

Actuators - course description

| General information | |
|---------------------|--|
| Course name | Actuators |
| Course ID | 06.0-WE-AutP-Ac-Er |
| Faculty | Faculty of Computer Science, Electrical Engineering and Automatics |
| Field of study | Automatic Control and Robotics |
| Education profile | academic |
| Level of studies | Erasmus programme |
| Beginning semester | winter term 2017/2018 |

| Course information | |
|---------------------|--|
| Semester | 5 |
| ECTS credits to win | 3 |
| Course type | obligatory |
| Teaching language | english |
| Author of syllabus | <ul style="list-style-type: none">prof. dr hab. inż. Igor Korotyeyev |

| Classes forms | | | | | |
|----------------|--------------------------------|----------------------------|--------------------------------|----------------------------|--------------------|
| The class form | Hours per semester (full-time) | Hours per week (full-time) | Hours per semester (part-time) | Hours per week (part-time) | Form of assignment |
| Lecture | 30 | 2 | - | - | Exam |
| Laboratory | 30 | 2 | - | - | Credit with grade |

Aim of the course

Lecture: to obtain a credit a student has to get positive grades in all written tests carried out at least once a semester.

Laboratory: to obtain a credit a student has to get positive grades for all the tasks designed in the subject syllabus.

Prerequisites

Mathematical analysis, Physics for engineers, Fundamentals of electrical engineering, Fundamentals of electronics, Fundamentals of power electronics, Automatic control technique

Scope

General characteristics. Functions of actuators in automatic systems. Classification of actuators according to input/output signals and energy media used in acutators.

Electric actuators. Drive systems in automatics. Drive systems fed-by power electronic converters. Acutators in electrothermy. Actuators in control systems of environmental conditions. Examples of applied solutions.

Pneumatic and hydraulic actuators. Control of pneumatic and hydraulic energy flux. Basic elements of pneumatic and hydraulic devices. Examples of applied solutions.

Robot drives. Pneumatic drives. Electrohydraulic drives. Electric drives. Mechanical gears. Rotating gears. Rotation translation gears. Speed reduction gears. Examples of applied solutions.

Gripping devices of robots and their applications. Tasks for gripping devices. Classification and characteristics of gripping devices. Selection of a gripping device type for a given manipulation object class. Construction of mechanical grabs, drive systems of grabs, drive transmission arrangements, performing systems of grabs.

Control systems. General characteristics and examples of control system solutions for electric, pneumatic and hydraulic actuators.

Problems and development trends. Safety issues concerning the use and influence of actuators on the environment. New development trends.

Teaching methods

Lecture: conventional lecture

Laboratory: laboratory exercises, group work

Learning outcomes and methods of theirs verification

| Outcome description | Outcome symbols | Methods of verification | The class form |
|--|-----------------|---|--|
| He knows the safety rules associated with the use of automation executive devices and is aware of their impact on the environment | | <ul style="list-style-type: none">a quizan ongoing monitoring during classes | <ul style="list-style-type: none">Laboratory |
| Is able to classify the executive elements of automation. Knows the functions of actuators in automation systems. Has basic knowledge of pneumatic, hydraulic and electromechanical actuators for automation systems | | <ul style="list-style-type: none">an exam - oral, descriptive, test and other | <ul style="list-style-type: none">Lecture |

Assignment conditions

Lecture – the passing condition is to obtain a positive mark from the final test.

Laboratory – the passing condition is to obtain positive marks from all laboratory exercises to be planned during the semester.

Calculation of the final grade: lecture 60% + laboratory 40%

Recommended reading

Further reading

Notes

Modified by dr hab. inż. Wojciech Paszke, prof. UZ (last modification: 01-05-2020 17:29)

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