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|  **UNIVERSITY OF NIŠ** |
| **Course Unit Descriptor** | **Faculty**  | Pedagogical Faculty in Vranje |
| **GENERAL INFORMATION** |
| Study program  | Technical Education and Informatics |
| Study Module (if applicable) | / |
| Course title | Modelling and simulation of dynamical systems |
| Level of study | ☐Bachelor ⊠ Master’s ☐ Doctoral |
| Type of course | ☐ Obligatory ⊠ Elective |
| Semester  |  ☐ Autumn ⊠ Spring |
| Year of study  | second |
| Number of ECTS allocated | 5 |
| Name of lecturer/lecturers | Prof. Dr. Dragan Antić, Doc. Dr. Marko Milojković |
| Teaching mode |  ⊠Lectures ☐Group tutorials ☐ Individual tutorials ⊠Laboratory work ☐ Project work ☐ Seminar ☐Distance learning ☐ Blended learning ☐ Other |
| **PURPOSE AND OVERVIEW (max. 5 sentences)** |
| The purpose of the course Modeling and simulation of dynamical systems is to train the students in modeling of dynamical systems, designing different types of models, making simulation models, simulation of dynamical systems on the computer, introduction to the Matlab environment and Simulink toolbox, examples of modeling and simulation of different dynamical systems both in techniques and real life. |
| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** |
| Definition of a model of dynamical system and classification of the models. Principles of designing mathematical models, types of mathematical models and examples of mathematical models. Design of mathematical models of mechanical, hydraulic, thermal, chemical and technological processes. Graphical techniques of modeling. Validation and verification of the model. Simulation methods, design of simulation models, simulation tools, mathematical bases of digital simulation. The application of simulation in the identification, design and optimization of control systems. Introduction to Matlab programming environment and Simulink. Models given by differential equations, input-output equations, transfer function and models in state-space. Simulation of models of mechanical, electrical, electro-mechanical, thermal and hydraulic systems. |
| **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** | 20 |
| **Teaching colloquia** | 50 | **OVERALL SUM** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |