| NAME OF THE COURSE | Introduction to Data science | | | | | |
|---|---|---|---|---|---|---|
| Code | PMIH25 | Year of study | GU-1 | | | |
| Course teacher | doc.dr. sc. Željko Agić | Credits (ECTS) | 5,0 | | | |
| Associate teachers | | Type of instruction (number of hours) | L | S | E | F |
| | | | 30 | | 30 | |
| Status of the course | | Percentage of application of e-learning | | | | |

| COURSE DESCRIPTION | | |
|---|---|---|
| Course objectives | Data is nowadays available at a previously unseen scale, and it comes in many forms and structuredness levels. The goal of this course is to introduce modern data science, as it encompasses approaches to collecting, structuring, analysis, and inference on top of heterogeneous and massive datasets. | |
| Course enrolment requirements and entry competences required for the course | | |
| Learning outcomes expected at the level of the course (4 to 10 learning outcomes) | - describe the basic methods of data science as applied math, statistics, and computer programming<br>- apply data processing across heterogeneous data types<br>- discover knowledge in various datasets by implementing computer software<br>- utilize scientific computing to process large volumes of data<br>- visualize findings of data analyses<br>- identify the possibilities for applying data science across a range of different application areas<br>- discuss the technological and societal impact of data science | |
| Course content broken down in detail by weekly class schedule (syllabus) | Data science and the scientific method (2+2)<br>Acquiring, preparing, and structuring data (2+2)<br>Exploratory data analysis basics (i) (2+2)<br>Exploring data (ii): variability, sampling, visualization (2+2)<br>Prediction with data (i) (2+2)<br>More prediction (ii): regression and classification (2+2)<br>Statistical inference with data (i) (2+2)<br>Inference (ii): hypothesis testing, reliability, errors (2+2)<br>Practical machine learning for data processing (2+2)<br>Massive datasets (2+2)<br>Applied data science with text and images (2+2)<br>Data science in social science (2+2)<br>Ethical concerns in data science (2+2)<br>Limitations and research frontiers (2+2)<br>Exam preparation (2+2) | |
| Format of instruction | ☒ lectures<br>☒ seminars and workshops<br>☒ exercises<br>☐ on line in entirety<br>☒ partial e-learning<br>☐ field work | ☒ independent assignments<br>☐ multimedia<br>☐ laboratory<br>☒ work with mentor<br>☒ homework assignments |
| Student responsibilities | exam<br>seminars | |

<table>
<tr><td></td><td>homeworks</td></tr>
<tr><td>Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>
<table>
<tr><th>Name</th><th>Ects</th><th>Name</th><th>Ects</th><th>Name</th><th>Ects</th></tr>
<tr><td>Class attendance</td><td>1.5</td><td>Research</td><td></td><td>Experimental work</td><td></td></tr>
<tr><td>Oral exam</td><td>2.5</td><td>Report</td><td></td><td>Homework assignments</td><td></td></tr>
<tr><td>Seminar essay</td><td>1</td><td>Essay</td><td></td><td></td><td></td></tr>
<tr><td>Tests</td><td></td><td>Practical training</td><td></td><td></td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td></td><td></td></tr>
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</td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td>oral exam (70%), independent assignment (30%)</td></tr>
<tr><td>Required literature (available in the library and via other media)</td><td>
<table>
<tr><th>Title</th><th>Number of copies in the library</th><th>Availability via other media</th></tr>
<tr><td>Grus: Dana Science from Scratch---First Principles with Python. 2015.</td><td>0</td><td></td></tr>
<tr><td>Hastie, Tibshirani, Friedman. The Elements of Statistical Learning: Dana Mining, Inference, and Prediction. 2013.</td><td>0</td><td></td></tr>
<tr><td>Igual, Segui: Introduction to Data Science. 2017.</td><td>0</td><td></td></tr>
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<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td>research papers</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td>student evaluations, in-class reflections, self-assessment</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td></td></tr>
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