<table>
<tr><td>Course code</td><td></td></tr>
<tr><td>Type and description</td><td>PD – elective course from a different discipline</td></tr>
<tr><td>ECTS credit</td><td>1</td></tr>
<tr><td>Course name</td><td>Computational Mathematics</td></tr>
<tr><td>Course name in Polish</td><td>Obliczenia komputerowe</td></tr>
<tr><td>Language of instruction</td><td>English</td></tr>
<tr><td>Course level</td><td>[8 PRK]</td></tr>
<tr><td>Course coordinator</td><td>Grzegorz Andrzejczak</td></tr>
<tr><td>Course instructors</td><td>Grzegorz Andrzejczak</td></tr>
<tr><td>Delivery methods and course duration</td><td>
<table>
<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>
<tr><td>Contact hours</td><td>15</td><td>0</td><td>0</td><td>0</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>0,00</td><td></td><td></td><td></td><td></td><td>0,00</td><td></td></tr>
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<tr><td>Course objective</td><td>1. Acquisition of knowledge concerning methods of mathematical variational analysis, and their effective implementation

2. Acquisition of knowledge on numerical methods of computing zeroes of real functions and their systems

3. Acquisition of knowledge on the structure and usage of the package SciPy within a Python programming environment.</td></tr>
<tr><td>Learning outcomes</td><td>After the course a PhD student will be able to:

1. understand and apply notions, theorems and numerical methods concerning solutions of multidimensional optimization problems: effects [W1, U3, K2];

2. understand and apply theorems and related algorithms in the field of variational calculus: effects [W1, U3 K2]

3. apply the acquired knowledge in order to examine various numerical problems in multidimensional spaces: effects [W3, K2]</td></tr>
<tr><td>Assessment methods</td><td>Effects [W1, W3– oral examination

effects [U3, K2] – presentation of results of the computation

The final evaluation is based on:

Exam - 50%</td></tr>
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	Presentation - 50%
Prerequisites	The contents of the master degree course on the differential and integral calculus, ability of programming and basic knowledge of numerical methods
Course content with delivery methods	Lecture 1. Iterative and stepwise approach to optimization problems. Finding zeroes in multivariate context. 2. Python In computations; packages: NumPy I SciPy in applications. 3. Variational problems through the Lax-Milgram theory. 4. Theoretical and practical aspects of multivariate finite elements.. 5. Numerical methods in applications. 6. Selected problems with a probabilistic background Presentation topics: Numerical solutions of individual problem. Convergence and error estimation. Library functions – a comparison (ease of use and effectiveness)..
Basic reference materials	1. G. Allaire, Numerical Analysis and Optimization. An introduction to mathematical modelling and numerical simulation, Oxford University Press, 2007 2. R. L. Burden and J. D. Faires, Numerical Analysis, Brooks/Cole, 2011, 9th Edition
Other reference materials	SciPy Reference Guide. Release 1.7.1, August 01, 2021
Average student workload outside classroom	35 h
Comments	
Last update	Brak informacji