


5 credits

24.0 h + 36.0 h

Q1

Teacher(s)	Segers Johan ;SOMEBODY ;
Language :	French
Place of the course	Louvain-la-Neuve
Main themes	Taking into account the most frequently encountered needs of researchers in Biology, as well as the time constraints, the course offers of two main modules : Linear Modeling, and Methods of Multivariate Analysis. The examples presented are mainly drawn from researches in Ecology.
Aims	<p>The objectives are that, as a result of successfully attending this course, the students :</p> <ul style="list-style-type: none"> <li>' Are aware of the necessity of planning any scientific experiment before it is started.</li> <li>' Have practiced, in the frame of a personal scientific question, the principles of experimental design.</li> <li>' Are able to review, choose, and apply knowingly the best adapted methods for modeling and analysing data from their domain of expertise in Biology.</li> <li>' Are able to set up a scientific experiment, to manage the data generated by this experiment, to analyse them (usually with the help of a computer software), and to interpret critically the results.</li> <li>' Have shown their ability to report a scientific experiment in a written document and through an oral communication. These reports may be elaborated in groups of two or three students.</li> </ul> <p>-----</p> <p><i>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".</i></p>
Evaluation methods	<p>Each of the two teachers will give a grade on 10 and this will grade will count for 50 % in the total. To succeed, the sum of the two grades should at least be 10/20 and each grade should at least be 4/10. Partial grades of 5/10 and higher are credited for the running academic year.</p> <p>Module 1 (UCLouvain) : written exam during the exam session. Dispensatory test for a part of the exam near the end of the lectures.</p> <p>Module 2 (UNamur) : Continuous evaluation during flipped classrooms (50%) : multivariate analyses in Excel and interpretation of the results. Evaluation during exercise classes (50%) : multivariate data analyses in R and interpretation of the results. No second session.</p>
Teaching methods	<p>Lectures and exercise classes in computer rooms.</p> <p>For Module 2 (UNamur), self-learning sessions and flipped classrooms; instructions will be given in the first course hour.</p>
Content	<p>Module 1 (UCLouvain): Linear statistical modeling</p> <ul style="list-style-type: none"> <li>– Simple and multiple linear regression, AN(C)OVA included</li> <li>– Generalised linear models: logistic and Poisson regression</li> <li>– Linear mixed models</li> <li>– Implementation in R</li> </ul> <p>Module 2 (UNamur): Multivariate data exploration</p> <ul style="list-style-type: none"> <li>– Data matrices</li> <li>– Useful techniques from matrix algebra</li> <li>– Multiple linear regression (no inference)</li> <li>– Principal component analysis</li> <li>– Classification</li> <li>– Canonical correspondence analysis</li> <li>– Implementation in R and Excel</li> </ul>
Inline resources	<p>Moodle page: <a href="https://moodleucl.uclouvain.be/course/view.php?id=7525">https://moodleucl.uclouvain.be/course/view.php?id=7525</a></p> <p>Module 1 (UCLouvain): R scripts of the recommended book: <a href="http://highstat.com/index.php/analysing-ecological-data">http://highstat.com/index.php/analysing-ecological-data</a></p> <p>Module 2 (UNamur)</p> <ul style="list-style-type: none"> <li>– Self-study website: <a href="http://webapps.fundp.ac.be/umdb/biostats2017/">http://webapps.fundp.ac.be/umdb/biostats2017/</a></li> <li>– Videos: <a href="http://medias.save.fundp.ac.be/videos/webcampus/2016-cours-biostatistique-Depiereux/module-200-10.mp4">http://medias.save.fundp.ac.be/videos/webcampus/2016-cours-biostatistique-Depiereux/module-200-10.mp4</a></li> </ul>

	<p><a href="http://medias.save.fundp.ac.be/videos/webcampus/2016-cours-biostatistique-Depiereux/module-210-10.mp4">http://medias.save.fundp.ac.be/videos/webcampus/2016-cours-biostatistique-Depiereux/module-210-10.mp4</a>  <a href="http://medias.save.fundp.ac.be/videos/webcampus/2016-cours-biostatistique-Depiereux/module-220-10.mp4">http://medias.save.fundp.ac.be/videos/webcampus/2016-cours-biostatistique-Depiereux/module-220-10.mp4</a>  <a href="http://medias.save.fundp.ac.be/videos/webcampus/2016-cours-biostatistique-Depiereux/module-220-20.mp4">http://medias.save.fundp.ac.be/videos/webcampus/2016-cours-biostatistique-Depiereux/module-220-20.mp4</a>  <a href="http://medias.save.fundp.ac.be/videos/webcampus/2016-cours-biostatistique-Depiereux/module-220-30.mp4">http://medias.save.fundp.ac.be/videos/webcampus/2016-cours-biostatistique-Depiereux/module-220-30.mp4</a>  <a href="http://medias.save.fundp.ac.be/videos/webcampus/2016-cours-biostatistique-Depiereux/module-230-10.mp4">http://medias.save.fundp.ac.be/videos/webcampus/2016-cours-biostatistique-Depiereux/module-230-10.mp4</a>  <a href="http://medias.save.fundp.ac.be/videos/webcampus/2017-cours-biostatistique-Depiereux/module-240-10.mp4">http://medias.save.fundp.ac.be/videos/webcampus/2017-cours-biostatistique-Depiereux/module-240-10.mp4</a>  <a href="http://medias.save.fundp.ac.be/videos/webcampus/2017-cours-biostatistique-Depiereux/module-240-20.mp4">http://medias.save.fundp.ac.be/videos/webcampus/2017-cours-biostatistique-Depiereux/module-240-20.mp4</a>  <a href="http://medias.save.fundp.ac.be/videos/webcampus/2017-cours-biostatistique-Depiereux/module-240-30.mp4">http://medias.save.fundp.ac.be/videos/webcampus/2017-cours-biostatistique-Depiereux/module-240-30.mp4</a>  <a href="http://medias.save.fundp.ac.be/videos/webcampus/2017-cours-biostatistique-Depiereux/module-240-40.mp4">http://medias.save.fundp.ac.be/videos/webcampus/2017-cours-biostatistique-Depiereux/module-240-40.mp4</a>  <a href="http://medias.save.fundp.ac.be/videos/webcampus/2017-cours-biostatistique-Depiereux/module-240-50.mp4">http://medias.save.fundp.ac.be/videos/webcampus/2017-cours-biostatistique-Depiereux/module-240-50.mp4</a></p>
Bibliography	<ul style="list-style-type: none"> <li>• Dias cours magistraux, syllabus TP, bases de données, codes informatiques. Site web auto-apprentissage.</li> </ul> <p>Alain F. Zuur, Elena N. Iono, Graham M. Smith, <i>Analysing Ecological Data</i>, Springer Science, 2007</p>
Faculty or entity in charge	BIOL

<b>Programmes containing this learning unit (UE)</b>				
Program title	Acronym	Credits	Prerequisite	Aims
Master [120] in Biology of Organisms and Ecology	BOE2M	5		
Master [60] in Biology	BIOL2M1	5		