

**AGH**AGH UNIVERSITY OF SCIENCE
AND TECHNOLOGY

Module name: Mechatronic design

Academic year: 2013/2014 Code: RMS-1-601-s ECTS credits: 4

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: 6

Course homepage: —

Responsible teacher: dr inż. Mańka Michał (mmanka@agh.edu.pl)

Academic teachers: dr inż. Karpiel Grzegorz (gkarpiel@agh.edu.pl)
dr inż. Mańka Michał (mmanka@agh.edu.pl)

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	Ability to correctly set priorities in meeting objectives	MS1A_K05	Participation in a discussion, Execution of a project
Skills			
M_U001	Ability to acquire information from literature, databases and other sources, integrate, select and interpret the information, draw conclusions, formulate	MS1A_U01	Execution of a project
M_U002	Ability to work individually or in team, to estimate the time needed to complete an assigned task and meet the deadlines	MS1A_U02	Execution of a project
M_U003	Ability to develop documentation related to the completion of an engineering task and prepare text discussing the results of the task	MS1A_U03	Examination, Project, Report
M_U004	Ability to prepare and give a brief presentation of the results of the engineering task completed	MS1A_U04	Examination, Presentation
M_U005	Ability to perform critical analysis of the performance and assess the existing technical solutions in mechatronic devices and system	MS1A_U11	Examination, Project

M_U006	Ability to design simple mechatronic devices or systems for given application, taking into consideration the required operating and economic criteria, using proper methods, techniques and tools	MS1A_U12	Project
M_U007	Ability to use data sheets and application notes to select appropriate components of the mechatronic device	MS1A_U13	Execution of a project
M_U008	Ability to evaluate the usefulness of routine methods and tools for solving given engineering task, select and apply proper methods and tools	MS1A_U20	Examination, Execution of a project
Knowledge			
M_W001	Knowledge and understanding of the methodology of designing mechatronic devices and methods and techniques used for the design; knowledge of computer tools for the design and simulation of mechatronic devices	MS1A_W12	Activity during classes, Execution of a project
M_W002	Knowledge of the current state and recent development trends of mechatronics	MS1A_W13	Activity during classes, Examination, Execution of a project
M_W003	Elementary knowledge of basic health and safety rules in the industries of mechatronics	MS1A_W15	Activity during classes, Project

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	Ability to correctly set priorities in meeting objectives	+	-	-	-	-	-	-	-	-	-	-
Skills												
M_U001	Ability to acquire information from literature, databases and other sources, integrate, select and interpret the information, draw conclusions, formulate	-	-	-	+	-	-	-	-	-	-	-
M_U002	Ability to work individually or in team, to estimate the time needed to complete an assigned task and meet the deadlines	-	-	-	+	-	-	-	-	-	-	-

M_U003	Ability to develop documentation related to the completion of an engineering task and prepare text discussing the results of the task	-	-	-	+	-	-	-	-	-	-	-
M_U004	Ability to prepare and give a brief presentation of the results of the engineering task completed	+	-	-	-	-	-	-	-	-	-	-
M_U005	Ability to perform critical analysis of the performance and assess the existing technical solutions in mechatronic devices and system	-	-	-	+	-	-	-	-	-	-	-
M_U006	Ability to design simple mechatronic devices or systems for given application, taking into consideration the required operating and economic criteria, using proper methods, techniques and tools	-	-	-	+	-	-	-	-	-	-	-
M_U007	Ability to use data sheets and application notes to select appropriate components of the mechatronic device	-	-	-	+	-	-	-	-	-	-	-
M_U008	Ability to evaluate the usefulness of routine methods and tools for solving given engineering task, select and apply proper methods and tools	-	-	-	+	-	-	-	-	-	-	-
Knowledge												
M_W001	Knowledge and understanding of the methodology of designing mechatronic devices and methods and techniques used for the design; knowledge of computer tools for the design and simulation of mechatronic devices	+	-	-	-	-	-	-	-	-	-	-
M_W002	Knowledge of the current state and recent development trends of mechatronics	+	-	-	-	-	-	-	-	-	-	-
M_W003	Elementary knowledge of basic health and safety rules in the industries of mechatronics	+	-	-	-	-	-	-	-	-	-	-

Module content

Lectures

Selection of mechatronic tools required to complete complex projects

Tools for the mechanical design

Tools for designing of the electronic components.

Informatic tools

Selected CAD/CAE tools for virtual prototyping

Project classes

Project of the assembly line

Students' task is to design an assembly line of the selected item. The project consists of: selection of manipulators or robots, selection of the required sensors and security systems, design of the mechanical structure of the assembly line and technical documentation.

Method of calculating the final grade

Weighted average of the project (70%) and exam (30%).

Prerequisites and additional requirements

Knowledge of CAD/CAE tools.

Recommended literature and teaching resources

Literature:

1. Janocha H. [red.]: Actuators: Basics and Applications, Springer, Berlin, 2004
2. Frank, R.: Understanding Smart Sensors. Artech House, Norwood, 2000
3. Weinheim: Sensors: a Comprehensive Survey. New York, 1989
4. Beeby S., Ensell G., Kraft M., White N.: MEMS Mechanical Sensors. Artech House, Norwood, 2004
5. Lisowski W. [red.]: Introduction to robotics, Wydawnictwa AGH, Kraków, 2004
6. Smith R.J., Dorf R.C.: Circuits, devices and systems: a first course in electrical engineering, Wiley, Nowy Jork, 1992

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
Participation in lectures	15 h
Completion of a project	45 h
Contact hours	15 h
Preparation of a report, presentation, written work, etc.	40 h
Examination or Final test	1 h
Summary student workload	116 h
Module ECTS credits	4 ECTS