



**LUND**  
UNIVERSITY

School of Economics and Management

## **DABN13, Data Analytics and Business Economics: Machine Learning from a Regression Perspective, 7.5 credits**

*Dataanalys och ekonomi: Maskininlärning ur ett regressionsperspektiv, 7,5 högskolepoäng*  
Second Cycle / Avancerad nivå

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### **Details of approval**

The syllabus was approved by The Board of the Department of Economics on 2020-09-15 and was last revised on 2022-09-13. The revised syllabus applies from 2023-01-16, spring semester 2023.

### **General Information**

This is a single subject master course in data analytics and business economics. The course is mandatory in the master programme Data Analytics and Business Economics. The course is optional within a number of master programmes at Lund University.

*Language of instruction:* English

(Teaching may be in Swedish if all registered students have a good knowledge of Swedish.)

*Main field of studies*

Data Analytics and Business Economics

*Depth of study relative to the degree requirements*

A1N, Second cycle, has only first-cycle course/s as entry requirements

### **Learning outcomes**

#### **Knowledge and understanding**

Students shall have an understanding of:

- basic regression and classification methods,
- model training and validation,
- model selection,
- regularization and dimension reduction techniques,
- the basics of non-linear machine learning methods, such as neural networks,

- how to interpret results from the methods covered.

### **Competence and skills**

Students shall have the ability to independently:

- apply the methods covered using the R software package,
- appropriately choose between a set of methods for a given empirical problem,
- evaluate the suitability of the chosen method,
- generalise their knowledge to empirical problems that have not been treated during the course,
- draw conclusions from empirical results and provide advice.

### **Judgement and approach**

Students shall have the ability to pursue further studies in the subject and should be able to search for and evaluate subject related information with a high degree of independence. Students shall also have sufficient competence to write an empirical report where machine learning is an essential element.

### **Course content**

Machine learning refers to statistical model predictions that improve through experience; as new data arrive, the model learns and adapts. The price that the supermarket can charge for advertisements depends critically on its ability to learn from the data which customers that are likely prospects for a particular supplier's product. Similarly, the price that Google can charge for space for sponsored links is directly tied to their ability to correctly identify people likely to follow the link. That is where machine learning comes in. This course teaches the basics of machine learning and it does so by focusing on those methods that build in one way or another on standard regression analysis. Some of the topics covered are classification based on logistic regression, model selection using information criteria and cross-validation, shrinkage methods such as lasso, ridge regression and elastic nets, dimension reduction methods such as principal components regression and partial least squares, and neural networks. Theoretical studies are interwoven with empirical applications to problems in business and economics, which are carried out using the R software.

### **Course design**

1. Teaching: Teaching consists of lectures and exercise classes.

### **Assessment**

1. Examination: The examination consists of a written exam and home assignments. The written exam takes place at the end of the course. There will be further opportunities for examination close to this date. Points gained on the home assignments count at exams during the current term. Other forms of examination may be used to a limited extent.

2. Limitations on the number of examination opportunities: –

The University views plagiarism and other academic dishonesty very seriously, and will take disciplinary action against students for any kind of attempted malpractice in connection with examinations and assessments. Plagiarism is considered to be a very

serious academic offence. The penalty that may be imposed for this, and other unfair practices in examinations or assessments, includes suspension from the University for a specified period.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

*Subcourses that are part of this course can be found in an appendix at the end of this document.*

## Grades

Marking scale: Fail, E, D, C, B, A.

1. Grade (Definition), Points or percentage out of maximum points, Characteristic  
A (Excellent) A distinguished result that is excellent with regard to theoretical depth, practical relevance, analytical ability, and independent thought.

B (Very good) A very good result with regard to the above-mentioned aspects.

C (Good) The result is of a good standard with regard to the above-mentioned aspects and lives up to expectations.

D (Satisfactory) The result is of a satisfactory standard with regard to the above-mentioned aspects and lives up to expectations.

E (Sufficient) The result satisfies the minimum requirements with regard to the above-mentioned aspects, but not more.

U (Fail) The result does not meet the minimum requirements with regard the above-mentioned aspects.

To pass the course, the student must have been awarded the grade of E or higher.

2. Weighting grades from different parts of the course: –

3. Grading scales for different parts of the course: –

## Entry requirements

Students admitted to the master programme Data Analytics and Business Economics are eligible for this course. Students admitted to the Master Programme in Economics with at least 30 ECTS-credits in economics at the advanced level including Advanced Econometrics are eligible for the course. For other students, a Bachelor degree including at least 30 ECTS-credits in statistics of which 7.5 ECTS-credits in econometrics or regression analysis, or a Bachelor degree in economics or business administration with at least 15 ECTS-credits in statistics of which 7.5 ECTS in econometrics or regression analysis is required.

## Further information

1. Transitional regulations: –

2. Limitations in the period of validity: –

3. Limitations: –

4. Similar courses: –

5. Limitations in renewed examination: –

## Subcourses in DABN13, Data Analytics and Business Economics: Machine Learning from a Regression Perspective

Applies from H21

2101 Machine Learning from a Regression Perspective, 7,5 hp  
Grading scale: Fail, E, D, C, B, A