

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Mechanics of fluids</b>		Code <b>1010315321010635573</b>
Field of study <b>Power Engineering</b>	Profile of study (general academic, practical) <b>(brak)</b>	Year /Semester <b>1 / 2</b>
Elective path/specialty <b>-</b>	Subject offered in: <b>polish</b>	Course (compulsory, elective) <b>obligatory</b>
Cycle of study: <b>Second-cycle studies</b>	Form of study (full-time,part-time) <b>part-time</b>	
No. of hours Lecture: <b>10</b> Classes: <b>-</b> Laboratory: <b>-</b> Project/seminars: <b>-</b>		No. of credits <b>1</b>
Status of the course in the study program (Basic, major, other) <b>(brak)</b>		(university-wide, from another field) <b>(brak)</b>
Education areas and fields of science and art <b>technical sciences</b>		ECTS distribution (number and %) <b>1 100%</b>
<b>Responsible for subject / lecturer:</b>  dr hab. inż. Andrzej Frąckowiak email: andrzej.frackowiak@put.poznan.pl tel. 61 6652213 Faculty of Machines and Transportation Piotrowo 3A, 60-965 Poznan		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	Basic knowledge of mathematics, physics, fluid mechanics
2	<b>Skills</b>	Ability to effective self-education in a field related to the chosen area of study
3	<b>Social competencies</b>	Is aware of the need to broaden their competence, readiness to work together as a team
<b>Assumptions and objectives of the course:</b> -Learning some chosen theoretical results in the field of fluid mechanics. Introduction to the various fluid models (Newtonian and non-Newtonian) and their behavior during the flow. Familiarization with the selected topics of numerical modeling of fluid flow		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b> 1. explain the laws which rule the flow of fluids and the principles of numerical modeling of fluid flow - [K_W01 ++ K_W02 ++]		
<b>Skills:</b> 1. use knowledge of fluid mechanics to describe the phenomena occurring as a result of fluid flow in the machines? channels and energy devices - [K_U01 ++ K_U02 ++]		
<b>Social competencies:</b>		

<b>Assessment methods of study outcomes</b>
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<p>-Lecture          ? evaluation of the knowledge and skills shown on the exam written</p> <p>Laboratory Exercises:          ? testing and rewarding knowledge necessary to solve presented problems in the current area of laboratory tasks,          ? continuous assessment, on all classes ? rewarding the gain of skill of using known rules and methods,          ? assessment of skills and knowledge related to the implementation of the task module, evaluation of the report from completed exercise.</p> <p>Achieving extra points for the activity classes, and especially for:          ? suggesting additional aspects of the issue to discuss;          ? the efficiency of application of knowledge gained while solving the problem given;          ? the ability to cooperate in a team solving practically a particular task in the laboratory          ? comments related to improving teaching materials;          ? aesthetic care of tasks and reports developed ? in self-study.</p>		
<b>Course description</b>		
<p>-Basic equations of fluid dynamics. The dynamics of a viscous liquid. Navier-Stokes equation. Bernoulli equation for the real liquid. Coefficient of friction losses. Local loss coefficient. The issue of the Rayleigh-Stokes equations for a plate. The boundary layer. Karman integral formula. Chosen issues of viscous fluid flow. The flow around a plate with uniform fluid suction. The collapse of a potential vortex in a viscous fluid. Selected issues of the numerical fluid mechanics. Modeling of mixing fluids in a static mixer. Non-Newtonian fluids.</p>		
<p><b>Basic bibliography:</b></p> <ol style="list-style-type: none"> <li>1. M.Ciałkowski ? Mechanika płynów, Wyd. Politechniki Poznańskiej, P-ń 2000</li> <li>2. M.Ciałkowski ? Mechanika płynów. Zbiór Zadań z rozwiązaniami, Wyd. Politechniki Poznańskiej, P-ń 2008</li> <li>3. Z. Orzechowski, P. Wiewiórski ? Ćwiczenia audytoryjne z mechaniki płynów, Wyd. Politechniki Łódzkiej, Łódź 1993</li> <li>4. W.J. Prosnak ? Równania klasycznej mechaniki płynów, PWN 2006</li> </ol>		
<p><b>Additional bibliography:</b></p> <ol style="list-style-type: none"> <li>1. J.A. Kołodziej ? Podstawy mechaniki płynów, Wyd. Politechniki Poznańskiej, P-ń 1982</li> <li>2. J. Walczak ? Inżynierska mechanika płynów, Wyd. Naukowo-Techniczne, 2010</li> </ol>		
<b>Result of average student's workload</b>		
<b>Activity</b>		<b>Time (working hours)</b>
<b>Student's workload</b>		
<b>Source of workload</b>	<b>hours</b>	<b>ECTS</b>
Total workload	15	1
Contact hours	15	1
Practical activities	0	0