UCL Université catholique de Louvain

LMAT1275

2015-2016

Statistics in the natural sciences

5.0 credits	30.0 h + 30.0 h	1q

Teacher(s) :	El Ghouch Anouar ;
Language :	Français
Place of the course	Louvain-la-Neuve
Prerequisites :	*The prerequisite(s) for this Teaching Unit (Unité d'enseignement – UE) for the programmes/courses that offer this Teaching Unit are specified at the end of this sheet.*
Main themes :	1) Introduction to probability theory and practice. 2) Random variables : concept, types (discrete, continuous, uni- or multivariate), properties of random variables and of functions thereof, principal models. 3) Introduction to statistical inference : theory, applications. The practicals help the student in testing his understanding of the concepts, his ability to apply them, and in revising the techniques of descriptive statistics.
Aims :	To lay down the fundamentals of statistical data analysis in the natural sciences, and of statistical inference. The student is initiated to the theory of probability, the concept of random variable, the principal models of discrete and continuous random variables. He understands the role of sampling and the principles of statistical inference, and applies these to some simple problems. After completing this course, the student should be able to fruitfully take courses on the application of methods of data analysis and of statistical inference to the various fields of natural sciences. *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".*
Content :	1) Introduction : What is statistics ? What is its usefulness in the natural sciences ? Aims of the lecture, means, support, evaluation. 2) Introduction to probability theory : Random experiment, events, axioms of probability, probability and frequency, joint, marginal, conditional, total, composed probabilities, Bayes formula, independence. Illustrations. 3) Random variables : concept, types, properties, functions of random variables, principal probability models of discrete and of continuous variables, introduction to two-dimensional variables, covariance and correlation. 4) Principles of statistical inference : Population and sample, sampling, statistics, sampling distribution, qualities of an estimator, estimation methods, point and interval estimation, hypothesis testing, error risks, power of a test. 5) Introduction to the inference concerning averages : one, two, or several populations (using the Normal or the Student laws or the analysis of variance). The presentations rely heavily upon illustrations. The practicals are essential to a good understanding and mastering of the concepts.
Other infos :	PREREQUISITE Basic notions of calculus; elements of set theory and of linear algebra EVALUATION Written examination evaluating mainly the understanding and capacity to apply the concepts and reasoning. The student is allowed to use the official booklet of formulae, of statistical tables, and a hand-calculator. SUPPORT Syllabus, booklet of exercises, of formulae, of statistical tables. Overheads. This course is on iCampus, where more information is available and the yearly calendar of activities is posted.
Faculty or entity in charge:	BIOL

Programmes / formations proposant cette unité d'enseignement (UE)

Intitulé du programme	Sigle	Credits	Prerequis	Acquis d'apprentissage
Bachelor in Biology	BIOL1BA	5	LMAT1111F **and** LMAT1111G	🔍
Minor in Biology	LBIOL100I	5	-	🔍
Bachelor in Geography : General	GEOG1BA	5	LMAT1111F **and** LMAT1111G	🔍