

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Combustion engine systems		Code 1010611251010627405
Field of study Mechanical Engineering	Profile of study (general academic, practical) (brak)	Year /Semester 3 / 5
Elective path/specialty Motor Vehicles	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 1 Classes: - Laboratory: - Project/seminars: -		No. of credits 2
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 %) 2 100% 2 100%
Responsible for subject / lecturer: DSc. DEng. Piotr Lijewski email: piotr.lijewski@put.poznan.pl tel. 616652045 Faculty of Transport Engineering Piotrowo 3 Street, 60-965 Poznań		Responsible for subject / lecturer: DSc. DEng. Piotr Lijewski email: piotr.lijewski@put.poznan.pl tel. 616652045 Faculty of Transport Engineering Piotrowo 3 Street, 60-965 Poznań
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Student has basic knowledge about the design and construction of motor systems of power: charge and aftertreatment, the impact of their parameters on the operational indices of engines.
2	Skills	Student is able to integrate the obtained information, make their interpretation, draw conclusions, formulate and justify opinions.
3	Social competencies	Student is aware of the importance and understands the non-technical aspects and effects of transport activities.
Assumptions and objectives of the course: Basic information about the design of internal combustion engine systems, mainly automotive, taking into account the latest solutions.		
Study outcomes and reference to the educational results for a field of study		
Knowledge: 1. Student has basic knowledge about the design of motor systems of injection, charging and aftertreatment, the impact of their parameters on the operational indices of engines - [-]		
Skills: 1. Student is able to integrate the information, make their interpretation, draw conclusions, formulate and justify opinions - [-]		
Social competencies: 1. Student is aware of the important means non-technical aspects and impacts of transport - [-]		
Assessment methods of study outcomes		
Written and oral examination		
Course description		
Design of compression ignition and spark ignition engine systems: injection, supercharging, aftertreatment. Operation of engine systems. The influence of operation parameters of selected systems, eg. power supply on engine operation indicators - power, engine torque, efficiency, exhaust emission. The influence of operation parameters of selected systems on the course of the combustion process. Development trends of combustion engine systems.		

Basic bibliography:		
1. Kazimierz Niewiarowski: Tłokowe silniki spalinowe.		
2. Jan A. Wajand, Jan T. Wajand: Tłokowe silniki spalinowe średnio- i szybkoobrotowe. WNT, 2005.		
3. Sławomir Luft: Podstawy budowy silników. WKŁ, 2018.		
4. Tadeusz Janiszewski, Spiros Mavrantzas: Elektroniczne układy wtryskowe silników wysokoprężnych. WKŁ, 2016.		
5. Tadeusz Rychter, Andrzej Teodorczyk: Teoria silników tłokowych. WKŁ.		
6. Janusz Mysłowski: Doładowanie silników. WKŁ, 2016.		
Additional bibliography:		
Result of average student's workload		
Activity	Time (working hours)	
1. Lecture	15	
2. Exam preparation	8	
3. Exam	2	
Student's workload		
Source of workload	hours	ECTS
Total workload	25	2
Contact hours	17	2
Practical activities	0	0