



## M.Sc. Data Science (from winter semester 2025/26)

Course of studies: **Start of studies in winter semester, full-time**

Specialization: **Human-Centred Data Science**

The following course of study shows you in which semesters which modules are offered, if you decide to specialize in Human-Centred Data Science. Compulsory modules must be completed during your studies. For all other modules, you can choose which modules you would like to complete. It is recommended that you complete a total of 30 ECTS\* through modules or courses per semester (totalling 120 ECTS in four semesters).

Courses are usually offered on an annual rhythm, i.e. they cannot be completed in every semester, but either annually in the winter semester or annually in the summer semester.

The course of study includes the entire range of courses and modules offered by the Master's degree programme:

- the compulsory area (incl. Master's Thesis) (at least 66 ECTS)
- the compulsory elective area "Machine Learning and Statistics" (at least 18 ECTS)
- the compulsory elective area "Specialization: Human-Centred Data Science" (at least 42 ECTS)

\*ECTS and credit points (CP) or in German Leistungspunkte (LP) are the same thing: a measure of the workload during your course of study. According to the European Credit Transfer System (ECTS), one ECTS/CP corresponds to 25 to 30 hours of work (course attendance, preparation and follow-up time as well as studying for exams or writing assignments or papers). Approximately 30 ECTS/CP should be completed in one semester of full-time studies - i.e. 60 ECTS/CP in one academic year of full-time studies.

| 1st semester: winter semester |   |       |      |  |  |
|-------------------------------|---|-------|------|--|--|
| Module code                   | Module title  | CHs   | ECTS | Category                                 | ECTS per semester  |
| DAT-M-MML                     | Modern Machine Learning                               | 2+2   | 6    | compulsory                               | In total:<br>18 ECTS<br>in the compulsory<br>and compulsory<br>elective area |
| DAT-M-FREE                    | Free Elective   |       | 12   | compulsory                               |  |
| DAT-M-UNIV                    | Studium Universale                                    |       | 12   | compulsory                               |  |
| DAT-M-MLS-SML                 | Statistical Machine Learning                          | 2 + 2 | 9    | Machine Learning and Statistics          |  |
| DAT-M-MLS-AS2                 | Advanced Statistics II                                | 2 + 2 | 6    | Machine Learning and Statistics          |  |
| DAT-M-MLS-MATH                | Lectures in Mathematics                               |       | 3-18 | Machine Learning and Statistics          |  |
| DAT-M-MLS-AXAI                | Advanced Explainable AI                               | 2 + 2 | 6    | Machine Learning and Statistics          |  |
| DAT-M-MLS-ENG                 | Advanced Data Engineering                             | 2 + 2 | 6    | Machine Learning and Statistics          |  |
| FIDS-WI-MSc-IB-M05            | Neural networks: An application-oriented introduction | 2 + 2 | 6    | Machine Learning and Statistics          | In total:<br>12 ECTS in Human-Centred Data Science                           |
| HCAI-M02                      | AI Ethics   | 2 + 2 | 6    | compulsory in Human-Centred Data Science |  |
| INF-M-HCC-INT1                | Interaction Technologies I                            | 2 + 2 | 6    | Human-Centred Data Science               |  |
| INF-M-HCC-INT2                | Interaction Technologies II                           | 2 + 2 | 6    | Human-Centred Data Science               |  |
| HCAI-M11                      | Empirical Human-Centred AI                            | 4     | 6    | Human-Centred Data Science               |  |
| HCAI-M12                      | Computational Human-Centred AI                        | 4     | 6    | Human-Centred Data Science               |  |

## 2nd semester: summer semester

| Module code     | Module title  | CHs   | ECTS | Category                                 | ECTS per semester  |
|-----------------|---|-------|------|--|--|
| DAT-M-FREE      | Free Elective   |       | 12   | compulsory                               | In total:<br>18 ECTS<br>in the compulsory<br>and compulsory<br>elective area |
| DAT-M-UNIV      | Studium Universale  |       | 12   | compulsory                               |  |
| DAT-M-MLS-AS1   | Advanced Statistics I                                     | 2 + 2 | 9    | Machine Learning and Statistics          |  |
| DAT-M-MLS-MATH  | Lectures in Mathematics                                   |       | 3-18 | Machine Learning and Statistics          |  |
| DAT-M-MLS-DIPAI | Digital Image Processing – AI-based Approaches            | 2 + 2 | 6    | Machine Learning and Statistics          |  |
| HCAI-M08        | Advanced Information Behaviour                            | 2 + 2 | 6    | compulsory in Human-Centred Data Science | In total:<br>12 ECTS in Human-Centred Data Science                           |
| HCAI-M09        | Deep Reinforcement Learning for Human Decision Strategies | 2 + 2 | 6    | compulsory in Human-Centred Data Science |  |
| INF-M-HCC-INT1  | Interaction Technologies I                                | 2 + 2 | 6    | Human-Centred Data Science               |  |
| INF-M-HCC-INT2  | Interaction Technologies II                               | 2 + 2 | 6    | Human-Centred Data Science               |  |
| HCAI-M06        | Explainable AI for Human-Computer-Interaction             | 2 + 2 | 6    | Human-Centred Data Science               |  |
| HCAI-M07        | Generative AI for Human-Computer-Interaction              | 2 + 2 | 6    | Human-Centred Data Science               |  |

## 3rd semester: winter semester

| Module code | Module title       | CHs | ECTS | Category   | ECTS per semester    |
|-------------|--------------------|-----|------|------------|----------------------|
| DAT-M-FREE  | Free Elective      |     | 12   | compulsory | In total:<br>12 ECTS |
| DAT-M-UNIV  | Studium Universale |     | 12   | compulsory |                      |

|                    |   |       |      |                                 |   |
|--------------------|---|-------|------|---------------------------------|---|
| DAT-M-SEM          | Current Topics in Data Science                        | 2     | 6    | compulsory                      | in the compulsory and compulsory elective area        |
| DAT-M-MLS-SML      | Statistical Machine Learning                          | 2 + 2 | 9    | Machine Learning and Statistics |   |
| DAT-M-MLS-AS2      | Advanced Statistics II                                | 2 + 2 | 6    | Machine Learning and Statistics |   |
| DAT-M-MLS-MATH     | Lectures in Mathematics                               |       | 3-18 | Machine Learning and Statistics |   |
| DAT-M-MLS-AXAI     | Advanced Explainable AI                               | 2 + 2 | 6    | Machine Learning and Statistics |   |
| DAT-M-MLS-ENG      | Advanced Data Engineering                             | 2 + 2 | 6    | Machine Learning and Statistics |   |
| FIDS-WI-MSc-IB-M05 | Neural networks: An application-oriented introduction | 2 + 2 | 6    | Machine Learning and Statistics |   |
| INF-M-HCC-INT1     | Interaction Technologies I                            | 2 + 2 | 6    | Human-Centred Data Science      | In total:<br>18 ECTS<br>in Human-Centred Data Science |
| INF-M-HCC-INT2     | Interaction Technologies II                           | 2 + 2 | 6    | Human-Centred Data Science      |   |
| HCAI-M11           | Empirical Human-Centred AI                            | 4     | 6    | Human-Centred Data Science      |   |
| HCAI-M12           | Computational Human-Centred AI                        | 4     | 6    | Human-Centred Data Science      |   |
| HCAI-M13           | Research Project in Human-Centred AI                  | 2 + 2 | 18   | Human-Centred Data Science      |   |

#### 4th semester: summer semester

| Module code  | Module title    | CHs | ECTS | Category   | ECTS per semester              |
|--------------|-----------------|-----|------|------------|--------------------------------|
| DAT-M-THESIS | Master's Thesis | 2   | 30   | compulsory | 30 ECTS Master's Thesis module |