

Course code																																	
Type and description	Elective Course																																
ECTS credit	1																																
Course name	Mathematical Problems in Engineering																																
Course name in Polish	Wybrane zagadnienia matematyczne w inżynierii																																
Language of instruction	English																																
Course level	8 PRK																																
Course coordinator	Marcin Koniorczyk, Piotr Ostrowski																																
Course instructors	Marcin Koniorczyk, Piotr Ostrowski																																
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></td> <td></td> <td></td> <td>1.0</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)				1.0			
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Course objective	<p>Aims of the course is:</p> <ol style="list-style-type: none"> To present some mathematical techniques for the solution of engineering problems, like : optimisation, iterative procedures, convergence of solution. 																																
Learning outcomes	<p>After the course student:</p> <ol style="list-style-type: none"> knows the basic properties and examples of Hilbert spaces W_4, knows the basic properties and examples of Sobolev spaces W_4, knows the Fixt Point Theorem and its basic applications W_4, knows how to apply the basic theorems concerning optimisation problems U_4, knows the Ritz Method and will be able to apply the method for boundary value problems U_4, 																																
Assessment methods	<p>W4 - oral exam U4, K1 – project seminar presentation W4, U4 – written project</p> <p>The student will be assessed based on the project</p>																																
Prerequisites																																	
Course content with delivery methods	<p>Topological Spaces Compactness, Continuity and Convexity Duality in Banach Spaces Weak formulation, Weak Convergence Ritz Method for Variational Problems Fix Point Theorem Some Optimisation Problems Lagrange multipliers, Kuhn-Tucker Theorem</p>																																
Basic reference materials	<ol style="list-style-type: none"> W. Rudin, Functional Analysis, McGraw-Hill, Inc. 1991. E. Zeidler, Applied Functional Analysis. Main Principles and Their Applications. Springer. 1995. E. Zeidler, Applied Functional Analysis. Application to Mathematica Physics. 1995. 																																
Other reference materials																																	
Average student workload	10h																																

outside classroom	
Comments	
Last update	Brak informacji