

Curriculum for the Doctoral Programme in Natural Sciences

Curriculum 2007 in the version of 2012

Legal validity remains restricted to the German original

The changes to the Curriculum for the Doctoral Programme in Natural Sciences were decided by the Curricula Commission for Doctoral Programmes and University Courses on May 14, 2012.

Editorial changes were made to the curriculum on 7 June 2016 by the Curricula Committee for Doctoral Programmes and the university certificate programmes in accordance with the Statute chapter on study law.

On the basis of the Universities Organisation and Studies Act (*UG 2002*), Austrian Federal Law Gazette (BGBl.) No. 120/2002 in its valid version, the Senate of Graz University of Technology issues the following curriculum for the Doctoral Programme in Natural Sciences.

§ 1 Objective and Qualification Profile

(1) Beyond pre-professional education, the objective of the Doctoral Programme in Natural Sciences at Graz University of Technology is to develop students' ability to do advanced, independent scientific research in the fields of competence of Graz University of Technology. Graduates are awarded the academic degree of Doktorin/Doktor der Technischen Wissenschaften (Doctor of Natural Sciences; Dr. rer.nat.). According to UG 2002, § 54, section 4, this degree is equivalent to the highest academic degree of "Doctor of Philosophy (PhD)".

(2) Qualification profile

A graduate of the Doctoral Programme of Natural Sciences of Graz University of Technology has advanced and perfected the ability to formalise problems in the natural and engineering sciences and to develop research-guided analyses and solutions. The graduate is capable of performing high-level scientific work independently.

The graduate is capable of team work in the field of engineering and scientific research, in both the university and industrial sectors, and can assume coordinating and leading functions.

The graduate has a broad basis and a consolidated field of specialisation and can thus advance and innovatively apply scientific knowledge in various fields of application.¹⁾

¹⁾All footnotes refer to the explanatory notes in the appendix.

§ 2 Admission, Curricular Workload and Period of Study

(1) Applicants are admitted to the programme by the Rector. Further to the general requirements according to § 60 and 63 UG 2002, admission is subject to the following prerequisites pertaining to the part on study regulations of the statutes of Graz University of Technology:

1. a relevant diploma or master's degree of a university in Engineering or the Sciences, or

2. a different degree of a recognised Austrian or foreign school of higher education equivalent to number 1., on
3. a degree of a recognised Austrian or foreign school of higher education, together with supplementary curricular obligations.
4. A Bachelor's degree in a qualifying subject of a university according to § 64, section 4a UG.

For admissions according to point 4, the admission criteria of the Rector's Office Guidelines on "Proof of General Eligibility for Admission to Doctoral Studies on the Basis of a Bachelor's Degree" also apply.

Applicants with degrees missing the equivalence criteria of numbers 1 or 2 may be subject to specific additional classes. Their scope and content are determined by the Vice Rector of Teaching and Studies through the Dean of Studies of the related faculty in consultation with the coordinator of the respective doctoral school (see § 3)²⁾.

(2) Studies of doctoral candidates admitted according to section (1), numbers 1 or 2, are single-stage periods of 3 years (official period of the programme). Studies of doctoral candidates admitted according to section (1), number 3, may be extended by up to two semesters. The period of studies may be shortened if all the criteria specified in the curriculum have been met and all imposed additional obligations have been fulfilled. The shortening of the period of studies requires written approval by the Dean of Studies.

§ 3 Doctoral Schools

(1) Doctoral schools are expert boards responsible for implementing the subject-specific details of the curriculum. Every doctoral school comprehends a broad subject area with its sub-disciplines. Doctoral schools may be set up across faculties or in cooperation with other universities. In this case the teaching responsibilities according to § 6 are to be shared in mutual consultation between the participating faculties or universities.³⁾

(2) In the admission process, every doctoral candidate is assigned to a doctoral school, which he/she has the right to propose. As a rule, the doctoral supervisor should be a member of this doctoral school.⁴⁾

(3) Every institute of Graz University of Technology is assigned to a doctoral school. Every doctoral school comprises the faculty with a *venia docendi* of the assigned institutes, as well as the assigned doctoral candidates. The doctoral schools are set up upon approval by the curricular commission for doctoral and postgraduate programmes and presentation to the Senate by the curricular commission. Every doctoral school nominates a coordinating team and its chairman.

(4) The coordinating team works out the statutes of the doctoral school. The statutes specify the contents of the instructional classes according to § 6. In inter-faculty and inter-university doctoral schools it determines the guidelines of cooperation. The subject-specific educational goals and qualification profiles are also outlined in the statutes. The curricular commission for doctoral and postgraduate programmes approves the statutes and presents them to Senate.⁵⁾

§ 4 Rights and Duties of Doctoral Supervisors and PhD Students

(1) In the admissions process, the doctoral candidate proposes a supervisor. Upon acceptance of a doctoral candidate, an educational agreement is concluded and signed by the doctoral candidate, the supervisor, and the Dean of Studies.

(2) The supervisor confirms with personal signature that, according to the supervisor's expertise in the subject, the PhD project may be accomplished within the envisaged timeframe. The doctoral candidate agrees with personal signature to observe the guidelines of Graz University of Technology ensuring good scientific practice.

(3) One task of the supervisor is to guide the PhD student towards independent scientific work. This includes encouraging activities of independent scientific publication.

(4) The PhD student and the supervisor discuss the progress of the PhD project at regular intervals. Either party can ask for meetings in person.

The PhD student provides the supervisor with yearly progress reports about the PhD project. The supervisor comments in a written form.

The report and comments are made available to all members of the doctoral school with a *venia docendi*.⁶⁾

(5) Failure to submit a PhD thesis within 5 years after admission to the doctoral programme requires justification in the respective report and a comment from the supervisor according to section (4).⁷⁾

(6) In serious cases, the supervisor is entitled to apply to the Dean of Studies to resign as the supervisor. Together with a justification, the request is made public within the doctoral school.

(7) In case of irreconcilable differences on the PhD project between the PhD student and the supervisor, both parties are entitled to appeal to the Dean of Studies as the arbitration authority.

(8) A justified change of supervisor is possible until submission of the PhD thesis. The change requires approval by the Dean of Studies.

§ 5 PhD Thesis

(1) In the course of the doctoral studies, a PhD thesis is to be written, which proves the doctoral candidate's ability to master new scientific problems independently.

In the admission process, the doctoral candidate, in consultation with the supervisor, proposes a working title for the PhD thesis and the respective doctoral school. A short description of the PhD project is made available to the members of the doctoral school with a *venia docendi*.⁸⁾

(2) The PhD thesis is assessed according to § 31, sections 5 through 7, of the part on study regulations of the statutes of Graz University of Technology. As a rule, the supervisor is the first referee of the PhD thesis. In consultation with the Dean of Studies, additional referees are pre-selected by the coordinating team of the doctoral school. The supervisor and the doctoral candidate have the right to propose names of referees. At least one referee should be from outside Graz University of Technology. Referees must not all be employed at the same institute. The members of the doctoral school with a *venia docendi* according to § 3 section (3) are informed about the pre-selection of referees by the coordinating team and have the right to comment.⁹⁾

(3) The referees should be pre-selected 2 months before submission of the PhD thesis at the latest. From that time on, all the referees are to be provided with a preliminary version of the PhD thesis. Upon submission of the PhD thesis, the Dean of Studies initiates the final assessment by the selected referees. As a part of the assessment, the PhD thesis is to be marked according to the applicable rating system.¹⁰⁾

(4) Upon submission of the PhD thesis, the required number of copies as specified by Graz University of Technology is to be made available. The graphics design and binding should follow the guidelines of Graz University of Technology.

(5) The PhD thesis must present the new scientific knowledge from the work accomplished and a comparison with the current state of scientific research. The work carried out must be documented consistently and the results presented in a comprehensible form. The structure of the PhD thesis should follow the standards of the subject. For group work, the individual contributions of each student are to be clearly identified, according to § 82, section 2 UG, and each contributing candidate is to submit an independent PhD thesis. It is recommended that the PhD thesis be written in the usual language of the subject.¹¹⁾

(6) Publication of finished parts of the PhD thesis in international scientific media, even before assessment, is recommended. If evidence of such publications cannot be provided at the time of appointment of the referees, at least three referee reports are required. At least one report must come from outside Graz University of Technology. A final comprehensive PhD thesis is, however, indispensable. This thesis may consist of a summary of publications of the candidate ("Mantel" PhD thesis) and must include a list of publications of the doctoral candidate.¹²⁾

7) As a rule, the PhD thesis (as a whole) must be made publicly available after the defence. In exceptional, justified cases the doctoral candidate can apply to the Dean of Studies for restriction of access to the thesis. The period of restriction is temporally limited. The doctoral school is to be informed about the restriction.¹³⁾

§ 6 Instructional Classes

(1) The extent of the instructional classes is 14 semester course hours, broken down as specified in the following sections (2) through (4). In justified cases, the statutes of a doctoral school may require more classes.¹⁴⁾

(2) Subject-specific basic courses (6 - 8 semester course hours, selection from a catalogue of compulsory courses)

Every doctoral school specifies courses at a high level. They widen the PhD student's knowledge in the own field and the specific topic of the PhD thesis and lead to the current state of research in additional fields.

1. A catalogue of courses is to be established by each doctoral school. The Dean of Studies, in consultation with the coordinating team of the doctoral school, assigns the courses.
2. The basic topics of these courses should be fixed in advance to a large extent, and they should be offered at least every two years. The institutes of the doctoral school should be involved in setting up and updating these courses on a regular basis.
3. A preview of the courses for the doctoral programme is to be made public in due time for two years in advance.
4. The doctoral candidate selects the subject-specific basic courses primarily from the catalogue of the candidate's doctoral school according to § 3, section (1). Courses from other subject areas or other

universities may be chosen upon application to the Dean of Studies and consultation of the candidate's supervisor. The doctoral school shall make the choices public.¹⁵⁾

(3) Scientific Methods and Communication (4 - 6 semester course hours are mandatory)

1. Each doctoral school offers, on a yearly basis, "Methods of Scientific Work" (2 semester course hours) as a semester or full-year course or seminar, compulsory from the first year of studies. The course reviews, teaches and discusses fundamental methods and conventions of research in the respective subject area. It is recommended to include qualified lectures on the history and theory of science of the respective subject area.
2. The "Doctoral Seminar" (2 x 1 semester course hours) is offered as a full-year course in every doctoral school, compulsory from the second year of studies. Professors of the doctoral school take turns in directing this seminar. All the PhD students participate and give presentations. All members of the doctoral school are expected to attend the seminar. The purpose of the seminar is to help the PhD students to improve on their speaking to a public, communication skills, and presentation of their field of work. Attendance is mandatory.
3. Up to 2 semester course hours of so-called "soft-skill" courses (presentation skills, rhetorics, etc.) may be selected from the catalogues of different fields of study, provided that they were not already a part of a previous degree.¹⁶⁾

(4) The Exclusive Seminar ("Privatissimum"; 2 semester course hours), compulsory in the course of the doctoral programme, is usually offered by the supervisor of the PhD student.

(5) The courses listed in sections (2) to (4) are marked individually; passed exam results are either "very good" (1), "good" (2), "satisfactory" (3), or "sufficient" (4). Negative results are marked as "unsatisfactory" (5). An exception is the doctoral seminar, for which proof of successful participation is sufficient.

(6) The instructional classes are subsumed into a single examination subject. An examination subject is successfully completed if all of its courses were completed successfully. The mark of the examination subject is determined as the average of the individual examination marks weighted by the number of semester course hours of the courses. Values with decimals greater than 5 should be rounded up to the next whole number; smaller numbers are rounded off.¹⁷⁾

§ 7 Thesis defence

(1) The defence of the PhD thesis is the final examination in the doctoral studies. The date of the thesis defence may be set upon proof of successful completion of the courses according to § 6, submission of the annual reports according to § 4, section (4), and positive assessment of the thesis according to § 5, sections (3) and (4), in compliance with the guidelines in § 21 and 23 of the part on study regulations of the statutes of Graz University of Technology. The defence is public in front of a board of at least three examiners.

(2) The board of examiners is convened by the Dean of Studies in compliance with the guidelines of § 24 of the part on study regulations of the statutes of Graz University of Technology. The examiners do not have to be the referees, and they must not be employed at the same institute. They are proposed by the coordinators of the doctoral school, taking into consideration the doctoral candidate's right to propose examiners. The proposed board is to be made public within the doctoral school.

(3) The thesis defence is an examination in two parts, consisting of

1. a presentation by the doctoral candidate of appropriate length on the scientific work conducted, and
2. an oral examination on the subject area of the PhD thesis by the board of examiners.¹⁸⁾

(4) The thesis defence is assessed (marked) according to § 24 of the part on study regulations of the statutes of Graz University of Technology.

§ 8 Overall Assessment

The thesis defence is followed by the overall assessment. The assessment is based on the marks of the PhD thesis, the thesis defence, and the instructional classes. The overall assessment is “bestanden” (“pass”) if all three marks are positive. It is “mit Auszeichnung bestanden” (“pass with distinction”) if at least 50 % is assessed with “sehr gut” (“very good”), and if none of the three marks is less than “gut” (“good”).¹⁹⁾

§ 9 Interim Regulations

(1) Doctoral studies in Natural Sciences started before October 1, 2007 are continued and completed based on the 4-semester curriculum (index number 091) phased out until September 30, 2017.

Doctoral studies which are not completed in time are continued subject to the present curriculum.

(2) Students have the right to opt into the present curriculum at any time within the specified admission deadlines. Applications to opt into the new curriculum must be directed to the Student Service in a written form and are irrevocable.

(3) Admission remains valid for students opting into this curriculum. The students shall be allocated to a doctoral school in accordance with § 3, section (1). The examinations completed as a part of the previously valid 4-semester curriculum (index number 091) shall count as credits for the curricular part according to § 6 as appropriate. In this case, attendance at the doctoral seminar according to § 6, section (3), number 2 must be ensured.

(4) The proof of presentation of the annual reports as a prerequisite for the admission to the doctoral examination according to § 7, section (1) is compulsory for reports due after implementation of the doctoral process in TUGRAZonline.

§ 10 Effective Date

This curriculum for the Doctoral Programme in Natural Sciences shall come into effect on October 1, 2012.

Appendix: Explanatory Notes

ad § 1 Objective and Qualification Profile

¹⁾ Further qualification aspects are to be detailed in the statutes of the doctoral school, see § 3, section (4).

ad § 2 Admission, Curricular Workload and Period of Study

²⁾ According to the related section of the statutes of Graz University of Technology, the authorised person meant here may be translated as the "governing body responsible for study regulations" The Vice Rector of Teaching and Studies is the governing body responsible for study law and all programme-related matters of the doctoral studies at Graz University of Technology. The Deans of Studies are authorised to carry out this duty in the Vice Rector's name.

ad § 3 Doctoral Schools

³⁾ The role of the doctoral schools is largely advisory. Regardless of this, the doctoral schools play the important role of the primary scientific public of the doctoral activities in the respective subject area. Important procedures and contents, such as, for example, supervision, PhD projects, and the appointment of referees, should be made apparent in this context and should be discussed in order to ensure consistently high quality.

⁴⁾ A doctoral school is established with regard to bringing together a "critical mass" of doctoral candidates in the same subject, for who the subject catalogue of the curricular part of the Doctoral School is normally valid, see section (4) and § 6. As a point of reference, there should be a total of 35 to 100 doctoral students per doctoral school.

⁵⁾ It is recommended that the Vice Rector in charge assigns the study matters of each doctoral school to a Dean of Studies of a bachelor's or master's programme closely related to the subject.

ad § 4 Rights and Duties of Doctoral Supervisors and PhD Students

⁶⁾ The purpose of the student's report and the supervisor's comments is to monitor and evaluate the progress of the project in a helpful manner.

⁷⁾ This regulation aims at providing a mechanism for the official evaluation of unsuccessful or abandoned PhD theses. It is explicitly accepted that, in justified cases (i.e., if a student is employed outside Graz University of Technology and studies on a part-time basis), doctoral studies may take longer than 5 years, as long as appropriate progress is made overall.

ad § 5 PhD thesis

⁸⁾ In the interest of quality control, the short description (1 - 2 pages) should propose reasonable and realisable topics for the PhD thesis only. In addition, the short description allows for a critical observation of the progress of the doctoral candidate. This should, however, still allow the PhD project to be extended and modified in the course of the work.

Should the doctoral candidate be subject to additional curricular obligations according to § 2, section (1), number 3, the presentation of the short description can be postponed for the additional number of semesters laid down in the obligations.

- ⁹⁾ *The appointment of referees should follow good scientific practice. As a rule, the referees should be international experts, so that an established, independent opinion is obtained. In selecting the referees, besides expertise in the field, particular attention is to be paid to impartiality.*
- ¹⁰⁾ *The two months' time for pre-assessment allow the referees to influence the PhD thesis positively where applicable, based on a preliminary version of the thesis. This way, the doctoral student has the chance to take any suggestions for improvement into consideration in good time.*
- ¹¹⁾ *The regulations on the writing of the PhD thesis are in the interest of good scientific practice. However, with respect to protecting intellectual property for PhD theses from industry cooperations, it must be ensured that the interests of the scientific community are also preserved and guaranteed and that the expert examiners can actually assess the PhD thesis. The usual and recommended language for technical and scientific PhD theses is English.*
- ¹²⁾ *Scientific publications are an essential part of the work of a PhD student. It is assumed that usually one or several publications have already appeared or were accepted for publication, which may be considered as positive pre-assessment. If, contrary to these expectations, this is not the case, an additional quality control by a further external referee must be initiated. Due to the various publication practices in different fields, it is recommended to specify the relevant meaning of "international scientific media" as well as the requirements for the refereeing practice in the statutes of the doctoral schools.*
- ¹³⁾ *In principle, restricting access to a PhD thesis runs contrary to the idea of promoting science. It is recommended that this mechanism be used severely (taking into account subject-specific usage).*

ad § 6 Instructional Classes

- ¹⁴⁾ *A sense of proportion is required for the determination of the scope of the curricular workload both in terms of the size (number of PhD students) of the doctoral school as well as the assignment of teaching responsibilities. The semester course hours specified below are based on the standard number of 14. The variable number of semester course hours in sections (2) and (3) results from the choice offered in section (3), number 2.*
- ¹⁵⁾ *These courses should not primarily provide a narrow, high level of specialisation. The term "postgraduate level" refers to the way participants are challenged and supported. The total offer of these kinds of courses per doctoral school and academic year should be between 8 and 16 semester course hours, depending on the number of PhD students of the doctoral school. In the interest of promoting a diverse range, it is recommended to limit the length of the individual courses to 2 to 4 semester course hours. The subject catalogue can be checked to verify the timeliness and, if needed, revised every 2 to 4 years. When assigning the courses to the teaching staff, the Dean of Studies ensures the proportionality of the overall offer with the size of the doctoral school. The doctoral candidates have the right to choose courses, subject to restrictions as outlined in § 2, section (1), number 3.*
- ¹⁶⁾ *If the size (number of PhD students) of the doctoral school permits, it is recommended to combine the two courses from items 1 and 2 into one single course or seminar (scope: 2 semester course hours in winter and summer semesters). In addition, the PhD students have the option to do the work for the doctoral seminar over a longer period of time.*
- ¹⁷⁾ *The purpose of combining the marks for the instructional classes into one single mark is to avoid a too strong influence from individual marks on the final assessment (§ 8).*

ad § 7 Thesis defence

¹⁸⁾ *Each doctoral school may formulate uniform guidelines for the thesis defence in their statutes. As a recommended guideline, a presentation time of 30 to 45 minutes is considered to be sufficient. The examination part should be approx. 20 minutes per examiner. The examination part has the character of a defence of the PhD thesis consisting of questions on the subject of the PhD thesis and the related subject area.*

ad § 8 Overall Assessment

¹⁹⁾ *Distinction is only awarded if three “very good” (“sehr gut”, (1)) or two “very good” (“sehr gut”, (1)) and one “good” (“gut”, (2)) were given.*