STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Methods of digital control**		Code **1010324391010326008**
Field of study **Electrical Engineering**	Profile of study (general academic, practical) **(brak)**	Year /Semester **5 / 9**
Elective path/specialty **Microprocessor's Control Systems in**	Subject offered in: **Polish**	Course (compulsory, elective) **obligatory**

Cycle of study: **First-cycle studies**	Form of study (full-time, part-time) **part-time**

No. of hours				No. of credits **3**
Lecture: **9** Classes: **-** Laboratory: **9**	Project/seminars: **9**			

Status of the course in the study program (Basic, major, other) **(brak)**	(university-wide, from another field) **(brak)**

Education areas and fields of science and art **technical sciences** **Technical sciences**	ECTS distribution (number and %**)** **3 100%** **3 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	It has basic knowledge from the range of the automated technology.
2	**Skills**	It knows to use basic knowledge from the range of the automated technology.
3	**Social competencies**	It can think and work enterprisingly in the area of the designing of industrial automated technology

Assumptions and objectives of the course:

Master of tools of analysis and synthesis digital control systems.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. to descripction principle of action and apply tools of analyses and synthesis of digital control systems on basic level - [K_W04+ K_W22+++]

Skills:

1. to apply the knowledge of within the range digital control systems for determined uses - [K_U03 ++ K_U17 ++]

Social competencies:

1. it can think and work enterprisingly in the area of the designing of the industrial automated technology and digital control systems - [K_K02 ++]

Assessment methods of study outcomes

Lecture

? the credit of the lecture preceded with the credit of occupations laboratory exercises and project,

Designing work and laboratory exercises:

? the test and awarding the knowledge of need-to-know to realization of placed problems

in the given area of tasks,

? verification skills on every exercises

? evaluation of the knowledge and skills related to the realization of laboratory exercise, the evaluation of the report from done exercises.

Obtaining additional points for activity during exercises, in particular way for:

? proposing to discuss additional aspects of the subject

? effective use of knowledge obtained during solving of given problem;

? comments related to improve teaching material,

? aesthetics of solved problems and reports ? within homework.

Course description

Characterization of the digital control. Classical linear models (SISO, MIMO). Methods of the digitalisation of integral-differential equations. The selection of the sampling interval. Linear regulators ? digital implementation of continuous regulators. Methods of designings of algorithms ? selection of parameters of digital regulators. Nonlinear regulators. Realization of digital control in distributed systems. Compensation of delays in distributed control systems.

Basic bibliography:

1. Bubnicki Z.: Teoria i algorytmy sterowania. PWN, Warszawa 2001

2. Grega W.: Sterowanie cyfrowe w czasie rzeczywistym, AGH, 1999

3. Kaczorek T.: Teoria sterowania i systemów. PWN, Warszawa 1999

4. Vaccaro R.J.: Digital Control. A State Space Approach. McGraw-Hill, New York 1995

Additional bibliography:

1. Franklin G.,Powell D.,Workman M.: Digital Control of Dynamic Systems. Adison-Wesley,

2. Niederliński A.: Systemy komputerowe automatyki przemysłowej, WNT, Warszawa 1985

Result of average student's workload

Activity	Time (working hours)
1. participation in the lectures	9
2. participation in the laboratory exercises	9
3. participation in consultations on the lecture	5
4. participation in consultations on the laboratory exercises	10
5. preparation for the laboratory exercises	10
6. preparation for the exam	10
7. preparation for the laboratory exercises pass	10
8. participation in the exam	5

Student's workload

Source of workload	hours	ECTS
Total workload	78	3
Contact hours	38	1
Practical activities	9	2