

Precision drives and industrial robots - course description

General information	
Course name	Precision drives and industrial robots
Course ID	11.9-WE-AutP-PDIR-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	6
ECTS credits to win	3
Course type	optional
Teaching language	english
Author of syllabus	

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	15	1	-	-	Credit with grade
Laboratory	30	2	-	-	Credit with grade

Aim of the course

- formation of basic skills in the selection of open and closed systems for speed, torque and position control,
- to familiarize students with the servo motors used in robots and robotic systems.

Prerequisites

Engineering physics, Electrical engineering principles, Electronics principles, Control engineering, Control of electrical drives

Scope

Servomotors used in robots and robot systems. DC motors (conventional and disc), synchronous motors permanent magnet and reluctance, step motors and asynchronous.

Power electronic converter servo drives.

Control methods of electric drives. Scalar control. Field oriented control. Direct torque control. Sensorless control.

Open and closed loop control of speed, torque and position. Realization of four-quadrant direct and alternating current drives. Follow-up and position servo drives, precise drives.

Robot drives. Sensor systems of robots.

Teaching methods

Lecture, laboratory exercises.

Learning outcomes and methods of theirs verification

Outcome description	Outcome symbols	Methods of verification	The class form
No outcomes found			

Assignment conditions

Recommended reading

1. Kaźmierkowski M. P., Tunia H.: Automatic Control of Converter-Fed Drives, Warsaw - Amsterdam - New York - Tokyo: PWN-ELSEVIER SCIENCE PUBLISHERS, 1994.
2. Kaźmierkowski M. P., Blaabjerg F., Krishnan R.: Control in Power Electronics, Selected Problems, Elsevier 2002.
3. Boldea I., Nasar S.A, Electric Drives, CRC Press, 1999.
4. Kaźmierkowski M. P. and Orłowska-Kowalska T.: Neural Network estimation and neuro-fuzzy control in converter-fed induction motor drives, Chapter in Soft Computing in Industrial Electronics, Springer-Verlag, Heidelberg, 2002.
5. Leonhard W.: Control of Electrical Drives, Springer, Berlin, New York, 2001.
6. Miller T.J.E.: Brushless Permanent-Magnet and Reluctance Motor Drives, Oxford University Press, Oxford, England, 1989.
7. Ryoji O.: Intelligent sensor technology, John Willey & Sons, 1992.
8. Samson C., Le Borgne M., Espinau B.: Robot control. Oxford University Press, 1991.
9. Canudas C., Siciliano B., Bastin G.: Theory of robot control. Springer Verlag, 1996.

Further reading

Notes

Modified by prof. dr hab. inż. Robert Smoleński (last modification: 01-05-2017 18:38)

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