



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Basic problems of ecology

### Course

Field of study

Mechanical and Automotive Engineering

Area of study (specialization)

–

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

1/1

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

### Number of hours

Lecture

30

Laboratory classes

0

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

### Number of credit points

2

### Lecturers

Responsible for the course/lecturer:

prof. dr hab. inż. Jerzy Merkisz

email: jerzy.merkisz@put.poznan.pl

tel. 61-6652207

Wydział Inżynierii Lądowej i Transportu

ul. Piotrowo 3 60-965 Poznań

Responsible for the course/lecturer:

dr hab. inż. Miłosław Kozak

email: miloslaw.kozak@put.poznan.pl

tel. 61-2244505

Wydział Inżynierii Lądowej i Transportu

ul. Piotrowo 3 60-965 Poznań

### Prerequisites

The student has knowledge related to environmental protection, learns the mechanisms of harmful emissions in transport and industry, the student has basic knowledge about environmental protection, factors causing environmental hazards, learns how to prevent harmful substances from getting into the atmosphere, learns the classification of compounds harmful to health man and their characteristics cards. The student is able to integrate the obtained information, interpret it, draw conclusions, formulate and justify opinions, can obtain information from literature and internet sources. The student is able to formulate judgments on social issues, is aware of the importance and understanding of non-technical aspects and effects of engineering activities on the environment, the student is aware of the risks associated with the emission of harmful compounds into the atmosphere and is environmentally aware of negative social behavior on human health and safety in transport and industry.



### Course objective

General knowledge of the risks associated with human activity now and possible consequences in the future, getting acquainted with the subject of ecology in industry and transport; hazard classification, general knowledge about alternative sources of propulsion and power supply of modern vehicles.

### Course-related learning outcomes

#### Knowledge

1. Has basic knowledge of the technical mechanics of fluids, i.e. ideal liquids and gases, Newtonian and non-Newtonian viscous liquids, theory of thermal-flow machines.
2. Has basic knowledge of technical thermodynamics, ie the theory of thermodynamic changes, heat flow, thermal machines and heating, drying and cooling devices..
3. Has elementary knowledge of the impact of machinery and technology on the natural environment and global energy balances..

#### Skills

1. Can assess material, environmental and labor costs for making a simple machine..
2. Can perform elementary technical calculations in the field of fluid mechanics and thermodynamics, such as heat and mass balances, pressure losses in pipelines, select parameters of blowers and fans for ventilation and transport systems, and calculate thermodynamic courses in thermal machines..
3. Can organize and substantively manage the process of designing and operating a simple machine from a group of machines from the group covered by the selected diploma path..

#### Social competences

1. 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.
2. Is ready to fulfill social obligations and co-organize activities for the benefit of the social environment.
3. Is ready to initiate actions for the public interest.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Final test at the end of the semester. Additional bonuses for activity.

### Programme content

Industry threats to the environment, basics of transport systems in terms of ecology, classification of drive systems; basic knowledge of exhaust gas aftertreatment systems; environmentally friendly



technologies in transport, the impact of macroeconomic factors on the implementation of environmentally friendly technologies in transport.

### Teaching methods

Lecture with the use of multimedia presentations.

### Bibliography

#### Basic

1. Merkisz J., Pielecha J., Radzimirski S., Pragmatyczne podstawy ochrony powietrza atmosferycznego w transporcie drogowym. Wyd. Politechniki Poznańskiej, Poznań 2009.
2. Gronowicz J., Ochrona środowiska w transporcie lądowym. Wyd. Instytutu Technologii i Eksploatacji, Poznań-Radom 2003.
3. Wiąckowski S., Toksykologia środowiska człowieka. Wydawnictwo: Branta, 2010.
4. Merkisz J., Pielecha I., Alternatywne napędy pojazdów. Wydawnictwo Politechniki Poznańskiej, Poznań 2006.

#### Additional

1. Dobrzańska B., Dobrzański G., Kiełczowski D., Ochrona środowiska przyrodniczego. Wyd. Naukowe PWN, Warszawa 2008.
2. Zięba S., Historia myśli ekologicznej. Wyd. KUL, Lublin 2004.
3. Lewandowski W., Proekologiczne źródła energii odnawialnej. WNT, Warszawa 2002.

### Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	20	1,0

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