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| **Study program : Integrated academic studies** - Master teacher of technology and informatics | | | | | | | | | |
| **Course title:** Automatic control systems | | | | | | | | | |
| **Lecturer**: Vlastimir D. Nikolić | | | | | | | | | |
| **Type of course:** obligatory | | | | | | | | | |
| **Number of ESPB**: 6 | | | | | | | | | |
| **Requirements**: | | | | | | | | | |
| **Purpose of course:**  Introduce students to different techniques of the analysis and designing of contemporary continuous and digital control systems for various classes of technical objects. | | | | | | | | | |
| **Results of course :**  The contents of this course enable students to become familiar with models of the control objects as well as basic of the analysis and designing of control of the classes of the technical objects as well as practical insight into the basic control equipment. | | | | | | | | | |
| **Course content:**  *Lecturing:*   * Introductory content- development, significance, classification and application of automatic control systems. Methods for representation of control systems. * Modeling and simulation of various classes of the basic mechanical objects. Modeling of the mechanical objects and processes. * Representation of the continuous systems by transfer functions and the state space models. * The analysis of the continuous control systems. The frequency and time domain analysis of systems. The response and accuracy of the systems in steady state. * Stability of continuous control systems. * Designing of control systems. Classical methods of automatic control systems and state space model designing. * Digital control systems, structure and components. * Elements of discrete signal theory. The process of sampling and reconstruction of signals. Transformational methods in analysis of the discrete systems. * Discrete transfer function. Conception of the state space in modeling of the discrete automatic control systems. Stability of the discrete automatic control systems. * Application of computer techniques in control of mechanical systems. Control computer systems for working in real time. Applications of computers and microcontrollers. * Applications of the programmable logic controllers (PLC). * The use of computers for complex automation of mechanical systems. Supervisory control and data acquisition systems (SCADA).   *Practical Teaching:*   * Computational (auditory) exercises. The exercises with use of computers-work with program package for simulation and designing of automatic control systems. * Laboratory work- working with PLC. | | | | | | | | | |
| **Literature:**  **Basic**   1. Nikolić V., Ćojbašić Ž., Pajović D., Automatsko upravljanje - analiza sistema, Mašinski fakultet,Univerzitet u Nišu, 1996. 2. Stojić M.R.,Kontinulani sistemi automatskog upravljanja, Naučna knjiga ,Beograd 1998. 3. Stojić M., Digitalni sistemi upravljanja , Naučna knjiga ,Beograd 1989. 4. Nikolić V., Ćojbašić Ž., Simonović M., Zbirka rešenih zadataka iz upravljanja sistemima, Mašinski fakultet u Nišu, 2007.   **Additional literature**   1. Ogata K., **Modern Control Engineering**, third edition, Prentice-Hall Inc., 1997. 2. Dorf R.C.,Modern Control Engineering, third edition, Prentice-Hall Inc.1997. | | | | | | | | | |
| **The number of lectures** | | | | | | | | |
| Lectures:3 | Exercises: 2 | | The other ways of teaching: | | Study research work: | | Other classes: | |
| **Teaching methods**  Lectures, exercises, laboratory work, homework, colloquiums | | | | | | | | |
| **Assessment Methods and Criteria (max score 100)** | | | | | | | | |
| Pre exam Duties | | points | | **final exam** | | points | |
| Activity During Lectures | | 10 | | Written examination | | 25 | |
| Practical Teaching | | 10 | | Oral Examination | | 25 | |
| Colloquiums | | 30 | | **..........** | |  | |