01NEX - Lecture 00
General information on the course

Jiri Franc

Czech Technical University
Faculty of Nuclear Sciences and Physical Engineering
Department of Mathematics

Besic information

Duration of Course:	13 weeks.
Schedule:	Every Tuesday 14:30 to 17:00, room T-211.
Type of Assessment:	exercises, homeworks, and final report.
Evaluation:	6 step scale (A,B,C,D,E,F).
Qualified Prerequisites:	01PRST, 01SM (alternatively 01PRA12), 01REAN. Experience with programming in R.
Scope and Form:	lectures, discussion of exercises in lecture room, exercises in groups, homework exercises, reports.
Guarantee of the Course:	Ing. Jiri Franc Ph.D. & Doc. Ing. Tomas Hobza Ph.D.
Teaching	Ing. Jiri Franc Ph.D.

Goal of the 01NEX course

- The main aim of this course is to learn how to design and analyse an experiment where variation is present. Given experimental conditions, the main challenge is to formulate experimental plans which will provide informative data suitable for statistical analysis.
- Secondary goal is to learn R, improve your data analysis skills and think about data science in many aspects.

Outline of the 01NEX course

1. Introduction and simple comparative experiments
2. Single factor experiment ANOVA
3. Factorial design
4. Bloking Latin Greco BIBD
5. 2k factorial design I
6. 2k factorial design II
7. 2k factorial design - Blocking and Center point
8. 2k fractional factorial design
9. 3k factorial design
10. Random factors mixed models
11. Nested and split plot
12. Longitudinal Data Analysis
13. Final Project

Assesment and Evaluation details

The system of assesment and evaluation of the 01NEX course is following:

Final grade is primary based on **Final written report** that must be handed until **March 1, 2021.**

Attendance is voluntary, but if you miss the lecture, you have to elaborate and hand the corresponding exercise (commented R code is enough). Three missed lectures are tolerated without penalization.
Not satisfy the condition $=>$ -1 grade.

Elaborate and hand **two** homework exercises.
Not satisfy the condition $=>$ -1 grade each.

Literature + Sources + Useful links

- D. C. Montgomery (2012): Design and Analysis of Experiments, 8th Edition, John Wiley and Sons
  Student Companion Site, Montgomery: Design and Analysis of Experiments, 8th Edition: on http://bcs.wiley.com
- A. Dean and D. Voss (1999): Design and Analysis of Experiments, Springer
- Online course of Stat 503 Design of Experiments:
  https://onlinecourses.science.psu.edu/stat503/
- DTU course 02411:
  Statistical Design and Analysis of Experiments
- R Companion to Montgomery's Design and Analysis of Experiments:
  http://www.aliquote.org/articles/tech/dae/