SYLLABUS

Name: Maintenance and reliability of technical systems
Name in Polish: Eksploatacja i niezawodność systemów technicznych
Name in English: Maintenance and reliability of technical systems

Information on course:

Course offered by department:	Faculty of Organisation and Management
Course for department:	Silesian University of Technology
Study level and form:	Bechelor's degree, Full-time
Term:	winter semester 2026/2027
Coordinator of course edition:	Andrzej Wieczorek PhD

Default type of course examination report:

Language:
English

Course homepage:
https://platforma.polsl.pl/roz/

ECTS
3

Short description:
Subject assumptions: The aim of the subject is to apply knowledge and social knowledge regarding theoretical and practical aspects of the use and application of technical means

Description:
Forms of conducting classes:
-lecture: 30 hours
-laboratory: 30 hours
-project: 15 hours

Detailed program content:
lecture:
1. Introduction to maintenance and reliability of technical systems.
2. Events and processes of technical mean exploitation.
3. Technical condition. Diagnosing and monitoring of technical system.
4. Reliability of technical systems.
5. Shaping the reliability of technical systems.
6. Human reliability in human engineering systems.
7. Safety of technical system exploitation.
8. Maintenance management of technical systems
9. Computer support for reliability assessment of technical systems
10. Computer support in technical system exploitation.

laboratorium:
1. Introduction to CMMS class systems.
2. Modeling technical system structure in enterprise.
3. Modeling human resources for maintenance management of technical means.
4. Modeling resources in maintenance inventory.
5. Breakdown maintenance and corrective maintenance.
6. Preventive maintenance.
7. Maintenance coordination and realisation.
8. Post-construction inspection of maintenance and repairs
9. Data visualisation of CMMS class systems.

project:

1. Description of the selected technical system.
2. Reliability analysis of the selected system.
3. Effectiveness analysis of the selected system with the use of KPI,
4. Effectiveness analysis of the selected system with the use of OEE indicator.

Bibliography:

1. Levitt J.: The Handbook of Maintenance Management. Industrial Press Inc., New York 1997.
2. Macha E.: Reliability of machines, Oficyna Wydawnicza, Opole 2001.
3. Niebel B.: Niebel W.B.: Engineering Maintenance Management. Second edition. Marcel Dekker Inc., New York 1994.
4. Wieczorek A.: Assessment of usefulness of CMMS class system for Industry 4.0 enterprise. „Scientific Papers of Silesian University of Technology. “Organization and Management”, 2023.
5. Wieczorek A.: Metody gromadzenia i analiz danych przestrzennych we wspomaganiu eksploatowania środków technicznych przez osoby starsze – przegląd literatury i możliwości zastosowania, Systemy Wspomagania w Inżynierii Produkcji, 2023, vol. 12, nr 2, s. 89-98.

Learning outcomes:

Knowledge:
student knows and understands:
K1A_W3: basic exploitation processes and methods and tools supporting exploitation of technical mean and also methods of solving problems with their use.
K1A_W7: fundamental problems existing in maintenance management.

Skills:
student can:
K1A_U4: select methods and tools for solving maintenance problems,
K1A_U6: design new and monitor existing production and exploitation objects, processes and systems, using appropriate methods, techniques, tools and materials

Social competencies:
student is ready to:
K1A_K1: assess critically having knowledge and captured contents, acceptance of knowledge meaning in solving cognitive and practical problems and seeking expert opinion if you have difficulty solving problems on your own.

Assessment methods and assessment criteria:

Lecture:
Oral communication in the form of a lecture, supported by audiovisual means.
The basis for passing the lecture is a positive result of the test.

Lab:
Carrying out tasks using a CMMS system.
The basis for passing the laboratory will be completing the tasks and submitting the report.

Project:
Implementation of the project and preparation of documentation for the tasks performed. Discussion with students about the content included in the documentation.
The basis for passing projects is passing reports and demonstrating knowledge and understanding of the issues constituting their content.

The final grade is a weighted average of the grades obtained for the lecture, laboratory and project (0.4 x lecture + 0.3 x laboratory + 0.3 x project).

Practical placement: