



Universität Hamburg

DER FORSCHUNG | DER LEHRE | DER BILDUNG

**OFFICIAL TRANSLATION OF  
Fachspezifische Bestimmungen für den  
Studiengang Technomathematik (M.Sc.) der  
Fakultät für Mathematik, Informatik und  
Naturwissenschaften**

(Amtliche Bekanntmachung Nr. 26 vom 15. Mai 2019)

**THIS TRANSLATION IS FOR INFORMATION ONLY –  
ONLY THE GERMAN VERSION SHALL BE LEGALLY VALID AND  
ENFORCEABLE!**

**Subject-Specific Provisions for the Master of Science in In-  
dustrial Mathematics at the Faculty of Mathematics, Infor-  
matics and Natural Sciences**

**dated 15 January 2019**

On 1 April 2019 in accordance with Section 108 subsection 1 of the Hamburg higher education act (Hamburgisches Hochschulgesetz, HmbHG) dated 18 July 2001 (HmbGVBl. p. 171) as amended on 29 May 2018 (HmbGVBl. p. 200), the Executive University Board of the University of Hamburg ratified the Subject-Specific Provisions for the Master of Science in Industrial Mathematics (MSc) put forward by the Industrial Mathematics joint committee on 15 January 2019 in accordance with Section 96a HmbHG and Section 4 of the cooperation agreement with the Hamburg University of Technology and the University of Hamburg dated 29 March 2016.

## **Preamble**

These Subject-Specific Provisions supplement the provisions of the Faculty of Mathematics, Informatics and Natural Sciences' Examination Regulations (Prüfungsordnungen MSc) dated 11 April and 4 July 2012, as amended, governing Master of Science (MSc) degree programs and provide a description of the modules for industrial mathematics as a subject.

## **I. Supplemental provisions**

### **Section 1**

#### **Program and examination objectives, academic degree, and implementation of the degree program**

##### **Section 1 subsection 1:**

- (1) The Master of Science in Industrial Mathematics has a research-oriented profile.
- (2) The master's examination forms the professional qualification of an in-depth and research-related, scientific education in the Master of Science in Industrial Mathematics.
- (3) The degree program imparts the ability to tackle and solve complex problems using scientific methods, even beyond the extent of current knowledge.
- (4) Taking into account the requirements and changes in the professional world and interdisciplinary relationships, the degree program imparts the necessary technical methods, skills, and knowledge and enables students to work scientifically, to apply and critically classify scientific findings, and to act responsibly.
- (5) The degree program is conducted in English.

The degree program focuses predominantly on

1. specialized knowledge oriented to current research questions based on in-depth fundamental knowledge;
2. methodological and analytical competencies that enable students to independently expand scientific knowledge, with a primary focus on research methods;
3. the teaching of technical versatility and scientific depth within applied mathematics; and
4. teaching core skills that are professionally relevant.

##### **Section 1 subsection 4:**

This degree program is administered by the Faculty of Mathematics, Informatics and Natural Sciences at the University of Hamburg and the Hamburg University of Technology.

### **Section 4**

#### **Program and examination structure, modules and ECTS credits**

##### **Section 4 subsections 2 and 3:**

- (1) The 4-semester master's degree program encompasses a mathematics component, an engineering component, and an informatics component. Of the 120 ECTS credits to be achieved, at least 46 are allocated to mathematics, at least 20 to engineering and/or informatics and 30 to the master's thesis.

- (2) Students can choose from all specializations offered in the master's degree programs at the Technical University of Hamburg in engineering and informatics.
- (3) The Master of Science in Industrial Mathematics is comprised of required courses (6 ECTS credits), required elective courses (68 ECTS credits), elective courses and (16 ECTS credits), and the master's thesis final module (30 ECTS credits).
- (4) The required area consists of a lecture seminar in applied mathematics.
- (5) 68 ECTS credits must be earned in the required elective area. Generally, the modules listed in II. Module Descriptions of these subject-specific provisions are available for selection. An additional ungraded lecture seminar in applied mathematics can be included in the required elective area. In addition, ungraded lecture seminars are included in the elective courses.
- (6) A preparatory project in mathematics amounting to 15 ECTS credits may be completed in the third semester. This is particularly relevant when the master's thesis deals with a subject with only minimal in-person preparatory classes.
- (7) The combination of individual modules must be approved by the examinations board to ensure the study objectives are met according to Section 1 subsection 1. As a rule, this is done in the first subject semester, but no later than the beginning of the second subject semester.
- (8) Modules for the elective area with a total of 16 ECTS credits can generally be freely selected from the degree programs offered by the University of Hamburg and the Hamburg University of Technology.
- (9) Modules from the catalog of bachelor modules can also be taken in the free elective area. As a rule, the content of the modules may not overlap with the modules already completed in the bachelor's degree. ECTS credits for bachelor's modules do not count toward the minimum amounts listed in point 1 above.
- (10) The master's thesis must be written in the field of applied mathematics. Alternative topics must be approved by the examinations board.
- (11) Typical structure of the degree program:

Semester 1:

Elective and/or required elective modules and/or a seminar (30 ECTS credits)

Semester 2:

Elective and/or required elective modules and/or a seminar (30 ECTS credits)

Semester 3:

Elective and/or required elective modules, possibly a seminar and/or a preparatory project (30 ECTS credits)

Semester 4:

Master's thesis (including a presentation on the master's thesis) (30 ECTS credits)

**Section 4 subsection 4:**

The master's degree program commences on the first day lectures are held.

**Section 5  
Course types****Section 5 sentence 2:**

Courses may take any form pursuant to Section 5 of the Revised Examination Regulations for Master of Science Degree Programs. Another type of course is guided independent study working on an individual problem.

**Section 5 subsection 3:**

Courses are held in English.

**Section 9  
Admission to module examinations****Section 9 subsection 1:**

Retaking module examinations:

In justified exceptional cases, on request, the Examinations Board may prescribe a different type of examination for a student's second attempt at passing an examination or course examination that has not been previously passed.

**Section 13  
Completed coursework and module examinations****In Section 13 subsection 4:**

- (1) A scientific debate may be provided for as an additional form of examination. A scientific debate is a professional discussion and questioning session and may include a lecture component.
- (2) Oral examinations may be used as an alternative to written examinations for module examinations. Written examinations may be used as an alternative to oral examinations for module examinations. The examinations board responsible must approve other alternative forms of examination.
- (3) The specific type and duration or scope of the examination will be announced at the beginning of the course.

**Section 13 subsection 6:**

Examinations shall be held in English.

**Section 14  
Master's thesis****Section 14 subsection 1:**

A colloquium is a compulsory component of the master's thesis.

**Section 14 subsection 2 sentence 1:**

Students who have acquired at least 72 ECTS credits may be admitted to the master's thesis.

**Section 14 subsection 4 sentence 2:**

The master's thesis may be written in either German or English. This must be agreed mutually between the student and the supervisor.

**Section 14 subsection 5 sentence 1:**

A successfully completed master's thesis will be awarded 30 ECTS credits. The master's thesis must be completed within six months.

**Section 15**

**Evaluation of examinations**

**Section 15 subsection 3 sentence 5:**

If a module examination is comprised of several course examinations, then the module grade is calculated by averaging the grades from each course examination.

**Section 15 subsection 3 sentence 9:**

The total grade for the master's degree program is calculated by weighted average of the grades of the final module examinations and the master's thesis, whereby the master's thesis is given double weight, whereas seminars and credits from the free elective area are not taken into account.

**Section 15 subsection 4:**

The overall final grade "with distinction" will be awarded if a grade of 1.0 is earned for the master's thesis and the average grade from all module examinations is not less than 1.3. Modules graded pass/fail, such as seminars or modules from the free elective area, are not included in the calculation of the overall grade.

**Section 23**

**Effective date**

These Subject-Specific Provisions become effective on the day following official publication by the University of Hamburg. They first apply to students commencing their studies in Winter Semester 2019/20.

Hamburg, 15 May 2019  
**University of Hamburg**

|           |                                 |                      |                                                                         |                    |                      | Courses                                                                                             |              |             |                       | Examinations                               |                             |        |              |
|-----------|---------------------------------|----------------------|-------------------------------------------------------------------------|--------------------|----------------------|-----------------------------------------------------------------------------------------------------|--------------|-------------|-----------------------|--------------------------------------------|-----------------------------|--------|--------------|
| Frequency | Duration (one or two semesters) | Recommended semester | Module type: Required (Req.) or Required Elective (RE), or elective (E) | Module number/code | Module prerequisites | Module                                                                                              | Course title | Course type | Credit hours per week | Examination prerequisites                  | Type of examination         | Graded | ECTS credits |
| WS/SS     | 1                               | —                    | RE                                                                      | Ma-M-DGL_n         |                      | <b>Advanced module: Differential equations (module with two versions)</b>                           |              |             |                       |                                            |                             |        |              |
|           |                                 |                      |                                                                         |                    |                      |                                                                                                     | Lecture      | L           | 4                     | Successfully completed practical exercises | Oral or written examination | Yes    | 12           |
|           |                                 |                      |                                                                         |                    |                      |                                                                                                     | Exercise     | PC          | 2                     |                                            |                             |        | Or           |
|           |                                 |                      |                                                                         |                    |                      | Or                                                                                                  | lecture      | L           | 2                     | Successfully completed practical exercises | Oral or written examination | Yes    | 6            |
|           |                                 |                      |                                                                         |                    |                      |                                                                                                     | Exercise     | PC          | 1                     |                                            |                             |        |              |
| WS/SS     | 1                               | —                    | RE                                                                      | Ma-M-VM-MOA_n      |                      | <b>Advanced module: Modern methods of optimization and approximation (module with two versions)</b> |              |             |                       |                                            |                             |        |              |
|           |                                 |                      |                                                                         |                    |                      |                                                                                                     | Lecture      | L           | 4                     | Successfully completed practical exercises | Oral or written examination | Yes    | 12           |
|           |                                 |                      |                                                                         |                    |                      |                                                                                                     | Exercise     | PC          | 2                     |                                            |                             |        | Or           |
|           |                                 |                      |                                                                         |                    |                      | Or                                                                                                  | lecture      | L           | 2                     | Successfully completed practical exercises | Oral or written examination | Yes    | 6            |
|           |                                 |                      |                                                                         |                    |                      |                                                                                                     | Exercise     | PC          | 1                     |                                            |                             |        |              |

|           |                                 |                      |                                                                         |                    |                      | Courses |                                                                         |             |                       | Examinations                               |                             |        |              |
|-----------|---------------------------------|----------------------|-------------------------------------------------------------------------|--------------------|----------------------|---------|-------------------------------------------------------------------------|-------------|-----------------------|--------------------------------------------|-----------------------------|--------|--------------|
| Frequency | Duration (one or two semesters) | Recommended semester | Module type: Required (Req.) or Required Elective (RE), or elective (E) | Module number/code | Module prerequisites | Module  | Course title                                                            | Course type | Credit hours per week | Examination prerequisites                  | Type of examination         | Graded | ECTS credits |
| WS/SS     | 1                               | —                    | RE                                                                      | Ma-M-WR_n          |                      |         | <b>Advanced module: Scientific computing (module with two versions)</b> |             |                       |                                            |                             |        |              |
|           |                                 |                      |                                                                         |                    |                      |         | Lecture                                                                 | L           | 4                     | Successfully completed practical exercises | Oral or written examination | Yes    | 12           |
|           |                                 |                      |                                                                         |                    |                      |         | Exercise                                                                | PC          | 2                     |                                            |                             |        | Or           |
|           |                                 |                      |                                                                         |                    |                      | Or      | lecture                                                                 | L           | 2                     | Successfully completed practical exercises | Oral or written examination | Yes    | 6            |
|           |                                 |                      |                                                                         |                    |                      |         | Exercise                                                                | PC          | 1                     |                                            |                             |        |              |
|           |                                 |                      |                                                                         |                    |                      |         |                                                                         |             |                       |                                            |                             |        |              |
| WS/SS     | 1                               | —                    | RE                                                                      | Ma-M-VFA_n         |                      |         | <b>Advanced module: Functional analysis (module with two versions)</b>  |             |                       |                                            |                             |        |              |
|           |                                 |                      |                                                                         |                    |                      |         | Lecture                                                                 | L           | 4                     | Successfully completed practical exercises | Oral or written examination | Yes    | 12           |
|           |                                 |                      |                                                                         |                    |                      |         | Exercise                                                                | PC          | 2                     |                                            |                             |        | Or           |
|           |                                 |                      |                                                                         |                    |                      | Or      | lecture                                                                 | L           | 2                     | Successfully completed practical exercises | Oral or written examination | Yes    | 6            |
|           |                                 |                      |                                                                         |                    |                      |         | Exercise                                                                | PC          | 1                     |                                            |                             |        |              |

|           |                                 |                      |                                                                         |                    |                      | Courses                                                                         |              |             |                       | Examinations                               |                             |        |              |
|-----------|---------------------------------|----------------------|-------------------------------------------------------------------------|--------------------|----------------------|---------------------------------------------------------------------------------|--------------|-------------|-----------------------|--------------------------------------------|-----------------------------|--------|--------------|
| Frequency | Duration (one or two semesters) | Recommended semester | Module type: Required (Req.) or Required Elective (RE), or elective (E) | Module number/code | Module prerequisites | Module                                                                          | Course title | Course type | Credit hours per week | Examination prerequisites                  | Type of examination         | Graded | ECTS credits |
| WS/SS     | 1                               | —                    | RE                                                                      | Ma-M-VAD_n         |                      | <b>Advanced module: Applied Discrete Mathematics (module with two versions)</b> |              |             |                       |                                            |                             |        |              |
|           |                                 |                      |                                                                         |                    |                      |                                                                                 | Lecture      | L           | 4                     | Successfully completed practical exercises | Oral or written examination | Yes    | 12           |
|           |                                 |                      |                                                                         |                    |                      |                                                                                 | Exercise     | PC          | 2                     |                                            |                             |        | Or           |
|           |                                 |                      |                                                                         |                    |                      | Or                                                                              | lecture      | L           | 2                     | Successfully completed practical exercises | Oral or written examination | Yes    | 6            |
|           |                                 |                      |                                                                         |                    |                      |                                                                                 | Exercise     | PC          | 1                     |                                            |                             |        |              |
| WS/SS     | 1                               | —                    | RE                                                                      | Ma-M-VRM_n         |                      | <b>Advanced module: Pure mathematics (module with two versions)</b>             |              |             |                       |                                            |                             |        |              |
|           |                                 |                      |                                                                         |                    |                      |                                                                                 | Lecture      | L           | 4                     | Successfully completed practical exercises | Oral or written examination | Yes    | 12           |
|           |                                 |                      |                                                                         |                    |                      |                                                                                 | Exercise     | PC          | 2                     |                                            |                             |        | Or           |
|           |                                 |                      |                                                                         |                    |                      | Or                                                                              | lecture      | L           | 2                     | Successfully completed practical exercises | Oral or written examination | Yes    | 6            |
|           |                                 |                      |                                                                         |                    |                      |                                                                                 | Exercise     | PC          | 1                     |                                            |                             |        |              |

|           |                                 |                      |                                                                         |                    |                      | Courses |                                                                                            |             |                       | Examinations                               |                             |        |              |
|-----------|---------------------------------|----------------------|-------------------------------------------------------------------------|--------------------|----------------------|---------|--------------------------------------------------------------------------------------------|-------------|-----------------------|--------------------------------------------|-----------------------------|--------|--------------|
| Frequency | Duration (one or two semesters) | Recommended semester | Module type: Required (Req.) or Required Elective (RE), or elective (E) | Module number/code | Module prerequisites | Module  | Course title                                                                               | Course type | Credit hours per week | Examination prerequisites                  | Type of examination         | Graded | ECTS credits |
| WS/SS     | 1                               | —                    | RE                                                                      | Ma-M-VST_n         |                      |         | <b>Advanced module: Stochastics and mathematical statistics (module with two versions)</b> |             |                       |                                            |                             |        |              |
|           |                                 |                      |                                                                         |                    |                      |         | Lecture                                                                                    | L           | 4                     | Successfully completed practical exercises | Oral or written examination | Yes    | 12           |
|           |                                 |                      |                                                                         |                    |                      |         | Exercise                                                                                   | PC          | 2                     |                                            |                             |        | Or           |
|           |                                 |                      |                                                                         |                    |                      | Or      | lecture                                                                                    | L           | 2                     | Successfully completed practical exercises | Oral or written examination | Yes    | 6            |
|           |                                 |                      |                                                                         |                    |                      |         | Exercise                                                                                   | PC          | 1                     |                                            |                             |        |              |
|           |                                 |                      |                                                                         |                    |                      |         |                                                                                            |             |                       |                                            |                             |        |              |
| WS/SS     | 1                               | —                    | RE                                                                      | Ma-M-DGLAT_n       |                      |         | <b>Selected topics in differential equations (module with two versions)</b>                |             |                       |                                            |                             |        |              |
|           |                                 |                      |                                                                         |                    |                      |         | Lecture                                                                                    | L           | 4                     | Successfully completed practical exercises | Oral or written examination | Yes    | 18           |
|           |                                 |                      |                                                                         |                    |                      |         | Exercise                                                                                   | PC          | 2                     |                                            |                             |        | Or           |
|           |                                 |                      |                                                                         |                    |                      | Or      | lecture                                                                                    | L           | 2                     | Successfully completed practical exercises | Oral or written examination | Yes    | 9            |
|           |                                 |                      |                                                                         |                    |                      |         | Exercise                                                                                   | PC          | 1                     |                                            |                             |        |              |

|           |                                 |                      |                                                                         |                    |                      | Courses |                                                                                                       |             |                       | Examinations                               |                             |        |              |
|-----------|---------------------------------|----------------------|-------------------------------------------------------------------------|--------------------|----------------------|---------|-------------------------------------------------------------------------------------------------------|-------------|-----------------------|--------------------------------------------|-----------------------------|--------|--------------|
| Frequency | Duration (one or two semesters) | Recommended semester | Module type: Required (Req.) or Required Elective (RE), or elective (E) | Module number/code | Module prerequisites | Module  | Course title                                                                                          | Course type | Credit hours per week | Examination prerequisites                  | Type of examination         | Graded | ECTS credits |
| WS/<br>SS | 1                               | —                    | RE                                                                      | Ma-M-<br>MMAAT_n   |                      |         | <b>Selected Topics in Modern Methods of Optimization and Approximation (module with two versions)</b> |             |                       |                                            |                             |        |              |
|           |                                 |                      |                                                                         |                    |                      |         | Lecture                                                                                               | L           | 4                     | Successfully completed practical exercises | Oral or written examination | Yes    | 18           |
|           |                                 |                      |                                                                         |                    |                      |         | Exercise                                                                                              | PC          | 2                     |                                            |                             |        | Or           |
|           |                                 |                      |                                                                         |                    |                      | Or      | lecture                                                                                               | L           | 2                     | Successfully completed practical exercises | Oral or written examination | Yes    | 9            |
|           |                                 |                      |                                                                         |                    |                      |         | Exercise                                                                                              | PC          | 1                     |                                            |                             |        |              |
| WS/<br>SS | 1                               | —                    | RE                                                                      | Ma-M-WRAT_n        |                      |         | <b>Selected topics in scientific computing (module with two versions)</b>                             |             |                       |                                            |                             |        |              |
|           |                                 |                      |                                                                         |                    |                      |         | Lecture                                                                                               | L           | 4                     | Successfully completed practical exercises | Oral or written examination | Yes    | 18           |
|           |                                 |                      |                                                                         |                    |                      |         | Exercise                                                                                              | PC          | 2                     |                                            |                             |        | Or           |
|           |                                 |                      |                                                                         |                    |                      | Or      | lecture                                                                                               | L           | 2                     | Successfully completed practical exercises | Oral or written examination | Yes    | 9            |
|           |                                 |                      |                                                                         |                    |                      |         | Exercise                                                                                              | PC          | 1                     |                                            |                             |        |              |

|           |                                 |                      |                                                                         |                    |                      | Courses |                                                                                   |             |                       | Examinations                               |                             |        |              |
|-----------|---------------------------------|----------------------|-------------------------------------------------------------------------|--------------------|----------------------|---------|-----------------------------------------------------------------------------------|-------------|-----------------------|--------------------------------------------|-----------------------------|--------|--------------|
| Frequency | Duration (one or two semesters) | Recommended semester | Module type: Required (Req.) or Required Elective (RE), or elective (E) | Module number/code | Module prerequisites | Module  | Course title                                                                      | Course type | Credit hours per week | Examination prerequisites                  | Type of examination         | Graded | ECTS credits |
| WS/SS     | 1                               | —                    | RE                                                                      | Ma-M-FAAT_n        |                      |         | <b>Selected Topics in Functional Analysis (module with two versions)</b>          |             |                       |                                            |                             |        |              |
|           |                                 |                      |                                                                         |                    |                      |         | Lecture                                                                           | L           | 4                     | Successfully completed practical exercises | Oral or written examination | Yes    | 18           |
|           |                                 |                      |                                                                         |                    |                      |         | Exercise                                                                          | PC          | 2                     |                                            |                             |        | Or           |
|           |                                 |                      |                                                                         |                    |                      | Or      | lecture                                                                           | L           | 2                     | Successfully completed practical exercises | Oral or written examination | Yes    | 9            |
|           |                                 |                      |                                                                         |                    |                      |         | Exercise                                                                          | PC          | 1                     |                                            |                             |        |              |
| WS/SS     | 1                               | —                    | RE                                                                      | Ma-M-ADAT_n        |                      |         | <b>Selected Topics in Applied Discrete Mathematics (module with two versions)</b> |             |                       |                                            |                             |        |              |
|           |                                 |                      |                                                                         |                    |                      |         | Lecture                                                                           | L           | 4                     | Successfully completed practical exercises | Oral or written examination | Yes    | 18           |
|           |                                 |                      |                                                                         |                    |                      |         | Exercise                                                                          | PC          | 2                     |                                            |                             |        | Or           |
|           |                                 |                      |                                                                         |                    |                      | Or      | lecture                                                                           | L           | 2                     | Successfully completed practical exercises | Oral or written examination | Yes    | 9            |
|           |                                 |                      |                                                                         |                    |                      |         | Exercise                                                                          | PC          | 1                     |                                            |                             |        |              |

|           |                                 |                      |                                                                         |                    |                      | Courses                                                                                      |              |             |                       | Examinations                               |                             |        |              |
|-----------|---------------------------------|----------------------|-------------------------------------------------------------------------|--------------------|----------------------|----------------------------------------------------------------------------------------------|--------------|-------------|-----------------------|--------------------------------------------|-----------------------------|--------|--------------|
| Frequency | Duration (one or two semesters) | Recommended semester | Module type: Required (Req.) or Required Elective (RE), or elective (E) | Module number/code | Module prerequisites | Module                                                                                       | Course title | Course type | Credit hours per week | Examination prerequisites                  | Type of examination         | Graded | ECTS credits |
| WS/SS     | 1                               | —                    | RE                                                                      | Ma-M-RMAT_n        |                      | <b>Selected Topics in Pure Mathematics (module with two versions)</b>                        |              |             |                       |                                            |                             |        |              |
|           |                                 |                      |                                                                         |                    |                      |                                                                                              | Lecture      | L           | 4                     | Successfully completed practical exercises | Oral or written examination | Yes    | 18           |
|           |                                 |                      |                                                                         |                    |                      |                                                                                              | Exercise     | PC          | 2                     |                                            |                             |        | Or           |
|           |                                 |                      |                                                                         |                    |                      | Or                                                                                           | lecture      | L           | 2                     | Successfully completed practical exercises | Oral or written examination | Yes    | 9            |
|           |                                 |                      |                                                                         |                    |                      |                                                                                              | Exercise     | PC          | 1                     |                                            |                             |        |              |
|           |                                 |                      |                                                                         |                    |                      |                                                                                              |              |             |                       |                                            |                             |        |              |
| WS/SS     | 1                               | —                    | RE                                                                      | Ma-M-STAT          |                      | <b>Selected Topics in Stochastics and Mathematical Statistics (module with two versions)</b> |              |             |                       |                                            |                             |        |              |
|           |                                 |                      |                                                                         |                    |                      |                                                                                              | Lecture      | L           | 4                     | Successfully completed practical exercises | Oral or written examination | Yes    | 18           |
|           |                                 |                      |                                                                         |                    |                      |                                                                                              | Exercise     | PC          | 2                     |                                            |                             |        | Or           |
|           |                                 |                      |                                                                         |                    |                      | Or                                                                                           | lecture      | L           | 2                     | Successfully completed practical exercises | Oral or written examination | Yes    | 9            |
|           |                                 |                      |                                                                         |                    |                      |                                                                                              | Exercise     | PC          | 1                     |                                            |                             |        |              |

|           |                                 |                      |                                                                         |                    |                                                                         | Courses                             |              |             |                       | Examinations                 |                                                                                                                                                |        |              |
|-----------|---------------------------------|----------------------|-------------------------------------------------------------------------|--------------------|-------------------------------------------------------------------------|-------------------------------------|--------------|-------------|-----------------------|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------------|
| Frequency | Duration (one or two semesters) | Recommended semester | Module type: Required (Req.) or Required Elective (RE), or elective (E) | Module number/code | Module prerequisites                                                    | Module                              | Course title | Course type | Credit hours per week | Examination prerequisites    | Type of examination                                                                                                                            | Graded | ECTS credits |
| WS/SS     | 1                               | —                    | RE                                                                      | Ma-M project       | Individual projects may recommend specific subject matter prerequisites | Project                             |              |             |                       |                              |                                                                                                                                                |        |              |
|           |                                 |                      |                                                                         |                    |                                                                         | Project (concerning various topics) |              | Proj        | 4                     | Active project participation | Project completion                                                                                                                             | Yes    | 9            |
| WS/SS     | 1                               | —                    | RE                                                                      | Ma-M-AS            |                                                                         | Guided Independent Study            |              |             |                       |                              | Depending on task, examination type per Section 13 subsection 4 General Examination Regulations and Subject-Specific Regulations on Section 13 | Yes    | 2–9          |
|           |                                 |                      |                                                                         |                    |                                                                         | Guided Independent Study            |              | GIS         |                       |                              |                                                                                                                                                |        |              |

|           |                                 |                      |                                                                         |                    |                      | Courses |                            |             |                       | Examinations              |                                                                                                                                                 |        |              |
|-----------|---------------------------------|----------------------|-------------------------------------------------------------------------|--------------------|----------------------|---------|----------------------------|-------------|-----------------------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------------|
| Frequency | Duration (one or two semesters) | Recommended semester | Module type: Required (Req.) or Required Elective (RE), or elective (E) | Module number/code | Module prerequisites | Module  | Course title               | Course type | Credit hours per week | Examination prerequisites | Type of examination                                                                                                                             | Graded | ECTS credits |
| WS/SS     | 1                               | —                    | RE                                                                      | Ma-M-VP            |                      |         | <b>Preparatory project</b> |             |                       | I                         | Depending on task, examination type per Section 13 subsection 4 General Examination Regulations and Subject-Specific Regulations for Section 13 | Yes    | 2–9          |
|           |                                 |                      |                                                                         |                    |                      |         | Preparatory project        | GIS/L/PC/S  |                       |                           |                                                                                                                                                 |        |              |
| WS/SS     | 1                               | —                    | Req.                                                                    | Ma-M-S_n           |                      |         | <b>Seminar</b>             |             |                       |                           | Presentation                                                                                                                                    | No     | 6            |
|           |                                 |                      |                                                                         |                    |                      |         | Seminar                    | S           | 2                     |                           |                                                                                                                                                 |        |              |

|           |                                 |                      |                                                                         |                    |                                                                                                                        | Courses                |              |             |                       | Examinations              |                     |        |              |
|-----------|---------------------------------|----------------------|-------------------------------------------------------------------------|--------------------|------------------------------------------------------------------------------------------------------------------------|------------------------|--------------|-------------|-----------------------|---------------------------|---------------------|--------|--------------|
| Frequency | Duration (one or two semesters) | Recommended semester | Module type: Required (Req.) or Required Elective (RE), or elective (E) | Module number/code | Module prerequisites                                                                                                   | Module                 | Course title | Course type | Credit hours per week | Examination prerequisites | Type of examination | Graded | ECTS credits |
| WS/<br>SS | 6 mo.                           | 4                    | Req.                                                                    | TeMa-MSc           | Only students who have earned at least 72 ECTS credits in total may commence work on the master's thesis. (Section 14) | <b>Master's thesis</b> |              |             |                       |                           | See section 14      | Yes    | 30           |
|           |                                 |                      |                                                                         |                    |                                                                                                                        | Master's thesis        |              |             |                       |                           |                     |        |              |

|           |                                 |                      |                                                                         |                    |                                                                              | Courses                                                                     |              |             |                       | Examinations              |                                                                                                                         |                                                                                                                         |              |
|-----------|---------------------------------|----------------------|-------------------------------------------------------------------------|--------------------|------------------------------------------------------------------------------|-----------------------------------------------------------------------------|--------------|-------------|-----------------------|---------------------------|-------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|--------------|
| Frequency | Duration (one or two semesters) | Recommended semester | Module type: Required (Req.) or Required Elective (RE), or elective (E) | Module number/code | Module prerequisites                                                         | Module                                                                      | Course title | Course type | Credit hours per week | Examination prerequisites | Type of examination                                                                                                     | Graded                                                                                                                  | ECTS credits |
| WS/<br>SS | 1–2                             | —                    | RE                                                                      |                    | See Hamburg University of Technology master's degree module handbook Hamburg | <b>Modules of Hamburg University of Technology master's degree programs</b> |              |             |                       |                           | As per the relevant module descriptions in the master's degree module handbook for the Hamburg University of Technology | As per the relevant module descriptions in the master's degree module handbook for the Hamburg University of Technology |              |

|           |                                 |                      |                                                                         |                    |                             | Courses                                                                                   |              |             |                       | Examinations                                                           |                                                                        |                 |              |
|-----------|---------------------------------|----------------------|-------------------------------------------------------------------------|--------------------|-----------------------------|-------------------------------------------------------------------------------------------|--------------|-------------|-----------------------|------------------------------------------------------------------------|------------------------------------------------------------------------|-----------------|--------------|
| Frequency | Duration (one or two semesters) | Recommended semester | Module type: Required (Req.) or Required Elective (RE), or elective (E) | Module number/code | Module prerequisites        | Module                                                                                    | Course title | Course type | Credit hours per week | Examination prerequisites                                              | Type of examination                                                    | Graded          | ECTS credits |
| WS/<br>SS | 1                               | I                    | E                                                                       |                    | See the module descriptions | Free elective area                                                                        |              |             |                       | In accordance with the provisions of the respective module description | In accordance with the provisions of the respective module description | As per elective | 16           |
|           |                                 |                      |                                                                         |                    |                             | Free choice according to Section 4 subsections 3 and 8 of the Subject-Specific Provisions |              |             |                       |                                                                        |                                                                        |                 |              |