COURSE DESCRIPTION CARD - SYLLABUS

Course name
Operating fluids [N1MiBP1>ME]

Course

Field of study
Mechanical and Automotive Engineering

Year/Semester
2/4

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture
9

Laboratory classes
0

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

1,00

Coordinators

prof. dr hab. inż. Wiesław Zwierzycki
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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: the student is aware of the social and economic importance of environmental protection

Course objective

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

Course-related learning outcomes

Knowledge:
Has basic knowledge of tribological processes occurring in machines, i.e. friction, lubrication and wear.
Has extended basic knowledge necessary to understand specialist subjects and specialist knowledge about the construction, construction methods, manufacturing and operation of a selected group of working, transport, thermal and flow machines covered by the diploma path.
Has elementary knowledge of the life cycle of machinery, recycling of machine elements and

construction and consumables.

Skills:
Is ready to recognize the importance of knowledge in solving cognitive and practical problems and to consult experts in case of difficulties in solving the problem on his own.
Is ready to initiate actions for the public interest.
Is willing to think and act in an entrepreneurial manner.

Social competences:
Understands the impact of combustion of fuels and lubricants on the natural environment. Is aware of the importance of collecting and utilizing used lubricating oils.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
For discussion, ongoing preparation and activity in class. Written 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. Automotive lubricants (engine and transmission oils, plastic lubricants).
2. Other automotive consumables (brake fluids, cooling fluids, windscreen washer fluids, etc.).
3. Motor fuels (including distribution problems).
4. Industrial consumables (machine oils, compressor oils, turbine oils, gear oils, hydraulic oils, etc.).
5. Operational ageing of oils and working fluids (condition diagnostics), environmental problems.

Teaching methods

1. Lecture: multimedia presentation.

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 (333 str.)
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	25	1,00
Classes requiring direct contact with the teacher	9	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	16	0,50