

COURSE DESCRIPTION CARD

Course name	Experimental and numerical flow analyses				
Course type	optional	Course code	SDPB0116	ECTS credits	2
Forms and number of hours	S – 6h Sw – 14h	Scientific discipline	MEng		
Course objectives	The aim of the course is to enhance knowledge and skills in flow analysis. To familiarise PhD students with experimental research methods and mathematical modelling of flow processes.				
Course content	Seminar: Research methods used in flow analysis. Computer tools used in flow modelling. Specialised work: Experimental studies of flow under steady state and cyclic disturbance conditions. Identification of selected flow parameters from experimental results. Modelling of the flow process using empirical models and numerical fluid mechanics.				
Teaching methods	Seminar: Presentation of issues combined with discussion. Speeches by PhD students in the form of short presentations based on literature reports. Specialist work: Laboratory and project exercises.				
Assessment method	Seminar: Preparation of speeches (presentations) and discussion. Specialised work: Preparation and completion of reports on the laboratory and project parts.				
Symbol of learning outcome	Learning outcomes		Reference to the learning outcomes for the field of study for the 8 th level of Polish Qualification Framework (PRK)	Methods of assessing the learning outcomes	
LO1	The PhD student knows and understands the theoretical basis and the general issues and selected specific issues in the area of flow analysis. Student is able to participate in scientific discussions.		SD_W1, SD_U6	oral presentation followed by discussion	
LO2	The PhD student is able to apply experimental and computational research methods and techniques in flow analyses. Student is able to formulate conclusions from the conducted research.		SD_U1	reports on the laboratory and design part	
LO3	The PhD student is ready to recognise the importance of knowledge in solving practical and modelling problems in flow analysis.		SD_K1	oral presentation followed by discussion	

Student workload (in hours)	
Specialist work / seminar	14 / 6
Consultations	5
The unassisted student work	20
Implementation of project tasks and preparation for and participation in exams/tests	15
Total	60
ECTS credits	2

Basic references	<ol style="list-style-type: none"> 1. LaNasa, P.J. and Upp, E.L. (2014) Fluid Flow Measurement - A Practical Guide to Accurate Flow Measurement (3rd Edition). Third. Chantilly: Elsevier. 2. Kamiński, Z. (2012) Symulacyjne i eksperymentalne badania pneumatycznych układów hamulcowych pojazdów rolniczych. Białystok: Oficyna Wydawnicza Politechniki Białostockiej (Rozprawy Naukowe - Politechnika Białostocka nr 228). 1. Jayanti, S. (2018) Computational Fluid Dynamics for Engineers and Scientists. 1st edn. Dordrecht: Springer Nature.
Supplementary references	<ol style="list-style-type: none"> 3. Pozrikidis, C. (2016) Fluid Dynamics: Theory, Computation, and Numerical Simulation. 3rd ed. 2017. New York, NY: Springer Nature. 4. Fang, C. (2019) An Introduction to Fluid Mechanics. 1st ed. 2019. Cham: Springer Nature (Springer Textbooks in Earth Sciences, Geography and Environment). 5. Korzyński, M. (2013) Metodyka eksperymentu : planowanie, realizacja i statystyczne opracowanie wyników eksperymentów technologicznych, Warszawa: Wydaw. WNT
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