MICRO-110 **Design of experiments**

Subramanian Vivek

Cursus	Sem.	Type
Microtechnics	BA2	Obl.

Language of teaching	English
Coefficient	3
Session	Summer
Semester	Spring
Exam	Written
Workload	90h
Weeks	14
Hours	**3 weekly**
Courses	2 weekly
Exercises	1 weekly
Number of positions	

Summary

This course provides an introduction to experimental statistics, including use of population statistics to characterize experimental results, use of comparison statistics and hypothesis testing to evaluate validity of experiments, and design, application, and analysis of multifactorial experiments

Content

Course Introduction

- Observing Experiments - introduction to factors and responses
- Designing efficient experiments - introduction to experimental cost, observation of effects and interactions, and general design strategies
- Building models - Relating factors to responses
- Inference - Relating samples to populations

Descriptive statistics

- Mean, Median, Mode, Standard Deviation - Summary statistics for populations and samples
- Population Statistics
- Graphical Representation - Chart types
- Population distributions - Normal and binomial distributions
- Mean and standard deviation - Summary statistics and degrees of freedom
- Sampling - Randomness and statistical representation

Comparison Statistics

- Sampling, Blocking and randomization
- Replication
- Significance tests - t tests, randomization test, ANOVA
- Regression and fitting - correlation and least squares

Design of Experiments

- Factorial design
- Fractional factorial design

Keywords

Statistics, Design of Experiments, Hypothesis Testing, ANOVA, regression, correlation, multifactorial

Learning Outcomes

By the end of the course, the student must be able to:

- Design Experiments using multifactorial techniques
- Work out / Determine correlation between experimental data sets
- Characterize sampled data and population data to determine central tendencies and variability
- Assess / Evaluate Statistical validity of a hypothesis

Teaching methods

Lectures with extensive in-class interactive content, exercises using computational tools

Expected student activities

Attend lectures and participate in in-class discussion
Complete exercises
Complete in-class and final examinations

Assessment methods

2 written midterm tests in class
Written final examination

Supervision

Office hours	Yes
Assistants	Yes
Forum	No
Others	Office hours will be held after midterms to review results