

		Course title: <i>Mechatronics</i>		
Course code	Course status	Semester	Number of ECTS credits	Lecture hours
<i>PA4204</i>	<i>Optional</i>	<i>II</i>	<i>5</i>	<i>3P+1V+0L</i>

Study program:

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

Prerequisites: No prerequisites required

Course aims:

Students will be introduced with the most important components and project types of modern electromechanical systems, including mechanic integration, electro techniques and informatics for the purpose of the best solutions.

Teacher(s) first and last names:

PhD Vladan Vujičić – professor

Studying method:

Lectures, exercises, individual work and practical assignments, consultations.

Course synopsis:

Preliminary week	Preparation and semester enrolment.
I week	Introduction. Mechatronics system description.
II week	Project principles in mechatronics and parts of mechatronics system.
III week	Mathematical models and dynamic features of electromechanical system. Electromechanical analogy.
IV week	Basic components of control system: sensors (linear, rotational, accelerometers).
V week	Sensors and measurements (measurement of force, moment, power, flow, temperature and distance.
VI week	<i>I colloquium</i>
VII week	Free week
VIII week	Actuators (electro mechanic, hydraulic, pneumatic actuators.).
IX week	Electric motors (step, brushless, switching reluctant motor...)
X week	Control, regulation and analysis of electromechanical systems.
XI week	Examples of systems with and without feed back.
XII week	Stability, speed of response, sensibility of mechatronics system
XIII week	<i>II colloquium</i>
XIV week	Microcontroller based system of control DSP, FPGA, PLC.
XV week	Examples: Control of brushless DC motor and control of reluctant motor
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>Working hours: 5 credits x 40/30 = 6 hours and 40 minutes.</p> <p>Working hours structure: 3 hours for teaching 1 hour for exercises 2 hours and 40 minutes for individual work, including consultations.</p>	<p>Teaching and the final exam: (6hours and 40 minutes) x 16 = 106 hours and 40 minutes.</p> <p>Necessary preparation (before semester): 2 x (6hours and 40 minutes) = 13hours and 20 minutes.</p> <p>Total work hours for the course: 150hours</p> <p>Additional hours for preparing correction of the final exam, including the exam taking: up to 30hours.</p> <p>Work hours structure: 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 and colloquiums.

Literature:

Robert H. Bishop: The Mechatronics Handbook, CRC Press, 2002.

Sergey E. Lyshevski: Electromechanical Systems, Electric Machines, and Applied Mechatronics, CRC Press, 2000.

The forms of knowledge testing and grading:

- Test 5x2 points (total 10 points).
- Two colloquiums carry 2x20 points,
- Final exam: 50 points.

Student gets the passing grade by collecting **51** points at least.

Special remarks for the course:

Teacher(s) who provided the information: PhD Vladan Vujičić

Note: -