Doctoral Programme
Doctoral School of Mechanical Engineering

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

Doctoral seminar  March 9th 2023
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 members of the Doctoral School in the research field of Mechanical Engineering.

The Dean of Studies is responsible for all study matters at the Faculty of Mechanical Engineering and Economic Sciences.

The coordination team supports the Dean of Studies.

Student Council for the doctoral programme

Works Council for academic personnel employed at TU Graz
Three articles organize the doctoral programme

- Legal Regulations for Academic Affairs part of the TU Graz Statute
  As of 1st Oct. 2018

- Curriculum for the Doctoral Programme in Technical Sciences
  Curriculum 2007 Version 2012 valid until 30.09.2024

- 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)

Appendix: Explanatory Notes

Graz University of Technology

Doctoral School Mechanical Engineering (DSM)
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 doctoral candidates
- Choose a Mentor (CURR 2019 only)
- Progress Report (Fortschrittsbericht)

**Second Year**
- First publications
- First conferences
- 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 reviewers (assessors) 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**
- Supervisor's Institute
- Registrar's Office
- Educational Agreement (Ausbildungsvereinbarung)
- Curricular Workload (Curricularer Anteil)
- Admission to Doctoral Programme (Zulassung zum Doktoratsstudium)
- Supervision Confirmation (Betreuungszusage)

**Doctoral Management Tool “My Doctoral Project”**
(Intranet TU Graz, please log in first)

**Form sheet download from TU4U**
(Doctoral degree programmes – Dean's Office for Mechanical Engineering and Economic Sciences, Intranet TU Graz, please log in first)
Doctoral Programme

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

Second Year
- First publications
- First conferences

Final Year
- Two month before thesis submission: Select reviewers 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.
- Thesis defense / Rigorosum

Important informations will be send to your student e-mail account @student.tugraz.at
Please forward this student mail-account to your business mail-account!

Admission Process

- Supervision Confirmation
- Admission to Doctoral Programme
- Educational Agreement

Curricular Workload
- Confirmation (Betreuungszusage)
- Admission to Doctoral Programme (Zulassung zum Doktoratsstudium)
- Educational Agreement (Ausbildungsvereinbarung)

Supervision's Institute

Registrar's Office

Doctoral Management Tool “My Doctoral Project”
(Intranet TU Graz, please log in first)

Form sheet download from TU4U
(Doctoral degree programmes – Dean’s Office for Mechanical Engineering and Economic Sciences, Intranet TU Graz, please log in first)
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 choose a **supervisor**. He or she is also entitled to propose the topic or to choose the topic from a number of proposals. 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 doctoral candidate 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 doctoral candidate 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 ……..“
Mentorship

The doctoral candidate is entitled to call upon one or more 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 take into account 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.
Sign the Educational (Training) Agreement

- **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**, according to the supervisor's expertise in the subject **that the doctoral project can be accomplished within the envisaged time frame.**

  **The doctoral candidate agrees to observe the guidelines of Graz University of Technology ensuring good scientific practice.** CURR §4 guideline good scientific practice

- **Minimum period of the programme UG §54: 3 years**
Sign the Educational (Training) Agreement

- 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, according to the supervisor's expertise in the subject, that the doctoral project may be accomplished within the envisaged time frame.

- The doctoral candidate agrees to observe the guidelines of Graz University of Technology ensuring good scientific practice.

In your student account (Doctoral Management Tool)

- Immediately when you start your doctoral programme:

  Educational agreement
  After submitting your educational agreement, you can start working on your doctoral thesis. Once the educational agreement has been accepted, you can upload progress reports.
  Progress reports
  A progress report is to be delivered every year. The goal for the PhD student is to reflect on their own work as well as new skills and knowledge they acquired. By writing the reports, the student should deal with the question of how well and how far the work on the thesis has progressed each year. This makes it possible to identify any problems and counteract them early enough. After submission, the progress report can be viewed by the student's supervisor as well as the members of their doctoral school with a teaching qualification.

- Yearly:

  Complete progress report
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) 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 candidate’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

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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 candidate'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.

Module 1: 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 studies 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

Module 2: Courses often chosen by doctoral candidates from 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**

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

*Based on 14 semester course hours*

- Doctoral School of Mechanical Engineering
- Doctoral School Techno-Economics

<table>
<thead>
<tr>
<th>Family Name</th>
<th>First Name</th>
<th>Matriculation Number</th>
<th>Code Number</th>
</tr>
</thead>
</table>

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

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Course Type</th>
<th>SCH</th>
</tr>
</thead>
</table>

Scientific Methods and Communication (4 SCH with 2 SCH Doctoral Seminar)

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Course Type</th>
<th>SCH</th>
</tr>
</thead>
</table>

Doctoral Seminar (mandatory) 4 SE 2

Exclusive Tutorial (2 SCH)

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Course Type</th>
<th>SCH</th>
</tr>
</thead>
</table>

Please mail to the Dean’s office

Immediately when you start your doctoral programme

In close consultation with his/her supervisor from the portfolio courses from §5a of the master's curriculum in Mechanical Engineering, the master's programme are not eligible as subject-specific basic courses.

You are strongly discouraged to choose all courses from the supervisor's institute!

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

Courses completed in the doctoral candidate master's programme are not eligible as subject-specific basic courses.

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.

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. §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.
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.

Only when in class: 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 are you employed? In which lab will you carry out your research? Financing? Are there any research partners?

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Only when in class: A **Feedback Form** is distributed to all participants of the seminar. The result of this feedback can be reviewed by you only.
Coming to an end - choosing the reviewers for your thesis

- The dean of studies will submit the doctoral thesis to two professors (venia), who must assess the doctoral thesis within four months. The second assessor (reviewer) may be taken from a subject closely related to the subject of the doctoral thesis.

- It is recommended to involve at least one professor from another university. The doctoral school provides a guideline for the thesis assessment.

- The reviewers should be pre-selected 2 months before submission of the doctoral thesis at the latest CURR §5 From that time on, all the referees are to be provided with a preliminary version of the doctoral thesis.

- Upon submission of the doctoral thesis, the Dean of Studies initiates the final assessment (grading!) by the selected referees.

- Completed parts of the thesis shall be published before the selection of reviewers. If proof of such publications cannot be provided at the time that the assessors are appointed, at least three assessors (reviewers) shall be appointed, of which at least one must be from outside of TU Graz. STR §31
Coming to an end - choosing the referees for your thesis

1. The referees should be pre-selected 2 months before submission of the doctoral thesis at the latest. From that time on, all the referees are to be provided with a preliminary version of the doctoral thesis. Upon submission of the doctoral thesis, the Dean of Studies initiates the final assessment (grading) by the selected referees. The dean of studies shall submit the doctoral thesis to two professors (venia), who shall assess the doctoral thesis within four months. The second assessor may be taken from a subject closely related to the subject of the doctoral thesis.

2. It is recommended to involve competent professors from another university. The doctoral school provides a guideline for the thesis assessment.

3. Completed parts of the thesis shall be published, 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. Please mail to the Dean's office and upload the returned signed version to the Doctoral Management Tool.
Publications

- The Doctoral School of Mechanical Engineering encourage doctoral candidates to **publish at least 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 proven by the ISBN** (international standard book number), **the ISSN** (international standard serial number), **or by the DOI** (digital object identifier).

- **What are reviewed publications?** Such publications are **full-text papers which undergo a peer-review process**, meaning that positive reports by at least two reviewers are needed. These referees work within the same field of expertise as the submitting authors. **peer = colleague (at least two, usually anonymous)**
• The Doctoral School of Mechanical Engineering encourages doctoral candidates to publish at least 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.

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

• What are reviewed publications? Such publications are full-text papers which undergo a peer-review process. These referees work within the same field of expertise as the submitting authors.

Letter from Editor

Dear Dr. [Name],

I have now received the referee reports of your manuscript mentioned above. These have been appended to this message. As you can see from these reviews, the referees feel that the manuscript can be accepted for publication; however, some questions must still be included in the revised manuscript, before publication is possible.

I would therefore like to suggest that you now prepare a revised manuscript or a rebuttal, taking into account the account of the referee. I would also appreciate receiving a clear point-by-point commentary to all referees.

Yours sincerely,

Associate Editor

Letter from Editor

Dear Editor,

Enclosed please find the revisions, and the point-by-point commentary requested. Besides minor changes we added a conclusion section, some more lines to the discussion and the experimental setup, and improved Fig.10 as requested by the reviewers. Please find the revised manuscript enclosed in file [filename], with all revisions in red color.

We do not believe that an additional figure of the dye trail will add information. We placed a possible figure into the commentary section, so that the reviewers may see their own decision.

With kind regards,

[Name]

Ref.: Ms. No. EXIF

Experiments in Fluids

Reviewers’ comments:

Reviewer 1: An excellent and interesting paper. There is one major issue in my mind, noted below. We would like to thank reviewers 1 and 2 for the very constructive and helpful comments. In the current version of the manuscript, the authors have addressed all major issues raised by the reviewers. We are confident that the revised manuscript will improve understanding of the mechanisms involved in the process described. We would like to thank the authors for taking the time to address all the comments.

2.55

Change this experiment into a full text paper. Change the text accordingly. There are still a number of issues that need to be addressed. We do not add any new images to the manuscript. However, we believe it would improve understanding if the authors add an image to show the bridge in more detail.

Page Line Comment
1 (5) Text was changed accordingly
2 (5) Changed this experiment into a full text paper. Change the text accordingly.
3 (5) This experiment was added to the manuscript.
4 (5) This experiment was changed accordingly.

7-20

Dear Dr. [Name],

I have now received the referee reports of your manuscript mentioned above. These have been appended to this message.

As you can see from these reviews, the referees feel that the manuscript can be accepted for publication; however, some questions must still be included in the revised manuscript, before publication is possible.

I would therefore like to suggest that you now prepare a revised manuscript or a rebuttal, taking into account the account of the referee. I would also appreciate receiving a clear point-by-point commentary to all referees.

Your revision is due by 22-08-2009.

To submit a revision, go to [email protected] and log in as the Author. You will see a menu item. Submitting a Revision. You will find your submission record there.

Yours sincerely,

[Name]
Ensuring good scientific practice in publishing

- **Publications:** Authors are persons who individually make significant scientific 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. If multiple researchers make significant original contributions to a work of research or to a publication of the results of a project, these multiple researchers (authors) always bear collective responsibility for the content of the work or the publication.

- **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 doctoral thesis should follow the standards of the subject. For team work, the individual contribution of the candidate is to be clearly identified, according to § 82, section 2 UG, 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. CURR §5 (please also read guideline for the thesis assessment!)

- Doctoral candidates shall comply with the rules of good academic practice. Compliance shall be verified, to prevent (self) plagiarism, in particular. More detailed provisions can be found in the relevant part of the TU Graz statute. STR §32 Complex topic! Recommended reading: Plagiarism – Statutes TU Graz; Selbstplagiarismus, Uni Regensburg;
Thesis defense at DSM

What do I need to organize my defense?

1) Positive assessment of the thesis
2) Successful completion of the courses
3) The yearly progress reports
Thesis defense at DSM

Form sheet download from [TU4U](https://www.tu4u.ch) (Doctoral degree programmes – Dean’s Office for Mechanical Engineering and Economic Sciences, Intranet TU Graz, please log in first)
Thesis defense at DSM

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

- The thesis defence starts with the doctoral candidate presenting his/her research work based on the content of his/her doctoral thesis, e.g. the scientific problem formulation, the selected research methodology, the areas of emphasis and the main results. After the presentation the candidate answers questions on the doctoral thesis and its presentation, as well as on closely related subject areas. The thesis defence is open to the public, but 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 questions per examiner. The discussion part 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. CURR Appendix to §7
Some statistics at the end (1/2)

**Doctoral Candidates Mechanical Engineering December 2020:**

<table>
<thead>
<tr>
<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>10</td>
<td>157</td>
<td>9</td>
<td>59</td>
<td>235</td>
</tr>
</tbody>
</table>

**Doctoral Seminar, presenters' 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

Best 1
Some statistics at the end (2/2)

Average number of publications per doctoral candidate at reviewers selection

<table>
<thead>
<tr>
<th>Year Range</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 doctoral candidates 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.