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|  **UNIVERSITY OF NIŠ** |
| **Course Unit Descriptor** | **Faculty**  | Faculty of Electronic Engineering |
| **GENERAL INFORMATION** |
| Study program  | Control Systems |
| Study Module (if applicable) | Automatic Control |
| Course title | Predictive Control |
| Level of study | ☐ Bachelor ⊠ Master’s ☐ Doctoral |
| Type of course | ☐ Obligatory ⊠ Elective |
| Semester  | ⊠ Autumn ☐ Spring |
| Year of study  | First |
| Number of ECTS allocated | 4 |
| Name of lecturer/lecturers | Antić s. Dragan, Mitić B. Darko |
| Teaching mode |  ⊠ Lectures ⊠ Group tutorials ☐ Individual tutorials ☐Laboratory work ☐ Project work ☐ Seminar ☐Distance learning ☐ Blended learning ☐ Other |
| **PURPOSE AND OVERVIEW (max. 5 sentences)** |
| The aim of the course is to provide fundamental knowledge of theory and design of model predictive control (MPC) and regulator design. |
| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** |
| Introduction to model predictive control (MPC). Models and modeling. Linear dynamic models. Input-output models. Discrete models. Constraints. Linear quadratic regulator. Optimizing multistage function. Dynamic programming. Controllability. State estimation. Linear systems and normal distribution. Discrete-time MPC. State-space models with embedded integrator. Predictive control within one optimization window. Receding control control. Predictive control of MIMO systems. State estimation predictive control. Discrete-time MPC with constraints. Discrete-time MPC Using Laguerre Functions (DMPC). Continuous-time MPC. Model structures for CMPC design. MPC using finite prediction horizon. Optimal control strategy. Continuous-time MPC with constraints. Formulating of constraints. Numerical solutions for the constrained control problem. Real-time implementation of continuous-time MPC. MPC systems in state space formulation. |
| **LANGUAGE OF INSTRUCTION** |
| ⊠Serbian (complete course) ☐ English (complete course) ☐ Other \_\_\_\_\_\_\_\_\_\_\_\_\_ (complete course)☐Serbian with English mentoring ☐Serbian with other mentoring \_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **ASSESSMENT METHODS AND CRITERIA** |
| **Pre exam duties** | **Points** | **Final exam** | **points** |
| **Activity during lectures** | **10** | **Written examination** | **20** |
| **Practical teaching** | **0** | **Oral examination** | **10** |
| **Exercises** | **10** | **Project** | **10** |
| **Teaching colloquia** | **40** | **OVERALL SUM** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |