

<b>Course title: Adaptive control systems</b>				
<b>Course code</b>	<b>Course status</b>	<b>Semester</b>	<b>Number of ECTS credits</b>	<b>Lecture hours</b>
PA4203	Mandatory	II	5	3L+1E

**Study program:**

Master studies, ELECTRICAL ENGINEERING, study program: Power systems and Control, department: Automatics (studies last for 10 semesters, 300 ECTS credits).

Postgraduate studies, ELECTRICAL ENGINEERING, study program: Power systems and Control, department: Automatics (studies last for 8 semesters, 240 ECTS credits)

**Prerequisites:** No prerequisites required.

**Course aims:**

Students will be introduced with adaptive and robust control, as well as with methods of synthesis and algorithms of control of these systems. Active work in MATLAB will be required for all students.

**Teacher(s) first and last names:**

PhD Božo Krstajić –professor, MSc Aleksandar Vučić, assistant

**Studying method:**

Lectures, exercises, laboratory exercises with computer, individual work and practical assignments, consultations.

**Course synopsis:**

Preliminary week	Preparation and semester enrolment.
I week	Introduction of adaptive control. Definition and classification of adaptive systems
II week	Motivation for use of adaptive systems. Justification of adaptation in system.
III week	System parameter identification. Methods of identification. Persistent excitation.
IV week	System identification in open and closed loop. Identifikacija
V week	System analysis: stability, convergence and optimality.
VI week	I colloquium
VII week	<b>Free week</b>
VIII week	Laws of adaptation. (MIT rule, method of Ljapunov).
IX week	Adaptive system with referent model (MRAS)
X week	Self tuning adaptive control.
XI week	Self tuning regulators.
XII week	Methods of synthesis.
XIII week	Synthesis of regulator.
XIV week	II colloquium
XV week	Self tuning PID regulator
XVI week	<i>Final exam</i>
Final week	Administrative procedures.
XVIII-XXI week	Additional lessons, correction of the final exam and administrative procedures.

**STUDENT WORKLOAD**

<u>per week</u>	<u>per semester</u>
<p><b>Working hours:</b> 5 credits x 40/30 = 6 hours and 40 minutes.</p> <p><b>Working hours structure:</b></p> <ul style="list-style-type: none"> <li>3 hours for teaching</li> <li>1 hour for exercises</li> <li>2 hours and 40 minutes for individual work, including consultations.</li> </ul>	<p><b>Teaching and the final exam:</b> (6hours and 40 minutes) x 16 = 106 hours and 40 minutes.</p> <p><b>Necessary preparation</b> (before semester): 2 x (6hours and 40 minutes) = 13hours and 20 minutes.</p> <p><b>Total work hours for the course:</b> 150hours</p> <p><b>Additional hours</b> for preparing correction of the final exam, including the exam taking: up to 30hours.</p> <p><b>Work hours structure:</b></p> <p>106hours and 40 minutes (lectures) + 13hours and 20 minutes (preparation) + 30hours (additional work)</p>

Lessons attendance is mandatory for students, as well as doing homework, test, laboratory exercises and colloquiums.

**Literature:** Lj.Draganović, Adaptivni sistemi upravljanja, Svjetlost, Sarajevo,1982.

**The forms of knowledge testing and grading:**

- Tests, homework and laboratory exercises carry 10 points.
- Two colloquiums carry 2x20 points,
- Final exam: 50 points.

Student gets the passing grade by collecting 50 points at least.

**Special remarks for the course :**

Lectures will be performed for group of 40 students, but laboratory exercises will be performed for group of 20 students.

**Teacher(s) who provided the information: PhD Božo Krstajić**