STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
Operation and Maintenance of IC Engines	**1010621261010620267**

Field of study	Profile of study (general academic, practical)	Year /Semester
Mechanical Engineering	**(brak)**	**3 / 6**
Elective path/specialty	**Subject offered in:**	**Course (compulsory, elective)**
Internal Combustion Engines	**Polish**	**obligatory**

Cycle of study:	Form of study (full-time,part-time)
First-cycle studies	**full-time**

No. of hours	No. of credits
Lecture: **1** Classes: **1** Laboratory: **-** Project/seminars: **-**	**1**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
(brak)	**(brak)**

Education areas and fields of science and art	ECTS distribution (number and %)
technical sciences	**1 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Student possesses a basic knowledge in mechanics, construction of machines, machine engineering, strength of materials, thermodynamics
2	**Skills**	Student can combine acquired information, accomplish interpretation, conclude, associate theory and practice
3	**Social competencies**	Student is conscious of the role of combustion engine and simultaneously understands its unfavorable effect on environment and consequences

Assumptions and objectives of the course:

Formation of ability to formulate and solving problems in the field of machines operation and maintenance with special attention to IC engines

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Student possesses the knowledge on materials and composites used in construction and exploitation of IC engines. - [-]
2. He knows basics of tribological processes that occur in rubbing pairs of combustion engine. - [-]
3. Student possesses the basic, methodical knowledge in the field of material selection, both constructional and maintenance, their life cycle and recycling of engine parts. - [-]
4. Student mastered the elementary knowledge on engine effect on environment. - [-]
5. A basic specialized knowledge about IC engine exploitation is known to the student. - [-]

Skills:

1. Student knows how to acquire information from literature, internet and data bases and can interpret them and draw conclusions. - [-]
2. He can carry out a survey of catalogues and producer?s internet sites to find necessary engine parts and use them as spare parts. - [-]
3. Student knows how to perform basic calculations in the field of engine parts wear during exploitation. - [-]
4. Student can use technical standards concerning safety of engine operation - [-]
5. Student is able to compile engine service and maintenance manual - [-]
6. He can organize and supervise the IC engine exploitation process - [-]

Social competencies:

1. Student understands the need and possibilities of constant acquiring new skills for his own professional development - [-]
2. He can himself deepen the knowledge on the IC engines exploitation - [-]
3. Student knows how to operate the engine reducing its unfavorable effect on the environment - [-]
4. He can show economic advantages as the consequence of proper engine operation - [-]
5. He is able to think and act the enterprising way, take decisions, work for the benefit of employer and society - [-]

Assessment methods of study outcomes

Written and oral examination

Course description

Basic concepts and terms in machine exploitation. Models of vehicle exploitation (including IC engines); exploitation arrangement and system. System of exploitation supervision. Basic terms of durability. Limits of technical condition parameters of engines and their parts.

The wear of engine and its parts in relation to causes, course and effects. Identification of individual wear processes and counter acting remedies. Ageing of work fluids and their effect on the environment.

Disposal of worn parts and work media.

The influence of proper exploitation on engine reliability and efficiency. Tests of engine technical condition during operation (including diagnostic tests) relative to the level of wear.

Servicing systems, types of technical services, documentation of exploitation.

Rules of engine safe operation.

Basic bibliography:

1. J. Kaźmierczak: Eksploatacja systemów technicznych, Wyd. PŚ Gliwice 2000.
2. M. Hebda, T. Mazur, H. Pelc: Teoria eksploatacji pojazdów, WKiŁ Warszawa 1978.
3. J.A. Wajand, J.T. Wajand: Tłokowe silniki spalinowe średnio- i szybkoobrotowe WNT 2000.
4. S. Legutko: Podstawy eksploatacji maszyn, Wyd. Politechniki Poznańskiej, Poznań 2002

Additional bibliography:

1. W. Serdecki (red.): Badania silników spalinowych, Wydawnictwo Politechniki Poznańskiej Poznań 2012.
2. W. Zwierzycki: Płyny eksploatacyjne do środków transportu drogowego, Wydawnictwo Politechniki Poznańskiej Poznań 2006.
3. Z. Smalko. Podstawy eksploatacji obiektów technicznych, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 1998.

Result of average student's workload

Activity	Time (working hours)
1. Preparations for classes	3
2. Participation in classes (according to schedule)	15
3. Revision of content of classes / report	3
4. Labour	15
5. Preparations for labour	8
6. Participation in examination / credit hour	2

Student's workload

Source of workload	hours	ECTS
Total workload	46	1
Contact hours	31	1
Practical activities	15	0