BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS

BME Doctoral School of Electrical Engineering (D143)
Quality Assurance Plan
2024

1. Legal background

The quality assurance plan for doctoral training and degree acquisition carried out in the BME Doctoral School of Electrical Engineering Sciences (hereinafter: Doctoral School, abbreviated as DI) is laid down by

- the Doctoral and Habilitation Regulations of the Budapest University of Technology and Economics (BME DHSZ),
- the BME Study and Examination Regulations (BME TVSZ),
- the Operational Regulations of the DI (DI MSz),
- the Quality Assurance Plan of the DI (this document),
- the Training Plan of the DI, and
- ESG 2015 (Standards and Guidelines for Quality Assurance in the European Higher Education Area).ESG 2015

Below we present requirements that partly overlap with these regulations and partly go beyond them, without addressing the mandatory quality assurance elements set out in the relevant legislation (Act CCIV of 2011 on National Higher Education, Government Decree 387/2012 (XII.19.) on doctoral schools, the order of doctoral procedures and habilitation, and the resolutions of the Hungarian Accreditation Committee (MAB) concerning doctoral training).

The present Quality Assurance Plan of the DI follows the recommendation of the Hungarian Doctoral Council and in some respects sets higher expectations than those contained therein. The quality assurance system of the DI is widely public and accessible to the professional and scientific community on the DI website
(https://phd.vik.bme.hu) and on the website of the Hungarian Doctoral Council
(https://doktori.hu/).

The present Quality Assurance Plan of the Doctoral School of Electrical Engineering Sciences (hereinafter: Doctoral School) aims to ensure that the overall quality of the Doctoral School remains stable and high through regulating six key phases of doctoral training and degree acquisition. These key phases are: announcement of doctoral topics, admission to doctoral training, subjects of doctoral training, monitoring of student progress, requirements for PhD degree acquisition, and the PhD degree acquisition procedure.

2. Quality assurance principles

Through the individual points of its quality assurance regulations, the Doctoral School seeks to ensure the prominent application of the following quality assurance principles:

(1) Principle of professional control. The control of the national and international professional and scientific community must be ensured throughout the whole process of doctoral training and degree acquisition.

(2) Principle of observing scientific ethics. In the design and operation of the quality management system, the positions of the Scientific Ethics Committee of the Hungarian Academy of Sciences and the BME Code of Ethics must be taken into account.

(4) Principle of publicity. The main phases of the quality assurance system must be widely public for the professional and scientific community.

(5) Principle of feedback. Instructors, supervisors and members of the various councils of the doctoral school participating in doctoral training should receive continuous feedback on the quality of their work and have the opportunity to provide feedback based on their own experience.

(6) Principle of quality-centredness. Through the design and operation of the quality management system, we intend to ensure that both our students and our instructors continuously raise their standards with respect to themselves and their environment, while humility towards science, initiative and creativity become integral parts of their value system.

(7) Principle of the protection of intellectual property. The development of the quality management system must also contribute to ensuring that university doctoral training remains in full harmony with the efforts of the European Union and Hungary to protect intellectual property.

(8) Principle of individual responsibility. Building and operating a scientific school is teamwork, but it can only be successful if the tasks and responsibilities of each participant in the training and research process are clearly defined.

(9) Principle of documenting processes. Documentation must be prepared for every decision point related to doctoral training. The review of documentation is a fundamental task of the quality management system. At the same time, it is an important objective that the administrative workload of instructors involved in doctoral training should not increase during the development and operation of the quality management system.

3. Mission of the doctoral school (ESG 1.2)

The task of the Doctoral School is the training of the scientific elite: to ensure the renewal of academic and research staff in the research areas of the school. Our aim is to graduate professionals capable of independent research and of leading academic and industrial research, who understand the interrelations of the field of electrical engineering at system level, recognize its connections to other disciplines, perform high-quality research in their own fields, and publish their results internationally. They are capable of leading research-development-innovation projects, transferring up-to-date knowledge, achieving and applying innovative results, and establishing interdisciplinary research together with representatives of other disciplines.

Key quality objectives

quality	indicator	objective	quantification
high scientific standard	reviews received for the publications linked to the thesis points in the PhD dissertation, and the reviewers' assessment of the thesis points	scientific publications in high-prestige journals	the proportion of publications appearing in D1 and Q1-Q2 journals should increase. The proportion of publications in potentially predatory forums should decrease.
international embeddedness	number of dissertations prepared in English	the overwhelming majority of dissertations should be in English	by 2026 at least 90% of dissertations should be in English (currently 83%)
research results promising from the point of view of applications	external institutional (industrial and academic) relations	increase the level of innovation	number of prototypes, testbeds and experimental systems related to the scientific results presented in the dissertation
widely applicable knowledge	employment statistics	preparation for three career paths: research institute, higher education, business sector	at least 80% of graduates who obtained the degree should be employed in one of the above three areas
industrial utilisation and knowledge transfer	number of participations in industrial research projects, number of patents	increase the number of new technologies, procedures and patents created	by 2024, the number of research projects conducted directly on industrial topics with an industrial or university supervisor should be at least ten
efficiency	degree acquisition ratio	should significantly exceed the national average	the target is to reach 58%; currently it is 53%, which is above the national average

Quality assurance covers all elements of doctoral training and degree acquisition:

(1) announcement of topics, (2) admission to doctoral training, (3) the curriculum and research component of training, (4) monitoring during training, (5) the degree acquisition procedure, and (6) tracking graduates who have obtained the degree.

Oversight of the activities determining quality is jointly exercised by the Doctoral School Council (DIT) and the Habilitation Committee and Doctoral Council (HBDT) in accordance with the quality assurance plan detailed in the present regulations.

Degree acquisition ratios:
Degree acquisition ratio indexed to the calendar year of enrolment (F): the percentage of students enrolled in a given calendar year who obtained the degree.
Five-year degree acquisition ratio indexed to the calendar year of enrolment (F5): the percentage of students enrolled in a given calendar year who obtained the degree within 5 years of enrolment.
Degree acquisition ratio indexed to the calendar year of enrolment after the complex examination (Fk): the percentage of students who took the complex examination in a given calendar year and obtained the degree within 3 years after the complex examination.

Presentation and teaching skills:
OHV rating: the average of the OHV results of those participating in the teaching phase of doctoral training.

Scientific achievements and research skills:
Beyond the minimum publication requirements necessary for obtaining the PhD degree, the DI intends to encourage publication in high-prestige forums and to avoid publishers/journals/conferences carrying out potentially suspicious activities and providing limited quality guarantees (so-called predatory publishers).

4. Announcement of doctoral topics (ESG 1.2, ESG 1.8)

(1) Twice a year (May and December), the Doctoral School invites PhD topic proposals from the organizational units participating in training and from cooperating institutions. Data on the supervisors must also be provided for each proposal. The general requirement for supervisors is at least 2 years of professional experience after obtaining their doctoral degree, and one supervisor may simultaneously supervise a maximum of 4 doctoral students. Beyond these general conditions, both the doctoral topic and the person of the supervisor must be approved by the Doctoral School Council (DIT), whose membership meets exceptionally high professional and scientific standards (see the Operational Regulations of the Doctoral School). The DIT evaluates each topic and only approves those for which the intellectual and infrastructural background of the research is ensured and for which it considers it realistic that a high-quality dissertation can be submitted within 5 years.
Supervision carried out at an external research site is possible in institutions that have entered into a cooperation agreement with the doctoral school, where the student's employment relationship is duly regulated and the student's rights and obligations are clearly defined. In the case of an external supervisor, announcement of the topic also requires a declaration of

acceptance by the head of the host institution and the appointment of a consultant holding a full-time position at BME.

(2) A key expectation towards supervisors is active research activity: the publication indicators of the 5 years preceding the announcement of the topic must exceed the publication requirements prescribed by the Doctoral School for obtaining the degree. Evaluation of the topic proposer's previous supervision record is also an important consideration when authorizing PhD topic announcements.

(3) The doctoral topics approved and announced by the DIT, together with the data sheets of the supervisors, may be viewed on the website www.doktori.hu. Regularly updated public information on the announced doctoral topics and supervisors approved by the DIT, as well as on admission requirements and the list of students admitted to the Doctoral School, is available on the website of the Doctoral School. www.doktori.hu

(4) A topic proposer becomes a supervisor if a student applying for the announced topic is admitted and enrols in the doctoral school. Each doctoral student has one and only one supervisor, who fully directs and supports the student's studies, research work and preparation for obtaining the doctoral degree. Dual supervision is possible only in the case of training conducted within an international cooperation framework or in the case of an interdisciplinary research topic. More than 4 doctoral students may belong to one supervisor only in exceptionally justified cases and with the permission of the EHBDT.

(5) The name(s) of the supervisor(s) must be clearly indicated on the title page of the doctoral dissertation. This must be identical with the name(s) of the supervisor(s) approved by the DIT, with the names listed in the thesis booklet, and with the data uploaded to the database of the Hungarian Doctoral Council (the website www.doktori.hu).

(6) If, in doctoral training started before 1 September 2016, someone initiates the doctoral procedure more than 7 years after beginning their studies, the indication of a supervisor on the dissertation may be requested only in exceptionally justified cases. Without EHBDT permission, such a candidate qualifies as an individual preparer.

(7) If, in doctoral training started after 1 September 2016, someone does not submit a doctoral dissertation within three years after the complex examination (this period may be extended by at most one year in exceptionally justified cases within the competence of the HBDT), they may obtain the degree only by repeating their studies or as an individual preparer without indicating a supervisor (BME DHSZ Section 14(4)).

5. Admission to doctoral training (ESG 1.4, ESG 1.8)

(1) Entry into doctoral training is possible only through application to the call for applications announced nationally on the website www.doktori.hu and after a successful admission interview before the admission committee. Twice a year (March and November), the doctoral

school issues a call for applications, containing the topic announcements and the formal and substantive requirements for admission to doctoral training. www.doktori.hu

(2) Participation in the admission examination requires written assurance of acceptance by the supervisor and the host unit (department or external institution). The formal requirement for admission is a diploma of at least 'good' classification and proof of English language proficiency.

(3) The purpose of the admission interview is to verify adequate preparedness and to make a ranked admission proposal. The admission procedure takes place before an Admission Committee designated by the DIT. Participation in the admission examination requires written assurance of acceptance by the supervisor and the host unit (department or external institution).

(4) The admission process is controlled by numerous persons and bodies of the Doctoral School and the Faculty: based on the proposal of the admission committee, the DIT decides on admission and the awarding of state scholarships. The Chair of the DIT informs the Dean of the Faculty about the admission decisions.

6. Subjects of doctoral training (ESG 1.5, 1.6)

The DIT decides before each semester on the acceptance of subjects into the training programme and on the renewal of the course offer. The syllabus must be reviewed at least every three years. In addition to traditional doctoral courses, the doctoral school also encourages the announcement of elective doctoral subjects that, while fitting into the disciplinary framework of the subject, also provide methodological knowledge related to research and publication, thereby facilitating more effective completion of the dissertation phase of the training.

The DIT continuously monitors the suitability of the instructors of the Doctoral School: only instructors and researchers holding a scientific degree may be instructors of the Doctoral School if, upon the proposal of the head of the doctoral school, the DIT considers them suitable for a given period to perform teaching, research and supervision tasks within the doctoral school. The instructors of the DI are listed in the ODT database of the school, and if someone teaches in more than one doctoral school, they declare in their ODT profile the percentage of their affiliation to each school.

Regularly updated public information on the current Training Plan of the DI, as well as on its subjects and instructors, is available on the DI website.

7. Monitoring student progress (ESG 1.6)

In those study and examination matters of doctoral students that are not assigned by legislation or university regulations to the competence of the Doctoral School Council, the

Doctoral Studies Committee (DTB) acts (BME TVSZ Section 173). The DTB has at least four members, half of whom are doctoral students.

The academic performance and progress of students are evaluated every semester by the supervisors.
In the semester of the complex examination, the head of the DI or a person appointed by them personally reviews with the students preparing for the complex examination and/or their supervisors the level of fulfilment of the conditions and discusses with the student and the supervisor whether the conditions are expected to be met.
The DIT also checks during the semester of the complex examination whether the conditions required for admission to the complex examination have been fulfilled.

At the internal doctoral workshops regularly organized by the departments of VIK,
student progress is also monitored.

After the dissertation has been prepared, student progress is evaluated at the in-house debate, to which the vice dean for research, as well as members of the DIT and HBDT, are also invited.

The Faculty of Electrical Engineering and Informatics of BME operates information systems (e.g. mailing systems, Teams groups) through which it can efficiently and broadly reach students and instructors participating in doctoral training.

8. Requirements for the PhD degree

The general requirements for the doctoral degree are regulated in detail by BME DHSZ Section 17 and Section 14 of the Operational Regulations. The publication requirements prescribed by the DI, which are stricter than those of the BME DHSZ, are elaborated by the HBDT and contained in Annex 2 of the Operational Regulations. To obtain the degree, in accordance with BME DHSZ Section 17(6), the detailed doctoral requirements system elaborated by the Disciplinary Habilitation Committee and Doctoral Council (HBDT), taking into account the specific features of the field, must also be fulfilled. These are made public via the DI website; see the Operational Regulations. The degree requirements system elaborated by the HBDT is also approved by the University Habilitation Committee and Doctoral Council (EHBDT) in accordance with BME DHSZ Section 7(g). For the approval by the EHBDT of the publication requirements appearing as a key part of the requirements system, the EHBDT determines general minimum requirements at BME level.
In addition to the continuous supervision of the standard of doctoral complex examinations, the DIT reviews every two years the professional blocks and syllabus elements of the complex examination. The complex examination committees are appointed by the DIT in every case.

9. Degree acquisition procedure (ESG 1.4)

The rules of the degree acquisition procedure are described in detail in BME DHSZ Sections 15-23. The body conducting the procedure is the Habilitation Committee and Doctoral Council of Electrical Engineering Sciences (HBDT). The requirements for obtaining the doctoral degree are the acquisition of the absolutorium, submission of the doctoral dissertation within three years after the complex examination (Act Nftv. Section 53(4)), and the successful defence of the doctoral dissertation in a public debate organized by the HBDT (the three-year deadline may, in exceptionally justified cases, be extended by at most one year within the competence of the HBDT).

Before submission, the doctoral dissertation must be submitted to an in-house debate. The purpose of the in-house debate is to examine the adequacy of the doctoral dissertation and the thesis points and to prepare for the public defence. In the debate, the dissertation is evaluated by two reviewers (at least one external and at most one internal), each holding at least a PhD degree. The course of the debate, and in particular the opinions and findings concerning modifications of the dissertation, must be recorded in minutes. By open vote, the participants of the in-house debate must decide on the following two questions:

1. Do they recognize the results included in the candidate's thesis points as independently achieved results?
2. In what form may the dissertation be submitted? (without modification, with minor modifications required, only after substantial revision, may not be submitted).

The annexes to the minutes are the reviewer opinions submitted in writing in advance and expressed orally, the oral responses given to them, the list of modifications prepared by the candidate, and the attendance sheet. If the voting result is 'only after substantial revision', the in-house debate must be repeated. In addition to staff members of the organizational unit, members of the DIT and HBDT, as well as the vice dean for research, must also be invited to the in-house debate.

After the dissertation is submitted, the HBDT examines whether the review procedure can be initiated, and then the members of the Review Committee appointed by the HBDT in accordance with DHSZ Section 20 receive the complete procedural documentation. Members of the Review Committee receive the opponents' opinions electronically after both reviews have been completed, and the candidate's responses to them no later than one week before the defence. When the public debate is announced, the dissertation and the thesis booklet become public on the DI website and on www.doktori.hu.www.doktori.hu

The scientific publications presenting the candidate's own results shown in the doctoral dissertation must be assigned to the thesis points. A condition for sending the doctoral dissertation to the reviewers is that the scientific publications containing the candidate's own results satisfy the detailed publication requirements system of the doctoral school, which forms part of the Operational Regulations of the doctoral school (publicly available in the

database at www.doktori.hu and on the doctoral school's website). A further condition for initiating the review procedure is the fulfilment of the language requirements.

The identity of the reviewers is not public until the reviews have been completed.

The dissertation sent to the reviewers may not be modified afterwards. If the Review Committee objects to scientifically incorrect statements or does not accept certain thesis points, the relevant part of the committee minutes shall be attached to the dissertation (also in electronic form), and the defended dissertation shall be made public with this supplement (library, repository).

If the degree acquisition requirements change, then within 2 years following the decision on the change the previous or the new requirements shall be applied according to the candidate's choice.

10. System of DI-level measurements (ESG 1.1, 1.7, 1.9)

Opinions of instructors, students, graduates who have obtained the degree, students who did not obtain the degree, and cooperating partners

In line with the PDCA quality assurance approach, the DI has designed and developed a measurement system in which the opinions of the above stakeholders are collected, processed, and the necessary actions are defined and implemented in different ways and formats. We have summarized this system in a separate document available at the following link under the title 'System of DI-level Measurements'. The document also records in table form what is measured, by whom, by what method and with what frequency, and on which DI and Faculty forums the results of the measurements are discussed.“DI szintű mérések rendszere”

Tracking graduates who have obtained the degree

The DI continuously tracks the careers of graduates who have obtained the degree. During the follow-up repeated every two years, the survey carried out through questioning supervisors covers all graduates who have obtained the degree. The tasks related to this follow-up are organized by the vice dean for research, and the results are evaluated by the DIT.

At the end of every academic year, the DI publishes on its website statistical data relating to training and degree acquisition (student headcount data, F, F5 and Fk degree acquisition ratios). The tasks related to this are organized by the vice dean for research, and the results are evaluated by the DIT.

11. Reviews of the doctoral school (ESG 1.8, 1.9)]

Every two years, the DI reviews the courses of the programme, reviews the related regulations (Quality Assurance Plan, Operational Regulations, Training Plan), carries out questionnaire surveys among instructors and students to reveal the strengths and weaknesses

of the programme, and updates on the DI website the information on the career paths of graduates in line with the ESG guidelines.

The DI continuously monitors the professional and administrative compliance of the bodies of the doctoral school (body of core members, HBDT, DIT, DTB), its supervisors and its instructors.
A strategic task of the DI is to ensure the continuous replacement of its human resources in cooperation with the host Faculty.

12. Closing provision

Where the present regulations impose a requirement not fixed in legislation and BME regulations, or a stricter one, it may exceptionally be authorized to reduce the requirement to the extent permitted by higher-level regulations. Such authorization may be granted on the basis of a detailed written request, in the case of doctoral training by the DIT, and in the case of a degree acquisition procedure by the HBDT, by a minuted decision.

25 April 2024