

## FORMAL REQUIREMENTS AND ADMINISTRATION OF DOCTORAL STUDIES

Version: Released and applicable since 17<sup>th</sup> February 2025

PhD program: **Life Sciences**

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Standard study period: 4 years

Maximum length of study: 8 years

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### I. Requirements for Courses

- achieving **240 ECTS**
- **Core courses** ca 65 % of workload, all core courses are mandatory (see *Tab. A*)
- **Hard-skill courses** ca 20 % of workload, a minimum of **four** courses completed during the 1<sup>st</sup> and 2<sup>nd</sup> year
- **Soft-skill courses** ca 15 % of workload, a minimum of **three** courses

The list of courses is available on the CEITEC PhD School webpage: [portal.muni.cz/ceitec/ceitec-phd-school/student/life-sciences/courses-training](http://portal.muni.cz/ceitec/ceitec-phd-school/student/life-sciences/courses-training)

*Tab. A. Core courses*

|                     |                                      |  |
|---------------------|--------------------------------------|--|
| <b>S5007</b>        | Ph.D. Thesis                         | obligatory each semester <sup>1</sup>  |
| <b>S5050</b>        | Field Seminar                        | obligatory each semester   |
| <b>C7777/C777en</b> | Handling Chemical Substances         | obligatory each <b>autumn</b> semester <sup>1</sup>                                    |
| <b>S5012</b>        | CEITEC PhD School Conference         | obligatory each <b>spring</b> semester <sup>1,2</sup>                                  |
| <b>S5010</b>        | CEITEC Friday Seminar                | obligatory in the <b>autumn</b> semester of the 1st and 2nd year <sup>2</sup>          |
| <b>S5013</b>        | TAC Meeting                          | according to the <a href="#">mandatory schedule</a> (minimum three times) <sup>1</sup> |
| <b>S5006</b>        | Lecture for the scientific community | once during the study  |
| <b>XD110</b>        | Stay abroad                          | once during the study <sup>3</sup>   |
| <b>S5008</b>        | Scientific publication               | once during the study  |

### II. Requirements for Publications

- The student has to be the **first author** of at least one publication in a journal with IF **Q1**. If this journal has not IF Q1 in the given field of study, there should be two more publications in journals with IF Q1 or Q2 of which the student should be a co-author.
- For projects on which more scientific teams collaborate (and each is, for example, responsible for a different part of the expertise), **shared first-authorship is eligible**. In such a case, the student should clearly declare his/her contribution to the work and the results included.

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<sup>1</sup> obligatory also after 4th year of study

<sup>2</sup> except during stay abroad

<sup>3</sup> Exemptions only upon approval of doctoral board - participation in international creative project with results published or presented abroad, or direct participation in international cooperation.

- In case a student plans to publish an article in an **open-access journal** without an impact factor, immediate consultation with the members of the Executive Committee of the Life Sciences Doctoral Board is required. The committee will review the specific situation and quality of the journal and decide whether such output will meet the requirements for completing studies.
- The **affiliation** with both institutes must be listed: 1) National Centre for Biomolecular Research, Faculty of Science, Masaryk University; 2) Central European Institute of Technology, Masaryk University.

### III. Requirements for Internship Abroad

- Obligatory a minimum one-month stay abroad in total during the study (ECTS according to faculty rules);
- Alternatively (after approval of the doctoral board) participation in an international creative project with results published or presented abroad or direct participation in international cooperation.

### IV. Requirements for Doctoral State Exam (DSE)

- Performed in English;
- The Executive Committee, in collaboration with the supervisor, designs two specific exam topics for the state doctoral exam: **the first** one focusing either on **biological aspects** (with an emphasis on function) or **molecular aspects** (with a focus on structure), and **the second** on the **methodology** that is commonly used in the given field and relevant to the PhD candidate's dissertation. The topics are designed based on the list of general topics (see *Tab. B*), completed **hard skills courses** and in relation to the dissertation thesis topic.
- The doctoral candidate gives a presentation on 1 of the 2 topics (10 minutes) followed by discussion and further questions covering the remaining 2 topics and the area of the given discipline.

*Tab. B. List of General Topics for DSE*

|                              |   |
|------------------------------|---|
| <b>Biological aspects</b>    | <ul style="list-style-type: none"> <li>• general cellular and organismal functions of bio(macro) molecules</li> <li>• proteins – cellular structure, metabolism, transport, signalling</li> <li>• nucleic acids – genetic information, protein biosynthesis and its regulation, non-coding RNA, chromosomes, and telomeres</li> <li>• glycans – signalling, protein stabilisation, intra- &amp; inter-cellular communication and interactions</li> <li>• lipids – membranes, lipid rafts</li> </ul>   |
| <b>Molecular aspects</b>     | <ul style="list-style-type: none"> <li>• composition and structure of proteins, nucleic acids, glycans, and lipids</li> </ul>   |
| <b>Bioanalytical aspects</b> | <ul style="list-style-type: none"> <li>• sequencing of biopolymers</li> <li>• determining the structure of bio(macro)molecules, its hierarchical aspects (primary, secondary, tertiary, quaternary, modifications, suprastructures)</li> <li>• determining and quantifying interbiomolecular interactions (protein-protein interactions, protein-nucleic acid, protein-ligand)</li> <li>• bioinformatics – molecular property predictions, experimental data analysis, gene ontology</li> <li>• molecular modelling (basics of quantum mechanics, molecular mechanics)</li> </ul> |

### V. Requirements for Dissertation Thesis Defence

- Performed in English (as well as the Thesis itself)

- Oral presentation (20 min) of the doctoral project results, followed by a discussion clarifying the opponents' comments and questions, further questions from the Examination Committee members, and questions from the audience.

## VI. Requirements for Individual Study Plan

Tab. C. Description of study elements

| Study element                                     | Description  |
|---|--|
| <b>PhD Project/<br/>Doctoral thesis</b>           | Research, a dissertation project, a literature search of the actual state of the topic, planning, and the scientific activities itself.<br>A student with the supervisor defines the framework topic of the PhD project as the proposal for the entire study period. |
| <b>Publication activities</b>                     | Described in <i>II. Requirements for Publications</i> (above)  |
| <b>Conferences and academic forums</b>            | Presentation of results on scientific seminars, symposia, conferences, etc., including preparation of talks. At least one documented oral presentation in English to an appropriate scientific audience, preferentially international conference.                    |
| <b>Theoretical training</b>                       | Theoretical courses, preparation for the doctoral state exam. Recommendation: plan courses and training for the first two years; consider courses at MU/outside; identify student's knowledge gaps and what should be learned for SDE.                               |
| <b>Internships and international cooperation</b>  | Described in <i>III. Requirements for Internships Abroad</i> (above)   |
| <b>Pedagogical competencies</b>                   | Optional – included in the limit of Soft-skills courses, up to 150 hours through the entire doctoral studies. Recommendation: pass during the first three years.   |
| <b>Language competencies</b>                      | Further improving English language competences, attending courses, seminars, conferences, writing publications, all in English.  |
| <b>Transferable skills and career development</b> | Career development, preparation and management of projects, scientific writing, communication, other soft-skills.<br>A minimum of three credited courses is required. Consider courses at MU/outside.  |

Tab. D. Study Plan by Semesters

| Year | semester      | PhD Project/Doctoral thesis  |  | Publication activities    | Conferences and academic forums                                 | Theoretical training     |              |              |  | Internships and international cooperation | Pedagogical competencies                | Language competencies     | Transferable skills and career development |
|------|---------------|--|--|---------------------------|---|--------------------------|--------------|--------------|--|---|---|---------------------------|--|
| 1    | 1<br>(autumn) | <b>S5007</b><br>(recommended 25 ECTS)  | • Submit <b>TAC Members Proposal</b>   |                           |   | <b>S5050</b>             | <b>C7777</b> | <b>S5010</b> | <b>Hard-skill course</b><br>- optional   |   |   |                           | <b>Soft-skill course</b><br>- optional     |
|      | 2<br>(spring) | <b>S5007</b><br>(recommended 25 ECTS)  | <b>S5013</b><br>1 <sup>st</sup> TAC meeting  |                           | <b>S5012</b><br>attendance                                      | <b>S5050</b>             |              |              | <b>Hard-skill course</b><br>- optional   |   |   |                           | <b>Soft-skill course</b><br>- optional     |
| 2    | 3<br>(autumn) | <b>S5007</b><br>(recommended 25 ECTS)  |  |                           |   | <b>S5050</b>             | <b>C7777</b> | <b>S5010</b> | <b>Hard-skill course</b><br>- optional   |   |   |                           | <b>Soft-skill course</b><br>- optional     |
|      | 4<br>(spring) | <b>S5007</b><br>(recommended 25 ECTS)  | <b>S5013</b><br>2 <sup>nd</sup> TAC meeting<br>4 <sup>th</sup> or 5 <sup>th</sup> semester |                           | <b>S5012</b><br>attendance                                      | <b>S5050</b>             |              |              | <b>Hard-skill course</b><br>- optional<br><br><b>4 hard-skill courses</b><br>completed |   |   |                           | <b>Soft-skill course</b><br>- optional     |
| 3    | 5<br>(autumn) | <b>S5007</b><br>(recommended 30 ECTS)  | <b>S5013</b><br>2 <sup>nd</sup> TAC meeting<br>4 <sup>th</sup> or 5 <sup>th</sup> semester |                           |   | <b>S5050</b>             | <b>C7777</b> |              | • Application for <b>DSE</b><br>• <b>Doctoral State Exam</b>                           |   |   |                           | <b>Soft-skill course</b><br>- optional     |
|      | 6<br>(spring) | <b>S5007</b><br>(recommended 30 ECTS)  |  |                           | <b>S5012</b><br>poster  | <b>S5050</b>             |              |              |  |   |   |                           |  |
| 4    | 7<br>(autumn) | <b>S5007</b><br>(recommended 30 ECTS)  | <b>S5013</b><br>3 <sup>rd</sup> TAC meeting  |                           |   | <b>S5050</b>             | <b>C7777</b> |              |  |   |   |                           |  |
|      | 8<br>(spring) | <b>S5007</b><br>(recommended 30 ECTS)<br><br>• Submit <b>PhD Thesis</b><br>• <b>PhD Thesis Defence</b> |  | <b>S5008</b><br>completed | <b>S5012</b><br>oral presentation<br><br><b>S5006</b> completed | <b>S5050</b>             |              |              |  | <b>XD110</b><br>completed                 | <b>S5009</b><br>completed<br>(optional) | <b>S5006</b><br>completed | <b>3 soft-skill courses</b><br>completed   |
| 4+   | 9+            | <b>S5007</b><br>(recommended 20 ECTS)  | <b>S5013</b><br>TAC meetings in<br>9 <sup>th</sup> , 11 <sup>th</sup> , ...<br>semester    |                           | <b>S5012</b> poster   | <b>S5050</b><br>optional | <b>C7777</b> |              |  |   |   |                           |  |