

PROGRAMME DESCRIPTION

PhD programme in Science

180 credits

Tromsø

This programme description was approved by the Programme Board for the PhD programme in Science on 9 November 2018.

Name of the programme of study	Bokmål: Ph.d.-program i realfag Nynorsk: Ph.d.-program i realfag English: PhD programme in Science
Degree attained	Philosophiae Doctor (PhD) in Science
Target group	Competent candidates with potential for scientific and/or technological research
Admission requirements, required prerequisite knowledge and recommended previous knowledge	To be admitted to the PhD programme, the applicant must either have completed an integrated master's degree (300 credits), a master's degree (120 credits) that expands on a bachelor's degree (180 credits) or an equivalent education that the faculty has approved as the basis for admission. The applicant must have an average grade of C or higher in his/her master's degree and the relevant parts (specialisation) of his/her bachelor's degree to be admitted to the programme. The applicant must be able to document potential for research. If the research group is of the opinion that the candidate lacks necessary skills within the academic field, the faculty can, on the advice of the research group, require that the candidate takes some special courses in addition to those specified in the programme description. The applicant must have adequate funding to be admitted to the programme, which is generally the salary at the level of a PhD position.
Academic content and programme description	The PhD programme in Science has a scope of 180 credits, consisting of 30 credits for the instruction component and 150 credits for the doctoral thesis (including trial lecture and defence). The doctoral thesis constitutes the main part of the programme. The doctoral thesis shall be an independent piece of academic research which meets international standards in the subject within which it is written. The doctoral thesis shall contribute to the development of new knowledge and achieve a level meriting publication in scientific literature in the field. The doctoral thesis can either be a monograph or a collection of several smaller research papers (an anthology). In the latter, there must be a connection between the various components, which must be explained in a summary. The instruction component shall support the candidate's work on his/her doctoral thesis, as well as provide the necessary professional scope and specialisation, so the candidate develops an independent and reflected relationship with his/her research and that of others, and the role of the researcher in a wider context.

	The courses in the instruction component must be at PhD level. The instruction component must contain courses equivalent to 30 credits, comprising 20-27 credits in the field of mathematics and natural science, 3-6 credits in philosophy of science and ethics and, if desired, up to 4-7 credits of courses in transferable skills. Consequently, the maximum number of credits allowed for philosophy of science and ethics, and transferable skills is 10. For students with projects relating to subject didactics, the instruction component must contain courses equivalent to 30 credits, comprising 20-27 credits in the field of mathematics and natural science and/or subject didactics, 3-6 credits in philosophy of science and ethics and, if desired, up to 4-7 credits of courses in transferable skills. Consequently, the maximum number of credits allowed for philosophy of science and ethics, and transferable skills is 10. The PhD trainee schools may have specific requirements related to compulsory courses and the composition of the instruction component. The following type of courses may be included: 1. Ordinary PhD courses and specialized syllabus selected by the student at UiT 2. Ordinary PhD courses and specialized syllabus selected by the student taken at other accredited higher education institutions 3. National and international PhD courses arranged by, or in cooperation with, accredited higher education institutions 4. National and international PhD courses arranged by research institutions or other organisations During the programme, the candidate is expected to present his/her work at international conferences within the academic field and at PhD courses and/or seminars. Presentations in the form of lectures and/or poster are not approved as credits in the instruction component.
Structure of the programme of study	The PhD students are recommended to implement the instruction component during the first two years of the programme. Furthermore, they are recommended to implement the course in philosophy of science and ethics as soon as possible after starting the programme. If the student wishes to undertake a period of study abroad, this should generally be implemented in the second or third academic year. PhD students with a starting date after 22 June 2018 must implement a compulsory midway evaluation when they are half way through the programme.
Learning outcome descriptors in accordance	A candidate who has completed his/her qualification should have the following learning outcomes defined in terms of knowledge, skills and general competence:

with the Norwegian Qualifications Framework for Higher Education	Knowledge: The candidate... • is in the forefront of knowledge within his/her academic field, physics, geosciences, computer science, chemistry, mathematics, bioinformatics, molecular and structural biology, statistics, technology and the intersection between two or more of these, and masters the field's philosophy of science, issues, methods and techniques • can evaluate the expediency and application of different methods and processes in research and scholarly development projects within their scientific field • can contribute to the development of new knowledge, new theories and new methods in their scientific field • has knowledge of relevant channels and forums for research dissemination in their scientific field Skills: The candidate... • can formulate problems, plan and carry out research and scholarly development work in science • can carry out research and scholarly development work in science of a high international standard • can handle complex academic issues and challenge established knowledge and practice in their scientific field General competence: The candidate... • can communicate research-based knowledge orally through lectures in a way that the lecture can be followed by students with prerequisite knowledge equivalent to the level one would expect to find among advanced students in the subject • can disseminate research-based knowledge in writing at a high international level • can participate in debates in international forums within their scientific field • can manage complex assignments and projects within a scientific field or in the intersection between two or more scientific fields • can identify new relevant ethical issues and carry in their research and carry out their research with scholarly integrity • can assess the potential for innovation and/or ideas that may be commercialised within their research¹
Relevance of the programme of study	The programme educates candidates with scientific competence in the forefront of their scientific field. The candidates hold a research qualification that enables them to carry out research at a high international level in or

¹ This point applies for students admitted after 22 June 2018 with a compulsory midway evaluation.

	outside academia. With a view to being able to apply the research outside academia, the candidates are trained to evaluate the potential for innovation and commercialisation.² The candidates have general skills that are of relevance for project work in academia as well as trade and industry, e.g. the candidates can work independently, acquire new knowledge, carry out complex projects, build networks and communicate specialized knowledge orally and in writing.
Workload and learning activities	The PhD programme qualifies candidates for research activities of international standard and for other types of work for which a high level of academic expertise and analytical skill is required, according to the canons of scientific and scholarly practise and ethical standards. The instruction component comprises of different types of courses, where the teaching methods may include lectures, seminars, laboratory work and self-study. One credit is equivalent to approx. 25-30 hours of work. The doctoral thesis is an independent piece of work presented as a monograph or a collection of several smaller research papers (an anthology). The doctoral project may include fieldwork, laboratory exercises, literature studies and independent writing work. Furthermore, the PhD student will receive regular academic supervision and a midway evaluation.
Examination and assessment	The courses that may be included in the instruction component have different forms of examination and grades/assessments. These are stipulated in the individual course descriptions. The specialized syllabus selected by the student is assessed with the grading scale pass/fail. The instruction component must be completed and approved before the doctoral thesis may be submitted for evaluation. The doctoral thesis is assessed by an expert committee comprising of at least three members. If the doctoral thesis is found worthy of defence for the PhD degree, the candidate shall hold a trial lecture on a given topic. When the trial lecture has been held and approved, the candidate may defend his/her doctoral thesis in a public disputation.
Doctoral thesis	The doctoral thesis has a scope of 150 credits. The form of assessment is pass/fail. It is preferable for the doctoral theses in the PhD programme in Science to be written in English. A decision on whether two or more PhD students may co-author a doctoral thesis will be taken by the Committee for Research Training on a case by case basis based on a recommendation from the relevant research group.

² This point applies for students admitted after 22 June 2018 with a compulsory midway evaluation.

Language of instruction and examination	All PhD courses at the faculty are taught in English.
Internationalisation	PhD students in science who are employed as doctorate research fellows at UiT or who are financed by sources that do not provide grants for periods of study abroad may apply for an overseas research grant for a period abroad of 2-6 months' duration. The application deadline is 1 October each year for periods of study abroad the following year. There must be clearly defined academic grounds for the period of study abroad and how this will be incorporated into the doctoral project. The period of study abroad shall generally be implemented in the second or third academic year. The faculty also has a grant scheme for PhD students wishing to take courses that will form part of the instruction component at other universities, in Norway or abroad. If equivalent courses are not offered at UiT, the student may apply for a grant for the exchange period as well as a travel grant.
Administrative and academic responsibility	The programme of study is administrated by the Faculty of Science and Technology and the academic responsibility for the programme lies with the Committee for Research Training at the faculty.
Quality assurance	The PhD programme in Science is quality assured through midway evaluations and annual progress reports from students and their supervisors. All academic supervisors in the PhD programme at the faculty are invited to an annual supervision seminar to shed light on relevant topics and discuss relevant issues. Although a co-supervisor may be responsible for the day-to-day supervision, internally or externally, the main supervisor has the overall academic responsibility. Reports and written work must be presented to all supervisors. The PhD student should have regular contact with his/her supervisors and should participate in an active research group. Consequently, the PhD student should stay at UiT for part of the effective period of study, unless special conditions determine otherwise. Furthermore, the Committee for Research Training works continually on development and monitoring the quality and completion of the programme.