Course Specifications

Valid as from the academic year 2018-2019

Statistics and Data Handling (E003220)

Course size (nominal values; actual values may depend on programme)

Credits 4.0	Study time 120 h	Contact hrs	30.0 h

Course offerings and teaching methods in academic year 2018-2019

A (semester 1)	Dutch	lecture	15.0 h
		self-reliant study activities	0.0 h
		seminar: coached exercises	10.0 h
		seminar: practical PC room classes	5.0 h

Lecturers in academic year 2018-2019

De Belie, Nele		TW14	lecturer-in-charge

Offered in the following programmes in 2018-2019	crdts	offering
Bachelor of Science in Engineering: Architecture	4	A

Teaching languages

Dutch

Keywords

statistics, data handling, probability, distributions, estimations, regression analysis, testing hypotheses

Position of the course

Learn the basic principles of probability, statistics and data handling. Know how to analyse the results of an experiment in a statistically sound way. Be able to determine the correlation between different variables.

Contents

- Basic principles of probability: combinations, rule of Bayes, probability density function, mean, variance, fractile, moment, random numbers, sample characteristics, frequency table, estimate, (non)-parametric hypothesis, degrees of freedom, significance level, errors of type I and II, one and two tailed testing, regression, correlation, analysis of variance, multiple comparison of means, conservativeness of a test
- Theory of one-dimensional distributions
- Distribution of discrete variables: Bernoulli, binomial and Poisson
- Normal distribution
- Distributions of continuous variables: uniform, exponential, X, t- and F-distribution
- Descriptive statistics
- Estimates (confidence interval, moment method)
- Testing hypotheses
- Linear regression
- Multiple comparison of means

Initial competences

Final competences

1 Explain the distribution of a variable and how the variable can be characterised using simple parameters.
2 Identify experiments of processes for which certain probability density functions can be applied.
3 Decide on characteristics of a population based on analysis of samples.

4　To be able to estimate parameters and calculate confidence intervals.
5　To be able to test a statistical hypothesis.
6　Investigate whether the difference between populations is relevant.
7　Calculate the chance that an event will occur.
8　Draw and use the graphical representation of a probability function.
9　Analyse the output of an experiment by use of frequency tables.
10　Investigate whether a sample comes from a population behaving according to a certain statistical model.
11　Analyse a trend in data using regression analysis.
12　Pay attention to the option to characterise a complex phenomenon by the use of simple parameters.
13　Be able to analyse large data sets statistically.
14　Critically evaluate the information coming from small samples.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Lecture, self-reliant study activities, seminar: coached exercises, seminar: practical PC room classes

Learning materials and price

course notes

References

- Walpole R.E., Myers R.H., Myers S.L., Ye K. (2007). Probability and statistics for engineers and scientists. London, Pearson Education, ISBN 0-13-204767-5.
- Howitt D., Cramer D. (2004). Statistiek met SPSS 11 voor Windows. Pearson Education Benelux, ISBN 90-430-0843-5.
- Johnson R., Freund J., Miller I. (2011). Probability and statistics for engineers (8th edition). Boston, Prentice Hall - Pearson Education, ISBN 0-321-69498-8.
- Mendenhall W., Sincich T. (2007). Statistics for engineering and the sciences (5th edition). London, Pearson education LTD, ISBN 0-13-187706-2.
- Norusis M.J. (2008). SPSS 16.0 guide to data analysis. Upper Saddle River, Prentice Hall, ISBN-13: 978-0-13-606136-6.

Course content-related study coaching

Evaluation methods

end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period

Written examination

Examination methods in case of periodic evaluation during the second examination period

Written examination

Examination methods in case of permanent evaluation

Report

Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible in modified form

Extra information on the examination methods

The examination within the exam period consists of a written open book exam comprising theory and exercises.
Furthermore, a report concerning analysis of data using the statistical software SPSS and prepared in groups of two students, is judged.
If one does not participate in one of the parts of the evaluation, it is not possible to pass for this course. In case the final score would still be 10 or more on 20, this will be reduced to the highest no-pass score (9/20).

Calculation of the examination mark

The written exam counts for 80% of the points (40% theory, 40% exercises), the report for 20% of the points.