Title **Control Engineering and Robotics (Automatyka i robotyka)**	Code **1010401241010330698**
Field **Fizyka Techniczna**	Year / Semester **2 / 4**
Specialty **-**	Course **core**
Hours Lectures: **2** Classes: **-** Laboratory: **1** Projects / seminars: **-**	Number of credits **3**
	Language **polish**

Lecturer:

dr inż. Jarosław Warczyński
Instytut Automatyki i Inżynierii Informatycznej
Poznań, ul. Piotrowo 3A,
pl. M. Skłodowskiej-Curie 2
Tel.: 61 6652365; 61 6652624
jaroslaw.warczynski@put.poznan.pl

Faculty:

Faculty of Technical Physics
ul. Nieszawska 13A
60-965 Poznań
tel. (061) 665-3160, fax. (061) 665-3201
e-mail: office_dtpf@put.poznan.pl

Status of the course in the study program:

Core course of the study for Technical Physics, Faculty of Technical Physics.

Assumptions and objectives of the course:

Presenting of the principles of the automatic control systems, especially feedback systems. Inspiration to the analyse such systems for research devices, technological plants and robots control.

Contents of the course (course description):

Automation as cotrol practice and theory. Concept and importance of the feedback control. Automatic control system and its components. Methods of the mathematical description of the components and systems. Linear and nonlinear, continuous and discrete, analog and digital systems. Transfer function and spectral transfer function. Static and dynamic characteristics of the processes. Electro mechanical analogies. Regulators and programable controllers. PID controllers and its tuning. Servomechanisms. System stability problem. Stability precondition and criteria, presentation using phase plane method. Robot as an automatic control system. Mechanical and electronical systems of robots. Various kinematic diagrams and configurations of robots. Robots programming. Sensor systems of robots. Robotised manufacturing stands. Mobile robots. Non industrial applications of robots.

Introductory courses and the required pre-knowledge:

Mathematics (mathematical analysis, differential equations, spectral analysis)
Electrotechnics and electronics, (electrical circuits, electromagnetism, semiconductors, integrated circuits)
Mechanics (Kinematics, dynamic equations)

Courses form and teaching methods:

Multimedia aided lecturers (computer symulations, animations of devices, producer presentations). Discussions on the theoretical and practical control problems.
As labor exercises ? operating with the physical models of the technological plants, controlled by PLC industrial controllers. Programming of the robotised manufacturing stand.

Form and terms of complete the course - requirements and assessment methods:

Assessment of the student activity during lecturers and labors. Analysis of the students reports from doned exercises. Final written exam and oral make-up.

Basic Bibliography:

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Additional Bibliography:

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