

## Data Science

### Master study programme, second Bologna cycle

### COURSE STRUCTURE of the study programme

The study programme consists of 15 courses, 2 seminars, practical training, and the preparation and defence of a Master's thesis. Courses are divided into compulsory (12 courses) and external elective courses (3 courses). Courses are assigned either 6 or 3 ECTS under the European Credit Transfer and Accumulation System (ECTS).

Students may register the topic of their Master's thesis upon enrolment in the second year. All remaining academic requirements must be completed prior to the submission of the Master's thesis.

Students complete the programme once they have fulfilled all academic requirements, successfully defended their Master's thesis, and accumulated a total of 120 ECTS.

The following section presents the structure of the study programme by year, as well as the compulsory and internal elective courses of the programme.

**Table 1: Structure of the study programme**

| Year of study | Study obligation             | Number | ECTS-credits (ECTS) |                    |
|---------------|------------------------------|--------|---------------------|--------------------|
|               |                              |        | ECTS                | ECTS/Year of study |
| 1.            | Compulsory Course            | 9      | 48                  | 60                 |
|               | Seminar                      | 2      | 6                   |                    |
|               | External Elective Course     | 1      | 6                   |                    |
| 2.            | Compulsory Course            | 3      | 18                  | 60                 |
|               | External Elective Course     | 2      | 12                  |                    |
|               | Practical Training (3 weeks) | 1      | 6                   |                    |
|               | Master's Thesis              | 1      | 24                  |                    |

**Legend:**

ECTS credits (ECTS) = credit points awarded under the European Credit Transfer and Accumulation System (ECTS). The credit system facilitates student mobility and the mutual recognition of completed academic requirements.

ECTS credits represent an average estimate of the time required to complete a course and include both organized forms of instruction (lectures, seminars, seminar and laboratory exercises, fieldwork, practical training, etc.) and the student's independent work (exam preparation and other course-related obligations, etc.). One (1) ECTS credit corresponds to 25 to 30 hours of study workload. Credits are awarded upon the successful completion of the requirements for an individual course.

**Table 2: First year of study**

| No. | Course                                               | ECTS |
|-----|------------------------------------------------------|------|
| 1.  | Data Engineering and Distributed Information Systems | 6    |
| 2.  | Data Science Ethics                                  | 3    |
| 3.  | Mathematical Practicum                               | 6    |
| 4.  | Selected Topics in Discrete Mathematics              | 6    |
| 5.  | Statistics                                           | 6    |
| 6.  | Selected Topics in Information Visualisation         | 6    |
| 7.  | Intelligent System                                   | 6    |
| 8.  | Data Practicum I                                     | 3    |
| 9.  | Databases for Big Data                               | 6    |
| 10. | Data Science Seminar I                               | 3    |

| No. | Course                     | ECTS |
|-----|----------------------------|------|
| 11. | Data Science Seminar II    | 3    |
| 12. | External Elective Course I | 6    |

Table 3: [Second year of study](#)

| No. | Course                                   | ECTS |
|-----|------------------------------------------|------|
| 1.  | Selected Topics in Numerical Mathematics | 6    |
| 2.  | Mining Massive Data                      | 6    |
| 3.  | Data Practicum II                        | 6    |
| 4.  | External Elective Course II              | 6    |
| 5.  | External Elective Course III             | 6    |
| 6.  | Practical Training (3 weeks)             | 6    |
| 7.  | Master's Thesis                          | 24   |

## ELECTIVE courses

During the course of the study programme, the student completes three external elective courses, one in the first year and two in the second year.

Table 4: [Internal elective courses](#)

| No. | Course                                                  | ECTS |
|-----|---------------------------------------------------------|------|
| 1.  | Collection and Integration of Sensor Data               | 3    |
| 2.  | Security                                                | 3    |
| 3.  | Selected Topics on Data Processing                      | 6    |
| 4.  | Selected Topics on Data Acquisition                     | 6    |
| 5.  | Selected Topics on Data Visualisation II                | 6    |
| 6.  | Big Data in Structural Bioinformatics                   | 6    |
| 7.  | Foundations of Data Science and Artificial Intelligence | 6    |

Table 4 lists *all internal elective courses* accredited within the Data Science study programme. In addition, students may select Graph Algorithms and Computational Social Science (offered within the Master's programme in [Computer Science](#)) as internal elective courses. However, UP FAMNIT *offers only a selection of elective courses* from the broader pool each academic year. In doing so, the faculty takes into account its staffing and financial capacities, as well as student interest in individual courses. The final list of elective courses offered to students for the upcoming academic year is published prior to the start of enrolment for that year.

*External elective courses* may be selected within accredited study programmes in Slovenia or abroad in the fields of mathematics, computer science, informatics, bioinformatics, business informatics, management, and

communication. These courses are delivered by appropriately qualified academic staff and may also be offered in an online format.

A student who has not completed a course in probability at the undergraduate level is required to complete at least one external elective course in this field.

Students are advised, in consultation with the programme coordinator, to select courses in the social sciences, such as communication, critical thinking, organization, or management, in the scope of at least 6 ECTS credits, preferably within other study programmes of the University of Primorska. The selection of an external elective course outside the University of Primorska requires prior approval from the programme coordinator, based on the syllabus of the selected course. It is recommended that students complete their external electives (18 ECTS credits) either by selecting three courses worth 6 ECTS credits each or by combining four courses, two of which carry 6 ECTS credits and two 3 ECTS credits.

For assistance and guidance in selecting elective courses and study tracks, students may consult the study programme coordinator.

### **Practical training**

In the second year, students are required to complete mandatory practical training, which is awarded with 6 ECTS credits and lasts 3 weeks (or a total of 15 full working days).

As part of the practical training, students further develop their theoretical knowledge and acquire key competencies for practical application in a business environment, as well as skills in critical judgement, ethical awareness, and responsibility towards their work and colleagues. Through work on concrete, real-world tasks, students gain practical experience in managing large-scale data and develop the ability to solve specific problems related to data science, while integrating theoretical knowledge with practical applications in business processes. Students independently arrange their practical training with a host organization.

Each student is assigned a mentor within the selected organization, who is responsible for supervising and guiding their work. In addition, the student's progress is monitored by the practical training coordinator of the study programme. More detailed instructions for students are available in the section [Practical Training](#).

#### **Contact:**

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