

<b>Course code</b>																																	
<b>Type and description</b>	Elective Course																																
<b>ECTS credit</b>	1																																
<b>Course name</b>	Advanced Methods of Statistical Analysis																																
<b>Course name in Polish</b>	Zaawansowane metody analizy statystycznej																																
<b>Language of instruction</b>	English																																
<b>Course level</b>	8 PRK																																
<b>Course coordinator</b>	dr inż. Katarzyna Dems-Rudnicka																																
<b>Course instructors</b>	dr inż. Katarzyna Dems-Rudnicka																																
<b>Delivery methods and course duration</b>	<table border="1"> <thead> <tr> <th></th> <th>Lecture</th> <th>Tutorials</th> <th>Laboratory</th> <th>Project</th> <th>Seminar</th> <th>Other</th> <th>Total of teaching hours during semester</th> </tr> </thead> <tbody> <tr> <td>Contact hours</td> <td>0</td> <td>0</td> <td>0</td> <td>15</td> <td>0</td> <td>0</td> <td>15</td> </tr> <tr> <td>E-learning</td> <td>No</td> <td>No</td> <td>No</td> <td>No</td> <td>No</td> <td>No</td> <td></td> </tr> <tr> <td>Assessment criteria (weightage)</td> <td></td> <td></td> <td></td> <td>100</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		Lecture	Tutorials	Laboratory	Project	Seminar	Other	Total of teaching hours during semester	Contact hours	0	0	0	15	0	0	15	E-learning	No	No	No	No	No	No		Assessment criteria (weightage)				100			
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E-learning	No	No	No	No	No	No																											
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<b>Course objective</b>	The aim of the course is to provide knowledge and skills in advanced statistical methods used in natural and technical sciences																																
<b>Learning outcomes</b>	<p>After completing course the PhD student is able to:</p> <ol style="list-style-type: none"> <li>1. use the method of Analysis of One- and Multi-factor Variance (ANOVA) together with post-hoc tests,</li> <li>2. use selected methods of multivariability reduction (f.ex. Principal Components Analysis),</li> <li>3. use methods of multivariate analysis (f.ex. contingency tables, multiple regression),</li> <li>4. perform classification of experimental data (f.ex. Linear Discriminant Analysis),</li> <li>5. use tools supporting statistical analysis included in the R program,</li> <li>6. explain the concepts and statistical procedures used in the analysis of discussed problems</li> </ol> <p>Effects:W4, U4, K1</p>																																
<b>Assessment methods</b>	<p>Assessment methods:</p> <p>Learning outcome 1-6: assessment of the correctness and quality of the solution of the project task and the project report</p> <p>Learning outcome 5-6: additionally, presentation and discussion</p> <p>The final grade consists of:</p> <p>solving the project task using the known methods - 50%</p> <p>written report (paper or electronic) - 25%</p> <p>solution presentation and discussion - 25%</p>																																
<b>Prerequisites</b>	Knowledge of descriptive and mathematical statistics lectured at 1st and 2nd degree studies																																
<b>Course content with delivery methods</b>	Analysis of One-factor and Multifactorial Variance (ANOVA) together with post-hoc tests, selected methods of multivariability reduction (f.ex. Principal Components Analysis), multivariate analysis (f.ex. contingency tables, multiple regression), selected methods of classification of experimental data (f.ex.																																

	Linear Discriminant Analysis), use of tools supporting advanced statistical analysis contained in the R program
<b>Basic reference materials</b>	<ol style="list-style-type: none"> <li>1. J. I. Marden, Multivariate Statistics, <a href="http://stat.istics.net/Multivariate/">http://stat.istics.net/Multivariate/</a></li> <li>2. A. Stanis, Przystępny kurs statystyki, t. 1-3, wyd. StatSoft, Kraków 2006, 2007</li> <li>3. P. Biecek, Przewodnik po pakiecie R, Oficyna Wydawnicza GiS, Wrocław 2017</li> </ol>
<b>Other reference materials</b>	<ol style="list-style-type: none"> <li>1. D. Dalpiaz, Applied Statistics with R, <a href="https://book.stat420.org/">https://book.stat420.org/</a></li> <li>2. J. F. Foster, E. Barkus, C. Yavorsky, Understanding and Using Advanced Statistics, SAGE Publications Ltd., London 2006,</li> <li>3. J. Ćwik, J. Mielniczuk, Statystyczne systemy uczące się, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2009,</li> <li>4. E. Paradis, R for Beginners, <a href="https://cran.r-project.org/doc/contrib/Paradis-rdebuts_en.pdf">https://cran.r-project.org/doc/contrib/Paradis-rdebuts_en.pdf</a></li> <li>5. J. Koronacki, J. Mielniczuk, Statystyka dla studentów kierunków technicznych i przyrodniczych, WNT, Warszawa 2001</li> </ol>
<b>Average student workload outside classroom</b>	10 h
<b>Comments</b>	The course is carried out in the computer lab
<b>Last update</b>	21.04.2023