Doctoral Programme
Doctoral School of Mechanical Engineering

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Chairperson Coordination Team, Doctoral School of Mechanical Engineering

doctoral seminar 12th March 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 and their Doctoral Supervisors are member 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 program

Works Council for academic personnel employed at TU Graz

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

- **Legal Regulations for Academic Affairs**
  - As of 1st Oct. 2018

- **Curriculum for the Doctoral Programme in Technical Sciences**
  - Curriculum 2007 Version 2012
  - New version valid from 1st Oct. 2020
  - Appendix: Explanatory Notes

- **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

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*Doctoral School Mechanical Engineering (DSM)*
Doctoral Program

Admission Prozess

First Year
- Short Presentation of your project in the Doctoral Seminar within the first semester
- Start networking with other PhD candidates
- 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 starts.

First Year:
- Doctoral Seminar
- Networking
- Progress Report

Second Year:
- Publications
- Final Presentation
- Curriculum completion

Final Year:
- Thesis defense
- Further publications and conferences
- Curriculum completion

Admission Process:
- Supervision Confirmation
- Admission to Doctoral Program
- Educational Agreement
- Curricular Workload

Curricular Workload:
- Curricular Workload

Support:
- Supervisor's Institute
- Registration Office
- Intranet
- Doctoral Management
- Form Sheet download from TU4U
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 student 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 faculty member with venia legend (Lehrbefugnis): SSTR §29; duties of the supervisor: CURR §4, SSTR §31, STAT (7)
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**VENIA LEGENDI**(lat.) = favour to read

**VENIA DOCENDI** (lat.) = favour to teach

(licence to teach at a university a certain subject)

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 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 (TU4U) 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 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. CURR §4 guideline good scientific practice
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

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;
Module 2 aims 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.

When starting your doctoral program, the instructional classes portfolio (Curricular workload TU4U) has to be approved by the Dean of Studies. 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 program. (The supervisor confirms, the dean of studies approves.) CURR §6(2)4

During your program 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

STAT (10)-(13)

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. Engineering (elective) courses 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”
2 semester course hours, 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.

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
- 940.965, Intercultural Social Competence for Work and Life
- 940.930, Finding Scientific Literature and Publishing your Texts
- 940.942, Gesprächsverhalten, Diskussionstechnik und Rhetorik (in German)
- TUG In-house Training, Effective Scientific Writing in English
- TUG In-house Training, Leading Diverse Teams
- TUG In-house Training, Managing Cross-Cultural Conflict
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)

<table>
<thead>
<tr>
<th>Day</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Final Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. day</td>
<td>5 min presentation</td>
<td>20 min presentation</td>
<td>4 days must be completed attendance list!</td>
</tr>
<tr>
<td>2. day</td>
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<tr>
<td>3. day</td>
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<tr>
<td>4. day</td>
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</table>
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

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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 are you employed? In which lab will you carry out your research? Financing? Are there any research partners?

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- 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.

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 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)

- 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 a competent colleague **from a different university as the second assessor**. The doctoral school provides a **guideline for the thesis assessment**.
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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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. §5

**The PhD 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 primary assessor of the PhD thesis, and an additional, university lecturer with venia who may, but does not have to, be the second assessor of the PhD thesis. STAT (14)

- As a rule, in the thesis defence the doctoral candidate presents his/her research work completed and 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, in the examination, 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 (15)

- 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. CURR Appendix to §14
### 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>9</td>
<td>162</td>
<td>7</td>
<td>51</td>
<td>229</td>
<td></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>

Best 1 & Worst 4.1
Some statistics at the end (2/2)

Average number of publications per doctoral student at reviewers selection

<table>
<thead>
<tr>
<th></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.