<table>
<tr><td>Course code</td><td></td></tr>
<tr><td>Type and description</td><td>EC – elective courses from the discipline of civil engineering and transport</td></tr>
<tr><td>ECTS credit</td><td>1</td></tr>
<tr><td>Course name</td><td>Computation Fluid Dynamics in Civil Engineering</td></tr>
<tr><td>Course name in Polish</td><td>Obliczeniowa mechanika płynów w budownictwie</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>dr inż. Witold Grymin</td></tr>
<tr><td>Course instructors</td><td>dr inż. Witold Grymin</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>0</td><td>0</td><td>0</td><td>5</td><td>0</td><td>0</td><td>5</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>no</td></tr>
<tr><td>Assessment criteria (weightage)</td><td>0</td><td>0</td><td>0</td><td>100%</td><td>0</td><td>0</td><td>100%</td></tr>
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<tr><td>Course objective</td><td>1. Providing the theoretical knowledge concerning the computational fluid dynamics.
2. Enabling student to apply the CFD code to the problems encountered in the civil engineering, such as determining the air flow in the air voids in building components or calculating pressure exerted by the wind on the buildings of complicated geometry.</td></tr>
<tr><td>Learning outcomes</td><td>After the course, student can:

1. Explain the problems of the laminar and turbulent flow modelling
2. Prepare numerical simulations of simple fluid flow cases and heat transfer calculations
3. Determine quality of the solution and critically evaluate the results of the models
4. Present simulation results in appropriate form</td></tr>
<tr><td>Assessment methods</td><td>Project (100%)</td></tr>
<tr><td>Prerequisites</td><td>None</td></tr>
<tr><td>Course content with delivery methods</td><td>PROJECT

1. Basic equations of the computational fluid dynamics
2. Mesh preparation: different types of elements, refinement
3. Boundary and initial conditions
4. Turbulence modelling
5. Convergence of numerical calculations, monitoring of the simulations
6. Presentation of the program used for the CFD calculations
7. Analysis of the results quality</td></tr>
<tr><td>Basic reference materials</td><td>Hirsch, Charles. Numerical computation of internal and external flows, 2007</td></tr>
<tr><td>Other reference materials</td><td></td></tr>
</table>

Average student workload outside classroom	15h
Comments	
Last update	July 2020