UCLouvain

# lcops1114

*2025*

# Statistics and Bases of Probability Theory

The version you're consulting is not final. This course description may change. The final version will be published on 1st June.

| 5.00 credits | 30.0 h + 30.0 h | Q1 |
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| Language : | French |
| Place of the course | Louvain-la-Neuve |
| Main themes | Part 1: Descriptive statistics. This brings together methods that condense the data of a sample in a few useful characteristics or estimates. Frequency distributions, the functions of density and distribution, and parametric and non-parametric characteristics are addressed in the samples.<br>Part 2: Bases of probability theory. Depending on the procedure for selecting the sample, these methods ensure a link between the population and the sample. The matters addressed are the rules flowing from the Kolmogorov axiom on the calculation of total, composite and conditional probability, the quantification of events in random variables, the associated distribution of probabilities, and operational characteristics (parameters). There will also be a detailed examination of censuses of experimental schemes that generate uniform, discrete, binomial, geometric and hyper-geometric laws, and Poisson's law.<br>Part 3: Bases of statistical inference. To compare observations with hypotheses constructed on parameters of the population, the basic objectives are estimators, their characteristics, and their qualities of inference on simple plans.<br>Statistics is a science that compares data from a sample (the reality of estimates or numerical data collected while observing, or experimenting with, some of the population) with theory (a statement of abstract hypotheses on parameters of the population). For the most part, effective use of this methodological tool is acquired through work. This course is an introduction to statistics. |
| Learning outcomes | **At the end of this learning unit, the student is able to :**<br>1. describe a sample ;<br>3. identify simple sampling procedures ;<br>4. establish the operational characteristics of basis statistics (average, deviation and proportion) in these procedures ;<br>2. handle the bases of probability theory applied to censuses ;<br>5. identify qualities that will make it possible to make inferences on parameters of the population. |
| Evaluation methods | Final written exam (paper or computer format) : MCQ and/or numerical questions (with short answers) and/or open questions during the exam session. These final exam methods are identical in the second and third session.The review may possibly be different between the COMU and HUSO / SOCA / SPOL audiences. |
| Teaching methods | The course is given in lectures (presentation of concepts, examples of applications, problem solving) and exercise sessions in small groups (exercise resolutions), supplemented by an active participation of the students in readings, viewing videos, preparing exercises and carrying out knowledge tests. The Moodle course LCOPS1114 is the reference site. Students are invited to consult it regularly.<br>Specific communication and exchange channels between students and the teaching team have been set up (Moodle Forum, Teams channels, Teams meetings, etc.).<br>This teaching is designed in such a way as to adapt quickly to health developments (face-to-face, co-modal or distance education). Students are encouraged to regularly check their class schedule on ADE as well as the information available on Moodle.<br>During the Warmup period, the teacher presents 1) general, educational and evaluative information relating to the course; 2) the course content and its objectives as well as the necessary prerequisites. Students actively participate in the activities presented on a site specifically dedicated to upgrading students. |

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| Content | This lecture is an introduction to statistics. The statistics is the science which allows to confront data samples (observing or experimenting a subset of population) with theory (statements and tests of hypotheses on population characteristics). It is the science of data analysis that applies widely to economics, political and social sciences.<br>The lecture articulates around descriptive statistics, probability theory and statistical inference (introduction). |
| Inline resources | MOODLEUCL : lecture LCOPS1114. |
| Bibliography | Livre de référence : Notions de statistique, Christiane Simard, 3ème édition, Modulo Inc. |
| Faculty or entity in charge | ESPO |