



Board of Teacher Education  
Mathematics

## Syllabus

### Creative Mathematics for teaching in pre-school and grades 1-3

<b>Course Code:</b>	LPGG06
<b>Course Title:</b>	Creative Mathematics for teaching in pre-school and grades 1-3 <i>Kreativ matematik för grundlärare i förskoleklass och årskurs 1-3</i>
<b>Credits:</b>	30
<b>Degree Level:</b>	Undergraduate level
<b>Progressive Specialisation:</b>	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 2017-03-02, and is valid from the Autumn semester 2017 at Karlstad University.

#### Prerequisites

Completed courses LPGG01 and LPGG02

#### Learning Outcomes

The aim of the course is that students develop their mathematical subject knowledge and acquire mathematical knowledge for teaching, required to teach in preschool class and grades 1-3.

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

- apply and communicate subject knowledge regarding number sense, arithmetic, algebra, geometry, probability and statistics (1),
- identify and describe necessary preconceptions and critical steps in children's mathematical development (2),
- assess children's performance as a tool for learning (3),
- evaluate and argue for different teaching strategies, including aesthetic learning processes that can stimulate mathematical creativity and the joy of discovery (4),
- apply and analyse basic mathematical concepts regarding number sense and the use of numbers, which encompasses different forms of representation, and how these can be used in preschool class and grades 1-3 (5),
- describe parts of the historical development of mathematics and exemplify how to illustrate this for children (6),
- give an account of the role of culture and language in mathematics teaching (7),
- use correct and relevant mathematical language in speech and writing (8),
- give an account of relevant mathematics education research (9),
- describe the central role of problem solving in teaching mathematics and evaluate different solving

models (10),

- critically review and evaluate textbooks, pedagogical aids and digital tools in mathematics adapted to preschool class and grades 1-3 (11),
- analyse and problematise issues of teaching and learning mathematics in relation to children's different backgrounds and potentials to learn mathematics (12), and
- evaluate and argue for different teaching strategies, including aesthetic learning processes that can stimulate mathematical creativity and the joy of discovery (13).

### **Content**

The mathematics content of the course focusses on problem solving, number sense, arithmetic, geometry, algebra, probability and statistics on the basis of school curricula and mathematics education research. Problem solving and different strategies in problem solving are studied. Experimental and exploratory activities are tried out and evaluated. Relevant research results in mathematics education are studied and discussed. The focus is on number sense, basic arithmetic operations and the use of natural numbers. Children's perception of the positional system is studied and linked to the historical development of number systems. Algebra is approached as a development of number sense and the use of numbers. Unknown numbers and equations are demonstrated as powerful tools for generalising and solving problems. Probability and statistics are treated in relation to everyday situations and linked to the goals of primary education.

Central areas of primary school mathematics are studied in terms of both mathematical subject knowledge and mathematical knowledge for teaching in relation to curricular documents and mathematics education research. Experimental and exploratory activities and different teaching materials are tried out and analysed. Aesthetic presentation and diversity aspects of learning and teaching mathematics are evaluated. The role of mathematics is treated from different perspectives, such as cultural, social and historical. Students are made aware of their attitudes to mathematics and how they affect children's learning. Assessing children's knowledge is included as well as current education literature and relevant research.

The course includes a study use children's mathematical preconceptions and experiences. Furthermore, identification of obstacles and opportunities for all children's learning of mathematics, for instance from a diversity perspective. Further, the role of language and communication in mathematics education is dealt with.

Teaching materials, pedagogical aids and digital tools are analysed and discussed on the basis of national curricular documents and current mathematics education research. Different digital learning resources and basic programming are introduced and discussed.

### **Reading List**

See separate document.

### **Examination**

Assessment is based on:

Learning outcomes 1, 2 and 10: written exams

Learning outcomes 3 and 13: hand-in assignment and a creative and oral report

Learning outcomes 4, 5, 6, 7, 9, 11, and 12: hand-in assignments and oral reports

Learning outcome 8 is assessed in all examination tasks.

All submissions for assessment must clearly indicate individual contributions.

### **Grades**

One of the grades Distinction (VG), Pass (G), or Fail (U) 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: Primary School