

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Internal Combustion Engines		Code 1010614351010620244
Field of study Transport	Profile of study (general academic, practical) (brak)	Year /Semester 3 / 5
Elective path/specialty Road Transport	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: 9 Project/seminars: -		No. of credits 4
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		ECTS distribution (number and %)
Responsible for subject / lecturer: dr hab. inż. Piotr Lijewski email: piotr.lijewski@put.poznan.pl tel. 61-665-2045 Faculty of Transport Engineering ul. Piotrowo 3 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Students have basic knowledge of machine design and are familiar with mechanics and dynamics of solids
2	Skills	Students can apply their knowledge to understand traction engines
3	Social competencies	Students are aware of their career development
Assumptions and objectives of the course: Traction engines design and the function of their main working units		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Students have theoretical background in engines work and design (cycles and basic thermodynamic laws). - [-] 2. Students know how to assess the engine work (parameters, characteristics). - [-] 3. Students know the structure and function of all engine systems and units. - [-] 4. Students are familiar with the dynamometer and basic measuring methods applied in engine characteristics. - [-]		
Skills:		
1. Students are able to explain how particular engine systems work - [-] 2. Students can assess and compare engines - [-] 3. Students can expound traction engines? design and operation - [-] 4. Students are capable of carrying out engine tests including measurement and determining engine characteristics - [-] 5. Students can assess the engine quality and compare it with other sources of energy - [-]		
Social competencies:		
1. Students are aware of engine?s influences on the environment - [-] 2. Students can analyze and evaluate the suitability of an engine for particular power train - [-] 3. Students are able to justify recommended specifications and conditions of use - [-]		
Assessment methods of study outcomes		

Written examination, assessment for laboratory tasks		
Course description		
<p>Key words: pressure, work, power (theoretical, indicated, effective and friction); engine efficacy and fuel consumption Cycles: theoretical, in real conditions, values of pressure as well as temperature at specific cycle points Characteristics: full power, load, and general The structure and operation of: cam- and crankshaft, cooling system, charging system, EGR, all parts of fuel system, pump-injectors, CR control system Emission: directives for reducing emission, emission measurements, working conditions during measurement</p>		
Basic bibliography:		
Additional bibliography:		
Result of average student's workload		
Activity	Time (working hours)	
1. Lectures	30	
2. Laboratories	15	
3. Revision, reporting	8	
4. Preparation for lectures and laboratory classes	8	
5. Consultations	6	
6. Studying for exam, examination	10	
Student's workload		
Source of workload	hours	ECTS
Total workload	77	4
Contact hours	48	3
Practical activities	29	1