COURSE DESCRIPTION CARD - SYLLABUS

Course name
Operation of machines

Course

Field of study
Mechanical Engineering
Area of study (specialization)
Level of study
First-cycle studies
Form of study
full-time
Year/Semester
4/7
Profile of study
general academic
Course offered in
Polish
Requirements
elective

Number of hours

Lecture
30
Laboratory classes
Other (e.g. online)
Tutorials
Projects/seminars

Number of credit points

3

Lecturers

Responsible for the course/lecturer:
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Wydział Inżynierii Mechanicznej

ul. Piotrowo 3, 60-965 Poznań

tel.: 061 665 2361

Responsible for the course/lecturer:

Prerequisites

basic knowledge in the field of materials science, tribology, machine construction, mathematical statistics, manufacturing techniques

logical thinking, using information obtained from literature and the Internet

understanding the need to learn and acquire new knowledge

Course objective

learning basic issues regarding the use and operation of machines, their reliability, machine diagnostics and repair and modernization technologies

Course-related learning outcomes

Knowledge

Student should characterize the phases of existence of technical objects

Student should be able to define the basic terms of machine operation

Student should explain the basic terms of machine reliability

Student should distinguish types and groups of wear of machine parts

Student should characterize the features and functions of lubricants

Student should characterize the basic methods of diagnostic tests

Student should indicate basic activities in the field of machine repair and modernization technologies

Skills

Student is able to design the technological process of repair of a selected machine unit

Student is able to determine the dependence of wear on the time and operating conditions of a technical object

Student is able to distinguish between types of wear of machine parts

Social competences

Student is able to cooperate in a group

Student is aware of the role of proper operation of machines and devices in the modern economy and society

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Forming rating:

of lectures: not applicable

Summative assessment:

Examination on the basis of a written test consisting of four questions rated on a scale from 0 to 1. Included in the case of a minimum of 2,6 points.

Programme content

The genesis of the science of exploitation. Phases of the existence of a technical object. Subject of exploitation theory. Theoretical operating models formulated on the basis of praxeology and

cybernetics. The rules of equipment operation. Operational strategies. Use of machines. Friction. Wear of machines and technological devices. Lubrication. Basic concepts of reliability: reliability function, failure intensity, reliability models, structural reliability, reliability of technological devices. Machine diagnostics. Basic assumptions of diagnostics. Types of diagnostic tests. Examples of physical processes as sources of diagnostic signals. Practical vibroacoustic diagnostics of machines. Technological process of machine repairs. Disassembly of machines. Verification and regeneration of machine parts. Methods of regeneration of machine parts in repairs. Preparation of parts for assembly and assembly of machines. Methodology for the implementation of the technical service system. Contemporary methods of machine maintenance. Computer aided machine operation. Selected problems of exploitation of cutting tools, metal cutting machine tools, machine tools for plastic working.

Teaching methods

multimedia presentation with comment, illustrated with examples on the board and short films.

Bibliography

Basic

1. St. Legutko: „Eksploatacja maszyn”, Wyd. Politechniki Poznańskiej, Poznań 2007.

2. St. Legutko: „Podstawy eksploatacji maszyn i urządzeń”, Wydawnictwa Szkolne i Pedagogiczne, Warszawa 2010.

Additional

1. Praca zbiorowa: „Podstawy racjonalnej eksploatacji maszyn”, Wyd. Instytutu Technologii Eksploatacji, Radom, 1996.

2. Gwidon Stachowiak, Andrew W. Batchelor: Engineering Tribology, Elsevier Inc., 2005, ISBN-13: 978-0750678360.

3. Heinz P. Bloch, Fred K. Geitner: Machinery Failure Analysis and Troubleshooting, Gulf Professional Publishing, Houston Texas, 1999, ISBN-13: 978-0123860453.

4. Neville W. Sachs: Practical Plant Failure Analysis, Dekker Mechanical Engineering, CRC Press, 2006, ISBN-13: 978-0849333767.

5. Internet

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3
Classes requiring direct contact with the teacher	32	
Student's own work (literature studies, preparation for tests) [1]	43	

[1] delete or add other activities as appropriate