DESCRIPTION OF THE COURSE

- Course code: ELR2113
- Course title: DIGITAL CONTROL SYSTEMS
- Language of the lecturer: English

Course form	***Lecture***	***Classes***	***Laboratory***	***Project***	***Seminar***
*Number of hours/week**	*1*		*1*		
*Number of hours/semester**	*15*		*15*		
Form of the course completion	*pass*		*pass*		
ECTS credits	*1*		*1*		
Total Student's Workload	*45*		*45*		

- 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:
  Marek Michalik, Ph. D.
- Names, first names and degrees of the team's members:
  Waldemar Rebizant, Ph. D., D. Sc.
  Mirosław Łukowicz, Ph. D.
- Year: 2 Semester: 3
- Type of the course (obligatory/optional): optional
- 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, digital control with state observers.
- Lecture:

Particular lectures contents	*Number of hours*
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. Discrete representation of the continuous systems-methods, examples.	*2*
4. PID digital regulators – algorithms-examples.	*2*
5. Robust digital regulator design – basic methods.	*2*
6. . Digital state variable feedback control, examples	*2*
7. . Design of the digital state variable controllers, examples.	*2*
8. Control with digital state observers.	*1*

- 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.
- Project – the contents:
- Basic literature:

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

[2] Santina M.S., Stubberud A.R., Hostetter G.H.: Digital Contriol Systems. Oxford University Press.1994

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

[4] Isermann R.: Digital Control Systems. Springer-Verlag. 1997

- Aditional literature

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

[2] Kaczorek T.: Linear Control Systems. J.Wiley, N.Y., vol.1, 1992, vol.2. 1993

Conditions of the course acceptance/credition:

* - depending on a system of studies