



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Problems of hydrodynamic lubrication [N2MiBP1-HSN>PHSiŁ]

Course

Field of study

Mechanical and Automotive Engineering

Year/Semester

1/2

Area of study (specialization)

Hybrid Powertrain Systems

Profile of study

general academic

Level of study

second-cycle

Course offered in

Polish

Form of study

part-time

Requirements

compulsory

Number of hours

Lecture

18

Laboratory classes

0

Other

0

Tutorials

9

Projects/seminars

0

Number of credit points

3,00

Coordinators

dr inż. Maciej Babiak

Lecturers

Prerequisites

Knowledge: Base knowledge in design and function of combustion engines; base knowledge in mechanics of fluids Competences: Ability to read and understand diagrams, technical sketches etc. Social competences: Understanding of continuous personal development; understanding of the impact of engineering products on the human environment.

Course objective

Analysis of the process of piston-cylinder friction. Hydrodynamic theory of lubrication.

Course-related learning outcomes

Knowledge:

Has extended knowledge of thermodynamics and fluid mechanics to the extent necessary to understand the principle of operation and calculations of thermodynamic and flow processes occurring in working machines such as heating, cooling, drying, thermal and pressure agglomeration, etc., pneumatic transport, energy conversion, etc.

Has extensive knowledge of the processes taking place in the surface layer of machine structural elements and surface engineering methods.

Has general knowledge of standardization, EU recommendations and directives, national, industry and

international standards systems, and industrial standards.

Skills:

Can formulate and test hypotheses related to simple research problems.

Can plan and carry out experimental research of specific processes taking place in machines and routine tests of a working machine or a vehicle from a selected group of machines.

Is able to carry out basic measurements of mechanical quantities on the tested working machine with the use of modern measuring systems.

Social competences:

He is ready to critically assess his knowledge and received content.

It is ready to initiate actions for the public interest.

Is ready to fulfill professional roles responsibly, taking into account the changing social needs, including.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Discussion during the lesson

Mutual or written exam

Programme content

- Parts of the piston-cylinder group: materials, design and function
- Methods for oil film parameter calculation
- Navier-Stokes equation in the application to the cylinder liner and journal bearings
- Nanomaterials in friction and lubrication

Course topics

none

Teaching methods

various

Bibliography

Basic

1. Iskra A., Dynamika mechanizmów tłokowych silników spalinowych. Wydawnictwo Politechniki Poznańskiej, Poznań 1995

2. Zima S., Kurbeltriebe. Vieweg GmbH. Braunschweig, Wiesbaden 1999

Additional

Köhler E., Verbrennungsmotoren ? Motormechanik, Vieweg ? ATZ-MTZ-Fachbuch, Braunschweig/Wiesbaden 2002

Breakdown of average student's workload

	Hours	ECTS
Total workload	45	3,00
Classes requiring direct contact with the teacher	27	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	18	1,00