



**Curriculum for the Doctoral Programme  
in Natural Sciences**

**Curriculum in the version of 2019**

***Legal validity remains restricted to the German  
original***

**The changes to the curriculum for the Doctoral Programme in Natural Sciences were decided by the Curricular Committee for Doctoral and University Certificate Programmes on 26 January 2019.**

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On the basis of the Universities Organisation and Studies Act (*UG 2002*), Austrian Federal Law Gazette (BGBl.) No. 120/2002 as amended, and the Statutes, Chapter "Study Law", of Graz University of Technology, 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 Naturwissenschaften (Doctor of Natural Sciences; abbreviated to Dr. rer.nat.). According to UG 2002, § 54, para. 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 engineering and natural 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.<sup>1)</sup>

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<sup>1)</sup> All footnotes refer to the explanatory notes in the appendix.

## § 2 Admission, 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, admission is subject to the following prerequisites pertaining to § 64, paras. (4) and (5) UG:

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 those stated above, or
3. a degree of a recognised Austrian or foreign school of higher education, together with supplementary curricular obligations, or
4. a Bachelor's degree in a qualifying subject of a university according to § 64, para. 5 UG.

For admissions according to item 4, the admission criteria of the Rectorate directives 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 items 1 or 2 may be subject to specific additional classes. Their scope and content are determined by the officers responsible for study matters in consultation with the coordinators of the respective doctoral school (see § 3)<sup>2)</sup>.

(2) Studies of doctoral candidates admitted according to para. 1, items 1 or 2, are single-stage periods of 3 years (official period of the programme). Studies of doctoral candidates admitted according to para. 1, item 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 officers responsible for study matters.

## § 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.<sup>3)</sup>

(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.<sup>4)</sup>

(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 Committee for Doctoral and University Certificate Programmes and presentation to the Senate by the Curricular Committee. Every doctoral school nominates a coordinating team and its head.

(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 Committee for Doctoral and University Certificate Programmes approves the statutes and presents them to the Senate.<sup>5)</sup>

#### **§ 4 Rights and Duties of Doctoral Supervisors and Doctoral Candidates**

(1) In the admission process, the doctoral candidate must present a supervision confirmation. Upon acceptance of a doctoral candidate, an educational agreement is concluded, containing a brief description of the proposed doctoral project. It is signed by the doctoral candidate, the supervisor, and the officers responsible for study matters. The proposal and a work schedule must be presented publicly in an appropriate form within the first year.<sup>6)</sup>

(2) The supervisor confirms with personal signature that, according to the supervisor's expertise in the subject, the proposed doctoral project may be accomplished within the envisaged timeframe.

The doctoral candidate agrees with personal signature to observe the directives of Graz University of Technology ensuring good scientific practice. Both confirm with personal signature that they have acknowledged the Curriculum for the Doctoral Programme.

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

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

The doctoral candidate provides the supervisor with yearly progress reports about the doctoral 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*.<sup>7)</sup>

(5) The doctoral candidate is entitled to call upon one or more suitable persons to consult on and support the doctoral project. These people shall be nominated by the coordinating team at the suggestion of the doctoral candidate.<sup>8)</sup>

(6) Failure to submit a doctoral thesis within 5 years after admission to the doctoral programme requires justification in the respective report and a comment from the supervisor according to para. 4.<sup>9)</sup>

(7) In serious cases, the supervisor is entitled to apply to the officers responsible for study matters to resign as the supervisor. Together with a justification, the request is made public within the doctoral school.

(8) In case of irreconcilable differences on the doctoral project between the doctoral candidate and the supervisor, both parties are entitled to appeal to the officers responsible for study matters as the arbitration authority.

(9) A justified change of supervisor is possible until submission of the doctoral thesis. The change requires approval by the officers responsible for study matters.

## § 5 Doctoral Thesis

(1) In the course of the doctoral studies, a doctoral 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 doctoral thesis and the respective doctoral school. A short description of the proposed thesis is made available to the members of the doctoral school with a *venia docendi*.<sup>10)</sup>

(2) The doctoral thesis is assessed according to § 31, paras. 5 through 7, of the Statutes, Chapter "Study Regulations", of Graz University of Technology. In consultation with the officers responsible for study matters, reviewers are pre-selected by the coordinating team of the doctoral school. The supervisor and the doctoral candidate have the right to propose names of reviewers. At least one reviewer should be from outside Graz University of Technology. Reviewers must not all be employed at the same institute. The members of the doctoral school with a *venia docendi* according to § 3 para. 3 are informed about the pre-selection of reviewers by the coordinating team and have the right to comment.<sup>11)</sup>

(3) The reviewers should be pre-selected 2 months before submission of the doctoral thesis at the latest. From that time on, all the reviewers are to be provided with a preliminary version of the doctoral thesis. Upon submission of the doctoral thesis, the officers responsible for study matters initiate the final assessment by the selected reviewers. As a part of the assessment, the doctoral thesis is to be graded according to the applicable rating system pursuant to § 72, para. 2 UG.<sup>12)</sup>

(4) Upon submission of the doctoral 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 directives of Graz University of Technology.

(5) The doctoral 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 doctoral thesis should follow the standards of the subject. For group work, the individual contributions of each student are to be clearly identified, according to § 83, para. 2 UG in conjunction with § 81 para. 3, and each contributing candidate is to submit an independent doctoral thesis. It is recommended that the doctoral thesis be written in the usual language of the subject.<sup>13)</sup>

(6) Publication of finished parts of the doctoral 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 reviewers, at least three reviewer reports are required. At least one report must come from outside Graz University of Technology. A final comprehensive doctoral thesis is, however, indispensable. This thesis may consist of a summary of publications of the candidate ("Mantel" doctoral thesis) and must include a list of publications of the doctoral candidate.<sup>14)</sup>

7) As a rule, the doctoral thesis (as a whole) must be made publicly available after the doctoral examination. In exceptional, justified cases, the doctoral candidate can apply to the officers responsible for study matters for restriction of access to the thesis according to § 86, para. 4 UG (withholding access). The period of restriction is temporally limited. The doctoral school is to be informed about the restriction.<sup>15)</sup>

## § 6 Instructional Classes

(1) The extent of the instructional classes is 14 semester hours (here abbreviated SSt), broken down as specified in the following paras. 2 through 4. In justified cases, the statutes of a doctoral school may require more classes.<sup>16)</sup>

(2) Subject-specific basic courses (6 – 8 SSt, selection from a catalogue of elective courses)

Every doctoral school specifies courses at a high level. They widen the doctoral candidate's knowledge in the own field and the specific topic of the doctoral 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 officers responsible for study matters, in consultation with the coordinating team of the doctoral school, assign 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, para. 1. Courses from other subject areas or other universities may be chosen upon application to the officers responsible for study matters and consultation of the candidate's supervisor. The doctoral school shall make the choices public.<sup>17)</sup>

(3) Scientific Methods and Communication (4 – 6 SSt are mandatory)

1. Each doctoral school offers, on a yearly basis, "Methods of Scientific Work" (2 SSt) 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 SSt) 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 doctoral candidates 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 doctoral candidates to improve on their speaking to a public, communication skills, and presentation of their field of work. Attendance is mandatory.
3. Up to 2 SSt of so-called "soft-skill" courses (presentation skills, rhetorics, etc.) may be selected from the catalogues of different degree programmes, provided that they were not already a part of a previous degree.<sup>18)</sup>

(4) The exclusive seminar ("Privatissimum"; 2 SSt), compulsory in the course of the doctoral programme, is usually offered by the supervisor of the doctoral candidate.

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

(6) The instructional classes are subsumed into a single module. This module is successfully completed if all of its courses were completed successfully. The grade of this module is determined as the average of the individual examination grades weighted by the number of semester hours of the courses. Values with decimals greater than 5 should be rounded up to the next whole number; smaller numbers are rounded off.<sup>19)</sup>

### **§ 7 Doctoral Examination**

(1) The doctoral examination is the final examination in the doctoral studies. The date of the doctoral examination may be set upon proof of successful completion of the courses according to § 6, submission of the annual reports according to § 4, para. 4, and positive assessment of the thesis according to § 5, para. 3, in compliance with the directives in § 21 and 23 of the Statutes, Chapter "Study Regulations", of Graz University of Technology. The examination is public in front of a board of at least three examiners.

(2) The board of examiners is convened by the officers responsible for study matters in compliance with the directives of § 24 of the Statutes, Chapter "Study Regulations", of Graz University of Technology. The examiners do not have to be the reviewers, and they must not be employed at the same institute. They are proposed to the officers responsible for study matters 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 doctoral examination 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 doctoral thesis by the board of examiners.<sup>20)</sup>

(4) The doctoral examination is assessed (marked) according to § 24 of the Statutes, Chapter "Study Regulations", of Graz University of Technology.

### **§ 8 Overall Assessment**

The doctoral examination is followed by the overall assessment. The assessment is based on the grades of the doctoral thesis, the doctoral examination, and the instructional classes. The overall assessment is "bestanden" ("pass") if all three grades 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 grades is less than "gut" ("good").<sup>21)</sup>

### **§ 9 Interim Regulations**

(1) Doctoral studies in Natural Sciences started before 1 October 2020 are continued and completed based on the hitherto applicable curriculum until 30 September 2024.

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 Registrar's Office in a written form and are irrevocable.

(3) Admission remains valid for students opting into this curriculum.

### **§ 10 Legal Validity**

This curriculum for the Doctoral Programme in Natural Sciences shall come into effect on 1 October 2020.

## Appendix: Explanatory Notes

### ad § 1 Objective and Qualification Profile

<sup>1)</sup> Further qualification aspects are to be detailed in the statutes of the doctoral school, see § 3, para. 4.

### ad § 2 Admission, Curricular Workload and Period of Study

<sup>2)</sup> For the definition of “officers responsible for study matters”, see § 1 of the Statutes, Chapter “Study-law Board”, of Graz University of Technology. The Vice Rector for Academic Affairs is the officer responsible for study matters 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

<sup>3)</sup> 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, doctoral projects, and the appointment of reviewers, should be made apparent in this context and should be discussed in order to ensure consistently high quality. See § 6 of the Statutes, Chapter “Study-law Board”, of Graz University of Technology and the directives of the Curricular Committee for Doctoral and University Certificate Programmes and the Senate on establishing doctoral schools and the activities of the coordinating team.

<sup>4)</sup> A doctoral school is established for bringing together a “critical mass” of doctoral candidates in the same subject, for who the subject catalogue for the instructional classes of the Doctoral School is normally valid, see § 3 para. 4 and § 6. As a point of reference, there should be a total of 35 to 100 doctoral candidates per doctoral school.

<sup>5)</sup> See the directives of the Curricular Committee for Doctoral and University Certificate Programmes and the Senate on establishing doctoral schools and the activities of the coordinating team. It is recommended that the officers responsible for study matters assign 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 Doctoral Candidates

<sup>6)</sup> Publication within the relevant doctoral school. The specific implementation is the responsibility of the doctoral schools.

<sup>7)</sup> 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.

<sup>8)</sup> These persons in mentorship roles do not need to possess in-depth expert knowledge in



*the topic of the doctoral project. They must, however, come from within the doctoral school. The specific implementation is the responsibility of the doctoral schools.*

*<sup>9)</sup> This regulation aims at providing a mechanism for the official evaluation of unsuccessful or abandoned doctoral projects. 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), a doctoral project may take longer than 5 years, as long as appropriate progress is made overall.*

#### **ad § 5 Doctoral Thesis**

*<sup>10)</sup> In the interest of quality control, the short description (1 – 2 pages) should propose reasonable and realisable topics for the doctoral 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 doctoral 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, para. 1, item 3, the presentation of the short description can be postponed for the additional number of semesters laid down in the obligations.*

*<sup>11)</sup> The appointment of reviewers should follow good scientific practice. As a rule, the reviewers should be international experts, so that an established, independent opinion is obtained. In selecting the reviewers, besides expertise in the field, particular attention is to be paid to impartiality.*

*<sup>12)</sup> The two months of time for pre-assessment allow the reviewers to influence the doctoral thesis positively where applicable, based on a preliminary version of the thesis. This way, the doctoral candidate has the chance to take any suggestions for improvement into consideration in good time.*

*<sup>13)</sup> The regulations on the writing of the doctoral thesis are in the interest of good scientific practice. However, with respect to protecting intellectual property for doctoral theses from industry co-operations, 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 doctoral thesis. The usual and recommended language for technical and scientific theses is English.*

*<sup>14)</sup> Scientific publications are an essential part of the work of a doctoral candidate. It is assumed that usually one or several publications have already appeared or were accepted for publication, which may be considered as a positive pre-assessment. If, contrary to these expectations, this is not the case, an additional quality control by a further external reviewer 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 reviewing practice in the statutes of the doctoral schools.*

*<sup>15)</sup> In principle, restricting access to a doctoral thesis runs contrary to the idea of promoting science. It is recommended that this mechanism be used stringently (taking into account subject-specific usage).*

### ad § 6 Instructional Classes

<sup>16)</sup> A sense of proportion is required for the determination of the scope of the curricular workload both in terms of the size (number of doctoral candidates) of the doctoral school as well as the assignment of teaching responsibilities. The semester hours (SSt) specified below are based on the standard number of 14. The variable number of semester hours in § 6, paras. 2 and 3, results from the choice offered in § 6, para. 3, item 2.

<sup>17)</sup> 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 SSt, depending on the number of doctoral candidates 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 SSt. 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, para. 1, item 3.

<sup>18)</sup> If the size (number of doctoral candidates) of the doctoral school permits, it is recommended to combine the two courses from § 6, para. 3, items 1 and 2 into one single course or seminar (scope: 2 SSt in winter and summer semesters). In addition, the doctoral candidates have the option to do the work for the doctoral seminar over a longer period of time.

<sup>19)</sup> The purpose of combining the grades for the instructional classes into one single grade is to avoid a too strong influence from individual grades on the overall assessment (§ 8).

### ad § 7 Doctoral Examination

<sup>20)</sup> Each doctoral school may formulate uniform directives for the doctoral examination in their statutes. As a recommended directive, a presentation time of 30 to 45 minutes is considered to be sufficient. The oral examination should be approx. 20 minutes per examiner. This examination has the character of a defence of the doctoral thesis consisting of questions on the subject of the doctoral thesis and the related subject area.

### ad § 8 Overall Assessment

<sup>21)</sup> Distinction is only awarded if three “excellent” (“sehr gut”, (1)) grades, or two “excellent” (“sehr gut”, (1)) grades and one “good” (“gut”, (2)) grade have been given.