

Doctoral Studies Programme in Natural Sciences at the Faculty of Environmental, Regional and Educational Sciences, University of Graz

The legal basis for the Doctoral Studies Programme in Natural Sciences at the Faculty of Environmental, Regional and Educational Sciences is provided for in the Austrian Universities Act (*Universitätsgesetz*) and in the statutes of the University of Graz.

On 29.06.2011, and in accordance with section 25, para. 1, of the Austrian Universities Act (§ 25 Abs. 1 Z 10 UG), the Senate approved the adoption of the following Doctoral Studies Programme in Natural Sciences at the Faculty of Environmental, Regional and Educational Sciences.

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§ 1 Objectives and competency profile

(1) The research fields covered by the various disciplines at the Faculty of Environmental, Regional and Educational Sciences operate, each in their own way, at the interface between the natural and the cultural world. Approaches from various disciplines are thus adopted, combining social, cultural, and humanitarian research traditions. While this reflects the inherent scientific logic of the problem areas involved, it also serves to allow for particular emphasis to be placed on the interdisciplinary nature of the various fields. This underlying methodological diversity is reflected in the three study programmes on offer. These are intended to represent the three prevailing 'research cultures', and to enable all students at the faculty, no matter what their home discipline may be, to specialize in that particular area which matches their chosen doctoral path.

(2) The doctoral programme aims to provide young academics and researchers with an excellent course of study in line with international standards. Building on the candidate's previous academic experience, the programme is intended to promote the ability to engage in independent scientific study. In addition, by supporting candidates in their development of new knowledge, e.g. through the writing of a dissertation, candidates are led to the forefront of their field where further substantial contributions can be made. The programme thus qualifies individuals for leading careers in fields where scientific and specialist skills are required.

(3) The doctoral programme is geared towards the generation of an original piece of scientific research. This entails development of the following skills:

- Translating current research questions into a suitable project framework
- Coping with problems revealed by such questions in independent research
- Organizing relevant interdisciplinary or co-operative projects where necessary
- Arranging for any contact within the scientific community which may prove necessary for research continuity (e.g. conference participation)
- Engaging in the critical analysis, evaluation, and synthesis of complex ideas in the respective field, and describing their relevance with respect to overall social and historical developments

(4) The Doctoral Studies Programme in Natural Sciences develops expertise in the theoretical background and in the methodological skills that candidates need when engaging in scientific research in the field of the natural sciences. The object of study is the definition, measurement, and description, of living and non-living nature. The skills acquired by candidates are relevant in many natural science research fields as well as in numerous fields of practical application. Particular emphasis is placed on the formulation of hypotheses, experimental design, analytic and quantitative methods (particularly those related to mathematics and physics), paradigms of logic, modelling and simulation, computer-aided data processing and visualization.

§ 2 Admission and length of study

(1) Admission to the study program is authorized by the Rector's Office, after appropriate consultations have been made with the doctoral school responsible. Where no suitable doctoral school is available, permission for admission may be granted by the Rector's Office after consulting with the curriculum committee. In such cases, the study program is completed with no specific allocation being made to a doctoral school. Apart from satisfying the general conditions for university entry as set out in section § 60 und § 63 of the Austrian Universities Act, eligibility for admission to a doctoral programme, as stated in section § 64, paragraph 4, of the Austrian Universities Act, also depends on the following conditions being met:

- a) proof of successful completion of a relevant diploma, 'Magister' or master's degree programme, or
- b) proof of successful completion of a programme at a recognized home or foreign institute of higher education that is regarded as equivalent to that under a) above, or
- c) proof of successful completion of a relevant diploma or 'Magister', or master's degree programme undertaken at a 'Fachhochschule', or
- d) proof of successful completion of a relevant bachelor degree programme (as specified in section § 64, paragraph 4a of the Austrian Universities Act), or
- e) proof of successful completion of a study programme at a recognized home or foreign institute of higher education which is seen as being equivalent to that required under d) above.

(2) Where further requirements are called for before full equivalence can be granted, the Rector's Office has the right to demand that candidates pass additional examinations during the course of the doctoral programme.

(3) In order to achieve admission as set out under section (1)c) above, equivalence with a university diploma or 'Magister' (or master's) degree study program may be obtained by completing additional course requirements worth up to 40 ECTS credits. Where attainment of an additional 40 ECTS credits is still not sufficient for establishing equivalency with a university diploma or 'Magister' (or master's) degree study program, admission to the doctoral programme is not possible.

(4) Admission as set out under section (1)d) and (1)e) is granted based on the Rector's Office directive concerning proof of eligibility for admission to a doctoral programme after completion of a bachelor degree (original German title: „*Nachweis der allgemeinen Universitätsreife für die Zulassung zu einem Doktoratsstudium durch den Abschluss eines Bachelorstudiums*“ (published in University of Graz Bulletin No.18, on 10.02.2010), subject to the fulfilment of any additional requirements demanded.

(5) For those admitted in accordance with section (1)a) or (1)b) above the doctoral programme comprises one stage lasting three years. For those admitted under section (1)c) the programme may be extended by up to two semesters.

(6) Notwithstanding the possibility of an extension as mentioned in (5) above, as long as all requirements have been met, the doctoral programme can also be completed in less than three years.

§ 3 Registration

(1) Once admission has been completed, candidates have to register at the office of the dean of studies.

(2) Enrolment for the doctoral programme is taken care of in the Dean's Office. In order to register, the doctoral candidate is required to submit the following:

- a) A proposal for a dissertation project
- b) A statement giving the names of the obligatory and/or elective courses intended
- c) The name of the doctoral school in which the study programme is to be completed
- d) A supervision agreement signed by the proposed supervisor

(3) The dissertation must deal with natural science-related research questions found in those disciplinary areas covered by the Faculty of Environmental, Regional and Educational Sciences. The subject of the dissertation must also be chosen in such a way that a meaningful connection to the candidate's earlier study programs and/or to the current topic proposals available is maintained, and this must be approved as such by the supervisor.

(4) Should the dissertation project require the use of institute funds or resources, it is only permissible where the director of the respective institute has raised no objections with respect

to potential impairment of teaching or research activities, and where explicit approval from the said director has been received.

(5) The registration for the doctoral programme has to be passed on to the co-ordination team of the doctoral school responsible for overseeing the dissertation project.

(6) The co-ordination team issues a statement concerning the application. This should confirm details relating to the feasibility of the dissertation, supervision, and the courses to be taken under the taught part of the programme .

(7) As part of the application process, it is also important to ensure that candidates possess the required level of language competence necessary for completion of the taught part of the programme and for completion of their dissertation work. Where necessary, suitable additional requirements may be imposed. This is covered by the resolution of the rectorship concerning the admission of foreign students (*Rektoratsbeschluss „Internationale Studierende; Zulassung“*), published in University of Graz Bulletin No.32, dated 19.05.2010.

§ 4 Taught courses

(1) The following minimum number of courses has to be taken in the taught part of the doctoral programme in natural sciences:

a) Compulsory courses: Candidates have to select courses worth 24 ECTS credits from those natural science classes on offer at the relevant doctoral school. Course content must be appropriate for the dissertation topic.

Of the 24 ECTS credits, 8 credits have to be gained from doctoral research seminars (*Doktoratskolloquium*), a minimum of 8 credits from doctoral seminars (Dissertanten/innen-Seminar) , and a minimum of 4 credits from specialist doctoral seminars(*Privatissima*), from those on offer at the respective doctoral school.

b) Elective courses: here, under the condition that there is a suitable match with the research area covered in the dissertation, courses worth 8 ECTS credits may be chosen. Electives may be selected from an area or part-area which is closely related to the doctoral programme, or where a more interdisciplinary approach is being taken, from a more distant field which is considered relevant, for example from gender studies, philosophy, philosophy of science, organizational management, etc. The Dean of Studies is responsible for final decisions concerning the suitability of such courses.

(2) Candidates for whom admission to doctoral studies was made contingent, have to fulfil the extra conditions imposed.

(3) All doctoral schools have to offer sufficient doctoral research seminars, doctoral seminars, and specialist seminars, so as to enable candidates to acquire 24 ECTS credits during the course of their doctoral studies. Of these, 8 credits are gained through doctoral research seminars, a minimum of 8 credits from doctoral seminars, and a minimum of 4 credits from specialist seminars. The remaining 4 ECTS credits are not tied to a specific type of course. Depending on the number of doctoral candidates and on the number of doctoral subject areas, a doctoral school must offer a total number of such courses per year worth at least 16 ECTS credits.

(4) All candidates should attend taught courses offered by their own doctoral school. This is particularly true for the doctoral courses mentioned in (3) above. If necessary, a part of such courses may be selected from those on offer at other doctoral schools in the Faculty of Environmental, Regional and Educational Sciences, or from those on offer at the Faculty of Natural Sciences. Courses taken in other fields, or at other universities or research institutions may also be accredited where necessary.

(5) The following courses have been defined for inclusion in the taught part of the doctoral study programme:

a) Doctoral research seminars (*Doktoratskolloquien*): A doctoral research seminar is intended to allow for consultation and discussion concerning the research project in progress. The participation of external researchers in the seminar proceedings ought to play a key role.

b) Lectures: classes in which teaching is in the form of a lecture

c) Seminars: classes which serve the purpose of scientific discussion. Participants make specific contributions. Normally, a written paper is needed for the completion of a seminar.

d) Discussion classes (*Konversatorien*): Classes in which questions are discussed with the instructor

e) Specialist doctoral seminars (*Privatissima*): special, more exclusive classes for discussion of research

(6) To improve teaching quality, access to the above courses is restricted as follows:

a) Doctoral research seminar (*Doktoratskolloquium*): no more than 15 participants

b) Lecture: no restriction

c) Seminars: limited to no more than 15

d) Specialist doctoral seminars (*Privatissima*): limited to 10

The candidate must register for courses using the online registration system at the University of Graz.

Should it become logistically impossible to offer a sufficient number of parallel classes and the maximum number of possible participants is exceeded, students are then selected for classes on the basis of how urgently they require the class in order to complete their studies. Compulsory classes are given priority over restricted electives, which in turn, are given priority over free electives. Where the number of potential acceptances (i.e. those not deferred) still exceeds the number of places available, those at a more advanced stage of their studies are given priority. The stage of studies is determined on the basis of the number of ECTS credits already gained. Where further prioritization is necessary, the number of semesters is used, with those in a higher semester being given preference. Should this procedure still not result in a clear listing of priorities, lots are drawn to determine who is accepted for the available places. A total of 10% of the available course places have to be set aside until the

beginning of the course for students on international exchange programmes, for those in other study programmes at the University of Graz, and for those in need or distress.

(7) To help candidates extend their (research) horizons, it is recommended that they participate in dedicated taught or research study programmes at other domestic or foreign institutions, and that they take study breaks abroad. Candidates are referred to section § 78 para. 5, of the Austrian Universities Act, where conditions for pre-accreditation and exam recognition are described.

(8) In order to support the internationalization of study programmes, where possible, part of the taught programme should be offered and examined in English.

(9) To make for a more comprehensive education and training programme for young researchers, candidates are encouraged to gain experience in academic teaching. As part of their doctoral studies, candidates are expected to participate in university teaching to an appropriate degree.

§ 5 Establishing interdisciplinary doctoral schools

Doctoral studies programmes may be established at the Faculty of Environmental, Regional and Educational Sciences, University of Graz, for the Doctoral Studies Programme in Natural Sciences (see the relevant guidelines issued by the director of studies- "Richtlinie des Studiendirektors über die Einrichtung und den Betrieb von Doktoratsprogrammen an der Karl-Franzens-Universität Graz").

Interdisciplinary doctoral schools are binding, interdisciplinary structures in which a common theme and organizational framework are created for teaching and research activities. They do not replace individual supervision, but rather serve to provide for an additional form of guidance and supervision at the organizational level.

§ 6 Examination regulation 1: Compulsory and elective courses

(1) For successful completion of compulsory and elective classes candidates have to pass the respective class examinations. Continuous assessment procedures are used in the doctoral research seminars, seminars, and specialist doctoral seminars.

(2) In courses where no continuous assessment is used (lectures) examination takes the form of a single sitting, and may be oral and/or written.

Doctoral research seminars, seminars, discussion classes, and specialist doctoral seminars all use continuous assessment. Assessment and completion is based on the extent of active class participation and on fulfilment of any additional requirements announced by the instructor at the beginning of the course.

§ 7 Examination regulation 2: Dissertation

(1) Participants in the doctoral programme have to complete a dissertation. The purpose of the dissertation is to prove that the candidate is capable of solving relevant scientific problems and of dealing successfully with current research questions in an independent manner. The

doctoral dissertation represents a self-contained, original piece of scientific research which has been completed independently by the candidate. The candidate must attest to this at the beginning of the thesis.

(2) The dissertation may be completed either in the form of a monograph, or in the form of a cumulative piece of research. In the case of a monograph, any parts of the dissertation which are regarded as complete during the research process should be presented to the respective (international) research community, e.g. via conference participation or poster contributions, and the results of such work should be published in the form of related abstracts or conference proceedings. All such publications or related submissions should be integrated into the dissertation. In the case of a cumulative dissertation, the details of the supervision agreement must be confirmed by the doctoral school. Regardless of the specifics, a cumulative dissertation always needs to be based on at least two articles published in ISI journals. Lead authorship is necessary for one of the papers, and the article must already have been accepted for publication (in press). For the second article, at least co-authorship is necessary, and it must have passed the first stage of the review process (accepted with revisions). The purpose of a cumulative dissertation is in principle the same as that of a dissertation in the form of a monograph, i.e. to prove the candidate's ability to engage in independent scientific research. Thus, a cumulative dissertation comprises a series of scientific papers, all related in terms of content, which represent the original work of the doctoral candidate. In addition, an introductory chapter must also be drawn up. Here, the candidate is called upon to describe the nature and purpose of the research questions examined, the scientific relevance of the work, the current state of research in the field, and the various research methods employed. Furthermore, as well as the above, a final chapter also needs to be composed for the cumulative dissertation which outlines the results gained, and any conclusions which may be drawn.

(3) In the dissertation, candidates must present their newly acquired knowledge and show how it is related to current research in the area concerned. All research carried out has to be well documented and the result have to be presented in such a way that they are reproducible. The style of the dissertation should comply with the normal standards used in the respective field. In the case of group or collaborative research, the contribution made by the candidate must be clearly demarcated.

(4) A supervisor guides the candidate through the dissertation process. The main responsibilities of the supervisor lie in guiding the candidate towards the generation of new scientific knowledge and in developing the candidate's ability to engage in independent scientific research. As supervisor, any suitably qualified academic member of staff may be chosen by the candidate from among those members available in the respective doctoral school. The research field and qualifications of the person chosen must cover the areas or part areas dealt with in the dissertation topic.

(5) A mentor has to be selected. The candidate has the right to select a mentor. It is the mentor's responsibility to provide adequate support for the candidate, as well as adequate support for the main supervisor, and to check on the continuation and progress of the dissertation.

Any suitably qualified academic member of staff may be chosen as mentor. The mentor's qualifications must correspond to the area or part-area dealt with under the dissertation topic.

- (6) Where necessary, and assuming the Dean of Studies agrees, a suitably qualified individual from an external institution (a university or research centre) may function as mentor. Here, 'suitably qualified' means that the qualifications of the person chosen must be regarded as being equivalent to those demanded in the doctoral school in question, and that the qualifications of the person chosen must relate adequately to the area or part-area dealt with in the dissertation. In such cases, the person selected is then co-opted into the doctoral school.
- (7) A change in the dissertation topic, in supervisor, and in mentor is possible up to the point of dissertation submission. However, a written request to this purpose, stating reasons for the change, needs to be sent to the Dean of Studies. The change then has to be authorized by the latter.
- (8) Publication or part-publication of the dissertation in scientific journals before final assessment is both permissible and recommended. However, this does not remove the need to present a complete version of the work.
- (9) The completed version of the dissertation must be submitted to the Dean of Studies, who then passes it on to two suitably qualified examiners. The doctoral candidate has the right to propose examiners. Where necessary, one of the chosen examiners may be qualified in a field which is closely related to that of the dissertation topic. The examiners have to complete assessment of the dissertation within a period of four months.
- (10) The supervisor is normally one of the examiners. Where possible, an examiner external to the University of Graz should also be selected. In cases where both examiners work at the same institute, an additional examiner, external to the University of Graz, is also needed. When choosing examiners, in addition to establishing that the persons are suitably qualified, particular care needs to be taken with respect to ensuring their impartiality. The examiners have to prepare reports independently of one another.
- (11) Where examiners come to different conclusions regarding dissertation assessment, they must still report on how they reached their conclusions. If they cannot agree on a common grade, the arithmetic mean of the grades proposed is taken. This is rounded in order to produce an integer. Grades larger than $x.5$ are rounded up. Should one of the examiners arrive at a negative grade for the dissertation, the Dean of Studies must then call on the services of another examiner. Should the additional examiner also reach a negative assessment, the dissertation must then be rejected.
- (12) Written copies of the examiner's reports and the grades arrived at must be made available to the candidate.
- (13) In compliance with section § 86, para. 1 of the Austrian Universities Act, the dissertation must be made available to the public. This means that one complete copy must be submitted to the university library, and one complete copy must be submitted to the national library. An electronic version must also be made available.
- (14) In accordance with section § 86, para. 2 of the Austrian Universities Act, upon submission of the dissertation, the candidate is entitled to request that use of the dissertation be denied for a period of five years. The governing body responsible (*das studienrechtliche Organ*) must grant the request if the candidate can demonstrate that his/her rights or economic

interests would otherwise be impaired. The members of the doctoral school affected must be informed of any such suspension of use.

§ 8 Examination regulation 3: Oral examination (viva)

(1) Candidates complete their doctoral studies by taking a public, oral examination with a committee of examiners. The work associated with the oral examination is worth 4 ECTS credits.

(2) The candidate must submit an application for admission to the oral examination to the Dean of Studies. This may be done whenever the following conditions have been met:

a) Successful completion of all classes in the taught part of the doctoral programme (in accordance with section 4, above), and where necessary, successful completion of any additional requirements imposed in the course of admission;

b) The achievement of a passing grade for the dissertation

(3) For the oral examination, an examination committee, comprising at least three persons, must be appointed by the Dean of Studies. One of the committee members must be appointed as chair.

(4) On applying for the oral examination, the candidate is allowed to make suggestions regarding the individuals to be called as examiners, as well as suggestions concerning the date of the examination. The Dean of Studies should consider accepting the candidate's proposals where possible.

(5) All persons selected for the examination committee must be fully qualified in the disciplinary area covered by the dissertation, or suitably qualified in a related, relevant field.

(6) The candidate has to be informed of the names of the examiners and of the composition of the examination committee at least three weeks before the date of the oral examination. The date of the examination also has to be made public at least two weeks in advance.

(7) The oral examination consists of the following:

a) The candidate's presentation of the dissertation and the research results, and the candidate's defence of the research results as part of a general discussion

b) Oral examination of the subject matter (compulsory and elective courses) covered in the dissertation

(8) The oral examination is open to the public. The examination committee should complete the whole process within no more than 90 minutes. A period of about 60 minutes should be allowed for that part of the examination stated in (7)a) above.

(9) During the oral examination the candidate must prove that he/she is capable of conducting scientific analysis and research at a sufficiently competent level, that he/she can demonstrate ownership of the work dealt with in the dissertation, and that he/she is well aware of the key problems related to the research.

(10) It is the responsibility of the chair of the committee to ensure that the oral examination runs smoothly and to draft a report on the proceedings. The report should contain information on the place and time of the viva, the subject matter of the examination (as given in section (7) above), the names of the examiners, the name of the doctoral candidate, the questions asked, the respective grades awarded, and where no passing grade is awarded, the reasons for the negative assessment. In addition, the report should also include a record of any irregularities which occur.

(11) In accordance with section § 73, para.(1) and para.(2) of the Austrian Universities Act, the outcome of the examination is decided in a post-viva decision making and consultation process among the committee members which is closed to the public. Decisions are based on a majority vote. While all members of the examination have equal voting rights, the chair of the committee has to cast his/her vote last. When voting on the outcome, each member of the committee has to take into consideration both the results of each part of the examination, and the overall impression gained.

(12) When committee members are unable to reach agreement concerning the outcome of the viva, the grades arrived at by the individual committee members are to be added, the total to be divided by the number of members involved, and the result is then to be rounded to the next integer. Figures larger than x.5 are to be rounded up.

§ 9 Examination regulation 4: Overall assessment and grading

(1) Once the oral examination has been completed, an overall grade for the complete doctoral studies must be awarded. The overall assessment is derived on the basis of the following:

- a) the mean grade achieved for the courses taken in the taught part of the curriculum (see section (4) above),
- b) the mean grade achieved for the dissertation, and
- c) the final grade achieved in the oral examination.

(2) The overall grade is 'pass' when passing grades are achieved in all three of the above, otherwise a 'fail' grade is awarded. A 'pass with distinction' is awarded when none of the three grades is lower than 'good' (i.e. grade 2), and in addition at least two of the three grades are 'very good' (i.e. grade 1).

§ 10 Degree awarded

On passing the oral examination, candidates in the Doctoral Studies Programme in Natural Sciences at the Faculty of Environmental, Regional and Educational Sciences are awarded the degree of 'Doctor of Natural Sciences', in Latin, 'doctor rerum naturalium', the abbreviation of which is 'Dr. rer. nat.'. (The German titles are: 'Doktorin der Naturwissenschaften' for women, or 'Doktor der Naturwissenschaften' for men). The award, made by the governing body for academic affairs (*das studienrechtliche Organ*), is to be made officially, and in writing, as soon as possible, and no later than one month after completion of the viva, regardless of whether a degree award ceremony is planned or not.

§ 11 When in force

Translation / Doctoral Studies Programme in Natural sciences

The studies programme comes into force on 1st October, 2011.