

## Outcomes for the Degree of Doctor according to the Qualifications ordinance, annex 2, Higher Education Ordinance with examples of activities to achieve them

<p><b>Knowledge and understanding</b></p> <p>To obtain a doctoral degree, the student is required to</p>	<p><b>Examples of activities to achieve the intended learning outcomes</b> (state the time perspective, e.g. year 1, before half-time review; the activities that have been completed should be indicated when the study plan is followed up)</p>
<p>A1. demonstrate broad knowledge and systematic understanding of his/her research field as well as deep and current specialist knowledge in a particular aspect of this field; and</p>	<ul style="list-style-type: none"> <li>• Keep up to date with the X research literature.</li> <li>• Study the X textbook.</li> <li>• Take a course in X for theoretical knowledge.</li> <li>• Take active part in lab meetings/research group meetings, research seminars and journal clubs arranged by X (e.g. the research group, division, X research network).</li> <li>• Take active part in scientific conferences and symposia (specify).</li> <li>• Teach within the research field.</li> <li>• Demonstrate broad knowledge and a systematic understanding of the X research field when conducting the half-time seminar and thesis defence.</li> <li>• Demonstrate an up-to-date knowledge about the focus areas of the research when writing scientific papers and the thesis as well as during the thesis defense.</li> </ul>
<p>A2. demonstrate familiarity with scientific methodology in general and with the methods of his/her specific field of research in particular.</p>	<ul style="list-style-type: none"> <li>• Become familiar with the relevant methodologies through discussions with supervisors, research group members, statisticians, and by taking part in seminars and journal clubs.</li> <li>• Take course(s) in statistics and apply the knowledge to the research project in dialogue with supervisors.</li> <li>• Learn method X by X.</li> <li>• Visit the X lab to learn method X.</li> <li>• Attend a research conference to learn about the latest methodological developments in the X research field.</li> <li>• Discuss the methodologies used in the writing and defending of the thesis.</li> </ul>
<p><b>Proficiency and ability</b></p> <p>To obtain a doctoral degree, the student is required to</p>	<p><b>Examples of activities to achieve the intended learning outcomes</b> (state the time perspective, e.g. year 1, before half-time review; the activities that have been completed should be indicated when the study plan is followed up)</p>
<p>B1. demonstrate a capacity for scientific analysis and synthesis and the independent critical review and assessment of new and complex phenomena, issues and situations;</p>	<ul style="list-style-type: none"> <li>• Take active part in research seminars and journal clubs and thereby critical analyse and discuss issues related to my own research and the research of others.</li> <li>• Learn to draw relevant conclusions from the research results in dialogue with supervisors and other colleagues.</li> <li>• Contribute to the writing of manuscripts.</li> <li>• Write a systematic review article including a meta-analysis.</li> <li>• Write a literature review of the research field for half-time review and thesis defence.</li> </ul>

<b>Proficiency and ability</b>  To obtain a doctoral degree, the student is required to	<b>Examples of activities to achieve the intended learning outcomes</b> (state the time perspective, e.g. year 1, before half-time review; the activities that have been completed should be indicated when the study plan is followed up)
B2. demonstrate an ability to identify and formulate research questions critically, independently, creatively and with scientific rigour, and to plan and conduct research and other advanced tasks using appropriate methods and within given time frames as well as to review and evaluate such work;	<ul style="list-style-type: none"> <li>• Formulate research questions, hypotheses and make methodological choices in discussion with supervisors and other collaborators.</li> <li>• Take active part in as many phases of the research project phases as possible: planning, execution, analysis, writing.</li> <li>• Take active part in the publication process by, for example, maintaining a dialogue with a scientific journal.</li> <li>• Learn peer-review.</li> <li>• Participate as a doctoral student representative in work groups/committees/ boards at KI</li> <li>• Critically review earlier studies in the field when writing manuscripts and the thesis.</li> <li>• Develop project leadership skills by arranging events (specify).</li> </ul>
B3. demonstrate through the writing of a thesis the ability to make a significant contribution to the development of knowledge through his/her own research;	<ul style="list-style-type: none"> <li>• Contribute significantly to the formation of knowledge within X through my research.</li> <li>• Contextualize my own research within the field when writing and defending the thesis.</li> </ul>
B4. demonstrate an ability to present and discuss research and research results, orally and in writing and with authority, both in national and international contexts and in dialogue with the scientific community and society in general;	<p>Learn oral communication skills by</p> <ul style="list-style-type: none"> <li>• attending courses on presentation techniques/communicating (popular) science</li> <li>• presenting my research at group meetings, seminars, national/international conferences</li> <li>• teaching or presenting research to, e.g., master's students, patient associations</li> </ul> <p>Learn written communication skills by</p> <ul style="list-style-type: none"> <li>• attending courses on scientific writing/popular scientific writing</li> <li>• writing scientific articles, writing (popular) science articles/press releases</li> <li>• taking part in a thesis-writing seminar</li> <li>• learning peer-review</li> <li>• producing conference posters.</li> <li>• write a popular-science summary of the thesis.</li> </ul>
B5. demonstrate an ability to identify the need for further knowledge; and	<p>To identify the need of further knowledge:</p> <ul style="list-style-type: none"> <li>• in dialogue with supervisors and other collaborators,</li> <li>• by attending doctoral courses and participating in seminars and conferences,</li> <li>• at annual follow-ups and revisions of the individual study plan,</li> <li>• at the half-time seminar when presenting and discussing plans for remaining studies,</li> <li>• by writing research grant applications,</li> <li>• when writing and defending the thesis.</li> </ul>

<p><b>Proficiency and ability</b></p> <p>To obtain a doctoral degree, the student is required to</p>	<p><b>Examples of activities to achieve the intended learning outcomes</b> (state the time perspective, e.g. year 1, before half-time review; the activities that have been completed should be indicated when the study plan is followed up)</p>
<p>B6. demonstrate an ability to contribute to the development of society and to support the learning of others in research, education and other advanced professional contexts.</p>	<ul style="list-style-type: none"> <li>• Take a course in teaching and learning in higher education.</li> <li>• Teach on (a) course(s) at bachelor and master levels.</li> <li>• Actively contribute to discussions at conferences, research seminars, journal clubs, research group meetings.</li> <li>• Interact with society by holding classes for school students, patient organisation or the general public.</li> <li>• Take courses in innovation and entrepreneurship (arranged by, e.g., the Unit of Bioentrepreneurship, see ki.se UBE).</li> <li>• Participate in career planning activities (see e.g. Career support for doctoral students at staff.ki.se).</li> <li>• Demonstrate social commitment and an awareness of sustainable development.</li> <li>• Discuss future career plans with a mentor.</li> <li>• Write a popular science summary of the thesis.</li> </ul>
<p><b>Judgement and approach</b></p> <p>To obtain a doctoral degree, the student is required to</p>	<p><b>Examples of activities to achieve the intended learning outcomes</b> (state the time perspective, e.g. year 1, before half-time review; the activities that have been completed should be indicated when the study plan is followed up)</p>
<p>C1. demonstrate intellectual independence and scientific integrity as well as an ability to make ethical judgements in research; and</p>	<ul style="list-style-type: none"> <li>• Read “Good research practice” (PDF publication at vr.se) and discuss its implications with supervisors and other collaborators.</li> <li>• Take the online course on reference management and plagiarism (part of the introduction for new doctoral students).</li> <li>• Take a research ethics course/courses on laboratory animal science/quality assurance of clinical research</li> <li>• Write an application for ethical approval of study X.</li> <li>• Develop an open-minded, investigative, and inquisitive approach through discussion with supervisors and colleagues.</li> <li>• Attain intellectual autonomy through critical reflection and creative thinking and by exploiting opportunities for development as an independent researcher.</li> <li>• Write the thesis as independent as possible.</li> </ul>
<p>C2. demonstrate deeper insight into the possibilities and limitations of science, its role in society and the responsibility of the individual in its application.</p>	<ul style="list-style-type: none"> <li>• Take courses in research ethics and scientific theory.</li> <li>• Take active part in research seminars.</li> <li>• Take part in discussions and follow debates at the department and in larger contexts (e.g. in dialogue with society in general).</li> <li>• Discuss and reflect on the consequences of research in different contexts e.g. concerning global societal challenges (see e.g. UN Agenda 2030), locally and within healthcare.</li> <li>• Discuss and reflect on the responsibility of researchers regarding research findings and the interpretation and dissemination of those when writing and defending the thesis.</li> </ul>

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