

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Mechanics of fluids		Code 1010312311010635573
Field of study Power Engineering	Profile of study (general academic, practical) (brak)	Year /Semester 1 / 1
Elective path/specialty -	Subject offered in: polish	Course (compulsory, elective) obligatory
Cycle of study: Second-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 1 Classes: - Laboratory: - Project/seminars: -		No. of credits 1
Status of the course in the study program (Basic, major, other) (brak)		(university-wide, from another field) (brak)
Education areas and fields of science and art technical sciences		ECTS distribution (number and %) 2 100%
Responsible for subject / lecturer: dr hab. inż. Andrzej Frąckowiak email: andrzej.frackowiak@put.poznan.pl tel. 61 6652213 Faculty of Machines and Transportation Piotrowo 3A, 60-965 Poznan		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Basic knowledge of mathematics, physics, fluid mechanics
2	Skills	Ability to effective self-education in a field related to the chosen area of study
3	Social competencies	Is aware of the need to broaden their competence, readiness to work together as a team
Assumptions and objectives of the course: -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		
Study outcomes and reference to the educational results for a field of study		
Knowledge: 1. explain the laws which rule the flow of fluids and the principles of numerical modeling of fluid flow - [K_W01 ++ K_W02 ++]		
Skills: 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 ++]		
Social competencies:		

Assessment methods of study outcomes

<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>		
Course description		
<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>Basic bibliography:</p> <ol style="list-style-type: none"> 1. M.Ciałkowski ? Mechanika płynów, Wyd. Politechniki Poznańskiej, P-ń 2000 2. M.Ciałkowski ? Mechanika płynów. Zbiór Zadań z rozwiązaniami, Wyd. Politechniki Poznańskiej, P-ń 2008 3. Z. Orzechowski, P. Wiewiórski ? Ćwiczenia audytoryjne z mechaniki płynów, Wyd. Politechniki Łódzkiej, Łódź 1993 4. W.J. Prosnak ? Równania klasycznej mechaniki płynów, PWN 2006 		
<p>Additional bibliography:</p> <ol style="list-style-type: none"> 1. J.A. Kołodziej ? Podstawy mechaniki płynów, Wyd. Politechniki Poznańskiej, P-ń 1982 2. J. Walczak ? Inżynierska mechanika płynów, Wyd. Naukowo-Techniczne, 2010 		
Result of average student's workload		
Activity	Time (working hours)	
Student's workload		
Source of workload	hours	ECTS
Total workload	15	1
Contact hours	15	1
Practical activities	0	0