

Statutes of the Doctoral School of Techno Economics at the Faculty of Mechanical Engineering and Economic Sciences of Graz University of Technology

Version of 2020-06

(1) Statutes of the Doctoral School of Techno Economics

These statutes were written by the coordination team of the Doctoral School of Techno Economics. In addition to subediting the statutes, the coordination team at the Doctoral School is responsible for implementing the content of the curriculum portions specific for the subject field of techno economics. All tasks are carried out in coordination with the officer responsible for teaching matters (Dean of Studies, Degree Programmes Techno Economics). The members are made up of the employees with a teaching qualification for the institutes associated with the Doctoral School of Techno Economics as well as the assigned doctoral candidates. The coordination team approves association of any other persons with the Doctoral School of Techno Economics.

These statutes define the subject-specific additions made to the *curriculum* for the *Doctoral Programme in Technical Sciences* (the *curriculum*) and to the *Excerpt of Statutes Legal Regulations for Academic Affairs of Graz University of Technology* (the *Excerpt of Statutes Legal Regulations for Academic Affairs*) in the applicable versions. The statutes are edited in accordance with the *Excerpt of Statutes Organisation of Academic Affairs (Officers) of Graz University of Technology* (the *Excerpt of Statutes Organisation of Academic Affairs*), the guidelines for the constitution of Doctoral Schools and the work of the coordination teams and the *Guideline for the Layout of the Statutes of Doctoral Schools* in the currently valid version.¹

(2) Scope of the Doctoral School of Techno Economics

The doctoral programme at the Doctoral School of Techno Economics (German title: Doctoral School für Techno-Ökonomie) deals with problems of the economic-technical science in the field of techno economics and closely related subject areas. The doctoral programme develops advanced abilities of the candidates, not only in the economics and engineering sciences mentioned, not only in the field of their subject of research, but also in related areas. The training takes place alongside research activities.

(3) Admission of graduates in economics

Within the meaning of § 2 (1) 2 of the *curriculum*, graduates of degree programmes in economics may also be admitted to this Doctoral School. The officer responsible for study matters may, in consultation with the supervisor, require the doctoral candidate to complete courses with an engineering orientation as part of the curricular workload of the doctoral programme (see § 12 and § 13 of these statutes). In special cases, this can total up to 16 semester course hours per week (SWS) or 24 ECTS credit points in addition to the regularly required 14 semester course hours per week.

(4) Academic degree to be awarded

Graduates of the doctoral programme at the Doctoral School of Techno Economics are awarded the academic degree “Doctor of Technical Sciences” (abb. Dr. techn.).

(5) Objectives and subject-specific qualification profile

The objectives of the doctoral programme are to develop skills for independent scientific research, to advance knowledge of the graduates in the economics and engineering subject area of their doctoral thesis as well as related subject areas, and to provide doctoral candidates with the abilities needed to present and defend research results at the highest level.

Graduates of the Doctoral School of Techno Economics have in-depth knowledge about the areas of their doctoral theses, extensive experience with the application of scientific methods in the economics and engineering sciences, skills in presenting and defending research results, and the ability for teamwork.

(6) Subjects of the Doctoral School

a) Associated institutes

The following institutes are associated with the Doctoral School of Techno Economics:

- 3710 Institute of Innovation and Industrial Management
- 3720 Institute of General Management and Organisation
- 3730 Institute of Business Economics and Industrial Sociology
- 3740 Institute of Engineering and Business Informatics

b) Cooperation partners

There are no regulations for this specific Doctoral School.

(7) Structure and tasks of the coordination team

The Doctoral School of Techno Economics is headed by a tripartite coordination team, consisting of one professor, one representative of the non-professorial teaching staff and one doctoral candidate of the field of techno economics. The coordination team elects a chairperson and a deputy chairperson in the constituent meeting at the beginning of the three-year period.

According to § 3 (4), § 4 (5) and § 5 (2) of the *curriculum* along with paragraphs (6) to (13) of the *Guidelines Coordination Team* and § 6 (4) of the *Excerpt of Statutes Organisation of Academic Affairs*, the coordination team is responsible for coordinating the doctoral curriculum, nominating mentors, preselecting evaluators, and coordinating announcements of the Doctoral School in cooperation with the Dean of Studies for the techno economics degree programmes. The tasks of the coordination team include organising seminars for doctoral candidates to present their research results and progresses of doctoral projects that are part of the Doctoral School. These events can take place either within the institute or as part of cross-institute events such as the “Research Colloquium Techno Economics”.

The representative of the doctoral candidates has the right to be heard by the coordination team in the event of disagreement between the supervisors and doctoral candidates throughout the doctoral thesis process, in particular with regard to supervision, mentoring or appointment of the evaluators. Should mediation in accordance with § 4 (8) of the *curriculum* become necessary or is requested by the officer responsible for study matters (see § 1 of the *Excerpt of Statutes Organisation of Academic Affairs*), the coordination team will issue a statement.

(8) Guidelines for supervision and mentoring of doctoral candidates

Doctoral candidates are supervised by university staff with a teaching qualification² for the associated institute to which the doctoral candidate is assigned. The framework for a regular exchange between the doctoral candidate and the supervisor in the form of reports written by the doctoral candidate is determined between the supervisor and the doctoral candidate at the beginning of the doctoral project and must be observed. The chairperson of the coordination team must receive ~~copies~~ of these written reports.³

The supervisor's task is to support the doctoral candidates in the form of targeted feedback on the results presented in a timely manner, of networking support within and outside of the university, and of ways of presenting the intermediate and final results of the doctoral project. If the doctoral candidates make no progress or submit no results for a long period of time, the supervisors must demand that they do so.

The doctoral candidates have the right to ask one or more suitable people for advice and support in the doctoral project. These mentors are to be nominated by the coordination team at the doctoral candidate's suggestion (see § 4 (5) of the *curriculum*). The Doctoral School of Techno Economics promotes the good scientific practice of using experienced researchers as mentors. The coordination team and/or the supervisors actively support the process of finding suitable mentors. Especially in industry-related projects, doctoral candidates are obliged to take confidentiality and conflicts of interest into account when making their choice. In their capacity as project manager, the supervisors confirm the conclusion of a mentoring agreement that takes confidentiality and conflicts of interest into account.⁴

(9) Guidelines for the doctoral thesis

In accordance with § 5 (2) of the *curriculum*, evaluators are selected by the coordination team of the Doctoral School in agreement with the officer responsible for study matters (Dean of Studies). The supervisors and the doctoral candidates have the right to recommend evaluators. At least one evaluator must not be an employee of the same institute at Graz University of Technology.

The Doctoral School of Techno Economics aims for evaluations by relevant colleagues from other universities. An example of the recommended evaluation report format is provided by the Doctoral School.

(10) Publication guidelines at the Doctoral School

The Doctoral School of Techno Economics aims to ensure that approx. two publications from the doctoral candidate's research work in basic subjects have been submitted, accepted for publication or published in internationally peer-reviewed journals before the doctoral programme is completed. In areas of applied research, at least two publications in relevant peer-reviewed journals or at relevant, peer-reviewed conferences must have been submitted, accepted for publication or published.⁵

(11) *Instructional classes*

According to § 6 of the *curriculum*, the scope of the curricular workload for the Doctoral School of Techno Economics totals 14 semester course hours per week (SWS). It is structured as follows:

- Subject-specific basic courses totalling 8 SWS (§ 12 of these statutes);
- Courses from Scientific Methods and Communication totalling 4 SWS (§ 13 of these statutes), including a doctoral seminar totalling 2 SWS;
- Exclusive tutorial for doctoral programmes totalling 2 SWS (§ 14 of these statutes);

(12) *Subject-specific basic courses*

Subject-specific basic courses must be selected in close coordination with the supervisor from the course catalogue offered by Graz University of Technology. The selected courses must be approved by the officer responsible for study matters (Dean of Studies).

Courses from § 8 and § 9 “Catalogue of Electives” of the *curriculum* for the *Master's Degree Programme Mechanical Engineering and Business Economics* and the *Master's Degree Programme Production Science and Management* are recommended. However, courses that have already completed as part of the master's degree programme are not admissible.

In accordance with § 6 (2) point 4 of the *curriculum*, the officer responsible for study matters (Dean of Studies) can also approve courses from another department and from other universities, provided that these meet the above requirements.

To support the concept of a broad basic educational foundation at a high level, doctoral candidates are strongly discouraged from choosing only lectures that are given at the institute of their supervisor.

(13) *Scientific Methods and Communication*

The “Scientific Methods and Communication” part of the curriculum aims at teaching the theoretical knowledge and practical skills required for developing research results using scientific methods and to present and defend these results. The recommended courses listed below exemplify this:

Example catalogue for Scientific Methods and Communication

- 371.303, Teambuilding
- 372.214, Project Management
- 373.550, Research Design in Management Science
- 930.001, Fundamental and Applied Research: Third-Party Funding, Grant Proposals, Collaboration, Resources and Impact
- 940.965, Intercultural Social Competence for Work and Life
- 940.930, Finding Scientific Literature and Publishing your Texts
- 940.942, Communication Styles, Discussion Techniques and Rhetoric
- TUG In-House Training, Effective Scientific Writing in English
- TUG In-House Training, Leading Diverse Teams
- TUG In-House Training, Managing Cross-Cultural Conflict

Upon request, other courses with corresponding course content may be accepted by the officer responsible for study matters (Dean of Studies).

Furthermore, the doctoral seminar (2 SWS) is part of the curricular workload of the doctoral programme. Progress and results of the doctoral project developed as part of the Doctoral School of Techno Economics are presented as part of the doctoral seminar.

In this seminar, doctoral candidates present their doctoral projects starting from their second year of studies. All doctoral candidates in the first semester of their doctoral programme are obliged to introduce themselves by giving a presentation on the underlying questions of their work as part of the doctoral seminar.⁶

(14) Exclusive tutorial for doctoral programmes

The exclusive tutorial for doctoral candidates is a research seminar as part of the doctoral programme in accordance with § 4 (1) 11 of the *Excerpt of Statutes Legal Regulations for Academic Affairs* and provides personal supervision for a doctoral candidate, specifically reading and reviewing of submitted concepts, interim results, formulations, etc., as well as the specific feedback from the supervisor.

(15) Guidelines for the doctoral thesis

Details on the contents and layout of the doctoral thesis can be found in the § 5 of the *curriculum* along with the corresponding comments. It is recommended that the doctoral thesis is written in the language commonly used for publication in the corresponding field of study. In techno economics, this is usually English.

The Doctoral School of Techno Economics requires a doctoral thesis consisting of a collection of several publications, e.g. articles or papers ("Manteldissertation" or "kumulative Dissertation" in German) to contain the results of the doctoral project in the form of multiple individual publications (§ 5 (6) of the *curriculum*). These publications must have a related subject matter and be connected to each other due to the overarching research question of the doctoral thesis. Furthermore, the publications must have already been published or accepted for publication. With regard to its scientific contribution, a doctoral thesis consisting of a collection of several publications must correspond to a monographic doctoral thesis. In any case, if the doctoral thesis is a collection of several publications, the assessability of the doctoral thesis must be ensured. A doctoral thesis consisting of a collection of several publications must therefore be framed with an introductory chapter, a description of the research question, a report on the current state of research, a description of the methodology used and a conclusion presenting the results of the doctoral project. Finally, the contribution of the doctoral thesis to the scientific progress in the corresponding field of research must be elaborated. In addition, a doctoral candidate's share of work in the publications must be clearly stated. Particular attention should be paid to the fact that the Copyright Act applies.⁷

(16) Guidelines for the board of examiners for the doctoral examination

The board of examiners is responsible for the implementation of the doctoral examination and usually consists of the Dean of Studies for the Degree Programme Mechanical Engineering and Business Economics (chairperson), the supervisor in the doctoral thesis, and other subject-relevant, proficient teaching staff with a teaching qualification. Such subject-relevant, proficient teaching staff with a teaching qualification can, but do not have to, be evaluators of the doctoral thesis.⁸

(17) Guidelines for the doctoral examination

The doctoral examination consists of two parts, consisting of a presentation covering the content, subject matter and most notable results, research questions and methods of the doctoral thesis, followed by a discussion and an oral exam by the board of examiners, in which questions about the doctoral thesis, the previous presentation and other closely related subjects are asked. The doctoral examination is open to the public. However, only the members of the board of examiners are entitled to ask questions during the doctoral examination.⁹

(18) Confidentiality agreement

In the field of applied research, work leading to the doctoral thesis is often financed by companies or other cooperation partners. These partners usually have an interest in keeping the research results documented in the doctoral thesis confidential. In such cases and with mutual consent of the doctoral candidate(s), the supervisor(s) and the partner(s), it is possible to block the doctoral thesis, which will keep the results secret for a limited period (§ 29 (6) *Excerpt of Statutes Legal Regulations for Academic Affairs*). Even if such an agreement is in place, however, publication of the research results must be aimed at to an extent reasonable for all the partners in accordance with § 10 of these statutes. The confidentiality agreements to be concluded should regulate the possibility of publishing the results in the form of lectures given by the doctoral candidates at conferences and in the doctoral seminar. The blocking the doctoral thesis requires the approval of the officer responsible for study matters (Dean of Studies).

(19) Transitional agreement

The present statutes are applicable to doctoral candidates who are subject to the curriculum for the Doctoral Programme in Technical Sciences at Graz University of Technology, version 2019, which came into effect on October 1, 2020.

Full-time doctoral candidates who began the Doctoral Programme in Technical Sciences at Graz University of Technology before October 1, 2020 and did not submit to the curriculum in the 2019 version are entitled to continue and complete their doctoral programme in accordance with the statutes that were previously valid until September 30, 2024.

Appendix: Explanations

Regarding § 1 Statutes of the Doctoral School of Techno Economics

¹⁾ The documents mentioned are obtainable from the homepage of the Doctoral School of Techno Economics and/or on TU4U, the intranet of Graz University of Technology, under Forms & Downloads.

Regarding § 8 Guidelines for supervision and mentoring of doctoral candidates

²⁾ In Austria, a teaching qualification for a university (also *venia legendi* or *venia docendi*) is e.g. acquired through appointment to this university or through a habilitation. According to § 29 *Excerpt of Statutes Legal Regulations for Academic Affairs*, persons with a teaching qualification at Graz University of Technology are entitled to supervise and assess (evaluate) scientific theses from the subject area they are qualified to teach. Likewise, only those with a teaching qualification may be on the board of examiners of a doctoral examination and assess a thesis, or, in the case of foreign examiners or experts, persons with a qualification equivalent to a teaching qualification in accordance with § 29 (3) *Excerpt of Statutes Legal Regulations for Academic Affairs* (see also § 23 and § 31 *Excerpt of Statutes Legal Regulations for Academic Affairs*).

³⁾ At Graz University of Technology, a doctoral project first requires the completion of three steps by the doctoral candidate: The supervisor must sign a confirmation of supervision (§ 4 of the curriculum), the Registrar's Office must admit the doctoral candidate to the doctoral programme (§ 2 of the curriculum) and the educational agreement (§ 4 of the curriculum) and the curricular workload of the doctoral programme (see § 12 of these statutes) must be signed. Next, the doctoral project must be briefly presented in the doctoral seminar of the first semester (see § 13 of these statutes) and an annual progress report must be submitted in accordance with § 4 (4) of the *curriculum*. The "Doktoratsmanagement" (doctoral management) tool on TU4U, the intranet of Graz University of Technology, provides helpful support in completing the doctoral programme.

⁴⁾ Regarding the choice of mentors, the "Self-Regulation in Science" commission of the Deutsche Forschungsgemeinschaft (Eng. German Research Foundation, DFG) recommends: "As experience in Germany and abroad has shown, it is advisable to provide doctoral candidates with support from two more experienced researchers who are available for advice and help and, if necessary, to mediate in conflict situations but also to discuss work progress at annual intervals, in addition to the primary 'key carer'." (*Recommendation 4: Supervising young researchers, ensuring good academic practice, Recommendations from the "Self-Regulation in Science" commission of the Deutsche Forschungsgemeinschaft DFG, WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim, 1998 and 2013, ISBN 978-3-527-33703-3*)

When drafting the mentor agreement, doctoral candidates and supervisors are advised to refer to the *Data Protection and Non-Disclosure Agreement External Assessors*, as well as the *confidentiality agreement* of Graz University of Technology. Both documents are available on TU4U, the intranet of Graz University of Technology, under Forms & Downloads (staff). This agreement is preferred unless the project partner require stricter agreements as companies involved in third-party funded projects often have confidentiality interests and therefore their confidentiality agreements must be consulted.

Regarding § 10 Publication guidelines at the Doctoral School

⁵⁾ A valid publication must have a DOI (digital object identifier) or an ISBN (international standard book number) or an ISSN (international standard serial number). In order to be considered a peer-reviewed publication, there must generally be two, mostly anonymous reports, based on which the editor accepts, rejects, or returns the paper for revision before a possible acceptance. This peer-review process serves to ensure the quality of scientific work before it is published for the international scientific community. Graz University of Technology supports open access publications in peer-reviewed journals.

Regarding § 13 Scientific Methods and Communication

⁶⁾ The short presentation in the first semester usually lasts about 5 minutes or a maximum of 3 slides and answers the following questions: Where do I come from, what did I study? What is the subject of my thesis? Who is the supervisor for my thesis? Where am I employed? Is my project experimental or numerical? In which laboratory will I do my experimental work? Is my project third-party funded (FWF, FFG, EU, directly funded)? Who are the sponsors and research partners (companies, research centres, universities)?

From the 2nd year onwards, the doctoral project will be presented according to standards common for conference presentations in the fields of economics and engineering. Such a presentation should not take longer than 20 minutes and allow for a discussion of about 10 minutes. All members of the Doctoral School should be able to follow the presentation easily and leave the seminar with a higher understanding of the scientific work carried out at this Doctoral School. The supervisor, the supervising institute and any sponsors and research partners should be mentioned in the presentation.

Regarding § 15 Guidelines for the doctoral thesis

⁷⁾ A doctoral thesis consisting of a collection of several publications is defined based on the corresponding definitions in § 5 (5) of the *curriculum* for the *Doktoratsstudium der montanistischen Wissenschaften an der Montanuniversität Leoben* (Doctoral Programme Mining Engineering at Montanuniversität Leoben) version 2018, as well as on the *directive of the Vice Rector for Academic Affairs on doctoral theses by publication* at the Vienna University of Technology in version 2013. This procedure ensures comparability within the association of three Austrian technological institutions, TU Austria.

Each doctoral thesis must be subjected to a plagiarism check by the supervisor before submitting the thesis to the Dean's Office. Further details can be found in § 6 to § 9 of the *Safeguarding Good Scientific Practice Guidelines* of Graz University of Technology.

It is recommended to carry out a preliminary plagiarism check once a draft version of the doctoral thesis is available. In order to avoid self-plagiarism in a monograph, it is recommended to reference pre-publications in the relevant sections or illustrations and to emphasise your own contribution to them.

Regarding § 16 Guidelines for the board of examiners for the doctoral examination

⁸⁾ § 24 *Excerpt of Statutes Legal Regulations for Academic Affairs* stipulates that the board of examiners must consist of at least three people. It is a long-established tradition at the Faculty of Mechanical Engineering and Economic Sciences to invite all evaluators to the doctoral examination so that a larger board of examiners can be formed if necessary.

Regarding § 17 Guidelines for the doctoral examination

⁹⁾ The comment to § 7 of the *curriculum* recommends a presentation duration of 30 to 45 minutes and provides about 20 minutes of discussion time for each examiner. It is common practice at the Faculty of Mechanical Engineering and Economic Sciences to allow external examiners to open the discussion.