



## Engineering Statistics

### Engineering Statistics/Tillämpad statistik

7.5 credits

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**Ladok Code:** TBE031

**Version:** 1.0

**Established by:** Board of the department 2009-11-24

**Valid from:** Autumn 2009

**Education Cycle:** First cycle

**Main Field of Study (Progressive Specialisation):**

**Disciplinary Domain:** Technology

**Prerequisites:** Admitted to Industrial Engineering - Business Engineering.

**Subject Area:**

**Grading Scale:** ECTS-credits

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#### Content

- Descriptive statistics
- Probability
  - Basic Concepts
  - Combinatorics
  - Conditional Probability
  - Independent Events
  - Bayes's Theorem
- Discrete Probability Distributions
  - Probability, Expectation and Variance
- Special Discrete Distributions
  - Binomial Distribution
  - Poisson Distribution
  - Hypergeometric Distribution
- Continuous Distributions
  - Probability, Expectation, Variance, Median and Quartiles
- Special Continuous Distributions
  - Uniform Distribution
  - Exponential Distribution
  - Normal Distribution
- The Central Limit Theorem
- Quantile-Quantile plot
- Confidence intervals for a population mean
- Confidence intervals for a difference between two population means
- Hypothesis Testing
  - Simple and Composite Hypothesis
  - Type I and Type II errors
  - Power functions
- Matlab and Minitab

#### Learning Outcomes

This course in mathematical statistics is designed to expose students to the basic notions of probability and statistical inference. Computer based tools are used to perform calculations and simple simulations.

After passing the course the student should be able to do the following:

- Recognize applications modelled by basic probability theory
- Calculate descriptive statistical measures
- Use tree diagrams, permutations and combinations for counting.
- Explain the concepts of probability, independence, conditional probability, distribution, expectation and variance
- Calculate the probability of an event, and the expectation and variance from a given distribution
- Calculate confidence intervals for population mean and for a difference between two population means
- Testing statistical hypothesis

### **Forms of Teaching**

Lectures, exercise class, computer laboratory work.

### **Forms of Examination**

The course will be examined through the following examination elements:

#### *Written examination*

Learning outcomes:

Credits: 6

Grading scale: ECTS-credits

#### *Written assignment*

Learning outcomes:

Credits: 1.5

Grading scale: Fail (U) or Pass (G)

Student rights and obligations at examination are in accordance with guidelines and rules for the University of Borås.

### **Literature and Other Teaching Materials**

### **Student Influence and Evaluation**

The head of department and the course coordinator are responsible for a continuous and systematic collection of students' views. The evaluation report is completed by the students and provides the basis for the future design of the course.

### **Miscellaneous**

Required reading and teaching tools

Tanis & Hogg, A brief course in mathematical statistics