BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS

George A. Oláh Doctoral School

Chemical, chemistry, biotechnology and environmental engineering

Training Plan 2025

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Training Plan of BME's George A. Oláh Doctoral School

The language and international embeddedness of the doctoral school: The language of this profession is English. Upon admission into the doctoral school, competence of English language must be demonstrated by a complex language examination in English at level B2 or above, or an equivalent certification of language competence. If the applicant is unable to provide such a document, the Admissions Committee evaluates whether the applicant would be able to use professional English in their everyday work. In such cases, the complex language examination in English at level B2 or above, or an equivalent certification must be obtained before the student takes the complex exam (by the end of the student's fourth active semester). Accordingly, events organised by the doctoral school (subjects, presentations, defences) will be in English or Hungarian as required by the participants. Dissertations, research topic proposals, thesis defences, examination minutes may be both in English or Hungarian. The seminars are held in English. Depending on the funds available and also using online/hybrid defence options, the George A. Oláh Doctoral School aims to engage members of the international science community in seminars and doctoral degree award procedures.

Components of the PhD programme: The most important part of the doctoral programme is the ***research activity*** focusing on a topic proposed by the doctoral school. Each doctoral student has only one assigned supervisor (with the exceptions specified in BME's Code of Doctoral Studies and Habilitation), who is exclusively and fully responsible for managing and promoting the studies and the research activity of the doctoral student, the publication of the research findings and the writing of the PhD thesis. When an external supervisor is engaged, the George A. Oláh Doctoral School Council (DIT) designates a thesis advisor to provide administrative support with the supervisor's work and monitor the student's progress. The tutorial nature of the programme is underlined by regular consultations, recognised by credits (**Consultation 1-8**). Each semester, the supervisor awards a grade to evaluate the student's competence and contribution to the consultation sessions. Similarly, the supervisor assesses and confirms the student's research (**Research 1-17** subjects) and publication (**Publication 1-3** and **Presentation 1-3**) activity. The documentation for **Publications 1-3**, **Presentations 1-3** and **Technical Forum 1-4** must be presented to the Doctoral School's administrator. If there are any questions about the documents presented, the DIT will decide whether to award the credits.

Apart from their research work and the publication of research findings, PhD students are required to complete a dominant part of the academic components of the doctoral programme (subjects (**Lead subject**, **Secondary subjects 1-2**), seminars (**Seminar 1-2**), guided teaching (**Teaching 1-6**) and participation in professional forums (**Professional forum 1-4**) in the first part of their training. These activities represent 48 credits from a total of 120 credits students can obtain in the first part of their training. The second part of the training focuses

on research activities, the publication of research findings and the writing of the dissertation. The latter activities represent 102 credits from a total of 120 credits students can obtain in the second part of their training. Research and publication activities combined represent 174 credits from a total of 240 credits to be obtained during the four-year programme.

By recognising ***publication activities*** with credits, the supervisor ensures that

1./ The minimum publication requirements for the complex exam are fulfilled by the end of the fourth semester: a) one presentation, b) approval for publication of one publication with the applicant's significant contribution (the definition of this is given in the specification of the minimum publication requirements in the Rules of Organisation and Operation), to be published in Web of Science and/or Scopus (Elsevier) sources, or a registered patent. If the publication/patent has not yet been accepted, but its submission is documented, it may be considered sufficient to meet the minimum requirements if it is found to be satisfactory by the content check of the Habilitation Committee and Doctoral Council (HBDT).

2./ By the end of the eighth semester, 240 credit points must be earned in order to be awarded the absolutorium. All the major requirements for the minimum requirements for a doctoral degree are met by the completion of the publication activity, provided that it also meets the overall quality criteria. Thus, the publication requirements (with the proviso that in the case of a publication, a documented submission is sufficient, but in this case the credit can only be awarded after a substantive assessment by the DIT), the oral presentation in an appropriate forum, and the first language requirement (previously fulfilled as a condition for the complex examination) are fulfilled.

In consultation with their supervisors, doctoral students are required to choose a two-semester ***lead subject*** (10 credits in total) and two one-semester ***secondary subjects*** (5 credits each) from the subjects approved by the DIT. One of the secondary subjects may be selected from subjects provided by the doctoral schools of ELTE University (Doctoral School of Chemistry, Physics and Biology), SOTE University (Doctoral School of Pharmaceutical Sciences and Molecular Medicine) and BME's other doctoral programmes. Subject to approval by the DIT, the MSc subjects of the above universities and the PhD or potentially the master's subjects of other higher education institutions may also be selected. Requests for such approval must be submitted no later than 10 days prior to the registration week. The selected subjects will be included in the work plan prepared by the doctoral student every semester and signed by the supervisor (see below). Credits awarded for the completion of the subjects are distributed between the first two semesters of the two-phase training. The seminar series of the George A. Oláh Doctoral School (DI) is part of the programme and participation in the first two semesters of the programme is compulsory, recognised with one credit for each semester (**Seminar 1-2**).

Attendance of professional forums (conferences, summer universities etc.) is also part of the training

(**Professional forum 1-4**, 5 credits each).

Guided teaching is also part of the programme where in the scope of a required elective subject (**Teaching 1-6**) students work under the guidance of a designated instructor to improve their presentation and communication skills as well as develop their special competences by teaching at 4 university contact lessons, using a previously prepared and well documented training material. The subject and the assigned credits are determined, in consultation with the supervisor, by the department head of the supervisor/thesis advisor and its completion is confirmed by the department head based on the proposal of the designated (subject coordinator) instructor. In total, 24 credits must be collected in this educational format over the course of the programme.
A growing number of credits reflecting the higher amount of time invested with the progress of PhD work may be awarded for ***research work***. The topic of the research work and the number of credits assigned in each semester is jointly determined by the supervisor and the student and its completion is confirmed by the supervisor. The number of credits for research work should be determined on the basis that 40 hours of research per week is worth 30 credits. To fulfil the requirements for research work in each semester, students must sign in for the adequate number of **Research 1-17** subjects (5 credits each).

As the publication of the research findings is a prerequisite of the research work, DIT requires students to obtain mandatory ***publication credits*** in order to acquire an absolutorium as follows:

Publication: (**Publication 1-3** subjects). A journal article on original research findings in the topic of the student's research work, published (or documented as accepted for publication) in **an English-language journal in a Web of Science and/or Scopus (Elsevier) database with an impact factor**, in which the candidate's contribution is significant (the definition of this is given in the specification of the minimum publication requirements in the Rules of Organisation and Operation). Overall, one patent granted may be accepted as a publication recognised with 10 credits. Each of these publications is awarded 10 credits. Students must submit the document confirming the completion of the subject to the administrator of the Doctoral School. If the candidate has a significant contribution in two original articles in ***journals listed in the Web of Science and/or Scopus (Elsevier) database***, ***and <u>their impact factor sum is 8</u> or higher, <u>or</u>*** according to Clarivate or Scimago ***<u>one of them has at least</u> a <u>D1 and the other at least a Q2 ranking</u>***, 10 credit points should also be awarded to the **Publications 3** subject.

Presentation: (**Presentation 1-3** subjects). PhD students are required to deliver in total three *professional presentations* (*oral presentation or poster*) relevant for their research work over the course of the programme including one in the first phase of the programme. As one of the criteria of obtaining a doctoral degree is the delivery of an oral presentation, 5 credits are only awarded for the **Presentation 3** subject if the presentations included at least one oral presentation. Oral presentations may be delivered at an international conference, at a working committee session of the Hungarian Academy of Sciences (MTA) or a special group session of the Hungarian Chemical Society (MKE), at the Chemical Presentation Days (KEN), at MKE's national conference, at the annual PhD conference organised by George A. Oláh

Doctoral School and at any other forum approved by DIT. Students must submit the document confirming the completion of the subject (signed by their supervisor) to the administrator of the Doctoral School.

At the beginning of each semester, students are required to submit their work plan approved by their supervisor for each specific semester and, starting from semester 2, a report on the previous semester verified by their supervisor (one page each). Work plans should include the subjects signed in for, the planned teaching activities and the overview of the research work planned for the semester. Reports should include the subjects and teaching activities completed in the previous semester, the overview of the results achieved in the research work and a summary of the publications released until that time. In the first active semester the work plan must be submitted to the administrator of the Doctoral School by the end of the third week, in any following semesters the work plan and the report must be submitted by the end of the registration week.

PROFESSIONAL COMPETENCES TO BE ACQUIRED

Requirements for chemists, chemical, biotechnology and environmental engineers with a PhD degree

a) knowledge

They have a systematic and relational understanding of the general rules of chemical and biological science.

They know the subject, the general and specific characteristics, the key trends and boundaries as well as proven and debated relations of their discipline on research level.

They are positively familiar with the major relations and theories of the science disciplines related to their field of expertise and the relevant concept systems as well as terminology.

They constantly improve the knowledge of the leading international literature relevant for their discipline in a logical and analytical way.

They have the required level of skills in IT, mathematics and physics to productively apply in order to handle, assess and disclose their research data and findings.

They have the required research methodology competence to be able to conduct independent research in their discipline.

They know and understand the correlations and theories, the relevant concept system, specialised terminology and nomenclature of their research field at a level required for creative application.

b) skills

They are able to identify the fundamental chemical and biological principles of natural phenomena as well as to study these phenomena in an experimental way and analyse them in a theoretical way.

In their discipline, they are autonomously able to plan and implement new projects and work phases.

In their field of expertise, they are able to perform productive analysis, to describe comprehensive and special correlations in a synthetic and novel way, to develop models and to conduct appraising and critical activities.

They are able to use and improve the special learning and problem solving methods of their field of expertise.

They are able to creatively develop new and previously unknown methods to apply theories in practice.

They are able to identify the problems relevant for their research field, to define the theoretical and practical background in a detailed way and on research level, required for solving such problems and then to be able to solve them.

They are able to link not directly related information potentially relevant for other disciplines and to define the correlations between them. In doing so, they are able to identify and highlight crucial, essential and important aspects when productively assessing their research findings.

They are able to analyse and assess their own and other people’s research findings in a

professional, realistic and critical way and treat them based on their worth.

They judge information and news related to the science of chemistry and biology in a critical way and engage in professional debate presenting expert arguments.

They are able to effectively provide information to people competent and incompetent in their field of expertise and to participate in expert debates and discussions.

They are capable of spoken and written professional communication and of professional cooperation both with local and international partners.

They are able to summarise, present and effectively communicate their understanding of their discipline and their research findings. They know and are able to autonomously use the standard publication methods in their field of expertise (e.g. writing articles, books and studies on their own).

c) attitude

Typical characteristics include creativity, flexibility, the ability to identify and solve problems, intuition, systematic approach, the ability to process data and to make decisions.

They are eager to identify and describe unexplored and unsolved scientific problems.

They demonstrate solid professional commitment and accept the necessity of hard work.

They are open to learn about new technologies and emerging research areas, disseminate the information obtained as well as to integrate and improve the leading elements into their own research and development work.

They demonstrate an open and professionally non-judgemental approach when solving problems and developing models.

They evaluate the results achieved and the performance related both to their own and other people's work under their control in a realistic and emphatic way.

They acknowledge just professional criticism and accept the expert arguments of other people.

They are committed and open to participate in and initiate professional collaborations both with local and international partners.

They constantly try to maintain an effective balance between individual and team work.

They are able to work in an independent and highly engaged way but are also open to work in a team and support the work of other people.

d) autonomy and responsibility

They demonstrate a high degree of autonomy in the field of modern chemistry and biology in the development of comprehensive and special expert problems as well as in the representation and the justification of their expert points of view.

They intently and responsibly represent their scientific points of view.

They assume responsibility to address the ethical issues related to the theoretical and practical aspects of their field of expertise.

As the leader of the research project, they make independent decisions to control the activities of their colleagues and assume responsibility to promote their professional development.

They engage in debates with professionals in their field of expertise as equal partners.

All their activities reflect a responsible approach based on their expert knowledge to protect

the animate and inanimate nature and improve its condition.

They demonstrate productive and creative independence in developing new areas of learning and proposing new practical solutions.

Complex exam

The eligibility for the complex exam, the subjects of the complex exam and the examination boards are approved by the HBDT. The exam can be held if the following conditions are met:

- Complex language examination in English at level B2 or above, or an equivalent certification.
- At least one accepted publication in a journal listed in the Web of Science and/or Scopus (Elsevier) databases or an accepted patent. If the publication/patent has not yet been accepted, the HBDT will also examine the content of the submitted publication (submission to be documented) as a condition for admissibility to the complex examination.
- Documented delivery of at least one presentation (poster or lecture).
- Acquisition of all the required credits included in the recommended curriculum in the first four semesters of the doctoral programme (i.e. 120 credits in total) spread over the semesters as required. This requirement does not apply to candidates who independently prepare for their PhD degree and establish their student status by applying and being approved to take the complex exam.

The complex exam is taken publicly, in front of an exam board. The exam board consists of at least three members, with at least one third of the members having no employment relationship with the institution by which the doctoral school is operated. The chairperson of the exam board is a lecturer or a researcher holding the academic title of professor, professor emeritus or Doctor of the Hungarian Academy of Sciences. All the members of the exam board are required to have an academic degree. The candidate's supervisor may not be a member of the board. No later than one week prior to the exam, the supervisor sends the assessment of the student's performance to the chairperson of the board and the administrator of the Doctoral School in an electronic form. The supervisor will be invited to the complex exam.

No later than one week prior to the exam, candidates must submit a short summary of their theory level findings achieved up to date as well as their articles submitted for publication and published to the board in an electronic form.

The complex exam consists of two main parts, one assessing the theoretical preparedness of the candidate ("theoretical part") and the other assessing the candidate's scientific/artistic progress ("dissertation part").

In the theoretical part of the complex exam, the candidate takes an exam in two subjects. The list of these subjects is included in the training plan of the doctoral school and is available on the website of the doctoral school. In the theoretical part, candidates demonstrate their familiarity with the literature of the relevant discipline, art subject as well as their current theoretical and methodological knowledge.

During the dissertation part of the complex exam, candidates give a 15-minute presentation

to demonstrate their familiarity with the specialised literature of their research topics, sharing their research goals set based on the literary background, reporting on their research findings, describing their research plans for the second phase of their doctoral programme including the time schedule for preparing the dissertation and publishing the results. The presentation includes the description of the scientific relevance and innovation content of the candidate's findings and, if relevant, the technological motivations of the research and the applicability of the results.

The members of the exam board independently evaluate the theoretical and the dissertation part of the exam. The complex exam is successfully taken if the majority of the members of the board consider both parts of the exam to be successful. In case of a failed theoretical exam, candidates may retake the exam in the non-completed subject(s) one time in the same exam period. If unsuccessful, the dissertation part of the exam may not be retaken in the same exam period.
A report containing a written assessment is prepared on the complex exam. The exam results should be announced on the day of the oral exam. The result of the complex exam is not taken into account while deciding on the qualification of the doctoral degree but its successful completion is a condition for entering the second stage of the training.
Approval of the application in case of individual preparation is subject to disciplinary compliance and the formal completion of the publication and language requirements of the doctoral degree (as thesis statements are not required at the application, the content is not evaluated, only quantitative indicators need to be met).

Effective date:

This training plan is applicable to programmes starting on 1st February 2026 and shall enter into force on 27th November 2025[1].

Dr. András Szarka	Dr. Emília Csiszár	Dr. László Poppe
Dean	Chair of the HBDT	Head of the George A. Oláh Doctoral School

[1] Students enrolling on 1st February 2026 can decide whether to follow the previous training plan or this one.

CURRICULUM

Subject/type	**Total credits**	1st semester	2nd semester	3rd semester	4th semester	5th semester	6th semester	7th semester	8th semester
Σ Studies	**32/42**								
Main subject[a] **RE**	**10/ 10**	2/e/5	2/e/5						
Side subject **RE**	**10/ 10**	2/e/5	2/e/5						
Seminar[b] **M**	**2/ 2**	1/s/1	1/s/1						
Conference participation[c] **RE**	**10/ 20**		5		5		5		5
Σ Educational activity	**16/ 24**								
Educational activity[d] **M**	**16/ 24**	4/s/4	4/s/4	4/s/4	4/s/4	4/s/4	4/s/4		
Σ Research	**57/129**								
Consultation[e] **(1-8) M**	**22/ 44**	5/s/5	5/s/5	6/s/6	6/s/6	6/s/6	6/s/6	5/s/5	5/s/5
Research[f] **(1-17) M**	**35/ 85**	10	5	15	5	15	5	20	10
Σ Publication	**15/ 45**								
Publication[g] **(1-3) M**	**10/ 30**				10		10		10
Presentation[h] **(1-3) M**	**5/ 15**			5		5		5	
Total:	***120/ 240***	***30***	***30***	***30***	***30***	***30***	***30***	***30***	***30***

Symbols used: M Mandatory, RE Required Elective

[a] Main subjects are taught for two semesters and are awarded 10 credits each. Side subjects are taught for one semester and are awarded 5 credits each.

[b] Attendance of the seminar series organised by the Doctoral School. Documented attendance of the lectures is a criterion for the completion of the subject. **Seminar 1** and **Seminar 2** subjects are awarded 1 credit each.

[c] Attendance of local or foreign professional conferences, working committee meetings, summer/winter universities and other trainings relevant for the research work confirmed by the supervisor.
Conference participation 1-4 subjects are awarded 5 credits each.

[d] Guided educational activity in 4 hours per week under the guidance of the subject coordinator and confirmed by the department head of the supervisor/thesis advisor. **Educational 1-6** subjects are awarded 4 credits each.

[e] Tutorial consultation with the supervisor about the research work. **Consultation 1-2** and **Consultation 7-8** are awarded 5 credits each, **Consultation 3-6** subjects are awarded 6 credits each, to be confirmed by the supervisor.

[f] **Research activity 1-17** subjects are awarded 5 credits each, to be confirmed by the supervisor. Subject to the degree of progress made in the research work, more than one subject may be signed in for in each semester.

[g] **Publication 1-3** is awarded 10 credits for an article on original research findings in the topic of the student's research work, published (or documented as accepted for publication) in **an English-language journal in a Web of Science and/or Scopus (Elsevier) database with an impact factor**, in which the candidate's contribution is significant (the definition of this is given in the specification of the minimum publication requirements in the Rules of Organisation and Operation). If the candidate has a significant contribution in two original articles in ***journals listed in the Web of Science and/or Scopus (Elsevier) database***, ***and their impact factor sum is 8 or higher, or*** according to Clarivate or Scimago ***one of them has at least a D1 and the other at least a Q2 ranking***, 10 credit points may be awarded to the **Publications 3** subject. Maximum one patent granted may be accepted as a publication, recognised with 10 credits.

[h] **Presentation 1-3** is awarded 5 credits each for a poster or a lecture held by the candidate at an international conference, at a working committee session of the Hungarian Academy of Sciences (MTA), at a special group session of the Hungarian Chemical Society (MKE), at the Chemical Presentation Days (KEN), at MKE's national conference, at the annual PhD conference organised by George A. Oláh Doctoral School or another forum recognised by the DIT. The Presentation 3 subject is only recognised with 5 credits if at least one of the three presentations was an oral presentation delivered by the candidate.