



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

part-time

Year/Semester

4/7

Profile of study

general academic

Course offered in

Polish

Requirements

elective

Number of hours

Lecture

12

Tutorials

Laboratory classes

8

Projects/seminars

Other (e.g. online)

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

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Wydział Inżynierii Mechanicznej

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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:

a) Laboratory classes: based on the current progress of the exercises

b) Lectures: not applicable



Summative assessment:

Lecture: 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.

Laboratory: Assessment based on oral and written answers concerning the content of each exercise which has been performed. Laboratory report from each laboratory exercises based on indications of the teacher. All exercises must be included in order to be credited laboratories (positive evaluation of the answers and reports).

Programme content

Lecture: 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.

Laboratory:

Teaching methods

1. Lecture: multimedia presentation with comment, illustrated with examples on the board and short films.
2. Laboratory exercises: a multimedia presentation illustrated with examples given on a blackboard and performing tasks given by the teacher - practical exercises.

Bibliography

Basic

1. St. Legutko: „Eksplatacja 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	60	2,0
Classes requiring direct contact with the teacher	22	
Student's own work (literature studies, preparation for tests) ¹	38	

¹ delete or add other activities as appropriate