

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Turbines		Code 1010634151010630277
Field of study Mechanical Engineering	Profile of study (general academic, practical) (brak)	Year /Semester 3 / 5
Elective path/specialty Thermal Engineering	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) part-time	
No. of hours Lecture: 18 Classes: - Laboratory: - Project/seminars: -		No. of credits 3
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 Technical sciences		ECTS distribution (number and %) 3 100% 3 100%
Responsible for subject / lecturer: Prof. PP dr hab inż. Piotr Krzyślak email: piotr.krzyślak@put.poznan.pl tel. 61 665-2209 Wydział Maszyn Roboczych i Transportu http://www.fwmt.put.poznan.pl/		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Basic knowledge of circuits, thermal, steam and gas turbines
2	Skills	Ability to describe and calculation of the basic processes flow machines. The ability to effectively self-study in a field related to the chosen field of study
3	Social competencies	Is aware of the need to broaden their competence, willingness to cooperate within the team
Assumptions and objectives of the course: Acquisition of knowledge about gas and steam circuits of various types. Introduction to the operation of steam and gas turbines and the basic processes occurring in these machines. Learning the methods described medium flow in this type of machines		
Study outcomes and reference to the educational results for a field of study		
Knowledge: 1. Cel przedmiotu: Acquisition of knowledge about gas and steam circuits of various types. Introduction to the operation of steam and gas turbines and the basic processes occurring in these machines. Learning the methods described medium flow in this type of machines - [x]		
Skills: 1. to apply knowledge of the phenomena of mass flow of the working medium occurring in the flow machines - [x] 2. determine the correctness and efficiency of the production of machines and equipment used heat flow occurring in industrial and municipal - [x]		
Social competencies: 1. can think and act in an effective manner in the area of energy conversion processes in machines and thermal devices - [x]		
Assessment methods of study outcomes		
Lecture Continuous assessment for each course, rewarding activity and quality perception. Written final exam		
Course description		

Theoretical for right and left-hand rotation cycles. Circuits steam power plants. Gyms gas turbine. Circuits combined. The theory of the steam turbine stage. Equation Oiler. The efficiency of peripheral. Profile turbiny. Równanie equilibrium radial vanes. Equation Flugel? Stodola. Strary channels turbine. Methods for regulating steam turbines. Labyrinth seals.		
Basic bibliography:		
1. Chmielniak T., Obiegi termodynamiczne turbin ciepłych		
2. Chmielniak T., Turbiny gazowe		
3. Chmielniak T., Technologie energetyczne		
4. Chmielniak T., Technologie energetyczne		
Additional bibliography:		
Result of average student's workload		
Activity	Time (working hours)	
1. Preparing to lecture	7	
2. Participation in the lecture	15	
3. Lecture	18	
4. fixation content Consultation	2	
5. Preparing for exam	22	
6. Participation in the exam	2	
Student's workload		
Source of workload	hours	ECTS
Total workload	66	3
Contact hours	29	0
Practical activities	0	0