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DOCTORAL ACADEMIC STUDIES –
PHARMACEUTICAL SCIENCES
(IN SERBIAN AND ENGLISH)

STANDARDS FOR THE ACCREDITATION OF THE
STUDY PROGRAM

Standard 1: Study program structure

Doctoral studies have at least 180 ECTS points, with a previously achieved study volume of at least 300 ECTS points in basic academic and master's academic studies, i.e. in completed integrated academic studies. The doctoral dissertation is the final part of the study program of doctoral studies

Description (maximum 300 words):

The study program Doctoral Academic Studies – Pharmaceutical sciences, for obtaining the scientific title of Doctor of Medical Sciences - Pharmacy, lasts 6 semesters, i.e. 3 school years. The program has all the elements provided by the Law of Higher Education and the standards for the accreditation of doctoral study programs.

The goals of the study program are adequate scientific education, training students for independent and team scientific research work, writing scientific papers or scientific projects, organizing the work of a research group, managing scientific projects, as well as presenting the results of scientific work in the field of pharmaceutical sciences.

The type of studies (doctoral academic studies) and the outcomes of the learning process (independent/team work in scientific research institutions in jobs that imply a third-level higher academic education) are in accordance with the law that establishes the national framework of qualifications.

For enrollment in the first year of Doctoral academic studies - pharmaceutical sciences, candidates can apply if they have graduated from a faculty in the fields of pharmaceutical sciences, veterinary sciences, biological sciences, chemical sciences and have obtained at least 300 ECTS in basic academic and master academic studies or in integrated academic studies, with a total average grade of at least 8 (eight). The ranking of candidates for enrollment in the study program is in accordance with the regulations of the Law on Higher Education and general acts of the University of Kragujevac and the Faculty of Medical Sciences in Kragujevac.

The study program contains 9 mandatory and 33 elective subjects, of which the student chooses 9. The application, processing and defence of the doctoral dissertation is defined through subjects during the IV, V and VI semesters of study, and provides a total of 90 ECTS. The total scope of studies is 180 ECTS, and each year of study is worth 60 ECTS.

A list of compulsory and optional subjects with an outline content, as well as their execution method and point values of practice specifications expressed in accordance with the European point transfer system are available in the [subject book](#). The course book contains prerequisites for course enrollment, precisely defined outcomes of the learning process, as well as all other relevant data for each individual course.

The selectivity factor according to the positions where the student chooses subjects is 51,67%, which is in accordance with the defined accreditation standards for programs in the field of medical sciences.

The conditions for transferring from other, related study programs are regulated by the Faculty's general acts.

Standard 2: The purpose of the study program

The doctoral study program has a clearly defined and published purpose and role in the educational system.

The purpose of the study program Doctoral Academic Studies – Pharmaceutical sciences is the development of science, critical thinking, education and the formation of scientifically research competent staff in the domain of medical sciences, trained for independent and team scientific research work, as well as for adequate organization and management of scientific projects. By studying in this program, students acquire relevant and modern theoretical and practical knowledge that will provide the future doctor of medical sciences necessary competencies for his work in a research, academic or health institution but also in pharmaceutical industry. During their studies, doctoral students develop skills in designing and conducting both clinical and experimental research, adequate collection and analysis of relevant data, interpretation of obtained results and presentation of research papers.

The purpose of the study program Doctoral academic studies – Pharmaceutical sciences is clearly and unambiguously formulated and is in accordance with the basic goals, mission and tasks of the Faculty of Medical Sciences in Kragujevac, certain general acts of the Faculty, as well as with the goals of higher education, determined by the Law on Higher Education. The aforementioned program is fully adapted to the needs of modern society and contributes to scientific progress and the development of medical science.

Standard 3: Objectives of the study program

The study program of doctoral studies has defined goals.

The general goal of the study program Doctoral academic studies - pharmaceutical sciences is to train students for the application of acquired knowledge, scientific abilities, and academic skills in the field of realization of scientific research work, as well as for further professional and scientific progress, all in accordance with respect for legal, ethical and moral values that is, the principles of good clinical and scientific practice in the field of pharmaceutical sciences.

The specific objectives of the study program are as follows: Acquiring an advanced level of knowledge about basic principles, theories and concepts in pharmaceutical sciences including pharmacology, pharmaceutical chemistry, pharmacognosy, clinical pharmacy, pharmaceutical technology, as well as the field of discovery and development of new drugs, as well as new management systems and delivery of medicines; Developing the ability of analytical thinking and the ability to formulate a research question based on the perception of deficiencies or inconsistencies of data from a certain area; Acquiring a high level of knowledge in the field of scientific research methodology, experimental design, data analysis and interpretation; Acquiring a high level of research skills including the ability to design and conduct innovative research, analyze complex data and interpret research results; Development of creative abilities and mastering of practical skills specific to the field of scientific research work; Acquiring the skill of critical thinking in evaluating one's own results of scientific and research work, as well as the work of other scientists; Acquiring the skill of cooperation with other researchers and experts from different fields (medicine, biology, chemistry), as well as developing the skill of working in interdisciplinary teams, Acquiring the skill of adequate and efficient presentation of the results of scientific and research work in the form of scientific papers in leading journals or in the form of presentations at scientific conferences; Acquiring an advanced level of knowledge about the design, synthesis, formulation of new pharmaceutical substances; Acquiring knowledge about the principles of ethics in scientific and research work, as well as the guidelines that regulate clinical research, research involving animals and other research in the field of pharmaceutical research and development; Acquisition of knowledge and skills necessary for adequate application of scientific knowledge in the field of practical application; Developing the skills and abilities necessary to effectively teach and mentor junior researchers.

The goals of the study program are aligned with modern knowledge and development trends in the field of biomedical sciences at the international level. The goals of the study program are aligned with the goals of the Faculty of Medical Sciences and the University of Kragujevac in terms of scientific and research work, development of teaching staff, and health activities.

Standard 4. Graduate competencies

By mastering the study program of doctoral studies, the student acquires general and specific research abilities that are subordinated to the quality performance of professional and scientific activities.

By mastering the study program Doctoral Academic Studies - Pharmaceutical Sciences, the student acquires the knowledge, skills, developed abilities and competencies needed for:

- Independent solving of practical and theoretical problems in the field of pharmacy;
- Independent planning, organization and realization of scientific researches in the field of pharmacy;
- Active participation in international scientific projects and scientific projects financed by relevant institutions in the Republic of Serbia;
- Development and implementation of modern technologies, procedures, and knowledge in the scientific field of pharmaceutical sciences;
- Critical, creative and independent reasoning in scientific research work;
- Adherence to ethical and moral principles of good scientific practice in all phases of scientific research work;
- Professional interpretation and communication of scientific research results at scientific meetings and conferences, in scientific journals, through patents, and in new technical solutions
- Development of new knowledge in the field of pharmacy and science in general.

By mastering the study program Doctoral Academic Studies - Pharmaceutical Sciences, the student acquires the subject-specific competencies required for:

- Thorough knowledge and comprehensive understanding of scientific and professional doctrine in the field of pharmaceutical sciences;
- Solving professional and scientific problems and doubts using valid scientific methods and procedures;
- Synthesis of basic knowledge from different scientific fields and practical implementation of the integrated knowledge;
- Continuous monitoring of modern scientific and professional achievements and innovations in the field of pharmaceutical sciences;
- Development of modern skills and dexterity in the application of knowledge in the field of pharmaceutical sciences;
- Practical application of modern information and communication technologies in the process of mastering modern knowledge in the field of pharmaceutical sciences.

By mastering the Doctoral academic studies - pharmaceutical sciences study program, the student acquires general and subject-specific competencies that enable his further professional development in the fields of science, education, economy, and the public sector.

The learning outcomes provided by the curriculum structure of the study program Doctoral academic studies - pharmaceutical sciences enable the acquisition of knowledge, skills and abilities/attitudes in accordance with the descriptors of the learning outcomes of the national qualification framework, as well as the competencies arising from the study program, which integrate adequate skills for: independent solving of practical and theoretical problems in the field in which they received their doctorate, critical thinking and independent and creative action, independent interpretation and evaluation of scientific results, designing research that achieves a significant and original scientific research contribution, building professional behavior in accordance with the principles of the ethical code and good scientific practices, involvement in national and international scientific projects, management of research teams and projects, effective and professional scientific communication and presentation of scientific research results at scientific meetings, in scientific journals, through patents and new technical solutions, as well as for participation in the development of new knowledge in the field of biomedical sciences and science in general.

Standard 5: Curriculum

The curriculum contains a list and structure of mandatory and elective courses and modules with a description and a doctoral dissertation as the final part of the study program of doctoral studies.

The study program Doctoral academic studies - pharmaceutical sciences lasts 3 years or 6 semesters. The total number of classes is 2385 and includes 2235 classes of active teaching (585 hours of lectures, 1650 hours of study research work) and 150 other classes.

The curriculum contains 9 mandatory (total number of ECTS - 102) and 33 elective courses, from which the student chooses 9 (total number of ECTS - 78), and integrates the realization of courses that are directly related to the application, preparation and defense of the doctoral dissertation (number of ECTS - 90), which also belong to the group of mandatory courses. The curriculum of the study program contains adequately defined bases for the independent research work of the student. In order to balance the workload, the number of ECTS per semester is 30.

The study program has 18 classes in total. As part of the realization of the study program, students attend: in the first semester, 3 mandatory courses and 3 electives (out of 12 offered), with a total fund of active teaching of 27 classes per week and achieve 30 ECTS; in the second semester, 3 elective courses (out of 13 offered), with a total fund of active teaching of 21 classes per week and achieve 30 ECTS; in the third semester, 3 electives (out of 8 offered), with a total fund of active teaching of 21 classes per week and achieve 30 ECTS; in the fourth semester, 3 mandatory courses, with a total fund of active teaching of 20 classes per week and achieve 30 ECTS; in the fifth semester, 1 mandatory course, with a total fund of active teaching of 30 classes per week and achieve 30 ECTS; in the sixth semester, 2 mandatory courses with a total fund of active teaching of 30 classes per week and achieve 30 ECTS. During the IV semester, the student completes 150 other classes, the outcome of which is the application of the topic of the doctoral dissertation.

The total engagement of students through active teaching and other classes is expressed by the number of 180 ECTS. The implementation of ECTS was carried out according to a non-modularized system in which each subject can have a different number of points, so that the total number of points in one academic year is 60. Within each course, teaching activities relevant to achieving the goal and outcome of the course and the time required for each teaching activity are defined, so that the total work engagement of students corresponds to the number of points that belong to the course. The student achieves the points provided for the specific course after passing the final exam, and the conditions for attending each individual course are defined in the course book.

The course book contains a detailed description of the course: title, type of course, semester of study, number of ECTS, teacher's name, course objective with expected outcomes, knowledge and competences, prerequisites for attending the course, content, recommended literature, methods of teaching, methods of knowledge verification and assessment. The sequence of courses in the study program is organized in such a way that the knowledge required for the following courses is acquired from previously completed courses.

The selectivity factor according to the positions where the student chooses subjects amounts to 51,67% of the total number of ECTS, which is in accordance with the set accreditation criteria.

The number of ECTS corresponding to elective courses is 93, which is more than 50% of the total number of points corresponding to all courses of the study program, including contents related to transferable skills (communication skills, teamwork, entrepreneurship, project management, ethics, standardization, and intellectual property protection).

The list of elective courses contains 3.67 times more courses than the number of electives; the student chooses 9 of the 33 offered elective courses.

The curriculum clearly defines the requirements related to the preparation of a doctoral dissertation specific to the field of medical sciences. The doctoral dissertation represents the independent, original scientific work of a doctoral student. The procedure for applying, preparing, and defending a doctoral dissertation is clearly specified in the Rulebook on Doctoral Academic Studies of the Faculty of Medical Sciences in Kragujevac. Of the total number of ECTS provided for the realization of the study program of doctoral studies, 50%, or 90 ECTS, refer to the doctoral dissertation.

Active teaching consists of at least 26,17% of lectures. The remaining active teaching consists of study research work (SRW).

The student completes his studies after passing all exams provided for in the curriculum and a defended doctoral dissertation.

The Faculty of Medical Sciences in Kragujevac is accredited as a scientific research institution.

Tables for standard 5:

[Table 5.1. Specification of courses in the study program of doctoral studies.](#)

[Table 5.2. Schedule of courses by semesters and years of study](#)

Appendices for standard 5:

[Appendix 5.2. Course book \(in the documentation and on the institution's website\)](#)

Standard 6: Quality, modernity, relevance and international compliance of the study program

The study program follows contemporary world trends and the state of the profession and science in the corresponding educational-scientific field, is aligned with the country's strategic priorities and is comparable to similar programs at foreign higher education institutions within the European educational space.

The study program Doctoral academic studies – pharmaceutical sciences is designed on the basis of a comprehensive and detailed research of related study programs within the European educational space and the conclusions of the European Conference on Harmonization of PhD Programs in Medicine and Health Sciences (The Declaration of the European Conference on Harmonization of PhD Programs in Medicine and Health Sciences) adapted to our needs and conditions.

The study program is designed to provide students with the latest scientific knowledge in the field of pharmaceutical sciences and to follow new achievements in science. The modernity of this study program is ensured by international cooperation on the basis of concluded contracts with universities from Russia (I.M. Sechenov First Moscow State Medical University), Romania (University of Medicine and Pharmacy "Viktor Babes" in Timisoara and University of Medicine and Pharmacy "Grigore T. Popa" in Iași), and Canada (Institute of Cardiovascular Sciences, University of Manitoba), i.e. multiple study stays of Faculty delegations at the University of California in San Francisco (UCSF) and the University of Dubai. This study program is complete and comprehensive and harmonized with other programs of the Faculty of Medical Sciences of the University of Kragujevac. Also, this program is essentially and formally harmonized with the strategies for the development of education, science and profession in the Republic of Serbia, and especially with the Strategy for the Development of Education and Upbringing in the Republic of Serbia until 2030 and the Strategy for Scientific and Technological Development of the Republic of Serbia for the period from 2021 to 2025 "The power of knowledge".

The study program Doctoral academic studies – pharmaceutical sciences is structurally and formally harmonized with three relevant accredited foreign programs of renowned European higher education institutions:

1. [Faculty of Medicine, University of Rijeka, Croatia](#)
2. [Faculty of Medicine, University of Maribor, Slovenia](#)
3. [Faculty of Pharmacy and Biochemistry, University of Zagreb, Croatia](#)

The study program is structurally and formally harmonized with established accreditation standards for study programs of doctoral studies in educational-scientific fields and with European standards in terms of: enrollment conditions, duration of studies, conditions for transfer to the next year (collected minimum number of ECTS), degree acquisition and way of studying.

Standard 7: Student enrollment

The higher education institution, in accordance with social needs and the needs of the development of science, education and culture, and with its resources, enrolls students in the study program of doctoral studies.

In accordance with social needs and the needs of the development of science, education and culture and with its resources, the Faculty of Medical Sciences in Kragujevac enrolls, among others, students in the study program Doctoral academic studies – pharmaceutical sciences.

The decision on the number of students to be enrolled in the study program is made by the University, on the proposal of the Faculty, in accordance with the work permit and taking into account the available space, personnel and other possibilities of the institution, the priorities of the country, as well as the estimated social needs. The number of students whose studies are financed from the budget is determined by the Government of the Republic of Serbia.

Enrollment in the first year of study is carried out in the manner and according to the procedure prescribed by the competition announced by the University of Kragujevac in accordance with the law, and is carried out by the Faculty. The competition is announced in the month of September and contains: number of students for the study program, enrollment requirements, criteria for determining the order of candidates, the procedure for conducting the competition, the method and deadlines for submitting an appeal to the determined order, the amount of tuition paid by students whose studies are not financed from the budget of the Republic of Serbia and documentation that needs to be submitted by candidates who obtain the right to enroll.

In the first year of study in Serbian language can enroll a person who has graduated from a faculty in the field of pharmaceutical sciences, veterinary sciences, biological sciences, chemical sciences, and has obtained at least 300 ECTS in basic academic and master academic studies as well as integrated academic studies, with a total average grade of at least 8 (eight). The selection of candidates for enrollment in the study program is based on the success achieved during the mentioned studies and the length of studying. The requirement for enrollment is knowledge of at least one foreign language determined by the institution (English).

The ranking list of registered candidates is made by the enrollment committee, which is appointed by the Rector of the University at the proposal of the Teaching and Research Council of the Faculty. The right to enroll in studies is acquired by a candidate who is ranked in the ranking list within the number of approved students for enrollment in the study program.

A competition participant who believes that his rights have been violated may file a complaint in the manner and within the deadlines provided by the competition.

A candidate who has acquired the right to enroll, but does not enroll within the deadline, loses the right to enroll. Instead of the candidate who did not submit the documentation for enrollment, the next candidate is enrolled, according to the order in the final ranking list, within the deadline set by the competition.

A foreign citizen, in terms of previous education, can enroll in a study program in the Serbian language under the same conditions as a domestic citizen, in the manner regulated by the Law on Higher Education and the general act of an independent higher education institution. The condition for enrollment is knowledge of the Serbian language (in which classes are held) and English language.

In the first year of study in English language can enroll a person who has graduated from a faculty in the field of pharmacy, biology, biomedicine, who has a certificate of knowledge of the English language - level B2 or previously completed any level of education in English language (proof - diploma) and who in accordance with the number of points achieved on the basis of success during the aforementioned studies and length of study takes a place on the ranking list within the number of students approved by the Government of Serbia for enrollment in the first year, and in accordance with the competition rules can be enrolled.

Standard 8: Student Assessment and Progression

Grading of students is done by continuous monitoring of students' work and on the basis of points obtained by completing pre-examination obligations and taking exams. The doctoral dissertation is evaluated based on the indicators of its scientific contribution.

During studies, each student masters the study program by taking an exam, thereby acquiring a certain number of ECTS, in accordance with the defined study program. The number of ECTSs for each individual subject is determined on the basis of the student's workload in mastering a particular subject by applying the unique methodology of the higher education institution for all subjects. The success of students in mastering a certain subject is continuously monitored during classes and is expressed in points. The maximum number of points that a student can achieve in the course is 100. The student gains points in the course by completing pre-exam activities and passing the final exam. The minimum number of points that a student can acquire by fulfilling pre-examination obligations during classes is 30, and the maximum is 70, while the remaining number of points (up to 100) is obtained by the student at the final exam itself.

Each individual course from the study program has a precise, clear, and published method of earning points. The method of acquiring points during the teaching includes the number of points that the student acquires based on each individual type of activity within the pre-exam obligations and by passing the final exam. The overall success of the student in the course is expressed by a grade from 5 (failed) to 10 (excellent). The student's grade is based on the total number of points the student earned by fulfilling the pre-examination requirements and taking the exam, according to the quality of acquired knowledge and skills.

A student can take the final exam in a specific subject if he has completed all the pre-exam obligations determined by the study program. The method of taking the final exam for each course is defined by the study program and is shown in the course book.

In order for the student to pass the course, he must collect a minimum of 51 points, and within the pre-exam activities, as well as in the final exam, he must win more than 50% of the points provided for evaluating the pre-exam activities, i.e. passing the exam. The schedule of all forms of student assessment is determined at the beginning of the semester and is announced to students along with the method of obtaining points.

The dissertation is the final part of the study program of doctoral studies. The dissertation represents an independent scientific research work. The achieved scientific contribution is evaluated according to the number of scientific publications, patents, or technical improvements.

In order to start the defense of the doctoral dissertation, it is necessary that the student has published at least three papers in domestic or foreign journals, of which: A) one paper from the topic of the doctoral dissertation, in which the candidate is the first author, was published in a journal with an impact factor that is on the SCI list, category Q1 (Scopus classification - the category of the journal is considered at the time of acceptance of the manuscript for publication), or B) two papers from the topic of the doctoral dissertation, in which the candidate is the first author, published in a journal with an impact factor that is on the SCI list, category Q2 (Scopus classification - the category of the journal is viewed at the time of acceptance of the manuscript for publication). Other papers must be published in journals of at least Q3 category (Scopus classification - journal category is looked at at the time of manuscript acceptance and publication). The manner and procedure of preparation and defense of the dissertation are governed by the Rulebook on doctoral academic studies of the Faculty, which defines the acceptance of the topic for the dissertation, the evaluation of the completed dissertation, and the fulfillment of the conditions for joining the public oral defense. In accordance with the mentioned Rulebook, the mentor's participation in the work of the committee for the evaluation and defense of the doctoral dissertation is not foreseen.

During the school year, sessions of the Doctoral Academic Studies - Pharmaceutical Sciences Semester Council are held. Semester councils are made up of the dean, departmental vice-dean, heads of departments, or heads of subjects in the corresponding semester. The council is chaired by the dean or a member of the council appointed by him. The council meets once a week, at a predetermined time. Representatives of students attending classes in a given semester, who are delegated by students of the corresponding semester, can also attend the Council. The Council considers issues of interest for the implementation of teaching, improving the quality of teaching and reforming the curriculum, considers the effectiveness of studying and the quality of the teaching process, proposes corrective measures in order to improve the teaching process, and considers and prepares proposals on issues within its scope, which are

decided by the Teaching - scientific council of the Faculty.

Each student's progress is evaluated once a year and is an integral part of the study program self-evaluation report.