# Faculté des sciences économiques, sociales et politiques

## ESPO

| SEAG2121 | Multivariate statistical analysis |

[30h+15h exercises] 5.5 credits

This course is taught in the 1st semester

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| **Teacher(s):** | Léopold Simar |
| Language: | french |
| Level: | 2nd cycle course |

## Main themes

Develop the elements seen in basic probability and statistical courses in a multivariate setup. The aim is to provide tools allowing the analysis of multidimensional data sets. At the end of the course, the students should be able to handle, with the appropriate tools, real problems with multivariate data. The course will focus on the understanding of the methods and their practical implementations.

## Content and teaching methods

Contents
1. Introduction to multivariate methods
2. Reminder of algebra and basic statistics
3. Basic descriptive tools
4. Principal component analysis
5. Correspondence analysis (simple and multiple)
6. Classification
7. Regression models, including ANOVA and ANCOVA
8. Regression models for categorical variables
9. Discriminant analysis

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

Manual :
L. Simar (2003): An Introduction to Multivariate Data Analysis, manuscript , 233p, Institut de Statistique, Université Catholique de Louvain, Louvain-la-Neuve.
This manual is available at the DUC. A SAS guide for the procedures developed in the course will be available too.
Other References :
Härdle, W. and L. Simar (2003): Applied Multivariate Statistical Analysis, Springer-Verlag, Berlin, New-York.
Latin, J., Carroll, D.J. and P.E. Green (2003): Analyzing Multivariate Data, Thomson Learning Inc., US.
Practical aspects : The course is completed by 7 meetings of practical works on a computer (2 hours for each meeting): analysis of real data with an appropriate software (SAS). These practical works will start the first week of the term, the agenda will be fixed as soon as possible and has to be followed by the students (see evaluation below).
Evaluation : The final evaluation is based on a written exam with closed book (12 points) plus an evaluation during the practical works on the computer (8 points). During some of these practical meetings on the computer (2 meetings over the 7, the 5 others is for the training) analysis on real data will be performed and an evaluation of the work of each student will be done. In addition, a report (with questions) will be distributed for the students at the end of the meeting and will have to be fulfilled immediately. These reports will also be evaluated. The schedule will be given as soon as possible in the beginning of the term.
In case of absence during these evaluations meeting (absence which has to be justified and excused by the secretariat of INGE12), the amount of points for the written exam will be augmented in the appropriate (one absence: exam on 16 points, two absences exam on 20 points).
In case, for the exam of September and of January of the next academic year, the evaluation of these practical meetings remains valid. If the student prefers to abandon this evaluation, he can ask to pass the exam on 20 points. This choice has to be explicated clearly before the opening of the corresponding exams session
Written exam: Closed book exam, but a summary of most of the useful formulae ("formulaire") will be distributed during the course. The student comes at the written exam with his own "formulaire" without any additional notation.
Reception of students:
Professor L. Simar : sur rendez-vous au 010/ 47 43 08
Local d 127, Institut de Statistique et CORE, 20 voie du Roman Pays.
Assistants : Melle B. Teodorescu, et M. G. Geenens (horaire à déterminer)
Institut de Statistique, 20 voie du Roman Pays.

## Other credits in programs

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| **ECGE12/QU** | Deuxième candidature en sciences économiques et de gestion (Quantitative) | (4.5 credits) | Mandatory |
| **INFO23** | Troisième année du programme conduisant au grade d'ingénieur civil informaticien | (5.5 credits) | |
| **INGE12** | Deuxième candidature ingénieur de gestion | (4.5 credits) | Mandatory |
| **INGE21** | Première Ingénieur de Gestion | | Mandatory |
| **STAT2MS** | Master en statistique, orientation générale, à finalité spécialisée | (5 credits) | |
| **STAT3DA** | Diplôme d'études approfondies en statistique | | |