



# FED3250 Plasma Waves II 3.0 credits

## Plasmavågor II

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

## Establishment

Course syllabus for FED3250 valid from Spring 2012

## Grading scale

## Education cycle

Third cycle

## Specific prerequisites

## Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

## Intended learning outcomes

To provide the theoretical basis for waves appearing in plasmas, propagation and absorption of them. When completing the course, the student should be able to

- Derive the dispersion relation for waves in a cold plasmas

- Characterize the more common cold plasma waves
- Be familiar with the CMA diagram
- Solve wave equation in a planar geometry with WKB
- Describe how to treat the plasma response and basic properties of the response tensor
- Describe how one calculates wave propagation with the ray tracing method
- Describe the collisionless absorption mechanisms in a plasma
- Describe how the emission and absorption processes are related

## Course contents

Plasma waves and some kinetic theory. Waves in cold plasmas. Cold dielectric tensor. Oscillations in a bounded plasma. WKB, Ray tracing. Reflection, absorption and emission processes. Collisionless absorption mechanisms: Landau damping, cyclotron damping and TTMP damping. Kramers-Kronig's and Onsagers relations. Emission of waves. Larmor formula.

## Disposition

Seminars or discussion meetings.

## Course literature

T.H. Stix, Waves in Plasmas, American Institute of Physics, New York, 1992. Chapters 1-4, 11 or similar literature e.g. in D.G. Swanson, Plasma Waves, second edition, Institute of Physics Publishing Ltd 2003 London.

## Examination

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

## Other requirements for final grade

Written and a final oral exam.

## Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.

- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.