



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Problems of hydrodynamic lubrication

### Course

Field of study

Year/Semester

Design and operation of transport

1/2

Area of study (specialization)

Profile of study

Combustion Engines

general academic

Level of study

Course offered in

Second-cycle studies

polish

Form of study

Requirements

full-time

compulsory

### Number of hours

Lecture

Laboratory classes

Other (e.g. online)

30

0

0

Tutorials

Projects/seminars

15

0

### Number of credit points

3

### Lecturers

Responsible for the course/lecturer:

Responsible for the course/lecturer:

dr hab. inż. Jarosław Kałużny

email: jaroslaw.kaluzny@put.poznan.pl

tel. 61-6652049

Wydział Inżynierii Lądowej i Transportu

ul. Piotrowo 3, 60-965 Poznań

### 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

The student gains extended knowledge in thermodynamics and fluid dynamics.

#### Skills

The student can design and execute experiments related to the processes and phenomena occurring in machines.

#### Social competences

The student becomes to be happy to start his activity striving public affairs

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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

### 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	70	3,0
Classes requiring direct contact with the teacher	45	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	25	1

<sup>1</sup> delete or add other activities as appropriate