

3.1.m Course Module on 1st Semester: Probability Theory, Statistics and English

Title:

M1-12 Probability Theory, Statistics and English / Sandsynlighedsregning, statistik og engelsk

Preconditions:

Linear Algebra, Calculus, Mathematics and Numerical Methods from a relevant Bachelor of Science specialisation. International students must document English language skills with a level equal to an IELTS minimum band score of 6.5 and a minimum oral score of 6.5.

Objective:

Students who complete the module should:

Knowledge

Probability theory and statistics:

- Have knowledge and comprehension in the area of:
 - The axioms of probability theory
 - One and multi dimensional discrete and continuous stochastic variables
 - Description of stochastic variables by density functions, distribution functions, mean values, variance, correlation and covariance
 - Examples of probability distributions:
 - Discrete: Bernoulli, binomial, Poisson and hyper-geometric
 - Continuous: Uniform, Gaussian
 - The central limit theorem
 - Estimation theory:
 - Point estimation and interval estimation (confidence intervals) for mean values and variance
 - Especially maximum likelihood estimators and Bayes estimators are treated
 - Test theory:
 - Basic philosophy behind testing of hypotheses, null hypothesis and alternative hypothesis, significance level, faults of 1st and 2nd kind, P-value
 - Test of mean value and variance in normal distributions
 - Use of statistics on real data by use of computer programs (e.g. MATLAB)

Scientific English (for students having a bachelor degree from Aalborg University)

- Know techniques involved in the planning, production and presentation/ communication of scientific work in English

English (for students on the INTRO semester)

- Have knowledge about planning, production and presentation of scientific work in English

Skills

Probability theory and statistics:

- Be able to apply probability theory within engineering relevant statistical and stochastic processes
- Be able to apply statistical methods in engineering projects

Scientific English (for students having a bachelor degree from Aalborg University)

- Apply different methods for the presentation of scientific results in the English language as a conference paper, a poster, a journal paper or orally at conferences

English (for students on the INTRO semester)

- Be able to communicate scientific methods and results orally and visually in a classroom presentation.
- Be able to communicate scientific methods and results in written form in understandable English

Competence

- Independently define and analyse scientific problems in the area of probability theory and statistics
- Independently be able to communicate methods and results in a proper scientific manner in English

Type of instruction:

The course is taught through a mixture of lectures, workshops, exercises, mini - projects and self - studies.

Exam format:

The examination of the course will have one written examination in Probability and Statistics. To be allowed to attend the examination in Probability theory and Statistics, mandatory assignments for the English course must have been approved in advance. The written examination is held according to the Examination Policies and Procedures, Addendum to the Framework Provision of Faculty of Engineering and Science, Aalborg University.

Assessment criteria:

As stated in the Framework Provisions