COURSE DESCRIPTION CARD - SYLLABUS

Course name
Durability and reliability of vehicles [S2MiBP1-PS>KTiNP]

Course

Field of study
Mechanical and Automotive Engineering

Year/Semester
2/3

Area of study (specialization)
Motor 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
0

Other
0

Tutorials
15

Projects/seminars
0

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

The student has a basic knowledge of the construction of cars and the principles of operation of their components as well as the basics of reliability. The student is able to analyze and synthesize information, draw conclusions, formulate and justify opinions.

Course objective

Developing the ability to formulate and solve problems related to the reliability of vehicles at the stage of their design, manufacture and operation.

Course-related learning outcomes

Knowledge:
Has extensive knowledge of the processes taking place in the surface layer of machine structural elements and surface engineering methods.
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 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 estimate the potential threats to the environment and people from the designed working machine and vehicle from a selected group.
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:
He is ready to critically assess his knowledge and received content.
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 its own.
It is ready to fulfill social obligations, inspire and organize activities for the benefit of the social environment.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Project in the field of vehicle reliability modeling. Final test

Programme content

Reliability terminology. Airworthiness and unfitness condition, damage. Service life until failure and between failures. Limit state, durability. State assessment criteria.
Reliability in models used in the design of motor vehicles. Planning of research allowing for the development of reliability at the design stage
Reliability and technological quality. The dispersion of the properties of the manufactured elements. Influence of operating conditions on the reliability of vehicles. Influence of servicing strategy on vehicle reliability. Forms of destroying elements of motor vehicles. Typical courses of changes in technical condition. Statistical description of changes in technical condition. Analysis of operational data about mileage to failure and between failures. Analysis of the types, causes and effects of the vehicle functional failure and estimation of the risks resulting from its occurrence.
Empirical characteristics and models of vehicle reliability. Analysis of durability and reliability of selected vehicles. Identification of weak links in currently manufactured motor vehicles.

Course topics

none

Teaching methods

Informative and problematic lecture with a multimedia presentation. Exercises with didactic discussion.

Bibliography

Basic
1. Hebda M.: Eksploatacja samochodów. Wydawnictwo Instytutu Technologii Eksploatacji, Radom 2005
2. Gronowicz J.: Eksploatacja techniczna I utrzymanie samochodów. Wydawnictwo Uczelniane Politechniki Szczecińskiej, Szczecin 1997
3. Smalko Z.: Podstawy eksploatacji technicznej pojazdów. Warszawa, Wydawnictwo Politechniki Warszawskiej, 1987
4. Niziński S.:Diagnostyka samochodów osobowych i ciężarowych, Dom wydawniczy Bellona, Warszawa 1999r
5. Klyatis Lev M.: Accelerated reliability and durability testing technology
Additional
1. Moubray J.: Reliability centered maintenance, Industrial Press Inc, 2000
2. Kumar U.D., Crocer J.,Knezewic J.,El-Haram M.: Reliability, Maintenance and Logistic Support, Kluwert Academic Publishers, 2000
3. O?Connor P.D.T., Newton D., Bromley R.: Practical Reliabillity Engineering, Jonn Willey and Sons, LTD,

2001

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