

## Lehrangebot Master Mathematics for Data and Resource Sciences

| Catalogue |                  |                  |                  |                  |    |          |
|-----------|------------------|------------------|------------------|------------------|----|----------|
| Modul     | 1.Sem<br>V/Ü/S/P | 2.Sem<br>V/Ü/S/P | 3.Sem<br>V/Ü/S/P | 4.Sem<br>V/Ü/S/P | CP | Comments |

| Obligatory modules (winter semester applicants)                 |         |  |         |  |   |                                                                                                  |
|-----------------------------------------------------------------|---------|--|---------|--|---|--------------------------------------------------------------------------------------------------|
| Seminar Mathematical Fundamentals for Data and Resource Science | 0/0/3/0 |  |         |  | 5 |                                                                                                  |
| Deutsch A1/ 1. Semester                                         | 0/4/0/0 |  |         |  | 4 |                                                                                                  |
| Statistical Foundations of Data Science                         | 2/1/0/0 |  |         |  | 5 |                                                                                                  |
| Mathematics of Machine Learning                                 | 3/1/0/0 |  |         |  | 6 | this semester instead of next summer semester,<br>semester swap with Methods in Machine Learning |
| Seminar Mathematics for Data and Resource Sciences              |         |  | 0/0/2/0 |  | 6 |                                                                                                  |

| Obligatory modules (summer semester applicants)                 |  |         |  |  |   |                                                                                                  |
|-----------------------------------------------------------------|--|---------|--|--|---|--------------------------------------------------------------------------------------------------|
| Seminar Mathematical Fundamentals for Data and Resource Science |  | 0/0/3/0 |  |  | 5 |                                                                                                  |
| Deutsch A1/ 1. Semester                                         |  | 0/4/0/0 |  |  | 4 |                                                                                                  |
| Statistical Foundations of Data Science                         |  | 2/1/0/0 |  |  | 5 |                                                                                                  |
| Mathematics of Machine Learning                                 |  | 3/1/0/0 |  |  | 6 | this semester instead of next summer semester,<br>semester swap with Methods in Machine Learning |

| Catalogue |                            |                            |    |          |
|-----------|----------------------------|----------------------------|----|----------|
| Modul     | winter semester<br>V/Ü/S/P | summer semester<br>V/Ü/S/P | CP | Comments |

| Elective modules: Analysis                       |         |  |   |                                              |
|--------------------------------------------------|---------|--|---|----------------------------------------------|
| Basics in Partial Differential Equations         | 2/1/0/0 |  | 4 |                                              |
| Inverse Problems                                 | 2/1/0/0 |  | 5 | in even winter semester but not in this year |
| Fourier Analysis                                 | 2/1/0/0 |  | 5 | in odd winter semester                       |
| Differential Geometry                            | 2/1/0/0 |  | 5 | in even winter semester                      |
| Mathematics of Crystallographic Texture Analysis | 2/1/0/0 |  | 5 | in February/March 2027                       |

| Elective modules: Discrete Mathematics/Algebra |         |         |   |                                              |
|------------------------------------------------|---------|---------|---|----------------------------------------------|
| Algorithmic and Structural Graph Theory        | 2/1/0/0 | 2/1/0/0 | 9 |                                              |
| Algorithmic Topology                           | 2/2/0/0 |         | 6 | in odd winter semester                       |
| Geometry and Topology                          | 2/1/0/0 |         | 6 | not in this year                             |
| Algorithmic Geometry                           | 2/2/0/0 |         | 6 | in even winter semester but not in this year |
| Formalization of Mathematics with Lean 4       | 2/2/0/0 |         | 6 | new course                                   |
| Reading Group Discrete Structures              | 3/0/0/0 |         | 6 | new course                                   |

| Elective modules: Numerics/Optimization                     |         |  |   |                                                           |
|-------------------------------------------------------------|---------|--|---|-----------------------------------------------------------|
| Introduction to Scientific Programming                      | 2/2/0/0 |  | 4 |                                                           |
| Scientific Computing Project                                | 0/0/3/0 |  | 6 |                                                           |
| Current Topics in Numerical Analysis I                      | 2/0/1/0 |  | 6 | if there is a substitute professor for Math. Optimization |
| Modeling and Simulation                                     | 4/2/0/0 |  | 9 | in even winter semester                                   |
| Introduction to High Performance Computing and Optimization | 2/1/0/0 |  | 4 |                                                           |
| Numerical Methods for Initial Value Problems                | 4/2/0/0 |  | 9 | in odd winter semester                                    |

| Elective modules: Stochastics |         |  |   |                                                                             |
|-------------------------------|---------|--|---|-----------------------------------------------------------------------------|
| Applied Statistics            | 2/2/0/0 |  | 6 |                                                                             |
| Current Topics in Stochastics | 2/2/0/0 |  | 6 | in odd winter semester                                                      |
| Methods in Machine Learning   | 3/1/0/0 |  | 6 | next summer semester,<br>semester swap with Mathematics of Machine Learning |
| Stochastic Processes          | 3/1/0/0 |  | 6 | in even winter semester                                                     |

|                       |         |  |   |  |
|-----------------------|---------|--|---|--|
| Data Analysis Project | 0/0/1/1 |  | 4 |  |
|-----------------------|---------|--|---|--|

| Minor subject elective modules             |         |  |   |  |
|--------------------------------------------|---------|--|---|--|
| Advanced Theory of Potential Fields        | 2/1/0/0 |  | 4 |  |
| Theory of Potential Methods                | 2/1/0/0 |  | 4 |  |
| Numerical Simulation Methods in Geophysics | 2/2/0/0 |  | 6 |  |
| Climate Change                             | 2/2/0/0 |  | 5 |  |
| Applied Geomodelling                       | 1/2/0/0 |  | 4 |  |