

## Specification for the book of courses

|  |   |   |                                |                      |
|--|---|---|--------------------------------|----------------------|
| <b>Study program</b>   |   | Electrical Engineering and Computer Science |                                |                      |
| <b>Module</b>  |   | Communications and Information Technologies |                                |                      |
| <b>Type and level of studies</b>   |   | Undergraduate Academic Studies              |                                |                      |
| <b>The name of the course</b>  |   | Electric Circuits and Signals               |                                |                      |
| <b>Lecturer (for lectures)</b>   |   | Marković V. Vera, Dončov S. Nebojša         |                                |                      |
| <b>Lecturer/associate (for exercises)</b>  |   | Stošić P. Biljana                           |                                |                      |
| <b>Lecturer/associate (for OFE)</b>  |   | Stošić P. Biljana                           |                                |                      |
| <b>Number of ECTS</b>  | 6   | <b>Course status (obligatory/elective)</b>  | Obligatory                     |                      |
| <b>Prerequisites</b>   |   |   |                                |                      |
| <b>Course objectives</b>   | Acquiring of fundamental theoretical and practical knowledges in the analysis of analog and digital electric circuits and signals.  |   |                                |                      |
| <b>Course outcomes</b>   | Ability to apply acquired theoretical knowledge on the methods and techniques for analyzing electric circuits in solving practical problems.  |   |                                |                      |
|  | Ability to use software and measurement devices for the analysis of analog and digital electric circuits and signals.   |   |                                |                      |
| <b>Course outline</b>  |   |   |                                |                      |
| <b>Theoretical teaching</b>  | Signals (types and examples). The unit step function and the delta function. Network characterization. Basic passive and active circuit elements. Primary and secondary parameters of two-port networks. Network combinations. Special two-port networks. Circuits of first and second order (RC, RL and RLC networks). Time response. Response calculation with Laplace transformation. The Inverse Laplace transformation. Frequency response on periodic excitations. Resonance and antiresonance. Frequency-domain harmonic analysis. Elementary discrete signals. Recursive (IIR) and nonrecursive (FIR) discrete networks and their basic elements. Network analysis with difference equation and inverse z-transformation. |   |                                |                      |
| <b>Practical teaching (exercises, OFE, study and research)</b>                       | Solving of real problems during the exercises. Solving of problems and circuit analysis using software packages. Getting to know electrical components, measurement devices and measurement procedures. Use of Data Acquisition Device (NI myDAQ) based on NI LabVIEW software in electric circuits (digital multimeter, function generator, oscilloscope).   |   |                                |                      |
| <b>Textbooks/references</b>  |   |   |                                |                      |
| 1  | Miodrag Gmitrović, Radmila Petković, Electric Circuit Theory – Methodical workbook, second edition, University of Niš, Faculty of Electronic Engineering, 1999.   |   |                                |                      |
| 2  | James W. Nilsson, Electric Circuits, fourth edition, Addison-Wesley Publishing Company, Inc., 1993.   |   |                                |                      |
| 3  | B. P. Lathi, Linear Systems and Signals, second edition, Oxford University Press, Oxford, New York, 2005.   |   |                                |                      |
| 4  | Steven T. Karris, Circuit Analysis I with MATLAB Applications, Orchard Publications, 2003.  |   |                                |                      |
| 5  | Steven T. Karris, Circuit Analysis II with MATLAB Applications, Orchard Publications, 2003.   |   |                                |                      |
| <b>Number of classes of active education per week during semester/trimester/year</b> |   |   |                                |                      |
| <b>Lectures</b>  | <b>Exercises</b>  | <b>OFE</b>                                  | <b>Study and research work</b> | <b>Other classes</b> |
| 2  | 2   | 1   | 0                              | 0                    |
| <b>Teaching methods</b>  | Lectures, exercises, practical work on computers, practical work in laboratory, homework, consultations   |   |                                |                      |
| <b>Grade (maximum number of points 100)</b>  |   |   |                                |                      |
| <b>Pre-exam duties</b>   | <b>Points</b>   | <b>Final exam</b>                           |                                | <b>Points</b>        |
| <b>Activity during lectures</b>  | 5   | <b>Written exam</b>                         |                                | 30                   |
| <b>Exercises</b>   | 15  | <b>Oral exam</b>                            |                                | 20                   |
| <b>Colloquia</b>   | 30  |   |                                |                      |
| <b>Projects</b>  |   |   |                                |                      |