



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Fuels and lubricants [S2MiBP1>PiS]

### Course

Field of study

Mechanical and Automotive Engineering

Year/Semester

1/2

Area of study (specialization)

Railway Vehicles

Profile of study

general academic

Level of study

second-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

2,00

### Coordinators

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

### Lecturers

### Prerequisites

KNOWLEDGE: Has knowledge of the construction and production of fuels, oils, plastic lubricants (and specialized liquids) in transport means. SKILLS: Can learn using various sources of information. SOCIAL COMPETENCES: the student is aware of the social and economic importance of environmental protection

### Course objective

Getting to know the basics of construction, production, ownership and use of fuels and lubricants for means of transport

### Course-related learning outcomes

Knowledge:

Has knowledge of the principles of safety and ergonomics in the design and operation of machines and the threats that machines pose to the natural environment.

Has basic knowledge about selected technologies of machine works in agriculture, construction, transport, food industry, etc.

Has extended knowledge of the life cycle of machines, the principles of operation of working machines and destructive processes occurring during operation, such as tribological wear, corrosion, surface

fatigue and volumetric aging of the material.

#### Skills:

He can correctly select the optimal material and its processing technology for typical parts of working machines, taking into account the latest achievements in material engineering.

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.

He can design the technology of exploitation of a selected machine with a high degree of complexity.

#### Social competences:

It is ready to initiate actions for the public interest.

Is willing to think and act in an entrepreneurial manner.

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

- developing the professional achievements,
- maintaining the ethos of the profession,
- observing and developing the rules of professional ethics and acting towards the observance of these rules.

### 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 complements the topics presented in the 1st degree module "consumables".

This mainly concerns industrial oils and lubricants, which were only signally presented in the 1st degree.

The subject of fuels is also presented in a developed manner, firstly presenting the functional properties of fuels, then the problems of storage (storage) and transport, methods of testing functional properties. A synthesis from the area of fuel and lubricant diagnostic systems is also presented.

The programme of laboratory exercises includes exemplary methods of diagnosing (measuring) oil (fuel) parameters.

### Course topics

The lecture programme covers the following topics:

1. Construction and production of lubricating oils and fuels.
2. Automotive consumables.
3. Motor fuels
4. Storage and distribution of engine fuels.
5. Research on fuels and lubricants for means of transport
- 6 Diagnosis systems for fuels and lubricants.
7. Industrial oils and lubricants

The laboratory programme for the Motor Vehicles specialty includes the following:

1. testing the conductivity of fuels
- 2 - Comparison of the lubricity of fuels and oils
- 3 Determination of free water in fuels
- 4 Influence of fuel contamination on dynamic viscosity of oil
5. Effect of fuel contamination on flash point of oil
- 6 Determination of water crystallisation inhibitor in aviation fuel

The laboratory programme for other specialties includes the following:

1. Testing the shear resistance of lubricating oils. Kinematic viscosity.
2. Lubricating properties of oils.
3. Penetration measurement of plastic lubricants
4. Determination of water and solid contaminants content in operating 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. Laboratory exercises: carrying out the tasks given by the teacher - practical exercises

### Bibliography

#### Basic

1. Górski K., Górski W., Napędy lotnicze. Materiały pędne i smary, Wydawnictwo Komunikacji i łączności, Warszawa - 1986
2. Zwierzycki W., Płyny eksploatacyjne do środków transportu drogowego, Wydawnictwo Politechniki Poznańskiej, Poznań - 2006
3. Czarny R., Smary plastyczne, Wyd. NT, Warszawa 2004

#### 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  | 50    | 2,00 |
| Classes requiring direct contact with the teacher   | 30    | 1,00 |
| Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation) | 20    | 1,00 |