Linnæus University

Dnr: 2014/2424 -3.1.2

Course syllabus

Faculty of Technology

Department of Mathematics

4MA221 Multivariatanalys, 7,5 högskolepoäng
4MA221 Multivariate Analysis, 7.5 credits

Main field of study
Mathematics

Subject Group
Mathematics

Level of classification
Second Level

Progression
A1N

Date of Ratification
Approved 2009-08-11
Revised 2014-09-03 by Faculty of Technology. Prerequisites, objectives, content, examination and type of instructions are revised.
The course syllabus is valid from autumn semester 2015

Prerequisites
60 credits in mathematics including
In mathematics: Linear algebra (1MA151), 7.5 credits or equivalent.
In mathematical statistics: Probability theory and statistics (1MA201), 7.5 credits, and Linear statistical models (1MA203), 7.5 credits or equivalent.

Objectives
The student shall be able to

- account for general approaches to analyze multi-dimensional data by statistical methods
- compute means and covariances of linear combinations of random variables by matrix operations
- account for multidimensional normal distribution
- carry out inference for mean vectors applied to empirical data
- account for and apply multivariate regression, principal component analysis, factor analysis, discriminant analysis, and cluster methods, to empirical data
- shortly account for essential steps in data mining

Content
The course contents is

- computation of means and covarianses of linear combinations of random variables by matrix operations
- multi-dimensional normal distribution
- inference of mean vectors
- multivariate regression
- principal component analysis
- factor analysis
- discriminant analysis
- cluster methods
- short introduction to data mining

Type of Instruction
Lectures; home assignments; oral presentation, written report and opposition of a project.

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

Assessment of how well the student fulfills the objectives is achieved through:

- oral examination
- home assignment with analytical and computer based exercises
- oral presentation and written report of a project where an empirical data material is analyzed
- opposition of another student's project

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.

To pass, the student is required to achieve the expected learning outcomes of the course.

Course Evaluation
After the course a written evaluation of the course will take place according to the University guidelines.

Required Reading and Additional Study Material
Required reading
Johnson R A, Wichern D W. *Applied multivariate statistical analysis*, Prentice Hall, 2002.
453 (767) pages.