

Number Theory

Programme course

6 credits

Talteori

TATA54

Valid from: 2017 Spring semester

Determined by

Board of Studies for Computer Science
and Media Technology

Date determined

2017-01-25

Main field of study

Mathematics, Applied Mathematics

Course level

First cycle

Advancement level

G2X

Course offered for

- Mathematics
- Computer Science and Engineering, M Sc in Engineering
- Applied Physics and Electrical Engineering - International, M Sc in Engineering
- Applied Physics and Electrical Engineering, M Sc in Engineering
- Information Technology, M Sc in Engineering
- Computer Science, Master's programme
- Computer Science and Software Engineering, M Sc in Engineering

Entry requirements

Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites

Basic concepts in discrete mathematics.

Intended learning outcomes

The course should give insight into elementary number theoretic concepts and advance ability in their use. After completing the course the student should

- know how integers are constructed from the prime numbers and how the prime numbers are distributed among the integers
- be able to do calculations with congruences and solve certain diophantine equations
- know of certain important number theoretic functions, e.g. the Euler phi-function, and their use
- know the Möbius inversion formula and how to apply it
- have knowledge of some simple primality tests
- know the law of quadratic reciprocity
- be able to calculate with continued fractions and to use these in order to solve Pell's equation
- be able to handle the Gaussian integers and know how they are used to write integers as sums of two squares

Course content

Prime numbers, arithmetic modulo n , little Fermat, primitive roots, chinese remainder theorem, quadratic residues, reciprocity, sums of squares. Continued fractions.

Teaching and working methods

Lectures.

Examination

TEN1 Written Examination 6 credits U, 3, 4, 5

Grades

Four-grade scale, LiU, U, 3, 4, 5

Department

Matematiska institutionen

Director of Studies or equivalent

Jesper Thorén

Examiner

Leif Melkersson

Education components

Preliminary scheduled hours: 36 h

Recommended self-study hours: 124 h

Course literature

K.H. Rosen: Elementary Number Theory and its Applications. 6th ed., Addison-Wesley.

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://stydokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.