



## Course syllabus

Faculty Board of Science and Engineering

School of Computer Science, Physics and Mathematics

4MA122 Analytisk talteori, 7,5 högskolepoäng

4MA122 Analytic Number Theory, 7.5 credits

### **Main field of study**

Mathematics

### **Subject Group**

Mathematics

### **Level of classification**

Second Level

### **Progression**

A1N

### **Date of Ratification**

Approved by School of Computer Science, Physics and Mathematics 2010-05-12

The course syllabus is valid from spring semester 2011

### **Prerequisites**

2MA106, Elementary Number Theory, 7,5 credits or equivalent.

## Objectives

The student should know:

- a number of methods for calculating asymptotic mean values of arithmetic functions
- a number of equivalent statements of the prime number theorem and be able to prove the equivalences
- how to sketch the proof of Dirichlet's theorem of primes in arithmetic progressions
- how to use primitive roots to solve certain types of congruence equations and to construct Dirichlet characters
- how to sketch the proof of the prime number theorem.

## Content

- Arithmetic functions, especially Mangoldt's function and Chebychev's psi- and theta functions. Bell series
- Asymptotical mean values of arithmetic functions. Euler's summation formula

- Dirichlet characters
- Primitive roots and index (also known as discrete logarithm)
- Dirichlet's theorem of primes in arithmetic progressions
- Something about Riemann zeta function and the proof of the prime number theorem.

### Type of Instruction

Lectures and seminars. Compulsory assignments may be given during the course.

### Examination

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

On request, students may have their credits translated to ECTS-marks. Such a request must be sent to the examiner before the grading process starts.

The student's knowledge is assessed in the form of oral and/or written examinations. There could also be a continuous examination in the form of oral and/or written reports throughout the course. The principal assessment method for the course is determined at the beginning of the course.

### Course Evaluation

A course evaluation will be carried out at the end of the course in accordance with the guidelines of the University. The result of the course evaluation will be filed at the department.

### Required Reading and Additional Study Material

#### **Required Reading**

Jefferey Stopple, *A primer of analytic number theory*, Cambridge, 2003. 270 (380) pages.