

Radar and remote sensing, 5 credits
Fjärranalys (7.5 ECTS credits)

D-nivå
FJA450

Syllabus approved by the Academic Board of the School on August 31, 2005. Effective starting autumn term 2005.

PLACEMENT IN THE ACADEMIC SYSTEM

The course is offered as an independent course.

PREREQUISITES AND CONDITIONS FOR ADMISSION

Physics and electronics courses as to M.Sc. degree of electrical engineering at the University of Halmstad

PURPOSE AND OBJECTIVES

Remote sensing refers to the science of measuring properties of the Earth's surface (land and sea), and atmosphere from a distance, usually using electromagnetic radiation. In this course we focus on the use of radio waves for remote sensing of the Earth's surface. The course studies the interaction of radio waves with the Earth's surface, the influence of the atmosphere on the wave propagation, as well as different techniques for measuring the scattered and emitted radiation. In particular, the use of radar systems for remote sensing is studied in depth. The principles are illustrated with different applications using remote sensing for environmental monitoring.

The goals of the course are:

- To understand the principles of remote sensing using microwaves and radio waves.
- To understand microwaves, and the properties of a system for measuring them.
- To understand how the properties of a radar system affect the measurement accuracy, and how to process the data to maximise the usefulness of the data for remote sensing.
- To illustrate how to use knowledge of electromagnetic propagation and scattering, image and signal processing for a particular application (e.g. global mapping of wind speed over oceans).

PRIMARY CONTENTS

Satellite systems for microwave remote sensing. Electromagnetic wave propagation in media. Passive observational techniques. Radar technology (side-looking radar, altimeter, synthetic aperture radar). Information extraction – data reduction and analysis. Applications to remote sensing for environment observations: Green house effect. Laboratory projects in radar observations of moist ground, studies on work stations of synthetic aperture techniques, imaging and image analysis.

INSTRUCTION AND EXAMINATION OF STUDENTS

The instruction consists of lectures and worked example classes.

Examination consists of two compulsory computer exercises and one compulsory laboratory exercise.

The course is graded according to the following grading scale: Fail (U), 3, 4 and 5 (the grading system used in most Swedish, technical educations where 3 is the equivalent to a Pass).

COURSE EVALUATION

After completion of a course, the director of studies is responsible for giving the students the opportunity to make an evaluation of the course. The course evaluation should serve as a guide for further development and planning of the course. Participants in course evaluations should be anonymous. The results are distributed to concerned directors of studies, lab leader, teachers and students. Thereafter, a compilation is made of the results and subsequent measures, and reported to the school board of directors.

COURSE LITERATURE

Askne, J. (2001). Radar and remote sensing.