# LBIRE2101

*2016-2017*

# Statistical analysis of spatial and temporal data

| 3.0 credits | 22.5 h + 15.0 h | 2q |
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| Teacher(s) : | Bogaert Patrick ; |
| Language : | Français |
| Place of the course | Louvain-la-Neuve |
| Main themes : | Notions of spatial/temporal dependency and its effect on statistical estimation. Quantification and modelling of dependencies through space and time. Random fields theory. Prediction and simulation of correlated data. Mapping and forecasting methods. |
| Aims : | A the end of this activity, the student is able to :<br>· Name, describe and explain the theoretical concepts underlying the stochastic approach for the analysis and the modeling of spatial and temporal data in an environmental framework;<br>--<br>Explain the mathematical concepts and use the mathematical tools that are relevant for statistical exploratory analyses and inferential estimations from environmental data;<br>--<br>Use these concepts and tools in an operational framework in order to make statistical analyses and modeling from a real environmental data set in the framework of a group project;<br>--<br>Explain and justify the methodological choices that are made for the analyses and the modeling steps by integrating the relevant underlying theoretical concepts that have been presented and used during the practical exercises;<br>--<br>Write a concise report based on the main findings for this analysis and modeling work by using a relevant and accurate mathematical language and appropriate figures.<br><br>M.1.1, M.2.1, M.2.3, M.5.4, M.5.6., M.6.2, M.6.5<br>*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 : | This course will complete the basic notions already presented during the courses LBIR 1203 - Probability and Statistics (I) and LBIR 1304 - Probability and Statistics (II). The student will be able to analyze data that are correlated through space and time, that are frequently encountered in the agro-environmental framework. The course will emphasize the link between the general theory and the practical specificities of environmental data. It should allow the student to model such kind of processes and to use them in a mapping or forecasting context. Practical exercises using the Matlab software will take place in a computer room. |
| Other infos : | This course follows the BIR 1203 and BIR 1304 courses. There will be a written examination. Support is a set of slides and additional notes.<br>This course can be given in English. |
| Faculty or entity in charge: | AGRO |

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

| Intitulé du programme | Sigle | Credits | Prerequis | Acquis d'apprentissage |
|---|---|---|---|---|
| Master [120] in Statistics: Biostatistics | BSTA2M | 3 | - | |
| Master [120] in Biology of Organisms and Ecology | BOE2M | 3 | - | |
| Master [120] in Civil Engineering | GCE2M | 3 | - | |
| Master [120] in Environmental Bioengineering | BIRE2M | 3 | - | |
| Master [120] in Forests and Natural Areas Engineering | BIRF2M | 3 | - | |
| Advanced Master in Water Resources | REAU2MC | 3 | - | |
| | STAT2FC | 3 | - | |