

# TRAINING PLAN

## UNIVERSITY OF SZEGED

### Doctoral School of Pharmaceutical Sciences (DS)

Head of the doctoral school: Professor Dr. Judit Hohmann, member of the Hungarian Academy of Sciences

In addition to the Regulations Governing the Doctoral Training Programmes at the University of Szeged, the followings are also required.

During the training, 240 credits shall be earned according to the following rules:

- During the first 2 years of training, half of the credit points shall be obtained.
- During the first 2 years of training, at least 20 credits per semester shall be obtained.
- For compulsory courses, a total of 40 credit points shall be obtained during the first 2 years of training.
- For courses related to research (experimental work, publications), at least 130 credit points shall be achieved.
- For educational activities, students can obtain 48 credit points at most.

#### 1. Completing courses

To be eligible for a completion of studies certificate, students shall obtain 40 credit points during the first 2 years of training by completing compulsory courses.

Students can take elective courses from the courses of the Doctoral School of Pharmaceutical Sciences and other doctoral schools of the university. However, taking these courses shall happen in agreement with the programme director at the beginning of every semester. If the programme director allows a course of another doctoral school, the programme director shall consult with the person in charge of the course about announcing the course at the faculty and including it in the faculty curriculum. The programme director can make certain courses compulsory after informing the students about it at the beginning of the semester.

Credits shall be granted for only those courses that are graded on a 3-level or 5-level grading scale system. The credit point value of 1 lesson per week (14 lessons per semester) is 3 credit points, the credit point value of 2 lessons per week (28 lessons per semester) is 5 credit points. Completion of the courses is certified by the lecturers.

#### 2. Research

For courses related to research, at least 130 credit points shall be achieved to be eligible for a completion of studies certificate.

Credits for research shall be granted according to the followings:

- Experimental work: maximum 20 credit points per semester
  - 150 hours: 5 credits (lecturer workload 1 lesson per week)
  - 300 hours: 10 credits (lecturer workload 2 lessons per week)
  - 450 hours: 15 credits (lecturer workload 3 lessons per week)
  - 600 hours: 20 credits (lecturer workload 4 lessons per week)During the training, every 'Experimental work' course can be taken 3 times at most.
- Oral presentation/poster presentation:
  - poster at a national event: 1 credit
  - poster at an international event: 2 credits

- oral presentation at a national event: 3 credits
- oral presentation at an international event: 5 credits
- Summer school: Doctoral students can attend a summer university/summer school related to their thesis subject, with the prior approval of the programme director. The programme director decides on the accreditation of the summer school. (3 credits)
- Short-term study tour abroad: Doctoral students can go on short-term (from 2 weeks to 1 month at most) study tours related to their thesis subject, with the prior approval of the programme director. Certification of the study tour is the supervisor's task; accreditation is decided by the programme director. (3 credits)
- Long-term study tour abroad: Doctoral students can go on long-term (1-2 months) study tours related to their thesis subject, with the prior approval of the programme director. Certification of the study tour is the supervisor's task; accreditation is decided by the programme director. (5 credits)
- Publication: maximum 60 credits points can be obtained during the complete training period
  - scientific publication without impact factor 5 credits  
(For Hungarian students, publications in Hungarian are recommended.)
  - English scientific publication with impact factor: 10 credits
  - Q1 publication 15 credits
  - D1 publication 20 credits

Those who wish to obtain a doctoral degree within an individual preparation programme earn 120 credits for the comprehensive examination. Based on previously acquired skills and competencies, additional credits may also be recognised, which is decided by the Doctoral Council.

Regarding the ethical aspects of scientific research and publication at the Doctoral School, the principles and guidelines of the Ethical Codex of the Hungarian Academy of Sciences are applicable.

### 3. Educational activities

Students are granted credit points for participating in education (maximum 8 credits per semester). With educational activities during the training, 48 credit points shall be achieved at most.

Students can complete the following educational courses registered in the Neptun system. Completion of the courses is certified by the head of the department.

- Teaching / 1 lesson per week: 2 credit points
- Teaching / 2 lessons per week: 4 credit points
- Teaching / 3 lessons per week: 6 credit points
- Teaching / 4 lessons per week: 8 credit points

For involvement in Hungarian education, credit points shall be granted. For involvement in English language education, students shall receive either hourly fees or credit points.

### Foreign language lessons

For the duration of three semesters, doctoral students are entitled to four foreign language lessons per week. Credits shall not be granted for foreign language courses. Taking a foreign language course shall happen in agreement with the supervisor.

## Annual report

Doctoral students are required to give a maximum 2 pages long account of their annual research activities at the end of every academic year. No credit points are assigned to these reports. The report shall contain:

- taken and completed courses with results and credit points,
- educational activities with number of hours and credit points,
- most important research results,
- given scientific lectures,
- published, accepted and submitted articles.

The content of the report shall be certified by the supervisor. One copy of the report shall be handed to the supervisor, one copy shall be handed to the programme director and one copy shall be handed into the PhD Secretariat until 15 September.

## Comprehensive examination

As the end of the training and research part of the doctoral training (the first 4 semesters), students have to pass the comprehensive examination, which is also a condition of starting the research and dissertation phase of their training (the next 4 semesters). In order to take their comprehensive examination, students have to collect at least 90 credits and all the training credits for compulsory courses required by the training plan of the Doctoral School.

The academic part of the comprehensive examination consists of the following subjects and topics.

The examinee selects 1-1 subject/topic from the following two groups:

Subject/topic 1	Subject/topic 2
Analytical chemistry	Biopharmacy
Pharmacognosy	Botany
Pharmacodynamics	Separation techniques
Pharmaceutical chemistry	Pharmacoepidemiology
Pharmaceutical technology	Phytotherapy
Clinical pharmacy	Colloid chemistry
Organic chemistry	Quality assurance
	Instrumental analysis of pharmaceuticals
	Structural analysis

In order to submit a thesis, the doctoral candidate is required to have at least the following publications categorised based on the Scientific Journal Rankings

(SCImago, <https://www.scimagojr.com/journalrank.php>):

- Two Q1 original publication, and the candidate has to be the first author of at least one of them
- One Q1 publication and one publication in English with impact factor, and the candidate has to be the first author of one of them, as well as one scientific paper

Qualification of the publication shall happen according to the ranking valid at the time of acceptance of the paper. In case of student co-authorship within the Programme of the Doctoral School, the programme director declares how the students should share the joint publication. In highly justified cases, particularly high quality publications may be exceptions regarding the publication requirements, if the supervisor supports it. The Doctoral Council is also decisive in this case. The candidate is required

to be the first author of at least one publication. If the candidate is not first author of a publication, the corresponding author shall declare whether the candidate could use the publication in the PhD thesis. Patents may also be considered as publications if the student's share is more than 10%. The requirements of the previous regulations (minimum 3 publications, at least 1 of which has to be as a first author, and the sum of the impact factors has to be 3.0) are still valid until 31 December 2023. Students may decide whether they want to start the procedure of obtaining their degree according to the old ranking system or the current one.

### **Foreign language requirements**

To obtain a degree, intermediate language competence in at least one foreign language (English, German, Russian, French, Spanish or Italian) shall be certified by a B2 level complex type language examination or equivalent certification. Equivalence between language examinations is regulated by a Government Decree. Cases that are not regulated by the Government Decree fall under the authority of the Foreign Language Centre of the University. The expert opinion of the Centre shall be decisive.

The language exam certificate must be presented at the Doctoral Training Secretariat at the latest when the thesis is submitted. From 1<sup>st</sup> September 2023, the second basic level language exam is only mandatory if the student obtained the intermediate level language exam in a language other than English. In that case, the second basic foreign language must definitely be English.

In the case of foreign students, intermediate language skills can be recognized if the student has completed his high school or university studies in a world language (English, German, Russian, French, Spanish, Italian) and proves this with an official document issued by the high school or university.

PhD students who started their doctoral studies before September 1, 2023 can choose the old or new regulations of the second foreign language that are more favorable to them. The regulations before September 1, 2023 prescribed that at least basic level "B1" language knowledge is required, which can be verified with a language exam certificate or a certificate obtained at the Foreign Language Center. Any language can be chosen as a second foreign language except the mother tongue. In the case of foreign citizens whose mother tongue is not Hungarian, their mother tongue is also acceptable as a second foreign language. To document knowledge of the mother tongue, a public document is required (issued by the University's Foreign Language Center, consulate, etc.). For them, Hungarian is considered as a foreign language.

## STUDY PLAN

### 1<sup>st</sup> SEMESTER

Compulsory courses:	10 credits
Research, educational activities:	20 credits
<b>Total:</b>	<b>30 credits</b>

### 2<sup>nd</sup> SEMESTER

Compulsory courses:	10 credits
Research, educational activities:	20 credits
<b>Total:</b>	<b>30 credits</b>

### 3<sup>rd</sup> SEMESTER

Compulsory courses:	10 credits
Elective courses:	5 credits
Research, educational activities:	15 credits
<b>Total:</b>	<b>30 credits</b>

### 4<sup>th</sup> SEMESTER

Compulsory courses:	10 credits
Elective courses:	5 credits
Research, educational activities:	15 credits
<b>Total:</b>	<b>30 credits</b>

### 5<sup>th</sup> SEMESTER

Research, educational activities, elective courses:	30 credits
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### 6<sup>th</sup> SEMESTER

Research, educational activities, elective courses:	30 credits
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### 7<sup>th</sup> SEMESTER

Research, educational activities, elective courses:	30 credits
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### 8<sup>th</sup> SEMESTER

Research, educational activities, elective courses:	30 credits
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**Total: 240 credits**

## **PROGRAMME DIRECTORS AND THE DOCTORAL PROGRAMMES IN THE DOCTORAL SCHOOL OF PHARMACEUTICAL SCIENCES**

### **Pharmacognosy doctoral programme**

**Programme director:** Professor Dr. Judit Hohmann, member of the Hungarian Academy of Sciences

### **Pharmaceutical Analysis doctoral programme**

**Programme director:** Dr. István Ilisz, Doctor of Science

### **Pharmacology, Biopharmacy, and Clinical doctoral programme**

**Programme director:** Dr. István Zupkó, Doctor of Science

### **Pharmaceutical Chemistry and Pharmaceutical Research doctoral programme**

**Programme director:** Dr. István Szatmári, Doctor of Science

### **Pharmaceutical Technology doctoral programme**

**Programme director:** Dr. Ildikó Csóka, Ph.D.

## **COURSES OF THE DOCTORAL SCHOOL OF PHARMACEUTICAL SCIENCES**

### **Compulsory courses of the Doctoral School of Pharmaceutical Sciences (2 hours per week, 5 credits)**

Course name: **Methodology and ethics of scientific research and publication**

GYTKDI-01

Person in charge of the course: Dr. Szatmári István

Announcing department: Institute of Pharmaceutical Chemistry, University of Szeged

Announcement of the course: academic year "A", 1<sup>st</sup> semester

Course name: **Physical-chemical methods in pharmaceutical technology research**

GYTKDI-02

Person in charge of the course: Dr. Géza Regdon

Announcing department: Department of Pharmaceutical Technology and Drug Regulatory Affairs, University of Szeged

Announcement of the course: academic year "A", 1<sup>st</sup> semester

Course name: **Molecules of natural origin in the pharmaceutical repository**

GYTKDI-03

Person in charge of the course: Dr. Dezső Csupor

Announcing department: Department of Pharmacognosy, University of Szeged

Announcement of the course: academic year "A", 2<sup>nd</sup> semester

Course name: **The role of pharmacokinetics in pharmaceutical**

GYTKDI-04

Person in charge of the course: Dr. István Zupkó

Announcing department: Institute of Pharmacodynamics and Biopharmacy, University of Szeged

Announcement of the course: academic year "A", 2<sup>nd</sup> semester

Course name: **NMR Spectroscopy I.**

GYTKDI-05

Person in charge of the course: Professor Dr. György Dombi

Announcing department: Institute of Pharmaceutical Analysis, University of Szeged  
Announcement of the course: academic year "B", 1<sup>st</sup> semester

Course name: **Quality improvement in pharmaceutical research**

GYTKDI-06

Person in charge of the course: Dr. Ildikó Csóka

Announcing department: Department of Pharmaceutical Technology and Drug Regulatory Affairs,  
University of Szeged

Announcement of the course: academic year "B", 1<sup>st</sup> semester

Course name: **Introduction to the management of scientific electronic databases**

GYTKDI-07

Person in charge of the course: Professor Dr. Zsolt Szakonyi

Announcing department: Institute of Pharmaceutical Chemistry, University of Szeged

Announcement of the course: academic year "B", 2<sup>nd</sup> semester

Course name: **Separation techniques**

GYTKDI-08

Person in charge of the course: Dr. Kornél Szőri

Announcing department: Department of Pharmacognosy, University of Szeged

Announcement of the course: academic year "B", 2<sup>nd</sup> semester

#### **Elective courses for students of all training programmes**

Course name: **The Linguistic Aspects of Writing a Scientific Paper - seminar**

GYTK-DIE-19

Person in charge of the course: Dr. Csilla Keresztes

Announcing department: Foreign Language Department, Faculty of Medicine, University of Szeged

#### **Elective courses in the training programmes of the Doctoral School of Pharmaceutical Sciences**

<b>Elective courses of the Pharmacognosy programme</b>		
<b>Name</b>	<b>Number of hours</b>	<b>Credits</b>
Applied botany and pharmacognosy	28	5
Extraction and chromatographic techniques in the research of natural products	28	5
Phytoanalysis	28	5
Macro- and micromorphological and histochemical examination of herbs	28	5
Phytochemistry	28	5
The basics of comparative phytochemistry and chemotaxonomy	28	5
Application of NMR spectroscopy for structure determination of natural compounds (English)	28	5

Course name: **Applied botany and pharmacognosy**

Person in charge of the course: Dr. Zsuzsanna Hajdú

Prerequisite: Participation in the Pharmacognosy doctoral training

Announcing department: Department of Pharmacognosy, University of Szeged

Announcement of the course: both semesters

Requirements: oral exam

**Extraction and chromatography techniques in the research of natural products**

Person in charge of the course: Dr. Andrea Vasas

Prerequisite: Participation in the Pharmacognosy doctoral training

Announcing department: Department of Pharmacognosy, University of Szeged

Announcement of the course: both semesters

Requirements: oral exam

**Course name: Phytoanalysis**

Person in charge of the course: Dr. Dóra Rédei

Prerequisite: Participation in the Pharmacognosy doctoral training

Announcing department: Department of Pharmacognosy, University of Szeged

Announcement of the course: both semesters

Requirements: oral exam

**Course name: Macro- micromorphological, and histochemical examination of herbs**

Person in charge of the course: Dr. Tivadar Kiss

Prerequisite: Participation in the Pharmacognosy doctoral training

Announcing department: Department of Pharmacognosy, University of Szeged

Announcement of the course: both semesters

**Course name: Phytochemistry**

Person in charge of the course: Professor Dr. Judit Hohmann

Prerequisite: Participation in the Pharmacognosy doctoral training

Announcing department: Department of Pharmacognosy, University of Szeged

Announcement of the course: both semesters

Requirements: oral exam

**Course name: The basics of comparative phytochemistry and chemotaxonomy**

Person in charge of the course: Professor Dr. Imre Máthé

Prerequisite: Participation in the Pharmacognosy doctoral training

Announcing department: Department of Pharmacognosy, University of Szeged

Announcement of the course: both semesters

Requirements: oral exam

**Course name: Application of NMR spectroscopy for structure determination of natural compounds**

Person in charge of the course: Professor Dr. Judit Hohmann

Prerequisite: Participation in the Pharmacognosy doctoral training

Announcing department: Department of Pharmacognosy, University of Szeged

Announcement of the course: both semesters

Requirements: written report

<b>Elective courses of the Pharmaceutical Analysis programme</b>		
<b>Name</b>	<b>Number of hours</b>	<b>Credits</b>
NMR spectroscopy 2.	28	5
The basics of structural biology – New ways of drug molecule design	28	5
New joint analytical techniques in pharmaceutical research and bioanalysis	28	5

**Course name: NMR spectroscopy 2.**

Person in charge of the course: Professor Dr. György Dombi

Announcing department: Institute of Pharmaceutical Analysis, University of Szeged  
Prerequisite: NMR spectroscopy 1.  
Announcement of the course: 2<sup>nd</sup> semester

Course name: **The basics of structural biology – New ways of drug molecule design**  
Person in charge of the course: Dr. Gerda Szakonyi, Professor Dr. György Dombi  
Announcing department: Institute of Pharmaceutical Analysis, University of Szeged  
Prerequisite: basic knowledge of chemistry and biology  
Announcement of the course: 2<sup>nd</sup> semester

Course name: **New joint analytical techniques in pharmaceutical research and bioanalysis**  
Person in charge of the course: Dr. István Ilisz, Dr. Róbert Berkecz  
Announcing department: Institute of Pharmaceutical Analysis, University of Szeged  
Prerequisite: -  
Announcement of the course: both semesters

<b>Elective courses of the Pharmacology, Biopharmacy, and Clinical programme</b>		
<b>Name</b>	<b>Number of hours</b>	<b>Credits</b>
Cell culture-based <i>in vitro</i> methods	28	5
Pharmacogenetics	28	5
Visualisation techniques and interpretation of data analysis in pharmacoepidemiology	28	5
Clinical pharmacy problems of vulnerable patient populations	28	5
Pharmacoepidemiology	28	5
Selected pharmacology topics	28	5
Signal transduction mechanisms	28	5
The pharmacology of dermatitis	28	5

Course name: **Cell culture-based *in vitro* methods**  
Person in charge of the course: Dr. István Zupkó  
Announcing department: Institute of Pharmacodynamics and Biopharmacy, University of Szeged  
Prerequisite: -  
Announcement of the course: both semesters

Course name: **Pharmacogenetics**  
Person in charge of the course: Dr. Eszter Ducza  
Announcing department: Institute of Pharmacodynamics and Biopharmacy, University of Szeged  
Prerequisite: -  
Announcement of the course: 1<sup>st</sup> semester

Course name: **Visualisation techniques and interpretation of data analysis in pharmacoepidemiology**  
Person in charge of the course: Dr. Mária Matuz  
Announcing department: Department of Clinical Pharmacy, University of Szeged  
Prerequisite: -

Course name: **Clinical pharmacy problems of vulnerable patient populations**  
Person in charge of the course: Dr. Ria Benkő, Dr. Péter Doró, Dr. Réka Viola  
Announcing department: Department of Clinical Pharmacy, University of Szeged  
Prerequisite: -

Announcement of the course: 2<sup>nd</sup> semester

Course name: **Pharmacoepidemiology**

Person in charge of the course: Professor Dr. Gyöngyvér Soós

Announcing department: Department of Clinical Pharmacy, University of Szeged

Prerequisite: -

Announcement of the course: both semesters

Course name: **Selected pharmacology topics**

Person in charge of the course: Dr. István Zupkó

Announcing department: Institute of Pharmacodynamics and Biopharmacy, University of Szeged

Prerequisite: -

Announcement of the course: both semesters

Course name: **Signal transduction mechanisms**

Person in charge of the course: Dr. István Zupkó

Announcing department: Institute of Pharmacodynamics and Biopharmacy, University of Szeged

Prerequisite: -

Announcement of the course: both semesters

Course name: **The pharmacology of dermatitis**

Person in charge of the course: Professor Dr. Gyöngyvér Soós

Announcing department: Institute of Pharmacodynamics and Biopharmacy, University of Szeged

Prerequisite: -

<b>Elective courses of the Pharmaceutical Chemistry and Pharmaceutical Research programme</b>		
<b>Name</b>	<b>Number of hours</b>	<b>Credits</b>
Stereo-selective synthesis	28	5
Selected chapters of organic chemistry	28	5
NMR spectroscopy 2.	28	5
Computer-aided design of active compounds	28	5
Chemical biology	28	5
Efficient synthesis in a flow reactor and related analytical procedures	28	5

Course name: **Stereo-selective synthesis**

Person in charge of the course: Professor Dr. Árpád Molnár

Announcing department: Institute of Pharmaceutical Chemistry, University of Szeged

Prerequisite: -

Announcement of the course: 2<sup>nd</sup> semester

Course name: **Selected chapters of organic chemistry**

Person in charge of the course: Professor Dr. Zsolt Szakonyi

Announcing department: Institute of Pharmaceutical Chemistry, University of Szeged

Prerequisite: -

Announcement of the course: 2<sup>nd</sup> semester

Course name: **NMR spectroscopy 2.**

Person in charge of the course: Professor Dr. György Dombi

Course description: see in the Pharmaceutical Analysis programme

Announcing department: Institute of Pharmaceutical Analysis, University of Szeged

Prerequisite: NMR spectroscopy 1.  
Announcement of the course: 2<sup>nd</sup> semester

Course name: **Computer-aided design of active compounds**  
Person in charge of the course: Professor Dr. Tamás Martinek  
Announcing department: Institute of Pharmaceutical Chemistry, University of Szeged  
Prerequisite: -  
Announcement of the course: 1<sup>st</sup> semester

Course name: **Efficient synthesis in a flow reactor and related analytical procedures**  
Person in charge of the course: Dr. Rebeka Szabados-Mészáros; Dr. György Orsy  
Announcing department: Institute of Pharmaceutical Chemistry, University of Szeged  
Prerequisite: -  
Announcement of the course: 1<sup>st</sup> semester, every second academic year

<b>Elective courses of the Pharmaceutical Technology programme</b>		
<b>Name</b>	<b>Number of hours</b>	<b>Credits</b>
New achievements in pharmaceutical technology research	28	5
Innovative technologies	28	5
Methods for investigation of dermatological products	28	5
Toolkit of "Quality by Design": Risk Assessment, Design of Experiments and ANN based modelling (in Hungarian)	28	5
Toolkit of „Quality by Design”: Risk Assessment, Design of Experiments and ANN based modelling	28	5
Nanoparticle engineering in the modern drug formulation	28	5
Nanomedicine: design of peptid containing colloid carriers for alternative delivery routes	28	5

Course name: **New achievements in pharmaceutical technology research**  
Person in charge of the course: Professor Dr. Pirooska Révész  
Announcing department: Department of Pharmaceutical Technology and Drug Regulatory Affairs, University of Szeged  
Prerequisite: -  
Announcement of the course: both semesters

Course name: **Innovative technologies**  
Person in charge of the course: Professor Dr. Pirooska Révész  
Announcing department: Department of Pharmaceutical Technology and Drug Regulatory Affairs, University of Szeged  
Prerequisite: -  
Announcement of the course: 1<sup>st</sup> or 2<sup>nd</sup> semester

Course name: **Methods for investigation of dermatological products** (in Hungarian)  
Person in charge of the course: Dr. Szilvia Berkó  
Announcing department: Department of Pharmaceutical Technology and Drug Regulatory Affairs, University of Szeged  
Prerequisite: -  
Announcement of the course: 1<sup>st</sup> semester

Course name: **Toolkit of “Quality by Design”: Risk Assessment, Design of Experiments and ANN based modelling** (in Hungarian)

Person in charge of the course: Dr. Tamás Sovány

Announcing department: Department of Pharmaceutical Technology and Drug Regulatory Affairs, University of Szeged

Prerequisite: -

Announcement of the course: 2<sup>nd</sup> semester

The same course in English: **Toolkit of „Quality by Design”: Risk Assessment, Design of Experiments and ANN based modelling**

Person in charge of the course: Dr. Tamás Sovány

Course name: **Nanoparticle engineering in the modern drug formulation** (in English)

Person in charge of the course: Dr. Rita Ambrus

Announcing department: Department of Pharmaceutical Technology and Drug Regulatory Affairs, University of Szeged

Prerequisite: -

Announcement of the course: 1<sup>st</sup> semester

Course name: **Nanomedicine: design of peptid containing colloid carriers for alternative delivery routes** (in English)

Person in charge of the course: Dr. Ildikó Csóka

Announcing department: Department of Pharmaceutical Technology and Drug Regulatory Affairs, University of Szeged

Prerequisite: -

Announcement of the course: 2<sup>nd</sup> semester