STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Internal Combustion Engines		**1010611351010600244**
Field of study: **Transport**	Profile of study (general academic, practical): **(brak)**	Year /Semester: **3 / 5**
Elective path/specialty: **Logistics of Transport**	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: **2** Classes: **-** Laboratory: **1** 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: **technical sciences** **Technical sciences**		ECTS distribution (number and %): **4 100%** **4 100%**

Responsible for subject / lecturer:

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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). - [K1A_W13]
2. Students know how to assess the engine work (parameters, characteristics). - [K1A_W14]
3. Students know the structure and function of all engine systems and units. - [K1A_W14, K1A_W18]
4. Students are familiar with the dynamometer and basic measuring methods applied in engine characteristics. - [K1A_W16]

Skills:

1. Students are able to explain how particular engine systems work - [K1A_U01]
2. Students can assess and compare engines - [K1A_U04]
3. Students can expound traction engines? design and operation - [K1A_U02]
4. Students are capable of carrying out engine tests including measurement and determining engine characteristics - [K1A_U07]
5. Students can assess the engine quality and compare it with other sources of energy - [K1A_U10]

Social competencies:

1. Students are aware of engine?s influences on the environment - [K1A_K02]
2. Students can analyze and evaluate the suitability of an engine for particular power train - [K1A_K06]
3. Students are able to justify recommended specifications and conditions of use - [K1A_K03]

Assessment methods of study outcomes

Written examination, assessment for laboratory tasks

Course description

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

Basic bibliography:

1. Serdecki W. (red.): Badania silników spalinowych ? Laboratorium. WPP, Poznań, 2012 lub późniejsze wydania.
2. Wajand Jan A., Wajand Jan T.: Tłokowe silniki spalinowe średnio- i szybkoobrotowe. WNT, Warszawa, 2005.
3. Niewiarowski K.: Tłokowe silniki spalinowe. WKiŁ, Warszawa, 1983.

Additional bibliography:

1. Materiały producentów silników, konferencyjne i branżowe: Combustion Engines, MTZ, SAE .

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