Stockholms universitet

Reference number SU FV-2579-26

GENERAL STUDY PLAN FOR RESEARCH-LEVEL TRAINING IN ATMOSPHERIC SCIENCE AND OCEANOGRAPHY

including the study plan for the Licentiate degree

English translation. The Swedish version is the official version which applies.

(General syllabus for doctoral studies in Atmospheric Sciences and Oceanography)

Admission to doctoral studies at Stockholm University shall, in principle, be for programmes leading to a doctoral degree.

National regulations concerning admission, education and examination at doctoral level are set out in the Higher Education Ordinance, Chapters 5–7, 10, 12 and Appendix 2. At Stockholm University, the following regulations and rules also apply: *Admission Regulations for Third-Cycle Education, Rules for Third-Cycle Education and Examination,* and *the Local Degree Regulations for Stockholm University*.

The study plan was adopted by the Faculty Board of Natural Sciences on 1 July 2007, and revised ON(del) 12 June 2017, ON(del)17 June 2020 (partially) and 10 September 2026.

1 Subject description

In atmospheric science and oceanography, physics and chemistry are used in conjunction with mathematics and numerical methods to study the atmosphere and the ocean, as well as the links between them across all spatial and temporal scales. The doctoral programme utilises theoretical and experimental methods in the fields of atmospheric physics, dynamic and chemical meteorology, and oceanography. Key areas of application include climate research and the development of numerical weather forecasts.

2 Aims and objectives of the programme

In addition to the requirements for undergraduate and postgraduate education, third-cycle education shall develop the knowledge and skills necessary to conduct research independently.

Doctoral-level education aims to provide in-depth knowledge of atmospheric science and oceanography and familiarity with research methodology. Through its courses, the programme shall provide a broad, general orientation within the subject's main areas, as well as in-depth knowledge within one of the subject's specialised areas. Through the thesis work, the student shall demonstrate their ability to plan

Stockholm University
106 91 Stockholm

Visiting address:
Södra husen, Building A, Floor 5
www.su.se

Telephone:
Fax:
Email:

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and to carry out research in a specialised field, as well as to critically review and analyse the results obtained.

The programme concludes with a licentiate or doctoral degree. The objectives applicable to these degrees under the Higher Education Ordinance are set out in sections 5 and 6 below.

3 Entry requirements and prior learning requirements

In order to be admitted to postgraduate education, the applicant must fulfill both the general and specific entry requirements. The qualification requirements must be fulfilled before admission to the programme.

3.1 General entry requirements

The applicant who fulfills the general entry requirements for admission to a third-cycle study programme is someone who has earned a degree from a second-cycle studies programme, or have completed course requirements of a minimum of 240 higher education credits, of which a minimum of 60 higher education credits are in second-cycle studies, or in some other manner have acquired, either within or outside of Sweden, essentially equivalent knowledge.

The subject area board may grant an exemption, for an individual applicant, from the requirement for fulfilling the general entry requirements, if there are special grounds for doing so.

3.2 Specific entry requirements

An applicant fulfills the specific entry requirements if they have a minimum of 90 higher education credits in either of the subjects meteorology, oceanography, physics or chemistry, at least 15 higher education credits in mathematics, as well as an independent degree project of at least 15 higher education credits, and English language proficiency equivalent to English 6/English Level 2 at upper secondary school.

The specific entry requirements may also be met by those who have acquired equivalent knowledge through other means, either in Sweden or abroad.

4 Selection and admission

Selection from among applicants who meet the entry requirements shall be made with regards to their ability to benefit from the programme. That mere fact that an applicant is assessed to be able to receive credits for previous educational or professional/vocational activities to be credited to the educational programme may not give the applicant priority over other applicants in the selection process. Decisions on admission are made in accordance with the applicable delegation regulations.

The assessment criteria for admission to the postgraduate programme in Atmospheric Sciences and Oceanography are familiarity with the theory and applications of the subject, subject knowledge relevant to the research project, the ability to express oneself orally and in writing, proficiency in English, analytical ability, creativity, initiative, independence and the ability to work collaboratively. The assessment of the applicant’s ability in these respects are based on the relevance and results of completed higher education courses, the quality and scope of the independent project, references, interviews and a personal statement from the applicant describing their expectations of, and intentions regarding, the programme.

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5 Doctoral programme

5.1 General

The doctoral programme comprises the equivalent of four years of full-time study (240 higher education credits) and consists of a coursework component worth 60 credits and a thesis component worth 180 credits.

Although the coursework component precedes the dissertation component, doctoral students are advised to discuss their dissertation topic at an early stage.

Objectives for the Degree of Doctor in accordance with the Higher Education Ordinance

Knowledge and understanding
For the degree of doctor, the doctoral student shall

- demonstrate broad knowledge of and a systematic understanding of the research field, as well as in-depth and up-to-date specialist knowledge within a defined part of the research field, and
- demonstrate familiarity with scientific methodology in general and with the methods of the specific research area in particular.

Competence and skills
For the degree of doctor, the doctoral student must

- demonstrate the ability to carry out scientific analysis and synthesis, and to independently and critically examine and assess new and complex phenomena, issues and situations,
- demonstrate the ability to identify and formulate research questions critically, independently, creatively and with scientific rigour, as well as to plan and conduct research and other advanced tasks using appropriate methods within specified timeframes, and to review and evaluate such work,
- demonstrate, through a thesis, the ability to make a significant contribution to the advancement of knowledge through their own research,
- demonstrate the ability to present and discuss research and research findings with authority, both orally and in writing, in national and international contexts, in dialogue with the scientific community and society at large,
- demonstrate the ability to identify the need for further knowledge, and
- demonstrate the potential to contribute to the development of society and support the learning of others, both in research and education and in some other qualified professional capacity.

Judgement and approach
To be awarded a the degree of doctor, the doctoral student must

- demonstrate intellectual independence and academic integrity, as well as the ability to make judgements regarding research ethics, and
- demonstrate a thorough understanding of the potential and limitations of science, its role in society and the responsibility of individuals for how it is used.

5.2 Individual study plan

An individual study plan shall be drawn up for each doctoral student. The preparation and monitoring of the individual study plan shall be carried out by the doctoral committee, which, following admission, is established in accordance with the department's delegation regulations. The doctoral committee consists of the doctoral student, their principal and co-supervisors, and two independent researchers within the department's subject area.

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The individual study plan shall be drawn up as soon as possible following the decision on admission and approved no later than two months after the doctoral student has commenced their studies. The individual study plan shall be reviewed at least once a year. Where necessary,[1] follow-up shall take place more frequently. The individual study plan is approved in accordance with the applicable delegation regulations. During the follow-up of the individual study plan, it shall be made clear how the activities of the doctoral programme relate to the degree objectives set out in the Higher Education Ordinance.

The individual study plan must include:

- planned funding for studies (doctoral student post, other funding for studies, which must be specified in such cases),
- the names of the supervisors and the division of responsibilities between them (where applicable, expressed as a percentage or in hours),
- plans for and forms of supervision,
- access to a workspace and other resources,
- the progression of the doctoral student's studies in relation to the degree objectives,
- a research plan for the doctoral student's third-cycle education, including a timetable,
- a timetable for activities forming part of the doctoral student's programme (for the coming year or for the entire programme),
- the scope and content of any departmental duties,
- plans for seminars, literature studies and courses forming part of the doctoral programme,
- the doctoral student's other commitments during the programme,
- details of how supervision is organised, and
- a funding plan for the doctoral student.

Where funding does not consist of a doctoral student post, the funding plan must specify how the doctoral student's social protection is safeguarded in the event of, for example, illness or parental leave.

5.3 Courses and teaching

Courses in the doctoral programme aim to provide a broad understanding of the subject and in-depth knowledge of the thesis topic. Compulsory modules include:

- The General Circulation (15 credits)
  Intended to ensure compliance with the Ordinance's requirements for broad knowledge within the field of atmospheric science and oceanography.

- Introductory Course in University Pedagogy (3 credits)
  Compulsory for doctoral students whose departmental duties include teaching.

- Section-wide seminar on research ethics and scientific integrity (1.5 credits)
  Intended to ensure compliance with the Ordinance's requirements for sound knowledge of research ethics and scientific integrity.

Other courses are selected in consultation with the supervisor and the doctoral committee. Courses or equivalent may be taken at other departments or higher education institutions, or from other organisations, and will then be credited in accordance with current procedures.

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[1] E.g. where a doctoral student under-performs in their studies within the programme or neglects their obligations under the individual study plan. The withdrawal of supervision and other resources requires systematic documentation in the individual study plan.

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The doctoral student must hold seminars and should actively participate in eminars at which current research findings are discussed. Courses or teaching may be provided in collaboration with other departments. The student should make the most of opportunities to attend guest lectures both within their own subject and in related subjects.

Compulsory modules that do not carry credits are documented on an ongoing basis in a legally sound manner, in accordance with procedures established by the department board.

5.4 Thesis

As part of the programme, the student must write an academic thesis. The thesis must demonstrate the doctoral student's ability to independently – within or outside the framework of a team project – resolve the chosen research problem in a scientifically satisfactory manner. The quality of the thesis should be such that it can be assessed as meeting reasonable requirements for acceptance for publication in a high-quality academic journal. The doctoral thesis shall be structured either as a unified, coherent academic work (monograph thesis) or as a compilation of academic papers accompanied by a summary of these. The papers may have been co-authored with other individuals. The doctoral student's contributions must be clearly distinguishable if the work has been carried out as part of a collaborative project.

The doctoral thesis must be written in English. The department is responsible for ensuring that the thesis includes a Swedish translation of its English summary..

5.5 Supervision

For each doctoral student, a principal supervisor and at least one co-supervisor shall be appointed. At least one of these must have the competence of a docent and at least one must have completed supervisor training or been assessed as having equivalent competence. Staff employed within the Faculty of Science who are appointed as principal or co-supervisors within the doctoral programme must have completed CeUL's (the Centre for the Advancement of University Teaching) supervisor training or the equivalent; in the case of newly employed staff, the supervisor must complete the training within one year of employment. Decisions regarding supervisors are made in accordance with the applicable delegation regulations.

A doctoral student who so requests shall, following an application to the departmental board, be permitted to change supervisor. The individual study plan shall then be revised.

5.6 Examinations and the public defence

To qualify for a degree, the student must achieve a pass mark both in the examinations forming part of the degree and in the thesis. Each course generally concludes with a written or oral examination. In some cases, continuous assessment may take place in conjunction with lectures or laboratory sessions. Examinations are assessed as either a fail or a pass.

The thesis must be defended orally at a public defence. The defence must comply with the regulations applicable to the Faculty of Science, Stockholm University.

5.7 Credit transfers

Provisions regarding credit transfer are set out in Chapter 6, Sections 6–8 of the Higher Education Ordinance.

Credit for prior learning should be granted at the start of the third-cycle programme. Credit for prior learning granted at the start of the third-cycle programme shall be deducted from the net duration of study.

Decisions on the recognition of prior learning are taken in accordance with the applicable delegation regulations.

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6 Programme leading to a Licentiate degree

The Faculty Board may, where there are special grounds, decide that admission to postgraduate research education may be granted for part of a postgraduate research programme leading to a Licentiate degree comprising at least
120 higher education credits. The fact that student finance is deemed to be secure for a period corresponding to the fulfilment of the requirements for a Licentiate degree but not for a doctoral degree does not in itself constitute special grounds.

Decisions on admission to postgraduate research programmes with a licentiate degree as the objective are made in accordance with the applicable delegation regulations.

In cases where the doctoral student wishes to proceed to a doctoral degree, a renewed academic assessment and an analysis of the funding plan must be carried out before a decision on admission to doctoral education with the aim of a doctoral degree is made in accordance with the current delegation regulations.

6.1 General

A postgraduate programme comprising at least 120 credits, or a component comprising at least 120 credits of a postgraduate programme leading to a doctoral degree, may be completed with a licentiate degree.

The programme consists of coursework comprising at least 30 credits and a licentiate thesis worth 90 credits.

Although the coursework precedes work on the licentiate thesis, doctoral students are advised to discuss the topic of their thesis at an early stage.

Objectives for the Licentiate degree in accordance with the Higher Education Ordinance

Knowledge and understanding
For the Licentiate degree, the doctoral student shall

- demonstrate knowledge and understanding within the field of research, including up-to-date specialist knowledge within a defined area of this field, as well as in-depth knowledge of scientific methodology in general and the methods of the specific field of research in particular.

Competence and skills
For the Licentiate degree, the doctoral student
shall
- demonstrate the ability to identify and formulate research questions critically, independently and creatively, and with scientific rigour; to plan and, using appropriate methods, carry out a limited research project and other advanced tasks within specified timeframes, thereby contributing to the advancement of knowledge; and to evaluate this work,
- demonstrate the ability, in both national and international contexts, to present and discuss research and research findings clearly, both orally and in writing, in dialogue with the scientific community and society at large; and
- demonstrate the skills required to participate independently in research and development work and to work independently in other qualified activities.

Judgement and approach
For the Licentiate degree, the doctoral student shall

- demonstrate the ability to make ethical judgements regarding their own research,
- demonstrate an understanding of the potential and limitations of science, its role in society and people's responsibility for how it is used, and

- demonstrate the ability to identify their need for further knowledge and to take responsibility for developing their knowledge.

6.2 Individual study plan

The individual study plan shall be drawn up in the same way as for a doctoral degree; see 5.2.

6.3 Courses and teaching

Courses in the programme aim to provide a broad understanding of the subject and in-depth knowledge of the thesis topic. Compulsory modules comprise:

- A foundational course (15 credits)

- Introductory course in university pedagogy (3 credits)
  Compulsory for licentiate students whose departmental duties include teaching.

- A section-wide seminar on research ethics and scientific integrity (1.5 credits)
  Intended to ensure compliance with the Ordinance's requirements for sound knowledge of research ethics and scientific integrity.

Other courses are selected in consultation with the supervisor and the doctoral committee. Courses or equivalent may be taken at other departments or higher education institutions, or from other organisations, and will then be credited in accordance with current procedures.

The student must deliver seminars and should actively participate in seminars that discuss current research findings. Courses or teaching may be provided in collaboration with other departments. The student should make the most of opportunities to attend guest lectures both within their own subject area and in related subjects.

Compulsory modules are documented on an ongoing basis in a legally sound manner in accordance with procedures established by the Departmental Board.

6.4 Thesis

As part of the programme, students must write a licentiate thesis. In terms of quality, the thesis should be of such a standard that it is deemed to meet reasonable requirements for acceptance for publication in a high-quality academic journal.

6.5 Supervision

See 5.5.

6.6 Examination

The first paragraph of 5.6 also applies to the Licentiate degree. The examination of the Licentiate thesis takes place in conjunction with a publicly announced Licentiate seminar and must comply with the rules applicable to the Faculty of Science, Stockholm University.

6.7 Credit transfers

Provisions concerning credit transfer are set out in Chapter 6, Sections 6–8 of the Higher Education Ordinance.

Credit for previous studies should be granted at the start of the third-cycle programme. Credit for prior learning granted at the start of the third-cycle programme shall result in a corresponding reduction of study.

Decisions on the recognition of credit transfer are taken in accordance with the applicable delegation regulations.

7 Transitional provisions

Doctoral students who have commenced their third-cycle programme in accordance with a previous general study plan may complete their studies in accordance with that plan within the programme's nominal duration plus two years. The subject director decides on transitional arrangements following a request from an individual doctoral student.