UCLouvain

lstat2320a

2019

In view of the health context linked to the spread of the coronavirus, the methods of organisation and evaluation of the learning units could be adapted in different situations; these possible new methods have been - or will be - communicated by the teachers to the students.

3 credits	22.5 h + 5.5 h	Q2

Teacher(s)	Bogaert Patrick ;Govaerts Bernadette ;
Language :	French
Place of the course	Louvain-la-Neuve
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 The course includes 2 parts. Part A of the course can be followed independently of the part B: - Partim A: theory and exercises. - Partim B: project of application.
Aims	1 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. Part a of the course can be followed independently of part B. - - - - *The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".*
Evaluation methods	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** The final evaluation is based on • The participation in the homework. • A written exam. • A project. • An oral discussion of the project.
Teaching methods	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** Lectures (22.5h) • Methods presentation on the basis of real-life situations. • Formal but intuitive discussion of theoretical concepts and formulae for most methods. • Interpretation of software outputs and use of the JMP software in class. • Interactive lectures: students are encouraged to participate during the course. Computer labs (15h) • Case studies on JMP, methodological exercises, and JMP Output interpretation. Homework and projects • The student is invited to prepare each week an exercise, a quiz or a small project in order to apply and integrate course content.
Content	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.
Inline resources	See the Moodle site: : https://moodleucl.uclouvain.be/mod/page/view.php?id=537330
Bibliography	• Box G. et Draper N. et H. Smith [1987], Empirical Model-Building and Response Surfaces, Wiley, New York • Khuri A. et Cornell J., [1996], Response surfaces : designs and analyses, Marcel Dekker. • Myers R.H., Douglas C. Montgomery [2002], Response Surface Methodology: Process and Product Optimization Using Designed Experiments. Wiley • Et beaucoup d'autres possibles...

Other infos	Prerequistes Basis courses in statistics. Course in linear models. Evaluation: For all: written test on the course content and practical work. For those who follow the partim B: elaboration of a personal applied (in groups of 1 or 2) with oral discussion of work. 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
Faculty or entity in charge	LSBA

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Aims
Master [120] in Agricultural Bioengineering	BIRA2M	3		