
-The movements of the earth, sun, and moon in relation to one another and the phases of the moon and the cause of seasonal change
-The celestial bodies in our solar system and some constellations
-Meteorology in a local and global perspective and simple meteorological observations
-The history of technology and scientific discoveries and their significance to society today
-Technology in daily life illustrated through simple constructions and technical solutions
-Constructing with the help of simple mechanics
-Documentation in the form of sketches and physical or digital models
-Outdoor environment as a learning environment
-Outdoor surroundings as a learning environment
-Different means of illustrating science and technology e.g. play and games
-Subject-specific methods and approaches

Module 3 Cycles and Processes in the Surroundings 7.5 ECTS cr
The focus is on sustainable society and sustainable development, Different cycles in the surroundings are studied, as are different everyday materials and their properties.

Content:
-Common materials and their properties plus choice of materials
-Common physical phenomena such as magnetism and electricity
-Simple technical system
-Natural cycles and human impact on them
-Different energy sources and their effect on the environment
-Fossile and renewable fuel incineration
-Recycling and reusing for sustainable development
-Problem solving with sketches and models
-Formative and summative assessment in science and technology

Reading List
See separate document.

Examination
Assessment is based on:
Module 1
Learning outcome 1: excursion
Learning outcomes 2, 3, 5, 6 and 7: written exam
Learning outcome 4: seminar
Learning outcome 8: oral and written group presentation
Learning outcome 9: aesthetic visualisations

Module 2
Learning outcomes 1 and 2: written exam
Learning outcomes 3, 4 and 5: laboratory experiments and aesthetic visualisations
Learning outcome 6: laboratory work, oral presentations and aesthetic visualisations
Learning outcomes 7 and 11: seminar
Learning outcome 8: laboratory experiment and written individual hand-in assignment
Learning outcome 9: oral and written group presentations
Learning outcome 10: aesthetic visualisations

Module 3
Learning outcome 1: oral and written group presentations

Learning outcomes 2-4 : written exam
Learning outcome 5: group laboratory work and a written hand-in assignment
Learning outcome 6: written exam
Learning outcome 7: seminar

All examination components are mandatory. All presentations or submissions for assessment must clearly indicate individual contributions.

Grades
One of the grades Fail (U), Pass (G), or Distinction (VG) is awarded in the examination of the course.

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.

Teacher Education: Pre and primary school level