



Beginnelen van statistische data-analyse (C003797)

Cursusomvang (nominale waarden; effectieve waarden kunnen verschillen per opleiding)

Studiepunten 6.0 Studietijd 150 u Contacturen 62.5 u

Aanbodsessies en werkvormen in academiejaar 2017-2018

A (semester 1)	werkcollege: PC-klasoefeningen	7.5 u
	groepswerk	15.0 u
	hoorcollege	22.5 u
	werkcollege: geleide oefeningen	7.5 u
	zelfstandig werk	10.0 u

Lesgevers in academiejaar 2017-2018

Vansteelandt, Stijn	WE02	Verantwoordelijk lesgever
Goetghebeur, Els	WE02	Medelesgever
Thas, Olivier	LA10	Medelesgever

Aangeboden in onderstaande opleidingen in 2017-2018

Master of Science in Statistical Data Analysis	stptn	aanbodsessie
	6	A

Onderwijstalen

Engels

Trefwoorden

Descriptive statistics, hypothesis testing, estimation, information, simulation, non-parametric testing, statistical data analysis

Situering

This course serves as a solid introductory course of statistics aimed at students who will continue studying statistics within the master program. It is designed so that the student is well prepared for the other compulsory courses in the master program. The course provides the student with a solid basis and hands-on applicable knowledge for the design and analysis of simple empirical studies. Other objectives are: To allow her/him to have a thorough understanding, both conceptually and numerically, of the basic concepts of probability, random sampling, estimation, variation, bias, information, and evidence. To understand statistical properties of estimators and predictions. To enable the student to simulate simple data structures in R and examine their empirical properties. To introduce the basic concepts and practice of design and sample size calculations.

Inhoud

- Numerical and graphical summaries of data
- Random sampling from a population
- Discrete and continuous distribution functions
- Probability theory (Bayes' rule, law of total probability, odds ratios and relative risks, central limit theorem ...)
- Likelihood
- Directed Acyclic Graphs
- Introduction to maximum likelihood theory
- Simulation experiments
- Confidence intervals
- Hypotheses testing, p-values and power
- Comparing two means and proportions based paired and unpaired data
- Multiple testing and Bonferroni correction

- Sample size calculations
- Non-parametric tests of location and dispersion
- Permutation testing
- Kernel smoothing
- Reporting and protocol writing

Begincompetenties

Introductory mathematics

Eindcompetenties

- 1 The student has knowledge of basic probability theory, and of basic statistical methods for exploring and summarising data and for answering simple research questions related to means, variances, proportions and dependence.
- 2 The student knows the distinction between a population and a sample and knows how to draw justified inference on population means, variances and proportions based on a simple random sample.
- 3 The student can recognize practical problems which can be solved by means of simple statistics.
- 4 The student can describe a data set appropriately through graphs and summary statistics.
- 5 The student can use the statistical software R for all methods discussed in this course.
- 6 The student can evaluate properties of estimators and hypothesis tests through simulation.
- 7 The student understands the assumptions on which simple statistical inference methods rely and can verify whether the assumptions are consistent with the data.
- 8 The student can critically read the basic statistical content of scientific publications.
- 9 The student can collaborate with colleagues.
- 10 The student can adequately report results of a simple statistical analysis: both orally and in writing.

Creditcontractvoorwaarde

Toelating tot dit opleidingsonderdeel via creditcontract is mogelijk mits gunstige beoordeling van de competenties

Examencontractvoorwaarde

Dit opleidingsonderdeel kan niet via examencontract gevolgd worden

Didactische werkvormen

Groepswerk, hoorcollege, zelfstandig werk, werkcollege: geleide oefeningen, werkcollege: PC-klasoefeningen

Leermateriaal

Copies of slides and selected course notes
Geraamde totaalprijs: 20 EUR

Referenties

Introduction to the Practice of Statistics, Fifth Edition, by David S. Moore and George P. McCabe

Vakinhoudelijke studiebegeleiding

Students are coached during practical classes (some labs behind the PC) and learn from group work. Through the electronic learning environment they can exchange questions and answers outside lecture hours among themselves and with lecturers. A series of projects and home works will provide the students with practical experience in data analysis. The students will receive coaching and feed back.

Evaluatiemomenten

periodegebonden en niet-periodegebonden evaluatie

Evaluatievormen bij periodegebonden evaluatie in de eerste examenperiode

Schriftelijk examen met open vragen, openboekexamen, mondeling examen, werkstuk

Evaluatievormen bij periodegebonden evaluatie in de tweede examenperiode

Schriftelijk examen met open vragen, openboekexamen, mondeling examen, werkstuk

Evaluatievormen bij niet-periodegebonden evaluatie

Werkstuk, peer-evaluatie, verslag

Tweede examenkans in geval van niet-periodegebonden evaluatie

Examen in de tweede examenperiode is mogelijk

Toelichtingen bij de evaluatievormen

The knowledge and problem solving skills of the students are tested by means of a written test (open book, periodical evaluation), oral test and data analytic tasks.

Non periodical evaluation takes the form of three take home problem sets for independent work and a project assignment for group work.

At the end of the course there is a written + oral test to assess the student's understanding of the concepts/theory, and how these relate to the data analyses.

Eindscoreberekening

The total mark is computed as an average of the marks for the problem sets and project (50%), and the written+oral test (50%), but the student must pass both parts (i. e. more than 50% for each part) to receive a pass mark for this course unit.

If the student fails for this course in the first examination period and if he/she wants a retake in the second examination period, then the evaluation consists of a revised version of the non-periodical evaluation (problem sets+project) and a written+oral test.

Peer assessment is used to correct the marks for the project assignment so as to provide a more representative score for the student's individual contribution. A student's individual score for the project work will at most deviate 20% of average score for the group. 20% of the score of the project will be based on a report that is used to evaluate the process that student went through to arrive at the result (focus on the skills to participate in a group effort).