Guideline for the Habilitation at the Faculty of Mechanical and Industrial Engineering (MWBW)

1 Preliminary note

The habilitation is the highest-ranking university qualification which, within the framework of an academic procedure, establishes an applicant's ability to further develop a scientific or artistic subject area comprehensively in teaching and research. With the habilitation, the major teaching authorization (*Venia Docendi*) for a delimited subject is granted, which is associated with the right to freely exercise the scientific or artistic teaching at the university that granted the teaching authorization, subject to availability, as well as to supervise and assess scientific work. Accordingly, it is the acquisition of substantial academic rights. For members of the University, the habilitation also implies the agreement to teach compulsory courses at the faculty. The habilitation at the Faculty of MWBW enables the applicant to qualify for the next career level in addition to the teaching authorization according to the subject area at the TU Wien.

There are three ways to achieve this qualification: a) by **appointment as a university professor** (for the field of professorship), b) by **appointment as an honorary professor** (honorary teaching authorization; restricted to a specific field), c) by **habilitation**.

The present document for the habilitation at the Faculty MWBW of TU Wien is intended to provide a guideline for the implementation of this qualification. This habilitation guideline applies to all subject areas of the faculty and serves the transparency and comparability of the performance of the individual applicants.

2 Frameworks

The habilitation procedure at the TU Wien is regulated by the statute part "Habilitation Procedure" (latest version at https://www.tuwien.at/tu-wien/organisation/zentrale-bereiche/datenschutz-und-dokumentenmanagement/satzung). In the explanations to the statute part "Habilitation Procedure", reference is made to guidelines for the qualitative and quantitative orientation of the habilitation applicant, in which the regulations for habilitation procedures are set out. This document constitutes the guidelines for habilitation for all disciplines of the MWBW faculty. The criteria formulated here do not constitute a legal claim (or any guarantee) of a positive outcome of the habilitation procedure. Such a decision is solely at the discretion of the habilitation committee, which should also use this guide as a guideline to enable equal and fair conditions of evaluations.

3 Faculty Colloquium

The Faculty of MWBW requires a presentation of the candidate at a faculty colloquium (at the beginning of the Faculty Council meeting) before the habilitation process starts. This presentation is publicly oriented and the invitation is extended to the entire faculty. The focus of the talk should include the candidate's research profile and research already done, but should also include a presentation of the curriculum vitae and, in particular, a summary of involvement in teaching both at the TU Wien and at other institutions. In particular, the presentation should include a didactic introduction to the subject area, should be in a faculty-related, generally understandable form, and should last approximately 20 minutes. This presentation should take place at a stage where it is expected that the official application to the Rectorate for granting the habilitation will be submitted to the Dean's Office within one year.

Immediately after the lecture, the habilitated members of the Faculty Council and the professors meet once in a non-public part – without the presence of the applicant, but with the participation of the professor promoting the habilitation – and formulate a joint assessment regarding the intended habilitation. The chairperson of the Faculty Council shall promptly communicate the assessment to the applicant, which shall include, in particular, the subject-specific recommendations and any specific requirements for the habilitation. These requirements should meet international standards. In the case of a positive recommendation, the formal assignment to an organizational unit of the faculty should also be mentioned.

The recommendation is made to the candidate that, prior to a presentation to the Faculty Council, she/he should discuss with the mentor of the habilitation – usually the professor with whom the habilitation candidate works or who represents the subject to which the habilitation is to be assigned – and also with other professors and recent habilitation candidates whether the project meets the requirements of a habilitation in the subject.

4 Orientation of minimum requirements in the field of research and teaching

In contrast to a dissertation, which usually deals with a more focused defined special topic, the habilitation thesis should be a work that meets a particularly high methodological and content-related standard and through which research in a defined subject area has been advanced. Furthermore, a habilitation thesis must not only, like the dissertation, contain new scientific results, but must also demonstrate the applicant's mastery of the habilitation subject in its entirety and the ability to promote it.

For the habilitation at the MWBW faculty, therefore, several years of successful, independent activity in research and teaching are expected. The design and implementation of successful research differs in the different departments within the faculty. The definition of possible specifics is recommended at the beginning of the habilitation process. For this purpose, the above-mentioned discourse with the mentor of the habilitation serves – as a rule, the professor with whom the habilitation applicant works or who represents the subject to which the habilitation is to be assigned.

Below are some general recommendations for the specification of a successful habilitation procedure. These should already be the basis for mentoring and, after the faculty colloquium, serve to specify the assessment of the scientific work presented by the applicant and the personal profile, and ultimately to recommend admission to the habilitation procedure or to make supplementary recommendations for action. In this context, it must be taken into account that deviations in individual areas in particular can be compensated for by above-average performance in other areas.

4.1 Research

4.1.1 Research in relation to the habilitation thesis

- Establishment of an independent research profile that clearly distinguishes it from the doctoral thesis or clearly extends it.
- A sufficient number of peer-reviewed, scientific publications in reputable peer-reviewed journals must have been published, whereby the mere number is only a necessary criterion.[1]

[1] The **minimum number** for a cumulative habilitation is 10 publications or patents (for the habilitation thesis itself): Of these, at least 5 must have appeared in prestigious SCI-listed peer-reviewed journals. "Reputable peer-reviewed journals" are those that have at least one evaluation

At this career stage, several important postdoctoral publications are expected (especially if a cumulative habilitation thesis is sought, but also in the case of a monography).[2]

- For a part of the peer-reviewed, scientific publications, the independent contribution of the candidate and the independence from the doctoral supervisor should be clearly recognizable.[3] In particular, the scientific independence (according to subject-specific criteria) should be documented (for a cumulative habilitation thesis as well as for a monography).

4.1.2 Research in relation to the scientific activity carried out so far

- Establishment or management of a research group, i.e. independent research and scientific supervision/co-supervision of a scientific group (especially PhD students). The research group does not have to be embedded in a formal structure and may well be part of an established group.
- Scientific presentations at international conferences.
- Experience abroad and international networking: Extensive international cooperation activities over at least three major projects lasting several years or completion of a continuous research stay of at least six months at a university or research institution outside Austria. In case of international experience through doctoral studies abroad or in the context of a postdoctoral stay abroad, this point is considered to be already fulfilled (this point can alternatively also be mentioned in the CV).

4.1.3 Research in relation to the curriculum vitae

- Acquisition of external funding (e.g. FWF, FFG, EU, ERC, direct industrial projects), whereby at least one project [in which the applicant acts as Principal Investigator (PI)] should have been evaluated via an international peer review.
- International networking should be clearly evident. Possible criteria are the coordination of international research projects or cross-organizational research groups, organization of international workshops and conferences.
- Engagement in the field of public relations of the TU Vienna as well as reviewer activities for scientific journals as well as funding agencies and the like.

4.2 Teaching

- Teaching in the form of lectures should have been given over a total of several years and in an appropriate number of semester hours. A student-assessed lecture (min. 90 minutes) should be documented.
- Practical teaching in the form of exercises, internships or lecture exercises should have been held over a total of several years and to the extent of at least one semester hour per week.
- Supervision or co-supervision of academic theses (master's theses/dissertations).
- Participation in at least one seminar on each of the topics "Equal Treatment in Teaching" and "University Law".

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reference (for example, in a relevant ranking list) with an impact factor (e.g., from ISI Web of Knowledge) and are listed as Q1 or Q2 in the relevant field. Until further notice, no more than one MDPI journal may be among these Q1 or Q2 listed journals.

[2] The guideline for several publications after the doctorate is 15 (this is also the **minimum number** if a cumulative habilitation is sought). Publication series, i.e. publications divided into parts or chapters, or publications consisting of essentially the same content are considered as one publication (this also applies to 1 and 3).

[3] In the case of a cumulative habilitation, at least 3 of the 5 SCI-listed publications[1] must have been written by the first author. In the case of at least 5 publications, the habilitation applicant must be the main supervising author of the first author.

5 Types of habilitation thesis: Monography and cumulative habilitation

In general, there are two possibilities for the habilitation thesis: the classical monography and the cumulative habilitation. The habilitation thesis is to be thematically much broader than a dissertation. The contribution to the subject made by the habilitation thesis should be significant, and the gain in knowledge correspondingly high. The following criteria must be observed for both types of habilitation thesis:

- Is it a balanced overview covering your own and other relevant work in the field?
- Is the habilitation thesis also useful as an introduction to the topic (e.g., as an in-depth textbook)?
- Is it a critical review in the sense that it goes beyond a mere listing of previous work?
- Is the focus of the work on science and advancing knowledge over the state of the art?
- Is the quality of the language and illustrations sufficient?

The habilitation thesis must be submitted to the faculty within one year from the date of presentation of the habilitation project (in quintuplicate as a bound work, as specified in the statute section "Habilitation Procedure" of the TU Vienna, and in pdf form). Otherwise, a new habilitation project must be presented in order to ensure timeliness (also with regard to faculty affiliation).

5.1 Monography or cumulative habilitation?

The monography represents a comprehensive work. It offers the possibility to coherently describe a larger subject area with all its complexity. This is only possible to a limited extent in this quality through a cumulative habilitation. One aspect that speaks for a cumulative habilitation results from the increasing importance of bibliometric measures in research. An example of this is the Hirsch index, also known as the H-index. This is often used to evaluate and compare the scientific performance of researchers on the basis of the number of publications and their citations.

The effort involved in producing the scientific publications is more compatible with a cumulative habilitation. Against this background, the decision between monography and cumulative habilitation has to be made. However, the cumulative habilitation is not intended to be a time-saving variant for habilitating.

The habilitation thesis (monography as well as cumulative habilitation) must have an introductory chapter, which briefly presents the topic area, the open questions and the developed solution approaches. Both variants must be concluded with a summary and conclusion chapter. In the case of the cumulative habilitation, this is preferably before the publication chapter (see chapter 5.3) and must not be a mere stringing together of the concluding chapters of the individual publications.

5.2 The monography

A monography is a scientific book with a methodically flawless presentation of the derivation of knowledge content, which is dedicated to the subject area of the intended habilitation in thematic depth. The aim of a monography is to comprehensively discuss the state of the art on a scientific issue and to present the acquired knowledge. In particular, the state of the art and the methodological approach should be presented in such detail that the monography can serve the interested reader as an in-depth introduction to the subject (character of an in-depth textbook). The author's own scientific work should be referenced in the explanations. If a monography is submitted, the statutes of the Vienna University of Technology require that it must have been published or accepted for publication by a scientific publisher prior to the completion of the habilitation procedure.

Scientific publishers are those that check manuscripts not only for formal, but also for content-related scientific criteria or have them evaluated by peers in a procedure. The most important monographs in the respective field could be considered a good model. It should be noted, however, that the scientific criteria are again reviewed by the habilitation committee.

5.3 The cumulative habilitation

For the cumulative habilitation, already published publications[1] are used, each of which is presented with a brief description and a conclusion. An introduction should be followed by a comprehensive presentation of the state of the art before the publication chapter. This should be followed by a detailed chapter (approx. 50 pages) describing the methodological background that connects the individual publications to a coherent set of topics, with the respective references to these publications. These chapters should be written in such a way that they can be used as a standalone paper. The chapter with the own publications should contain a presentation of the scientific publications in the extent of approx. one page per publication and should carry in each case the consecutive number of the publication, its title, authorship and publication reference as heading. After these short descriptions, the individual publications are appended with a cover page each, on which the title, authorship and publication information are noted. Depending on the availability of publication rights, the cumulative habilitation thesis, enriched with the above-mentioned introductory and explanatory chapters, should also be published in book form by an academic publisher. If publication rights do not permit the inclusion of a separate scientific publication in the cumulative presentation, the one-page presentation is to be supplemented with an excerpt of at least one page for book publication. As with the monography, it should be noted here that the scientific criteria will again be reviewed by the habilitation committee.

5.4 Other scientific work

With the other scientific work, the habilitation applicant should prove his/her expertise in the subject area, which extends beyond the actual habilitation thesis. In the case of a cumulative habilitation, the minimum number of such other scientific papers is 5. These would also include, for example, papers that thematically go in a different direction than the habilitation thesis itself and therefore illustrate the "range" of the research.

These other works can be designed as an appendix to the actual habilitation thesis. These papers should be listed with title, authors and publication details including a short (few lines) explanation. The own contribution to the work should also be described. This appendix should be at the end of the bound habilitation thesis. These other scientific papers do not have to include all additional published scientific papers that are not part of the cumulative habilitation. In any case, all documents are also to be submitted to the Dean's Office in pdf form, including all publications (in pdf form) of the habilitation applicant.

6 Reviewers

According to the statutes, it is required that the submitted habilitation thesis as well as the other scientific works are reviewed by at least two persons who themselves represent the intended habilitation subject. At least one reviewer must not be a member of the MWBW faculty (it would be desirable that no reviewer is a member of the faculty). In any case, it must be ensured that all reviewers are not biased towards the habilitation applicant. In order to ensure that at least two independent experts can be used, it is advisable that the dean's office informs the senate of at least four possible experts.

7 Habilitation procedure

In the habilitation procedure, it is examined and assessed whether the legally required outstanding scientific qualification as well as the necessary didactic skills of the habilitation applicant are present.

8 Concluding remarks

The fulfillment of the above-mentioned quantitative benchmarks in no way prejudices the assessment of the scientific qualification of the habilitation applicant. This is the sole responsibility of the reviewers and the habilitation committee.