

Course code																																	
Type and description	Elective Course																																
ECTS credit	1																																
Course name	Nonlinear Boundary Value Problems																																
Course name in Polish	Nieliniowe zagadnienia brzegowe																																
Language of instruction	English																																
Course level	8 PRK																																
Course coordinator	Bogdan Przeradzki																																
Course instructors	Bogdan Przeradzki																																
Delivery methods and course duration	<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>0</td> <td></td> <td></td> <td></td> <td></td> <td>0,00</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)	0					0,00	
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Course objective	<ol style="list-style-type: none"> 1. Acquiring knowledge in topological and variational methods of Nonlinear Analysis. 2. Acquiring knowledge in applications of methods from point 1 to nonlinear boundary value problems 																																
Learning outcomes	<p>After the course a student is able to:</p> <ol style="list-style-type: none"> 1. prove the existence of solutions to nonlinear boundary value problems by using topological degree – outcomes W4, U4, K1 2. search for nonnegative solutions to boundary value problems by using Krasnoselskii Theorem – outcomes W4, U4, K1 3. search resonant problems for differential equations - outcomes W4, U4, K1 4. look for solutions to BVPs by using variational methods – outcomes W4, U4, K1 																																
Assessment methods	<p>Outcomes W4, U4, K1 – oral exam and class participation</p> <p>The final grade:</p> <p>75% - oral exam,</p> <p>25% - activity during lectures (questions, comments)</p>																																
Prerequisites																																	
Course content with	<ol style="list-style-type: none"> 1. Green functions for many dla differential operators. 2. Applications of Brouwer and Leray-Schauder degree theory. 																																

delivery methods	<ol style="list-style-type: none"> 3. Sub- and supersolutions for Bondary value problems. 4. Critical points of functionals - minimum and sadle points and their applications. 5. Differential equations In Banach spaces.
Basic reference materials	<ol style="list-style-type: none"> 1. Lecturer's materials, 2. P. Drabek, J. Milota, Methods of Nonlinear Analysis, Birkhauser 2007. 3.K. Deimling, Nonlinear Functional Analysis, Springer-Verlag 1985.
Other reference materials	P. Rabinowitz, Minimax Methods In Critical Point Theory with Applications to Differential Equations, AMS, 1986.
Average student workload outside classroom	10h
Comments	
Last update	11.05.2023