UNIVERSITY OF WARMIA AND MAZURY IN OLSZTYN

Faculty of Technical Sciences

Course title: Technical diagnostics

ECTS credit allocation (and other scores): 3

Semester: spring

Level of study: ISCED-6 - first-cycle programmes (EQF-6)

Branch of science: Engineering and technology

Language: English

Number of hours per semester: 60

Course coordinator/ Department and e-mail: Przemysław Drożyner, Department of Vehicles and Machinery, przemyslaw.drozyner@uwm.edu.pl

Type of classes: classes and lectures

Substantive content

CLASSES: Introduction to laboratory safety and diagnostic equipment; identification of machine components and typical failure modes; measurement of vibration, temperature, noise and operating parameters; acquisition and basic processing of diagnostic signals; assessment of machine condition using selected diagnostic indicators; interpretation of measurements, fault identification and preparation of diagnostic reports.

LECTURES: Fundamentals, objectives and classification of technical diagnostics; reliability, wear and degradation of machinery; diagnostic symptoms, signals and measurement methods; vibration and acoustic diagnostics; thermal and other non-destructive diagnostic techniques; signal processing and condition indicators; fault detection and diagnosis; condition monitoring, maintenance planning and prediction of technical condition; introduction to data-driven and artificial-intelligence methods in machine diagnostics.

Learning purpose: To provide students with the theoretical foundations and practical skills required to assess the technical condition of machinery, interpret diagnostic measurements, identify faults and support maintenance decisions.

On completion of the study programme, the graduate will gain:

Knowledge: Knowledge of the principles of technical diagnostics, common degradation mechanisms, diagnostic signals and methods for assessing the condition of machines.

Skills: Ability to select basic diagnostic methods, perform and interpret measurements, identify symptoms of faults and prepare a technical condition assessment.

Social Competencies: Ability to work responsibly and safely in a team, communicate diagnostic findings and recognise the importance of reliable assessments for operational safety.

Basic literature: Cempel C., Natke H. G. (eds.), An Introduction to the Holistic Diagnostics of Technical Systems, 2005. Randall R. B., Vibration-based Condition Monitoring: Industrial, Aerospace and Automotive Applications, Wiley, 2011.

Supplementary literature: Jardine A. K. S., Lin D., Banjevic D., A review on machinery diagnostics and prognostics implementing condition-based maintenance, Mechanical Systems and Signal Processing, 20(7), 2006, 1483–1510. ISO 17359, Condition monitoring and diagnostics of machines — General guidelines.

The allocated number of ECTS points consists of:

Contact hours with an academic teacher: 60

Student's independent work: 15