Module Description

Applied Statistics and Data Analysis

General Information

Number of ECTS Credits

3

Abbreviation

FTP_AppStat

Version

February 18th 2016

Responsible of module

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Language

	Lausanne	Bern	Zurich	Lugano
Instruction	☐ E ☒ F	☐ D ☐ E ☐ F	☒ D ☐ E	☒ E
Documentation	☐ E ☒ F	☐ D ☐ E ☐ F	☒ D ☐ E	☒ E
Examination	☐ E ☒ F	☐ D ☐ E ☐ F	☒ D ☐ E	☒ E

Module category

☒ Fundamental theoretical principles
☐ Technical/scientific specialization module
☐ Context module

Lessons

☒ 2 lecture periods and 1 tutorial period per week
☐ 2 lecture periods per week

Brief course description of module objectives and content

Students are introduced to statistical tools used in the industrial sector, and particularly in process and quality control. In this module, students learn to plan and conduct statistical evaluations independently.

Aims, content, methods

Learning objectives and acquired competencies

To be in a position to plan and evaluate experiments in an industrial environment; understand how processes are statistically controlled and improved; be capable of analyzing and interpreting data by means of regression analysis; be able to implement the methods covered with a statistical package.

Contents of module with emphasis on teaching content

Statistical process and quality control (SPC): the "Magnificent Seven“, control charts, operating characteristic curve, acceptance sampling (weighting 1/3)

Introduction to multiple regression analysis: model prerequisites, confidence and prediction intervals, graphic checking of model assumptions (weighting 1/3)

Overview of Design of Experiment – DOE (planning and evaluating experiments): basic principles for the planning of experimental studies, one-way and multi-way analysis of variance, factorial experiment designs and their analysis, block designs (weighting 1/3)

The contents listed are illustrated with case studies from the industrial and scientific environment. In doing so, use is made of graphical methods and statistical bases, including classic and robust estimation methods and Monte Carlo simulations.

Teaching and learning methods

Lectures, practical work on the computer with a statistics program

Prerequisites, previous knowledge, entrance competencies

Basic knowledge of the calculation of probabilities and statistics: models; parameter estimation; knowledge of how statistical tests are compiled and what confidence intervals are; user knowledge of a statistical program (Excel, R, S, SPSS or MATLAB); fundamental laboratory experience (measuring technology)

Literature

Lecturers' scripts with references to current literature

Assessment

Certification requirements for final examinations (conditions for attestation)

None

Written module examination

Duration of exam :	120 minutes
Permissible aids:	Open book