



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Operating fluids [S1Trans1>ME]

### Course

Field of study

Transport

Year/Semester

3/6

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

### Number of hours

Lecture

15

Laboratory classes

15

Other

0

Tutorials

0

Projects/seminars

0

### Number of credit points

3,00

### Coordinators

prof. dr hab. inż. Wiesław Zwierzycki  
wieslaw.zwierzycki@put.poznan.pl

### Lecturers

### Prerequisites

KNOWLEDGE: Has basic knowledge of chemistry and general knowledge of the operation of the internal combustion engine and mechanical (industrial) devices. SKILLS: Can learn using various sources of information. SOCIAL COMPETENCES: Understands the need for lifelong learning

### Course objective

Getting to know the basics of construction, obtaining, ownership and use of automotive and industrial operating fluids

### Course-related learning outcomes

Knowledge:

The student has ordered and theoretically founded general knowledge in the field of key issues of technology and detailed knowledge in the field of selected issues in this discipline of transport engineering

The student has a basic knowledge of the life cycle of means of transport, both equipment and software, and in particular about the key processes occurring in the product life cycle

### Skills:

The student is able to make a critical analysis of the functioning of transport systems and other technical solutions and to evaluate these solutions, including: is able to effectively participate in the technical inspection and assess the transport task from the point of view of non-functional requirements, has the ability to systematically conduct functional tests

### Social competences:

The student is aware of the importance of knowledge in solving engineering problems, knows examples and understands the causes of malfunctioning transport systems that have led to serious financial and social losses or to serious loss of health and even life

## Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:

Written and oral exam

## Programme content

The programme of the module 'vehicle and machine consumables' deals with basic and applied (operational) knowledge of three groups of materials:

- a. lubricants used in automobiles (engine oils, transmission oils and plastic lubricants),
- b. other operating fluids (for vehicle radiators, brake systems, so-called "automotive chemicals"), and
- c. motor fuels.

In each of the "material" blocks, the problems of construction and obtaining, physicochemical and functional properties (taking into account exploitation main and side functions), problems of ageing during use and methods of condition diagnostics (mainly lubricating oils) are discussed first. Adequate attention was also given to the problems of storage and transport of hazardous materials, i.e. engine fuels. A classification of industrial oils and lubricants (according to ISO) is also presented in a synthetic form.

## Course topics

The lecture programme covers the following topics:

1. Construction and production of mineral and synthetic lubricating oils.
2. Lubricants used in automotive applications (engine and gear oils, plastic lubricants).
3. Other automotive consumables (brake fluids, cooling fluids, windscreen washer fluids, etc.).
- 4) Motor fuels (including distribution problems).
5. Industrial consumables (machine oils, compressor oils, turbine oils, gear oils, hydraulic oils, etc.).
6. Operational ageing of oils and working fluids (condition diagnostics).
7. Consumables and the environment

The laboratory programme includes the following topics:

1. Lubricating oils shear resistance testing. Kinematic viscosity.
2. Lubricating properties of oils.
3. penetration measurement of plastic lubricants
4. Determination of water content and solid contaminants in service oils
5. Measurement of ignition, flaming and solidification temperatures of lubricating oils
6. Determination of viscosity-temperature characteristics of oil with a rotational viscometer. Dynamic viscosity

## Teaching methods

1. Lecture: multimedia presentation.
2. Practical classes - laboratory.

## Bibliography

### Basic

1. Zwierzycki W.: Oleje, paliwa i smary dla motoryzacji i przemysłu, Wyd. ITeE, Radom 2001 (486 str.) - również serwer Biblioteki PP - materiały dydaktyczne on-line.
2. Zwierzycki W.: Płyny eksploatacyjne dla środków transportu drogowego. Charakterystyka

funkcjonalna i ekologiczna. Wyd. Politechniki Poznańskiej, Poznań 2006

Additional

1. Baczewski K. Kałdoński T. Paliwa do silników o zapłonie iskrowym, WKiŁ, Warszawa 2005

2. Baczewski K. Kałdoński T. Paliwa do silników o zapłonie samoczynnym, WKiŁ, Warszawa 2005

### Breakdown of average student's workload

	Hours	ECTS
Total workload	70	3,00
Classes requiring direct contact with the teacher	30	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	40	1,50