Course Unit Descriptor

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| **Study Programme:** Applied Mathematics – Data Science | |
| **Course Unit Title:** Numerical analysis | |
| **Course Unit Code:** MDS14 | |
| **Name of Lecturer(s):** Nataša Krejić | |
| **Type and Level of Studies:** master studies | |
| **Course Status (compulsory/elective):** elective | |
| **Semester (winter/summer):** summer | |
| **Language of instruction:** English | |
| **Mode of course unit delivery (face-to-face/distance learning):** face-to-face | |
| **Number of ECTS Allocated:** 6 | |
| **Prerequisites: None** | |

**Course Aims: To learn basics in numerical analysis and implement numerical methods**

**Learning Outcomes:**

A student should be able to understand numerical algorithms, to analyse problems and to apply the methods taught in this course.

**Syllabus:**

*Theory*

Nonlinear equations - localication of zeroes. Iterative methods (convergence, error estimation, exit criteria). Succesive approximation method. Newton's method and its' modifications. Iterative methods for systems of eqautions. Newton's method and its modifications. Local convergence. Global covergence. The method of least squares. Numerical methods for linear and nonlinear boundary problems.

*Practice*

Computer implementation of the methods for nonlinear equations and systems of equations. The least squares method. Computer implementation of numerical methods for ODEs.

**Required Reading:**

D. Herceg, N. Krejić, Numerical Analysis, Stylos, Novi Sad, 1997.

D. Herceg, N. Krejić, Numerical Analysis / Collection of Solved Problems, I and II, University of Novi Sad, 1997.

R.L. Burden, J.D. Faires, Numerical Analysis, Brooks Cole, 2010

| **Weekly Contact Hours:** | **Lectures:** 2 | **Practical work:** 3 |
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**Teaching Methods:**

lectures, exercises, analysis of examples with applications, writing reports are statistical analysis

**Knowledge Assessment (maximum of 100 points):**

| Pre-exam obligations | points | Final exam | points |
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| Active class participation | | written exam | 50 |
| Practical work | | oral exam | |
| Preliminary exam(s) | 40 | ……. | |

| Seminar(s) | 10 | | |
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| The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc. | | | |