UCL Institut de statistique

STAT

STAT2520 Design of experiment.

[22.5h+7.5h exercises] 5 credits

This course is taught in the 2nd semester

Teacher(s): Bernadette Govaerts, Eric Le Boulengé
Language: french
Level: 2nd cycle course

Aims

At the end of the course, the student will be awared of the interest of using a methodology to design experiments that provides a maximum information at the lower cost. He will gain knowledge on different possible classes of experimental designs and on the statistical methods available to analyse experiment results.

Main themes

- Experimental cycle and strategies
- Linear regression as a tool to analyse the results of a designed experiment
- Problem formalisation and qualities of an experimental design
- Factorial designs and derivatives
- Designs for the estimation of response surfaces
- Optimal designs
- Experimental design as viewed by Taguchi
- Designs for mixture experiments
- Simultaneous optimisation of several responses
- Simplex and EVOP methodology to optimise one response

Content and teaching methods

The themes discussed in this course are :
- Experimental cycle and strategies
- Linear regression as a tool to analyse the results of a designed experiment
- Problem formalisation and qualities of an experimental design
- Factorial designs and derivatives
- Designs for the estimation of response surfaces
- Optimal designs
- Experimental design as viewed by Taguchi
- Designs for mixture experiments
- Simultaneous optimisation of several responses
- Simplex and EVOP methodology to optimise one response

Each course subject is presented on a case study.

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

Prerequistes
Basis courses in statistics. Course in linear models.
Reference :
Box G. et Draper N. et H. Smith [1987], Empirical Model-Building and Response Surfaces, Wiley, New York
Khuri A. et Cornell J., [1987], Response surfaces : designs and analyses, Marcel Dekker.
Myers R.H., Douglas C. Montgomery [1995], Response Surface Methodology: Process and Product Optimization Using Designed Experiments. Wiley

For more information:
http://www.stat.ucl.ac.be/cours/stat2450/index.html http://www.stat.ucl.ac.be/cours/stat2520/index.html

Other credits in programs

ECGE3DS/MK	Diplôme d'études spécialisées en économie et gestion (Master in business administration) (marketing)	(5 credits)
INCH22	Deuxième année du programme conduisant au grade d'ingénieur civil chimiste	(3 credits)
INCH23	Troisième année du programme conduisant au grade d'ingénieur civil chimiste	(3 credits)
MAP21	Première année du programme conduisant au grade d'ingénieur civil en mathématiques appliquées	(3 credits)
MAP22	Deuxième année du programme conduisant au grade d'ingénieur civil en mathématiques appliquées	(3 credits)
MAP23	Troisième année du programme conduisant au grade d'ingénieur civil en mathématiques appliquées	(3 credits)
MATH22/S	Deuxième licence en sciences mathématiques (Statistique)	(3 credits)
STAT2MS	Master en statistique, orientation générale, à finalité spécialisée	(5 credits)
STAT3DA/B	diplôme d'études approfondies en statistique (biostatistique et épidémiologie)	(5 credits)
STAT3DA/P	diplôme d'études approfondies en statistique (pratique de la statistique)	(5 credits)