

OFFICIAL TRANSLATION OF

**“Fachspezifische Bestimmungen für den Studiengang Ocean and Climate Physics (M.Sc.) vom 3. April 2019“
(Amtliche Bekanntmachung Nr. 29, vom 24. 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 (MSc) in Ocean and Climate Physics

dated 3 April 2019

On 8 May 2019 in accordance with Section 108 subsection 1 of the Hamburg higher education act (Hamburgisches Hochschulgesetz, HmbHG) dated 18 July 2001 (HmbGVBl. p. 171), last amended on 18 May 2018 (HmbGVBl. pp. 145, 154), the Executive University Board of Universität Hamburg ratified the Subject-Specific Provisions for the Master of Science in Ocean and Climate Physics that were adopted by the Faculty of Mathematics, Informatics and Natural Sciences on 3 April 2019 in accordance with Section 91 subsection 2 no. 1 HmbHG.

Preamble

These Subject-Specific Provisions supplement the provisions of the Faculty of Mathematics, Informatics and Natural Sciences' (MIN) Examination Regulations dated 11 April and 4 July 2012 as amended governing the Master of Science in Ocean and Climate Physics.

I. Supplementary provisions to the MSc examination regulations

Section 1

Program objectives

Section 1 subsection 1:

(1) The Master of Science in Ocean and Climate Physics is a consecutive, research-based degree program, which is taught in English.

(2) The Master of Science in Ocean and Climate Physics follows the general program goals set out in Section 1 subsection 1 MSc Examination Regulations of the MIN Faculty. In addition to these general objectives, the master-level study of physical oceanography and climate physics is intended to provide students with in-depth knowledge in the field of ocean and climate physics, prepare them specifically for research in physical oceanography and climate science, and provide them with the proficiencies

- for independent application and expansion of scientific knowledge, methods, and skills;
- for independent continuing education; and
- to act responsibly within their field in line with the rules of good scientific practice.

(3) The Degree Program prepares students for a career with a strong research focus. Following the advancement and expansion of knowledge of the subject in the first year of the program, there will be a semester of research-based learning in which students will be assigned to a research group in order that they can be prepared for their research work. Subsequently, students will have six months to work on their master's theses in which they will develop a solution to a complex problem from the field of physical oceanography or climate physics. After completion of the program, graduates of the Master of Science in Ocean and Climate Physics will have acquired the following professional competence, knowledge, and skills:

- They will be able to independently apply the numerical and experimental methods used in physical oceanography and climate physics, carry out observations and generate model data, analyze this information critically, and interpret it scientifically.
- They will have learned to develop scientific methods further and gain new insights, and to present these in an appropriate manner—both in writing and orally.
- They will have acquired the ability to carry out a mathematical and scientific analysis and interpretation of ocean processes and climate changes in the ocean.
- They will be prepared to work on a doctoral thesis in the field of physical oceanography, climate physics, or a related discipline as well as assume a non-university management position.

(4) Students may study physical oceanography and climate physics as a supplementary subject.

Section 4

Program and exam organization, modules, and ECTS credits

Section 4 subsection 1:

(1) The program for physical oceanography and climate physics is a study of the physics of the ocean and the climate. The program includes required modules from the area of physical oceanography and climate physics totaling 84 ECTS credits and required elective modules from physical oceanography, climate physics, or other subjects totaling 24 ECTS credits. In addition there are also supplementary subjects totaling 12 ECTS credits from one or two natural or earth science subjects outside of physical oceanography or climate physics, as a rule (see module table in Appendix A).

(2) The modules can be assigned to the following six categories with respect to content:

1. Acquisition of special knowledge in the field of physical oceanography (24 ECTS credits)
2. Acquisition of special knowledge in the field of climate physics (15 ECTS credits)
3. Acquisition of additional knowledge in the areas of physical oceanography or climate physics at students' discretion (required elective area) (24 ECTS credits)
4. Acquisition of additional knowledge in a subject area complementary to physical oceanography and climate physics (supplementary subject) (12 ECTS credits)
5. Preparation to carry out research work (15 ECTS credits)
6. Final module (30 ECTS credits). Required component of the module MSc Thesis is a colloquium consisting of a presentation and an academic discussion about the subject matter of the thesis. The grade for the colloquium shall comprise 1/5 of the grade for the module MSc Thesis. The colloquium must be held no later than six weeks after submission of the thesis.

(3) Detailed descriptions of all modules can be found in the module course catalog.

(4) As a rule, the supplementary subject(s) to acquire additional knowledge in a discipline complementary to physical oceanography or climate physics must be a subject within the disciplines mathematics or natural sciences. The selection of modules in this supplementary subject totaling 12 ECTS credits must form a coherent unit of an appropriate level that must be approved by the examinations board responsible.

Upon a student's submission of a reasoned application to the subject advisor for physical oceanography / climate physics, a subject not in the mathematical or natural

sciences may be chosen as a supplementary subject, upon approval of the examinations board.

Overview: Ocean and Climate Physics

| | | | | | |
|--------------------------------------|--|---|---|---|---|
| Winter Semester 1 30 ECTS credits | OCEAN I: Theoretical Oceanography I L4 + PC2, 9 ECTS credits | CLIMATE: Climate Processes and Observations L3 + PC1, 6 ECTS credits | ADVANCE: required elective 9 ECTS credits | | ADD: supplementary subject 6 ECTS credits |
| Summer Semester 1 30 ECTS credits | OCEAN I: Theoretical Oceanography II L4 + PC2, 9 ECTS credits | CLIMATE: Climate Modeling L2 + PC2, 6 ECTS credits | CLIMATE: Climate Dynamics L2, 3 ECTS credits | ADVANCE: required elective 6 ECTS credits | ADD: supplementary subject 6 ECTS credits |
| Winter Semester 2 30 ECTS credits | OCEAN 2: Oceanic Processes & Observations I2 + S2, 6 ECTS credits | ADVANCE: required elective 9 ECTS credits | SPEC: Specialization and Project Planning, incl. Presentation 15 ECTS credits | | |
| Summer Semester 2 30 ECTS credits | THESIS: Master's Thesis and Presentation 30 ECTS credits | | | | |

Key for table:
Lecture (L), Practical course (PC), Internship (I), Seminar (S)

(5) Moreover, students may voluntarily complete modules in excess of the 120 ECTS credits. They will, however, not be used to calculate the overall final grade.

(6) Students pursuing a supplementary subject shall enroll in individual modules in order to acquire knowledge from subareas of physical oceanography or climate physics. Under the heading "Verwendbarkeit des Moduls," (Applicability of the module) in the module descriptions of the module course catalog, there is information as to whether the respective module for physical oceanography and climate physics is intended as a supplementary subject. The examination regulations applicable to the student's main subject will provide more information about the scope of the supplementary subject. The examinations board shall stipulate which modules satisfy the substantive requirements prescribed within the framework of the main subject

after the student pursuing a supplementary subject has consulted with the subject advisor for the subject of physical oceanography / climate physics.

Section 5 Course types

Section 5 sentence 3:

Courses within the modules of the Degree Program will be held in English. Courses in supplementary subjects may be held in German or English. If students select supplementary subjects that are taught in German, they must be sufficiently proficient in German in order to register for the module.

Section 13 Completed coursework and module examinations

Section 13 subsection 4:

1. The examination types are specified in the appendix of the respective module descriptions. Any deviations will be announced at the beginning of registration for courses.
2. The oral examinations in the modules Theoretical Oceanography and Climate last between 30 and 45 minutes as a rule.
3. Students must register for oral examinations in the modules Theoretical Oceanography and Climate by scheduling an individual examination date with lecturers.
4. The following type of examination may be additionally used for module and course examinations: report—synoptic treatment of a topic that was addressed as part of the respective module.

Section 13 subsection 6:

Examinations in the modules of the Degree Program shall be conducted in English. Examinations in supplementary subjects may be conducted in either German or English.

Section 14 Master's thesis

Section 14 subsection 4:

The master's thesis must be written in English.

Section 14 subsection 5:

The workload for the master's thesis amounts to 30 ECTS credits, which 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 (overall) grade shall be calculated by averaging the grades from each course examination weighted according to the ECTS credits assigned to each part. In the module MSc Thesis, the grade for the module shall be weighted 80% for the grade of the master's thesis and 20% for the grade of the presentation and discussion.

Section 15 subsection 3 sentence 9:

The overall final grade for the Master of Science in Ocean and Climate Physics shall be calculated by averaging the grades from all modules weighted according to the ECTS credits assigned to each, whereby the module MSc Thesis shall have twice the weight.

Section 15 subsection 3 sentence 10:

No grades shall be awarded for the module SPEC (professional specialization). The module and grades for the supplementary subjects will not be used to calculate the overall final grade.

Section 15 subsection 4:

The overall final grade "pass with distinction" shall be awarded if a grade of 1.0 is earned for the master's thesis in both assessments, the master-level colloquium was graded at least 1.3, the average overall grade is less than or equal to 1.30, and none of the module examinations were passed with grades that were worse than 2.3.

Section 23
Effective date

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

Hamburg, 24 May 2019
Universität Hamburg

Appendix A: Module Table

| Appendix A: | | Subject-Specific Provisions—Master of Science—Ocean and Climate Physics—Module Table | | | | | | | | | |
|---|---------------------------------|--|--|--------------------|---|---|----------------|-----------------------|-----------------------|---|----------------------------------|
| Last updated: 3 April 2019 | | | | | | | | | | | |
| Information about the Module | | | | | Courses | | | | | Key for table: Lecture (L), Practical course (PC), Internship (I), Sem | |
| Duration in Semesters | Frequency | Recommended Semester | Module Type: Required (Req.) or Required Elective (RE) | Module Number/Code | Module | Course Title | Type of Course | Credit Hours per Week | Type of Examination | Graded | ECTS Credits |
| 2 | Every semester | | Req. | OZ-M-OCEAN 1 | Theoretical Oceanography | | | | | | 18 |
| | Annually in the winter semester | 1 | | | | <i>Theoretical Oceanography I</i> | L | 4 | Oral | Yes | 6 |
| | Annually in the winter semester | 1 | | | | <i>Theoretical Oceanography I</i> | PC | 2 | Practical examination | No | 3 |
| | Annually in the summer semester | 2 | | | | <i>Theoretical Oceanography II</i> | L | 4 | Oral | Yes | 6 |
| | Annually in the summer semester | 2 | | | | <i>Theoretical Oceanography II</i> | PC | 2 | Practical examination | No | 3 |
| <p><i>Intended learning objectives: After completion of the module, students will be familiar with the theoretical and physical fundamentals of wind and dense oceanic circulation as well as the entire range of variability in the ocean (from periodic processes such as gravity waves, planetary waves, and mesoscale vortices to turbulence). They will have an in-depth understanding of the mechanisms, scales, and dynamic equilibria, their mathematical description, and their treatment in ocean circulation models.</i></p> <p><i>Prerequisites for participation: none</i></p> <p><i>Examination prerequisites: prerequisites for the examination will be announced at the start of the respective course.</i></p> | | | | | | | | | | | |
| 1 | | | Req. | OZ-M-OCEAN 2 | Oceanic Processes and Observations | | | | | | Poster or term paper Yes 6 |
| | Annually in the winter semester | 3 | | | | <i>Oceanic Processes and Observations</i> | I | 2 | Practical examination | No | 3 |
| | Annually in the winter semester | 3 | | | | <i>Oceanic Processes and Observations</i> | S | 2 | Seminar presentation | No | 3 |
| <p><i>Intended learning objectives: After completion of the module, students will have an in-depth understanding of the selected process that are relevant for circulation gained through a combination of tank experiments, simulations, and observations. The type of examination will be individually agreed upon at the beginning of the course; students may choose between a poster and a term paper.</i></p> <p><i>Prerequisites for participation: none</i></p> <p><i>Examination prerequisites: prerequisites for the examination will be announced at the start of the respective course.</i></p> | | | | | | | | | | | |
| 2 | Every semester | | Req. | OZ-M-CLIMATE | Climate | | | | | | Oral Yes 15 |
| | Annually in the winter semester | 1 | | | | <i>Climate Processes and Observations</i> | L | 3 | | | 3 |

| | | | | | | | | | | |
|--|---------------------------------|---|--|--|---|--------|---|------------------------------|----|---|
| | Annually in the winter semester | 1 | | | <i>Climate Processes and Observations</i> | PC | 1 | <i>Practical examination</i> | No | 3 |
| | Annually in the summer semester | 2 | | | <i>Climate Modeling</i> | L | 2 | | | 3 |
| | Annually in the summer semester | 2 | | | <i>Climate Modeling</i> | PC | 2 | <i>Practical examination</i> | No | 3 |
| | Annually in the summer semester | 2 | | | <i>Climate Dynamics</i> | L + PC | 2 | <i>Practical examination</i> | No | 3 |

Intended learning objectives: After completion of the module, students will have in-depth knowledge of climate-relevant processes and phenomena in the ocean and the atmosphere and their short-term and long-term variability, both on a global and regional scale. Students will be able to describe these processes and phenomena dynamically and physically and will be familiar with the limitations and possibilities of the methods to describe these processes and phenomena by means of observations and numerical climate models.

Prerequisites for participation: none

Examination prerequisites: prerequisites for the examination will be announced at the start of the respective course.

| 3 | RE | OZ-M-ADVANCE | Advanced Methods and Knowledge | | | | | Yes | 24 | |
|---|--|--------------|--------------------------------|--|--|--------|-----|--|-----|------------|
| | Every two years in the winter semester | 1 or 3 | | | <i>Data Assimilation</i> | L | 3 | <i>Written examination, oral examination, presentation, or term paper. The exact type of examination shall be announced before course registration begins.</i> | Yes | 3 |
| | Every two years in the winter semester | 1 or 3 | and/or | | <i>Data Assimilation</i> | PC | 1 | | Yes | 3 |
| | Annually in the winter semester | 1 or 3 | and/or | | <i>Sea-Ice</i> | L + PC | 1+1 | | Yes | 3 |
| | Annually in the summer semester | 2 | and/or | | <i>Shelf Sea Dynamics</i> | S | 2 | | Yes | 3 |
| | Annually in the winter semester | 1 or 3 | and/or | | <i>Nonlinear Processes I</i> | L + PC | 2+2 | | Yes | 6 |
| | Annually in the summer semester | 2 | and/or | | <i>Nonlinear Processes II</i> | L + PC | 2+2 | | Yes | 6 |
| | Every two years in the winter semester | 1 or 3 | and/or | | <i>Predictions & Predictability of Climate</i> | L | 2 | | Yes | 3 |
| | Every two years in the winter semester | 1 or 3 | and/or | | <i>Predictions & Predictability of Climate</i> | S + PC | 2 | | Yes | 3 |
| | Annually in the winter semester | 1 or 3 | and/or | | <i>Special Topics in Oceanography or Climate Science</i> | S | | | Yes | 3 |
| | Annually in the summer semester | 2 | and/or | | <i>Special Topics in Oceanography or Climate Science</i> | S | | | Yes | 3 |
| | In accordance with individual scheduling | 1, 2, 3 | and/or | | <i>Marine Excursion</i> | | | <i>Internship certificate</i> | No | Up to 6 |
| | Every winter and summer semester | 1, 2, 3 | and/or | | <i>Courses for supplementary subjects in the MSc in ICSS (physics track)</i> | | | <i>In accordance with provisions of the Degree Program</i> | Yes | As offered |

| | | | | | | | | | | |
|--|---------------------------------|---|--------|-------------|---|---|---|--|-----|------|
| | Annually in the winter semester | 1 | and/or | | Introduction to Physical Oceanography | L | 2 | Practical examination | No | 3 |
| <p><i>Intended learning objectives: Students will have acquired in-depth subject and methodological knowledge in the field of physical oceanography or climate physics. Students will be able to select from a catalog of courses—the courses listed above are examples. The type of examinations for the individual courses will be stipulated and announced at the beginning of course registration; all courses will be graded save for two exceptions: (i) An introduction to physical oceanography course will be offered to students at the beginning of the first semester who do not have a BS in Physical Oceanography. (ii) Marine excursions that have been arranged by students themselves requiring active participation on research vessels while underway may be credited up to 6 ECTS ungraded credits (contingent on the duration of the voyage and activity on board) upon prior approval by the examinations board.</i></p> | | | | | | | | | | |
| <p><i>Prerequisites for participation: none</i></p> | | | | | | | | | | |
| <p><i>Examination prerequisites: prerequisites for the examination will be announced at the start of the respective course.</i></p> | | | | | | | | | | |
| 1 | Every semester | | Req. | OZ-M-SPEC | Specialization | | | | No | 15 |
| | Every semester | 3 | | | Specialization and Project Planning | | | Report | | 12 |
| | Every semester | 3 | | | Seminar | | | Presentation | | 3 |
| <p><i>Intended learning objectives: After the completion of the module, students, through intensive literature study and discussions in their working group, will have acquired in-depth knowledge of the oceanographic specialty in which they will later write their master's thesis. Through intensive participation in the ongoing research work of the working group, students will have learned to use the "tools" required to compose their master's thesis. In consultation with their supervisor, students will have also developed a strategic plan for their master's thesis. In addition, students will be able to present such a plan and other scientific content to an audience in a confident and motivated manner and be able to summarize it in writing.</i></p> | | | | | | | | | | |
| <p><i>Participation requirements: successful completion of OCEAN 1 and CLIMATE modules.</i></p> | | | | | | | | | | |
| <p><i>Examination prerequisites: prerequisites for the examination will be announced at the start of the respective course.</i></p> | | | | | | | | | | |
| 1 | Every semester | | Req. | OZ-M-THESIS | MSc Thesis | | | | Yes | 30 |
| | Every semester | 4 | | | | | | Master's thesis (80%) | | |
| | | | | | | | | Presentation and discussion (20%) | | |
| <p><i>Intended learning objectives: The master's thesis will demonstrate the student's ability to independently address a scientific question in the field of oceanography using scientific methods and document it in accordance with scientific standards. Commencing with the current status of research, solutions for scientific questions will initially be presented and then implemented. Findings must be presented in an appropriate manner and critically evaluated. The module shall conclude with a presentation and subsequent discussion open to members of the institute.</i></p> | | | | | | | | | | |
| <p><i>Prerequisites for participation: 60 ECTS credits from the required and required elective modules of the degree program</i></p> | | | | | | | | | | |
| 2 | | | RE | OZ-M-ADD | Additional/Supplementary Subject | | | | No | 12 |
| | Annually in the winter semester | 1 | | | Supplementary Subject 1 | | | in accordance with provisions of the respective degree program | | 0–12 |
| | Annually in the summer semester | 2 | | | Supplementary Subject 2 | | | in accordance with provisions of the respective degree program | | 0–12 |
| <p><i>Intended learning objectives: The aim of the module is to specifically broaden the knowledge acquired in the Master' of Science in Ocean and Climate Physics by acquiring additional knowledge from one or two subjects that complement oceanography / climate physics. External courses (summer schools, training courses) may also be taken with prior approval from the examinations board. Active participation is a requirement for recognition. Grades from this module will not be used to calculate the overall final grade. Students may also register for ungraded courses.</i></p> | | | | | | | | | | |
| <p><i>Prerequisites for participation: none</i></p> | | | | | | | | | | |
| <p><i>Examination prerequisites: prerequisites for the examination will be announced at the start of the respective course.</i></p> | | | | | | | | | | |