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|---|---------------|--------------------------|-------------------|
| <b>Study programme(s): Applied Mathematics – Data Science</b>   |               |                          |                   |
| <b>Level:</b> master  |               |                          |                   |
| <b>Course title:</b> Research methodology   |               |                          |                   |
| <b>Lecturers:</b> Zoran D. Budimac  |               |                          |                   |
| <b>Status:</b> elective   |               |                          |                   |
| <b>ECTS:</b> 5  |               |                          |                   |
| <b>Requirements:</b> none   |               |                          |                   |
| <b>Learning objectives</b><br>Teaching and development of concepts, organizational structure and deliverables using quantitative and qualitative research methods. Students are expected to demonstrate in-depth understanding of the ways of organizing, planning, implementing, and leading technical research projects.  |               |                          |                   |
| <b>Learning outcomes</b><br><i>Minimal:</i> Students are expected to show the ability of communication and formulating the goals within the scope of a research project; ability to prepare, plan and track technical research project; to demonstrate the knowledge of critical evaluation and analysis of the project.<br><i>Optimal:</i> Students are expected to have the ability to choose the appropriate research method while collecting data, as well as knowledge and experience in procedures for structuring, collecting and processing the data that are needed in technological environment.  |               |                          |                   |
| <b>Syllabus</b><br><i>Theoretical instruction</i><br>Theoretical approaches to the project – managing the project and management of the quality, communication skills, including presentation skills, literature and patents review, and writing of technical reports. Theoretical fundamentals of research methods, problem analysis and solving techniques, problem structuring methods, qualitative methods of system analysis and evaluation of performances, quantitative methods for collecting and analysis of data, experimental design, analysis of performances, plagiarism, references.<br><br><i>Practical instruction</i><br>Exercising the skills and methods covered in case studies by using some of the software tools for project management. |               |                          |                   |
| <b>Literature</b><br>1. CLELAND & KING Project management handbook 2nd edition, van Nostrand Reinhold.<br>2. LAMERS & ARNOLD, Report writing for science, technology and management, Wageningen Agricultural University, 1990.<br>3. MONTGOMERY DOUGLAS C, introduction to statistical quality control 2nd edition, John Wiley and Sons.<br>4. STRAKER DAVID, A toolbox for quality improvement and problem solving, Prentice Hall, 1995<br>5. BHOTE KELI R, World class quality, American Management Association.  |               |                          |                   |
| <b>Weekly teaching load</b>   |               |                          | <b>Other:</b>     |
| Lectures: 2   | Exercises: 2  | Other forms of teaching: | Student research: |
| <b>Teaching methodology</b><br>Classical methodology is applied in lectures including the use of the video-beam. During exercises, case studies are analyzed in-depth. Some aspects and principles are practically covered by software tools. Furthermore, students study some of the covered topics and report on their findings in written papers in an individual and more thorough manner.  |               |                          |                   |
| <b>Grading (maximum number of points 100)</b>   |               |                          |                   |
| <b>Pre-exam obligations</b>   | <b>points</b> | <b>Final exam</b>        | <b>Points</b>     |
| Active participation in lectures  | 6             | Written exam             |                   |
| Practical instruction   | 6             | Oral exam                | 40                |
| Colloquia   |               |                          |                   |
| Seminar(s)  | 48            |                          |                   |