Doctoral Programme
Doctoral School of Mechanical Engineering

J. Woisetschläger
Chairperson Coordination Team, Doctoral School of Mechanical Engineering

doctoral seminar 15th October 2020
Doctoral School of Mechanical Engineering

where the European Higher Education Area meets the European Research Area

Doctoral schools are expert boards responsible for implementing the details of the curriculum specific for the research subject.

Doctoral Candidates

Doctoral Candidates and their Doctoral Supervisors are members of this doctoral school in the research field of Mechanical Engineering.

The coordination team works out the statutes of the doctoral school and supports the dean of studies, who is responsible for all study matters at the Faculty of Mechanical Engineering and Economic Sciences.

Student Council for the doctoral programme

Works Council for academic personnel employed at TU Graz

Doctoral School Mechanical Engineering (DSM)
Three articles organize the doctoral programme

Graz University of Technology

Legal Regulations for Academic Affairs part of the TU Graz Statute

As of 1st Oct. 2018

Graz University of Technology

Curriculum for the Doctoral Programme in Technical Sciences

Curriculum 2007 Version 2012 valid until 30.09.2024

Curriculum 2019 New version valid, for students registered after 1st Oct. 2020 or in case of voluntarily opting

Appendix: Explanatory Notes

Doctoral School Mechanical Engineering

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

Subject-specific supplement to the Curriculum

As of 11th Jan. 2019 (supplement to Curriculum 2007 V 2012)

As of 19th Mar. 2020 (supplement to Curriculum 2019)

Appendix: Explanatory Notes
Three articles organize the doctoral programme:

The new Curriculum & Statutes:

- Like any other publication, the doctoral thesis can now be reviewed externally. The supervisor no longer has to be a reviewer.

- Doctoral candidates can now choose mentors.

- A clearer definition of cumulative doctoral theses is given.

- For both new documents explanatory notes are included in the appendix.

- The curricular workload and the doctoral programme remain the same, in order to ease a voluntary opting in favor of the new curriculum!
Doctoral Programme

First Year
- Short Presentation of your project in the Doctoral Seminar within the first semester
- Start networking with other PhD candidates
- Choose a Mentor (CURR 2019 only)
- Progress Report (Fortschrittsbericht)

Second Year
- First publications
- From 2nd year on: Final Presentation in the Doctoral Seminar
- Try to complete your curriculum
- Progress Report (Fortschrittsbericht)

Final Year
- Two month before thesis submission: Select referees and send first version of the thesis to them for pre-review
- Submit the final version of your thesis. The review process and the grading of the thesis then starts.

Admission Process
- Supervision Confirmation (Betreuungsbestätigung)
- Admission to Doctoral Programme (Zulassung zum Doktoratsstudium)
- Educational Agreement (Ausbildungsvereinbarung)
- Curricular Workload (Curriculärer Anteil)

Intranet
- Doctoral Management Tool “My Doctoral Project”
- Form sheet download from TU4U

Doctoral School Mechanical Engineering (DSM)
Doctoral thesis – Choose the Supervisor

- 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. CURR §5

- The doctoral candidate is entitled to propose the topic or to choose the topic from a number of proposals, he or she is entitled to choose a supervisor, a change of supervisor shall be permissible up until the doctoral thesis is submitted (approval by the dean of studies STR §31)

- One task of the supervisor is to guide the PhD student towards independent scientific work. This includes encouraging activities of independent scientific publication. (the supervisor is a TU Graz faculty member with venia legendi (Lehrbefugnis): SSTR §29; duties of the supervisor: CURR §4, SSTR §31, STAT (7)
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One task of the supervisor is to guide the PhD student towards independent scientific work. This includes encouraging activities of independent scientific publication. (the supervisor is a TU Graz faculty member with venia legendi (Lehrbefugnis): SSTR §29; duties of the supervisor: CURR §4, SSTR §31, STAT (7))

VENIA LEGENDI (lat.) = favour to read
VENIA DOCENDI (lat.) = favour to teach
Short form: VENIA = Teaching licence at a university

In AT, D, CH, RU, HU, PL, CZ, SK, SI, FI also by habilitation (habilitare (lat.) = to enable), An appointment as University Professor always includes a venia for the relevant subject.

Equivalent in other countries:
e.g. Statistics and Indicators on Gender Equality in Science 2009, pp 129ff group A always (B sometimes)
or web search for „list of academic ranks in ……..“
Sign the Educational (Training) Agreement

- Minimum period of the programme UG §54: **3 years**
  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. CURR §4

- Upon acceptance of a doctoral candidate, an **educational agreement** is concluded and signed by the doctoral candidate, the supervisor, and the Dean of Studies. **The supervisor** confirms with personal signature that, according to the supervisor's expertise in the subject, the doctoral project may be accomplished within the envisaged time frame. **The doctoral candidate** agrees with personal signature to observe the guidelines of Graz University of Technology ensuring good scientific practice. CURR §4 **guideline good scientific practice**
Sign the Educational (Training) Agreement

- Minimum period of the programme: UG §54: 3 years

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In your student account (Doctoral Management Tool)

Immediately when you start your doctoral programme:
- Yearly: Complete progress report

Doctoral School Mechanical Engineering (DSM)
Choose the Curricular Workload

14 semester course hours (SWS) of instructional classes in three modules

When starting your doctoral program, the instructional classes portfolio (Curricular workload TU4U) has to be approved by the Dean of Studies.

Module 1: “Subject-specific basic courses”, 8 semester course hours;
Subject-specific basic courses are selected by the doctoral candidate in close consultation with his/her supervisor from the portfolio offered by Graz University of Technology. The DSM recommends courses from §5a of the master’s curriculum in Mechanical Engineering (electives). Courses completed in the doctoral candidate master’s programme are not eligible as subject-specific basic courses. You are strongly discouraged to choose all courses from the supervisor’s institute!

Module 2: “Scientific Methods and Communication”, 4 semester course hours, 2 of which must be the doctoral seminar;
aim: to provide the theoretical knowledge and practical skills for developing results in research with scientific methods, and to present and defend these results.

Module 3: An exclusive tutorial (Privatissimum), 2 semester course hours.
The exclusive tutorial is a research seminar within the scope of the doctoral programme. STR §4. It is an opportunity for one-to-one engagement with the student’s work offered by the supervisor and entails the study and discussion of presented concepts, preliminary results, formulations etc. and a concrete feedback from the supervisor.
Choose the Curricular Workload

14 semester course hours (SWS) of instructional classes in three modules

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Module 1: “Subject-specific basic courses”, 8 semester course hours;
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Module 2: “Scientific Methods and Communication”, 4 semester course hours, 2 of which must be the doctoral seminar;
aim: to provide the theoretical knowledge and practical skills for developing results in research with scientific methods, and to present and defend these results.

Module 3: An exclusive tutorial (Privatissimum), 2 semester course hours.
The exclusive tutorial is a research seminar within the scope of the doctoral programme. STR §4. It is an opportunity for one-to-one engagement with the student’s work offered by the supervisor and entails the study and discussion of presented concepts, preliminary results, formulations etc. and a concrete feedback from the supervisor.

Courses from other subject areas or other universities may be chosen upon application. Please choose these courses in the Curricular Workload form when you start your doctoral programme. (The supervisor confirms, the dean of studies approves.) CURR §6(2)4

During your programme your classes portfolio (Curricular workload) can be changed upon application. Please apply together with your supervisor at the dean’s office. An explanatory statement why this change is required must be given!
Choose the Curricular Workload

14 semester course hours (SWS) of instructional classes in three modules

Module 1: “Subject-specific basic courses”
Subject-specific basic courses are selected by the doctoral candidate in close consultation with his/her supervisor from the portfolio offered by Graz University of Technology. The DSM recommends courses from §5a of the master’s curriculum in Mechanical Engineering (electives). Courses completed in the doctoral candidate master’s programme are not eligible as subject-specific basic courses. You are strongly discouraged to choose all courses from the supervisor’s institute!

Module 2: “Scientific Methods and Communication”
4 semester course hours, 2 of which must be the doctoral seminar; aim: to provide the theoretical knowledge and practical skills for developing results in research with scientific methods, and to present and defend these results.

Module 3: An exclusive tutorial (Privatissimum), 2 semester course hours.
The exclusive tutorial is a research seminar within the scope of the doctoral programme. It is an opportunity for one-to-one engagement with the supervisor and entails the study and discussion of presented concepts, preliminary results, formulations etc. and a concrete feedback from the supervisor.

Courses often chosen for module 2 in the last years by students in this Doctoral School:

- 371.303, Teambuilding
- 372.214, Project Management
- 930.001, Fundamental and Applied Research: Third-Party Funding, Grant Proposals, Collaboration, Resources and Impact
- 373.550, Research Design in Management Science
- 940.965, Intercultural Social Competence for Work and Life
- 940.930, Finding Scientific Literature and Publishing your Texts
- 940.942, Gesprächsverhalten, Diskussionstechnik und Rhetorik
- TUG Interne Weiterbildung, Effective Scientific Writing in English
- TUG Interne Weiterbildung, Leading Diverse Teams
- TUG Interne Weiterbildung, Managing Cross-Cultural Conflict
Choose the Curricular Workload

When starting your doctoral programme, the instructional classes portfolio (Curricular workload TU4U) has to be approved by the Dean of Studies.

Immediately when you start your doctoral programme

At the moment via in-house mail to the Dean’s office,
In near future upload via Doctoral Management Tool

Module 1: “Subject-specific basic courses”, 8 semester course hours;
Subject-specific basic courses are selected by the doctoral candidate in close consultation with his/her supervisor from the portfolio offered by Graz University of Technology. The DSM recommends courses from §5a of the master’s curriculum in Mechanical Engineering (electives). Courses completed in the doctoral candidate master’s programme are not eligible as subject-specific basic courses. You are strongly discouraged to choose all courses from the supervisor’s institute!

Module 2: “Scientific Methods and Communication”, 4 semester course hours, 2 of which must be the doctoral seminar; aim: to provide the theoretical knowledge and practical skills for developing results in research with scientific methods, and to present and defend these results.

Module 3: An exclusive tutorial (Privatissimum), 2 semester course hours.
The exclusive tutorial is a research seminar within the scope of the doctoral programme. It is an opportunity for one-to-one engagement with the student’s work offered by the supervisor and entails the study and discussion of presented concepts, preliminary results, formulations etc. and a concrete feedback from the supervisor.

STAT (10)-(13)

Based on 14 semester course hours

7

Doctoral School of Mechanical Engineering
Doctoral School Techno-Economics

Choose the Curricular Workload

In accordance with § 6 Curriculum for the Doctoral Programme in Technical Sciences

Based on 14 semester course hours

Family Name: ____________________________  First Name: ____________________________
Matriculation Number: ____________________________  Code Number: ____________________________

Subject-Specific Basic Courses (8 semester course hours - SCH)

<table>
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<tr>
<th>Course number</th>
<th>Course Title</th>
<th>Course Type</th>
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Scientific Methods and Communication (4 SCH with 2 SCH Doctoral Seminar)

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<th>Course number</th>
<th>Course Title</th>
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Exclusive Tutorial (2 SCH)

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</table>

When starting your doctoral programme, the instructional classes portfolio (Curricular workload TU4U) has to be approved by the Dean of Studies.

Immediately when you start your doctoral programme

At the moment via in-house mail to the Dean’s office,
In near future upload via Doctoral Management Tool

Doctoral School of Mechanical Engineering
Doctoral School Techno-Economics
The doctoral candidate is entitled to call upon one or more suitable persons to consult and accompany the doctoral project. These mentors are proposed by the doctoral candidate and nominated by the coordination team (§4 Curriculum). The Doctoral School of Mechanical Engineering agrees upon the good scientific practice to suggest experienced scientists as mentors. The coordination team and / or the supervisors support the selection process. Especially in industry-related projects, doctoral candidates must account for confidentiality and conflicts of interest when making their selection. In their role as project managers, the supervisors have to confirm that an agreement has been reached with the mentors, which takes confidentiality and conflicts of interest into account.
Doctoral seminar at DSM

In the doctoral seminar (2x1 semester course hours), progress and results of the doctoral projects at the Doctoral School of Mechanical Engineering are presented. The seminar is held in four four-hour blocks each semester. In these sessions, doctoral candidates from their second year on present their work. All doctoral candidates in the first semester of their studies briefly introduce themselves and their work. STAT (12)
Doctoral seminar at DSM

5 minutes presentation:
Where are you from, what did you study? What is the objective of your scientific work? Will you work experimentally or numerically? Who is your supervisor? At which institute (company) are you employed? In which lab will you carry out your research? Financing? Are there any research partners?

20 minutes presentation (+10min discussion):
At first, mention your supervisor, your supervising institute, your employer (if not identical) and the project funding.

What can you expect from the audience?
- deepened mathematical knowledge. deepened scientific knowledge (physics, chemistry, informatics, diagnostic techniques).
- basic knowledge on design and construction, mechanics, dynamics, fluid mechanics, thermodynamics, and materials science.
- basic principles of business administration.

The presentation should be easy to follow so that all members of the Doctoral School are properly informed about your scientific task. A scientific discussion on the topic shall be triggered. A Feedback Form is distributed to all participants of the seminar. The result of this feedback can be reviewed by you only.
Doctoral seminar at DSM

5 minutes presentation:
Where are you from, what did you study? What is the objective of your scientific work? Will you work experimentally or numerically? Who is your supervisor? At which institute is your research? Financing? Are there any research partners?

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Presentation and discussion has to be in English.

Please download your presentation to the laptop placed at the console before the seminar starts.

Please test the presentation in case you have animated transparencies. Whenever special animations are required, please plug in and test your personal laptop before the seminar starts!
Coming to an end - choosing the referees for your thesis

- The dean of studies shall submit the doctoral thesis to **two professors (venia or equivalent)**, who shall **assess the doctoral thesis within a maximum of four months**. The second assessor may be taken from a subject **closely related** to the subject of the doctoral thesis. **The publication of completed parts in international publication media is recommended, before the assessment of the doctoral thesis. If proof of such publications cannot be provided at the time that the assessors are appointed, at least three assessors shall be appointed**, of which at least one must be from outside of TU Graz. STR §31

- It is recommended to involve competent professors **from another university**. The doctoral school provides a [guideline for the thesis assessment](#).

- 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 (grading!) by the selected referees. CURR §5 (form sheet download from [TU4U](#))**
Coming to an end - choosing the referees for your thesis

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3. It is recommended to involve competent professors from another university.

At the moment via in-house mail to the Dean's office, in near future upload via Doctoral Management Tool
Publications

- The Doctoral School of Mechanical Engineering requires doctoral candidates to publish approximately **two reviewed articles in international journals or at international conferences** prior to completing their doctoral studies. Articles must be submitted, accepted for publication or published. STAT (9)

- **What is a “publication”**? Publico, publicare: To make public. A valid publication is often proven by the ISBN (international standard book number), the ISSN (international standard serial number), or by the DOI (digital object identifier).

- **How to identify a reviewed publication**? Such publications are full-text papers and undergo a peer-review process, meaning that positive reports by at least two anonymous referees are needed. (These referees work within the same field of expertise as the submitting authors. peer = colleague)
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Publico, publicare: To make public. A valid publication is often proven by the ISBN (international standard book number), or by the ISSN (international standard serial number), or by the DOI (digital object identifier).

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Letter from Editor

Point-to-point response to the peers by authors
Ensuring good scientific practice in publishing

- **Publications**: If multiple researchers make significant original contributions to a work of research or to a publication of the results of a project, they always bear collective responsibility for the content of the work or the publication. Only persons who individually make significant contributions to the design of the study or experiments, to the collection, analysis and interpretation of data or to the writing of the manuscript, and who consent to the publication may be named as coauthors.

- The doctoral thesis must present the new scientific knowledge from the work accomplished and a comparison with the current state of scientific research (cite other researchers!). 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. CURR §5 (please also read guideline for the thesis assessment !)

- Students shall comply with the rules of good academic practice. Compliance shall be verified, to prevent plagiarism, in particular. More detailed provisions can be found in the relevant part of the TU Graz statute. STR §32

Complex topic! Recommended reading: § 6 – Plagiarism and Ghostwriting, TU Graz; Selbstplagiarismus, Uni Regensburg;
Thesis defense at DSM

- As a rule, the board of examiners for the thesis defence consists of the Dean of Studies for Mechanical Engineering (chairperson), the supervisor, and additional, university lecturer with venia who may, but does not have to, be the assessors of the PhD thesis STAT (16). Such a committee shall consist of at least three persons (STR §24).

- As a rule, in the thesis defence the doctoral candidate presents his/her research work based on the content of his/her PhD thesis, e.g. the scientific problem formulation, the selected research methodology, the areas of emphasis and the main results. Furthermore, during the defence, questions on the PhD thesis and its presentation, as well as closely related subject areas, are discussed. The thesis defence is open to the public. In the thesis defence, only members of the examination board are authorised to ask questions. STAT (16)

- As a recommended guideline, a presentation time of 30 to 45 minutes is considered to be sufficient. The discussion part should be approx. 20 minutes per examiner. The discussion 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. CURR Appendix to §7
Some statistics at the end (1/2)

### Doctoral Students Mechanical Engineering December 2019:

<table>
<thead>
<tr>
<th></th>
<th>Women AT</th>
<th>Men AT</th>
<th>Women non AT</th>
<th>Men non AT</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women AT</td>
<td>9</td>
<td>162</td>
<td>7</td>
<td>51</td>
<td>229</td>
</tr>
</tbody>
</table>

Doctoral Seminar, student‘s self-evaluation: (average grades with 1=++)

<table>
<thead>
<tr>
<th></th>
<th>Content</th>
<th>Arrangement</th>
<th>Language</th>
<th>Time</th>
<th>Presentation</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014 - 2018</td>
<td>1.7 ± 0.3</td>
<td>1.6 ± 0.3</td>
<td>1.7 ± 0.4</td>
<td>1.8 ± 0.3</td>
<td>1.7 ± 0.2</td>
<td>1.4 ± 0.4</td>
</tr>
<tr>
<td>2008 - 2014</td>
<td>1.7 ± 0.3</td>
<td>1.6 ± 0.2</td>
<td>1.6 ± 0.4</td>
<td>1.9 ± 0.3</td>
<td>1.8 ± 0.2</td>
<td>1.4 ± 0.3</td>
</tr>
</tbody>
</table>
Some statistics at the end (2/2)

Average number of publications per doctoral student at reviewers selection

<table>
<thead>
<tr>
<th>Period</th>
<th>Publications total</th>
<th>Publications reviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014 - 2018</td>
<td>7.3</td>
<td>4.4</td>
</tr>
<tr>
<td>2008 - 2014</td>
<td>6.1</td>
<td>2.6</td>
</tr>
</tbody>
</table>

2014-2018: peak values e.g. 24/21, 18/15 and 11/10 (total/reviewed), especially when PhD students are incorporated in research teams.

Second reviewers 2014-2018

91% are external reviewers! (84% 2008-2014). At several institutes 100%. In most defences the external reviewers also participated as examiners. In detail: TU Vienna (19%), MU Leoben (11%), other Austrian Universities (3%), German Universities (42%), other European Universities (15%), Universities from outside Europe (1%). 9% are internal reviewers from TU Graz.