

DESCRIPTION OF THE COURSE

- Course code: ARR2103
- Course title: METHODS AND ALGORITHMS OF DIGITAL CONTROL
- Language of the lecturer: Polish

<i>Course form</i>	<i>Lecture</i>	<i>Classes</i>	<i>Laboratory</i>	<i>Project</i>	<i>Seminar</i>
<i>Number of hours/week*</i>	2		1		
<i>Number of hours/semester*</i>	30		15		
<i>Form of the course completion</i>	exam		pass		
<i>ECTS credits</i>	3		2		
<i>Total Student's Workload</i>	90		60		

- Level of the course (basic/advanced):: Basic
- Prerequisites:
Completed courses: Fundamentals of Control Engineering 1, 2
- Name, first name and degree of the lecturer/supervisor:
Mirosław Łukowicz, Ph. D.
- Names, first names and degrees of the team's members:
Waldemar Rebizant, Ph. D., D. Sc.
Marek Michalik, Ph. D.
- Year: 3 Semester: 5
- Type of the course (obligatory/optional): obligatory
- Aims of the course (effects of the course):
Learning of fundamental topics related to digital control algorithms design for different types of digital controllers.
- Form of the teaching (traditional/e-learning): traditional
- Course description:
Structure of digital control systems, A/C and D/C conversion, conditioning and digital filtering of input signals. Direct Digital Control: PID digital regulators, robust digital regulators, fuzzy control, state variable feedback compensation, control digital with state observers.
- Lecture:

<i>Particular lectures contents</i>	<i>Number of hours</i>
1. Structures of digital control systems, regular and non-regular plants, plant decomposition.	2
2. Input and output signal conditioning, analogue filtration. A/D and D/A conversion	2
3. Digital filtration of input signals.	2
4. Discrete representation of the continuous systems-methods, examples.	2
5. Direct digital control	2
6. PID digital regulators – algorithms-examples.	2
7. PID regulator setting	2
8. Robust digital regulator design – basic methods.	2
9. Examples of robust regulators design.	2

10. . <i>Digital state variable feedback control, examples</i>	4
11. . <i>Design of the digital state variable controllers, examples.</i>	2
12. <i>Control with digital state observers.</i>	2
13. <i>Fuzzy logic controllers</i>	2
14. <i>Identification of signal parameters using state observer</i>	2

- Classes – the contents:

- Seminars – the contents:

- Laboratory – the contents:

Analog and digital filtration of control system input signals- design of NOI and SOI filters, design of digital PID controllers and robust digital controllers, design of state variable feedback controllers (computer simulation), design of digital state observers, controllers using a state observer, signal identification by use of digital state observers.

- Project – the contents:

- Basic literature:

[1] Kaczorek T., Teoria sterowania i systemów, WNT, Warszawa 1993.

[2] Niederliński A., Systemy cyfrowe automatyki przemysłowej, PWN, Warszawa 1977.

[3] Aufi R.: Digital Control Systems. Prentice Hall. 2004.

- Literatura uzupełniająca:

[1] Kuo B.J.: Digital Control Systems. Hold. Reinhard and Winston Inc. 1981

[2] Terano T., Asai K., Sugeno M., Applied Fuzzy Systems. AP Professional, 1994

Conditions of the course acceptance/creditation:

* - depending on a system of studies