



## DEPARTMENT OF MATHEMATICAL SCIENCES

### **MSA940 Thesis in Mathematical Statistics for the Master's Programme in Mathematical Sciences, Statistical learning and AI, 30 credits**

Examensarbete i matematisk statistik vid Masterprogrammet i matematiska vetenskaper, Statistisk inlärning och AI, 30 högskolepoäng

*Second Cycle*

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#### **Confirmation**

This course syllabus was confirmed by Department of Mathematical Sciences on 2019-11-08 to be valid from 2019-11-08, autumn semester of 2019.

*Field of education:* Science 100%

*Department:* Department of Mathematical Sciences

#### **Position in the educational system**

The course can only be taken as a part of the two-year Master's Programme in Mathematical Sciences. The course constitutes a degree project for the Master's degree (120 credits) in Mathematical Statistics.

The course can be part of the following programme: 1) Mathematical Sciences, Master's Programme (N2MAT)

*Main field of studies*

Mathematical Statistics

*Specialization*

A2E, Second cycle, contains degree project for Master of Arts/Master of Science (120 credits)

#### **Entry requirements**

To be eligible for the course it is necessary to be registered in the two-year Master's Programme in Mathematical Sciences.

The three compulsory courses and one of the courses in Mathematics or Mathematical Statistics within the specialization requirements for the specialization *Statistical learning and AI*, specified in the programme syllabus, must be completed.

### **Learning outcomes**

After completing the course, students should

- have the ability to solve problems within the AI-field that require advanced knowledge in mathematical statistics
- be able to follow the developments within the field of statistical learning and AI
- have thorough knowledge and understanding of and insight into current research in the field of the thesis
- have the ability to critically, independently, and creatively identify and formulate issues, and to plan and carry out advanced tasks within specified time limits
- be able to present and discuss their own and others' results orally and in writing
- be able to evaluate their own knowledge, to identify the need for further knowledge, and to take the responsibility for obtaining such knowledge.

### **Course content**

A supervisor and a separate examiner are appointed for each student. A project to be performed by the student is formulated within a statistical aspect of the field of AI in consultation with the supervisor and the examiner. The work typically includes reading relevant scientific literature, choosing a statistical model relevant for the project, and applying probability theory tools and statistical methods using properly chosen computer software. The work is presented in a written report and presented and discussed at a seminar. The report is written and presented in English. The work can be done individually or in groups of two. Students must also act as an opponent at a Master's thesis presentation of another student.

### **Form of teaching**

Teaching consists of tutoring for about 20 hours while the student's total work time is about 800 hours.

The course shall be conducted such that it fills at least half the time of full-time studies and shall be completed within one year from the start. Initially, the student, in consultation with the supervisor, sets up a project plan containing a project description and a schedule. In cases where the student and the supervisor want a timetable extending over more than one year, special reasons must be given, and the plan must be approved by the director of studies before the start of the work.

The timetable may be revised in case of special circumstances (prolonged illness, etc.). In such cases, relevant persons must be notified immediately and the revised plan must be approved by the director of studies. Students who do not finish their thesis according to the agreed (possibly revised) schedule are not entitled to further supervision.

The student should attend at least three other presentations of Master's projects, and the student must be an opponent at one of these occasions.

*Language of instruction:* English

### **Assessment**

The examiner sets a grade based on an overall assessment of the work performance, in the written report, during the oral presentation, and in the subsequent discussion. In case of a pair project, each student's contributions should be clearly stated in the written report.

To pass, an approved opposition to another Master's thesis presentation and attendance at two other Master's thesis presentations is also required.

### **Grades**

The grading scale comprises: Pass with Distinction (VG), Pass (G) and Fail (U).

### **Course evaluation**

Course evaluation takes place in cooperation between the student, supervisor, examiner, and director of studies during and after the course.

### **Additional information**

The syllabus for MSA930 was originally established to take effect from 2009-09-01.