|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **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** | | | | | | |