

**AGH**AGH UNIVERSITY OF SCIENCE
AND TECHNOLOGY

Module name: Operation of mechatronic devices

Academic year: 2013/2014 Code: RMS-1-705-s ECTS credits: 2

Faculty of: Mechanical Engineering and Robotics

Field of study: Mechatronics with English as instruction language Specialty: —

Study level: First-cycle studies Form and type of study: Full-time studies

Lecture language: English Profile of education: Academic (A) Semester: 7

Course homepage: —

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Description of learning outcomes for module

MLO code	Student after module completion has the knowledge/ knows how to/is able to	Connections with FLO	Method of learning outcomes verification (form of completion)
Social competence			
M_K001	awareness of the responsibility for own work and readiness to comply with the rules of team work and accepting responsibility for tasks performed collectively	MS1A_K04	
Skills			
M_U001	English language skills sufficient to communicate and read data sheets, application notes, manuals of the components of mechatronic systems, IT tools and other similar documents	MS1A_U05	Presentation
Knowledge			
M_W001	basic knowledge of metrology, knowledge and understanding of the methods of measuring basic physical quantities, knowledge of computational methods and IT tools necessary to analyse experiment results	MS1A_W07	Activity during classes
M_W002	well-ordered knowledge of microprocessor systems, basics of IT science, programming methods and techniques	MS1A_W10	

M_W003	basic knowledge of actuators and sensors, including vision systems used in mechatronic systems and devices	MS1A_W06	Presentation
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FLO matrix in relation to forms of classes

MLO code	Student after module completion has the knowledge/ knows how to/is able to	Form of classes										
		Lectures	Auditorium classes	Laboratory classes	Project classes	Conversation seminar	Seminar classes	Practical classes	Others	Fieldwork classes	Workshops	E-learning
Social competence												
M_K001	awareness of the responsibility for own work and readiness to comply with the rules of team work and accepting responsibility for tasks performed collectively	-	-	-	-	-	+	-	-	-	-	-
Skills												
M_U001	English language skills sufficient to communicate and read data sheets, application notes, manuals of the components of mechatronic systems, IT tools and other similar documents	-	-	-	-	-	+	-	-	-	-	-
Knowledge												
M_W001	basic knowledge of metrology, knowledge and understanding of the methods of measuring basic physical quantities, knowledge of computational methods and IT tools necessary to analyse experiment results	+	-	-	-	-	-	-	-	-	-	-
M_W002	well-ordered knowledge of microprocessor systems, basics of IT science, programming methods and techniques	+	-	-	-	-	-	-	-	-	-	-
M_W003	basic knowledge of actuators and sensors, including vision systems used in mechatronic systems and devices	+	-	-	-	-	-	-	-	-	-	-

Module content

Lectures

Examples of vibrodiagnostics system

Power plant

Wind turbine

Printing machinery

Introduction

Operation and maintenance, monitoring and diagnostic technical state,, related disciplines

Economics of technical means of maintenance

Benefits of application of condition monitoring.

Maintenance strategies

reactive, preventive, predictive

Structures and elements of monitoring and diagnostic systems pt.2

sensors, data acquisition units, servers

Overview of diagnostic methods pt.1

General overview of popular condition monitoring methods and equipment.

Structures and elements of monitoring and diagnostic systems pt.1

Modules of distributed condition monitoring systems

Overview of diagnostic methods pt.2

Vibration-based condition monitoring

Seminar classes

Presentations on selected topics

Portable vibration analyzers available on the Polish market

Portable vibration analyzers: Emerson

Portable vibration analyzers: Comtest

Portable vibration analyzers: SKF

Portable vibration analyzers: Hansford

Portable vibration analyzers: Bently Nevada

Monitoring systems in aviation

Monitoring and diagnostics of electric drives (electrical values)

Overview of standards for vibration diagnostics of machines

Examples of maintenance strategies

Industrial measuring equipment

Comparison of selected companies on-line condition monitoring systems

Proposed system for continuous monitoring of vibration in accordance with VDI

Acoustic emission in technical diagnostics

Oil analysis

Condition Monitoring Systems

Economic aspects of condition monitoring

Envelope analysis

High speed cameras in the diagnosis

Practical implementation of the ATEX Directive for monitoring machines operating in hazardous environment

The role of order analysis

SCADA Systems

Vibration monitoring system for a simple fan with AC motor and gearbox

Thermovision

Watchdog – functionality and implementation

Project classes

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Method of calculating the final grade

Final grade will result from oral presentation.

Prerequisites and additional requirements

None

Recommended literature and teaching resources

T. Barszcz, Systemy monitorowania i diagnostyki maszyn, Wyd. ITE, Radom 2006.

Cempel Cz., Diagnostyka wibroakustyczna maszyn, PWN, Warszawa 1989.

Eisenmann R. C., Machinery Malfunction Diagnosis and Correction. Hewlett Packard Professional Books, 1997.

Bently D.E., Fundamentals of rotating machinery diagnostics. BPBP, 2006.

Scientific publications of module course instructors related to the topic of the module

Additional scientific publications not specified

Additional information

None

Student workload (ECTS credits balance)

Student activity form	Student workload
Preparation for classes	10 h
Participation in seminar classes	15 h
Participation in lectures	30 h
Summary student workload	55 h
Module ECTS credits	2 ECTS