Institute of Statistics

STAT2MS Master en statistique, orientation générale, à finalité spécialisée (Master of Statistics : general orientation, leading to specialisation)

Programme management

STAT Institut de statistique
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Study objectives

The master of Statistics is destined for university graduates wishing to acquire skills in statistics to complement their basic training.

The different specialisations on offer enable candidates coming from a wide range of horizons to construct a personalised study programme, adapted to their domain of interest and along the lines of their previous training.

Through its professional vocation and as a complement to a methodological training, this programme offers numerous occasions to put the tools into practice during exercices sessions , individual work involving analysis of real data on the computer and an integration project, possibly accomplished in collaboration with a company.

Admission conditions

This master programme is accessible to all university graduates (having completed their "second university cycle") and to degree holders from long cycle studies from Institutes of Further Education. The lectures are delivered in French but students must be capable of understanding scientific texts written in English.

The programme requires that the student possesses a minimum of knowledge in mathematics, statistics and computers, but includes basic teaching in these domains so that the students all begin the programme with a solid and homogenous level.

Admission procedures

The University admission and enrolment procedures are specified on the study programme under the heading "Access to Studies," on the WEB link : http://www.ucl.ac.be/etudes/libres/acces.html as well as on the Institute of Statistics web site : http://www.stat.ucl.ac.be/diploma

Enquiries concerning admission applications should be addressed to : Sophie Malali - Tel. 010 47 43 14; e-mail : issec@stat.ucl.ac.be

Enquiries concerning the course content and advice on the composition of the programme should be addressed to : Bernadette Govaerts - Tel. 010 47 43 13 (e-mail : govaerts@stat.ucl.ac.be).

General structure of the programme

The programme is constituted of 120 credits. It runs over one or two academic years depending on the student's previous studies and personal situation. It is composed of a core programme and a specialisation . The *core programme* includes the background courses, the general courses on methodology and statistical tools and a project.

There is the possibility of five specialisations :

The specialisations " Statistics in Sciences and Technology ", " Statistics in Economics and Insurance " and " Statistics in Marketing and Surveys " help to develop skills in the application of statistics in one of these different sectors of activities.

The specialisation "Mathematical Methods" provides training in applied mathematical methods and mathematical statistics useful for the applied statistician.

The specialisation " Data Management and Data Mining " helps the students to acquire a master in statistics together with a certificate in data management with the software " SAS". This double training responds to an important demand from enterprises such as banks, insurance companies, pharmaceutical firms etc.

The student will establish a programme of 120 credits composed of a minimum of 65 credits of activities actually accomplished during the master (excluding the foundation studies) and a maximum of 55 credits worth of equivalence of previous studies and/or personal experience (with a maximum of 15 credits for the latter). The programme can include up to 30

credits worth of equivalence of training from graduate studies in a domain applicable to the chosen specialisation.

The student will prepare his programme in collaboration with the master programme supervisor. The programme will then be submitted for approval to the Management Committe of the master programme. Requests to have the programme spread over a duration of two years must be introduced upon enrolment.

Programme content
CORE PROGRAMME
Background courses

To be able to have access to the other parts of the programme, the student must prove that he has a sufficient basis in Mathematics, English, Computer studies, Descriptive Statistics, Probability and Statistical Inference. The skills required are equivalent to the content of the courses listed below :

ANGL1860	Anglais - compréhension de textes de sciences exactes[30h] (~) ⚠	N.
COPS1121	Information Technology and Multimedia[30h+15h] (4 credits) (in French)	Jean-Pierre Couwenbergh, Thierry De Smedt, Marcel Lebrun
SESP1111	Statistics and Elements of Probability[37.5h+37.5h] (7 credits) (in French)	Dominique Deprins (supplée Jean-Marie Rolin), Dominique Deprins (supplée Jean-Marie Rolin), Annie Robert, Jean-Marie Rolin, Sébastien Van Bellegem
ECGE1224	Economics and Management Statistics[30h+15h] (4 credits) (in French)	Christian Hafner
SESP1112	Mathematics and Logic[30h+15h] (3 credits) (in French)	Etienne Loute, Yves Pochet
ECGE1111	Mathematics and Analysis[30h+30h] (~) (in French)	Raouf Boucekkine, Yves Félix
ECGE1214	Mathematics in Economics and Management[30h+15h] (4 credits) (in French)	Paul Henrard

Any student possessing all of these skills will be able to obtain 25 credits for their equivalence. All lacks will have to be compensated for by following the appropriate courses in agreement with the programme supervisor. The below-mentioned course :

STAT2400	Introduction to probability and statistics. Mathematics for the statistician.[30h+30h] (12 credits) (in French)	Isabelle De Macq (supplée Philippe Lambert), Isabelle De Macq (supplée Philippe Lambert), Philippe Lambert, Ingrid Van Keilegom

is programmed as a personalised refresher course in mathematics and statistics for those who already partially possess the above bases.

Courses on methodology and statistical tools

The student will choose at least 25 credits from the following courses or will have the equivalent skills validated :

INGE1222	Multivariate Statistical Analysis[30h+15h] (4 credits) (in French)	Léopold Simar
STAT2430	Statistical computing[20h+20h] (7 credits) (in French)	Bernadette Govaerts
STAT2410	Discrete data analysis.[22.5h+7.5h] (5 credits) (in French)	Patrick Bogaert, Jean-Marie Rolin
STAT2411	Data Analysis[22.5h+7.5h] (5 credits) (in French)	Léopold Simar
STAT2412	Linear models[22.5h+7.5h] (5 credits) (in French)	Christian Hafner
STAT2413	Non parametric statistics[22.5h+7.5h] (5 credits) (in French)	Ingrid Van Keilegom
STAT2414	Times series[22.5h+7.5h] (5 credits) (in French)	Rainer von Sachs
STAT2415	Introduction to Bayesian statistics.[15h] (2.5 credits) (in French)	Philippe Lambert
STAT2416	Multivariate probabilities ans statistics[10h+5h] (2.5 credits) (in French)	Ingrid Van Keilegom

Project

The student will complete, together with the collaboration of an advisor, either a personal project to do with the analysis of a statistics methodology problem, or a piece of work involving the application statistics in the domain of the chosen specialisation. The project may relate to an apprenticeship in a company, the written work in that case taking the form of a report on that experience. The project counts for 15 credits of the programme.

Other courses

The student will complete his programme with relevant courses in the context of the master of Statistics and the chosen specialisation, of which the statistics lectures will constitute a minimum of 10 credits.

SPECIALISATIONS

To complement the core programme, the student will establish a programme of 30 credits in one of the below-mentioned specialiations. He will select at least 15 credits of studies from the courses listed and will complete this by means of lectures from a domain of application related to the selected specialisation.

Specialisation : Sciences and Technology

BIRA2101	Biometry : analysis of the variance[30h+22.5h] (~) (in French)	Christian Hafner, Eric Le Boulengé
BIRC2106	Chemometrics[22.5h+15h] (3 credits) (in French)	Bernadette Govaerts
BIRE2101	Statistical analysis of spatial and temporal data[22.5h+15h] (3 credits) (in French)	Patrick Bogaert
INMA2470	Discrete stochastic models[30h+22.5h] (~) (in French)	Philippe Chevalier
MECA2646	Reliability and probabilistic risk analysis.[30h] (~) (in French)	Ernest Mund, Yves Smeers
ESP3142	Epidemiology[22.5h+7.5h] (~) (in French)	Fabienne Nackers, Annie Robert (coord.)
STAT2510	Statistical quality control.[15h] (2.5 credits) (in French)	Bernadette Govaerts
STAT2520	Design of experiment.[22.5h+7.5h] (5 credits) (in French)	Bernadette Govaerts, Eric Le Boulengé
STAT2530	Statistics in clinical trials.[22.5h+7.5h] (5 credits) (in French)	Philippe Lambert, Annie Robert

Specialisation : Economics and Insurance

ACTU2111	Non life Insurance I[30h+15h] (~) (in French)	Michel Denuit
ACTU2123	Non life Insurance II[30h] (~) (in French)	Michel Denuit
ECON2135	Econometrics: methods and applications[45h+45h] (~) (in French)	Luc Bauwens, Fatemeh Shadman Valavi
ECON2245	Econometrics[30h+15h] (~) (in French)	Luc Bauwens
STAT2550	Data Mining[15h+15h] (5 credits) (in French)	Libei Chen

Specialisation: Marketing and Surveys

Compulsory course

STAT2540	Survey and Sampling[15h] (2.5 credits) (in French)	Yves Berger

Other courses

ACTU2111	Non life Insurance I[30h+15h] (~) (in French)	Michel Denuit
DEMO3422	Theory and practice of surveys[20h] (3 credits) (in French)	Claude-Michel Loriaux, Claude-Michel Loriaux
MARK2200	Market research[30h] (5 credits) (in French)	Ruben Alberto Chumpitaz Caceres (supplée Marie-Paule Kestemont), Marie-Paule Kestemont, Claudine Laperche
STAT2550	Data Mining[15h+15h] (5 credits) (in French)	Libei Chen

Specialisation : Mathematical Methods

Compulsory course

MATH2440	Statistical analysis[30h+22.5h] (~) (in French)	Ingrid Van Keilegom, Rainer von Sachs

Other courses

INMA2470	Discrete stochastic models[30h+22.5h] (~) (in French)	Philippe Chevalier
INMA2471	Optimization models and methods[30h+22.5h] (~) (in French)	François Glineur
INMA1170	Numerical analysis[22.5h+30h] (~) (in French)	Paul Van Dooren
MATH2360	Stochastic processes (statistics)[30h] (~) (in French)	Jean-Marie Rolin
MATH2430A	Théorie de la mesure et probabilités[30h+20h] (~) (in French)	Thierry De Pauw, Camille Debiève

Specialisation : Data Management and Data Mining

Compulsory courses

STAT2550	Data Mining[15h+15h] (5 credits) (in French)	Libei Chen
STAT2560A	Programmation de base en SAS[10h] (6 credits) (in French)	N.
STAT2560B	Programmation avancée en SAS[40h] (6 credits) (in French)	N.

Additional recommended course

INGI2271	Database management systems[30h+30h] (~) (in French)	Alain Pirotte (coord.), Marco Saerens

In order to enrol for this specialisation, the student must prove he has sufficient knowledge in English as the lectures and exams linked to the seminar on data-management (STAT2560) are in English. In addition to the UCL certification, part A of this seminar enables the student to acquire the "SAS" certificate of "Base programmer, " highly valued by firms. The part B seminar on data management (STAT2560B) is only obtainable if the student succeeds in attaining the certificate. Any student who does not succeed will have to change his specialisation.

Practical measures destined for students who are professionally active :

The programme also caters for people who are professionally active. It may, in fact, be spread over 2 to 4 academic years and take the form of one, or sometimes two, days of lectures per week.

A web-site has also been set up to make the documents and instructions, linked to the various lectures, available to the students : http://www.stat.ucl.ac.be/diploma/coursmemoires.html

Information from the secretary's office is communicated by e-mail issec@stat.ucl.ac.be as well as on the web-site : (

http://www.stat.ucl.ac.be/diploma/infosetud.html and students may also carry out certain administrative formalities by the same means.

Last but not least, the students may acquire personal licences for the principal softeware (SAS, S-Plus and SPSS) used during the master's programme.

Positioning of the programme within the University cursus

The master of Statistics will enable the student to acquire the necessary basics to embark on an in-depth studies degree in statistics (DEA), possibly followed by a PHD (doctorat).