

ECOLOGY AND NATURAL RESOURCE MANAGEMENT

[The Regulations for the Degree of Philosophiae Doctor \(PhD\) at the Norwegian University of Life Sciences](#) apply for the PhD education. The regulations concern the objectives of, responsibility for, admission to, and implementation and completion of the PhD education, including collaboration on PhD education with another degree-conferring institution. For all references in the text, these Regulations apply.

STUDY PROGRAMME

The PhD programme in Ecology and Natural Resource Management at the Department of Ecology and Natural Resource Management.

MAIN OBJECTIVES

The PhD programme in Ecology and Natural Resource Management shall qualify candidates for research of international standard within all subject areas at the Department of Ecology and Natural Resource Management and for other work in society where there are high demands on scientific insight and analytical thinking, in accordance with recognized principles of academic and research ethics. The PhD programme in Ecology and Natural Resource Management is a doctoral programme that will educate independent researchers of international calibre in conjunction with national and international research communities.

Candidates:

- Complete an education that provides in-depth and broader competence based on a relevant master's degree education or similar
- Carry out an independent work of research that will lead to a scientific thesis of high academic quality
- Learn critical thinking skills, dissemination of knowledge and academic cooperation

PLACE IN THE NORWEGIAN QUALIFICATIONS FRAMEWORK

Level 8, philosophiae doctor (PhD)

DEGREE ON COMPLETION OF THE PROGRAMME OF STUDY

PhD

SCOPE

Three years' full-time study.

OWNER AND CONTACT DETAILS

Department of Ecology and Natural Resource Management (INA), NMBU

COLLABORATION WITH OTHER INSTITUTIONS

The Department of Ecology and Natural Resource Management participates in extensive research collaboration with a range of national and international institutions. PhD candidates at the department may carry out research work and take required coursework at other institutions if this is appropriate for the candidate's education. We facilitate exchanges, both nationally and internationally.

SOCIETAL RELEVANCE

The Department of Ecology and Natural Resource Management (INA) has a particularly wide subject profile and offers comprehensive research and teaching activities in biology and ecology, natural resource management, renewable energy, nature-based tourism and forestry subjects. Our subject areas are behavioral ecology, biodiversity, evolution genetics, conservation biology, bio economics, botany, zoology, forest management fish and wildlife management, renewable energy, environmental impacts of land use and habitat change, market and natural resource economics and planning, nature-based tourism, population and community ecology, mapping of resources, wood technology, ecophysiology and ecotoxicology. Candidates educated at INA work in the higher education sector, research institutions, the business sector, public administration, ministries, municipalities etc.

ADMISSION REQUIREMENTS AND FUNDING

See sections 5 and 6.

Admission to the PhD programme is contingent on the applicant having an academically relevant education corresponding to a five-year Norwegian programme of study, where 120 credits are at the master's degree level, for example a master's degree, a cand. med. vet. degree or other relevant five-year programme of professional study. The applicant must have achieved learning outcomes in this programme of study corresponding to the descriptions in the Norwegian qualifications framework's second cycle. The Department to which admission is sought may stipulate that applicants must complete special courses and/or pass a special test prior to admission. The applicant must document a strong academic background from previous studies.

LEARNING OUTCOMES

KNOWLEDGE

On completion of the PhD programme in Ecology and Natural Resource Management, new doctors are expected to:

- Have in-depth knowledge in the chosen subject area within the PhD programme in Ecology and Natural Resource Management.
- Have in-depth knowledge about scientific theories and methods associated with the field.
- Be able to assess and analyze different theories, methods and processes in research and academic development projects – also from an international perspective.
- Contribute to the development of new knowledge, new theories and methods in the field.

SKILLS

On completion of the PhD programme in Ecology and Natural Resource Management new doctors are expected to:

- Be able to formulate issues, and plan and conduct research and academic development work of high international calibre within their field.
- Know how to use the scientific equipment, instruments and analysis tools of their field of specialization.
- Be familiar with relevant scientific methods and be able to assess their utility and limitations.
- Have conducted original research that has led to new knowledge that can be published in the form of scientific articles in international peer-reviewed journals.
- Be able to handle complexity, review and synthesize scientific information.
- Be able to perform critical assessments and give constructive criticism on scientific work in their field.

GENERAL COMPETENCE

On completion of the PhD programme in Biosciences, new doctors are expected to:

- Be able to conduct their research with professional and ethical integrity, and be able to identify and evaluate relevant environmental and ethical issues in their field.
- Be able to perform risk assessments of their work, and to take health, safety and environmental aspects into consideration.
- Be able to participate in complex interdisciplinary tasks and projects.
- Be able to disseminate research and development work through recognized national and international channels, and participate in scientific debates in international forums.
- Be able to disseminate the results of their research work to the business sector, the authorities and public administration, and to the general public.
- Have some experience in teaching students within their subject area or field of specialization.
- Be able to place own research in larger academic and societal contexts.
- Be able to assess the need for and, if required, stimulate innovation in the field.

LEARNING ACTIVITIES

MEANS OF ACQUIRING THE KNOWLEDGE

- The required coursework of at least 30 credits, consisting of a combination of compulsory and elective courses in the subject area, which will increase the depth and breadth of competence. The required coursework is adapted to the PhD candidate's individual specialization in the subject area based on his/her academic background.
- Reading and keeping updated on literature within his/her field of specialization.
- Work on the synopsis of the thesis / introductory chapter of the thesis, where the candidate has independently written an introduction that provides a theoretical and practical background for the research work, discusses and justifies the choice and use of research methods and puts his/her results in an international perspective.

MEANS OF ACQUIRING THE SKILLS

- Participating in planning and designing his/her PhD project in detail, and in planning new project applications, if relevant.
- Supervision and own research work, where the PhD student actively benefits from the competence of the supervisory team.
- Developing his/her own international academic network outside the supervisory team.
- Attending courses on research methods when relevant.
- Working on publications and submissions to journals, handling remarks from referees, as well as working on the thesis.
- Taking part in peer reviews of scientific manuscripts, giving feedback on colleagues' manuscripts, and attending seminars where other PhD candidates' and researchers' ideas and results are discussed.

MEANS OF ACHIEVING GENERAL COMPETENCE

- Taking a course on research ethics with a scope of at least 5 credits.
- Supervision and own research.
- Working on publications and the thesis.
- The trial lecture. The trial lecture requires familiarisation with a specified topic quickly, time management, searching for / selecting / evaluating / processing information, and giving an oral presentation.
- Presenting own research findings at national and international scientific conferences.
- Lecturing students in his/her area of competence.
- Giving lectures at scientific meetings.
- Giving interviews on radio and television, in the newspapers or other journals.

EVALUATION OF LEARNING OUTCOMES

The degree of philosophiae doctor (PhD) is conferred on the basis of:

- Approved completion of the required coursework
- An approved doctoral thesis
- An approved trial lecture on a specified topic
- An approved public defence of the doctoral thesis (disputation)

See section 12.

The objectives and the relevant learning outcomes are evaluated in the final instance through the trial lecture and public defence of the doctoral thesis. The required coursework is evaluated using different forms of evaluation such as oral or written examinations, submitting assignments or a semester paper. The content of the doctoral work and the required coursework must be approved by INA's research committee, and the committee monitors progress by means of the annual progress reports and the compulsory seminars (introductory, midway assessment seminar and final seminars). Other input to learning outcomes does not need to be evaluated separately but the principal supervisor is responsible for ensuring that the objectives are met through relevant measures, subject-related discussions and steps towards dissemination within the time frame of the doctoral degree work.

DETAILS

The progress report must be completed and submitted once a year to the research committee at the department, which will then perform an evaluation. Any important changes in the education plan must be dealt with by INA's research committee. All courses are evaluated in relation to NMBU's regulations. The candidate's ability to analyse different theories, methods and processes will be evaluated at the compulsory seminars. These are chaired by a member of the permanent academic staff, and another academic employee plays the role of the "opponent". The final evaluation of the candidate's ability to contribute new knowledge, theories and methods will be undertaken by the evaluation committee. The thesis must show that the candidate 1) helps develop new knowledge through original research that has been or can be published in peer-reviewed journals, 2) is able to review and synthesise complex issues, and 3) is able to perform critical assessments and give constructive criticism on scientific work within the field of specialisation. Ethical considerations must be embedded in the thesis and will thus be assessed by the evaluation committee. The thesis will constitute the final report on the research work.

ACADEMIC CONTENT AND STRUCTURE

INA has a particularly broad subject profile and performs comprehensive research and teaching activities in many biological disciplines and in the management of natural resources. Examples of subject areas (also mentioned above in point 11 Societal relevance) include behavioural ecology, biodiversity, evolution genetics, conservation biology, bioeconomics, botany, zoology, forest management, fish and wildlife management, renewable energy, environmental impacts of land use and habitat change, market and natural resource economics and planning, nature-based tourism, population and community ecology, mapping of resources, wood technology, ecophysiology and ecotoxicology.

The PhD programme in Ecology and Natural Resource Management is a doctoral programme that will educate independent researchers of international calibre in conjunction with national and international research communities. The programme will qualify candidates for research work and other work where there are high demands on scientific insight. The PhD programme seeks to meet the current and future needs for competence in order to conduct research, development and dissemination at universities and other public and private institutions, enterprises and organizations. The PhD candidate will complete an education that offers in-depth and broader competence based on a relevant master's degree or similar. He/she will carry out an independent

work of research that will lead to a scientific thesis of high academic quality, and must learn critical thinking skills, how to disseminate knowledge and academic collaboration.

INTERNATIONAL PERSPECTIVE

INA encourages candidates to participate in conferences, etc. They must be encouraged and helped to build national and international networks, as well as to participate in international conferences that can provide a basis for publication. The department has a comprehensive network of partners all over the world, which is reflected in our academic publications, with many international researchers as co-authors.

RESEARCH COMMUNITY LINKED TO THE PROGRAMME OF STUDY

The PhD candidate's principal supervisor will normally be appointed from among the department's permanent academic staff – researchers, associate professors and professors. Other researchers with relevant expertise can be appointed as co-supervisors, also from other national and international institutions. The candidate must be drawn actively into the discussions that take place in the research groups. All candidates are members of at least one of these groups.

RESEARCH WORK IN CONNECTION WITH THE PROGRAMME OF STUDY

The PhD education includes an independent scientific work that fulfils international standards and is of high academic quality in terms of the formulation of research questions, the specification of concepts, the methodological, theoretical and empirical basis, documentation, the use of literature and the form of presentation. The research work shall contribute to the development of new knowledge in the field, and must be of such quality as to qualify for publication as part of the scientific literature in the field.

SUPPORT FUNCTIONS AND INFRASTRUCTURE

See point 20 above, *Research community linked to the programme of study*: The principal supervisors for PhD students will normally be appointed from among the department's permanent academic staff – researchers, associate professors and professors. Other researchers with relevant competence can be appointed as co-supervisors, also from other national and international institutions. The candidate must be drawn actively into the discussions that take place in the research groups. All candidates are members of at least one of these groups.

EXCHANGES

INA facilitates national and international exchanges.

ACCESSIBILITY

General information about universal design and special arrangements at NMBU: <http://www.nmbu.no/lmu>.

WORDING OF THE DIPLOMA

A candidate who has completed the PhD programme in Ecology and Natural Resource Management must:

- Have in-depth knowledge and research competence of international standard in the chosen subject area within the PhD programme in Ecology and Natural Resource Management.
- Be familiar with research methods, theory and analysis tools in the subject area.
- Be able to conduct research with professional and ethical integrity.
- Be able to contribute original research that can be published in internationally recognized academic channels.

- Be able to assess the need for, initiate and move research projects forward.
- Be able to manage complex scientific tasks and projects.
- Be able to teach and supervise students.

The programme is based on the general description of the *PhD Education at NMBU*, and is regulated by the *Regulations for the Degree of Philosophiae Doctor (PhD) at the Norwegian University of Life Sciences*.