PROSPECTUS

UNIFORM MASTER’S PHARMACY PROGRAMME, UNIVERSITY OF LJUBLJANA, FACULTY OF PHARMACY (MASTER OF PHARMACY)

Presentation of the study programme:

1. Information on the study programme:

Uniform master's programme Pharmacy lasts 5 years (10 semesters) and comprises 300 credits. The academic title awarded to the students is magister/magistra farmacije – mag. farm. (Master of Pharmacy).

2. Fundamental objectives of the programme and general competences

The main objective of the uniform master’s programme is to train skilled personnel for the implementation of professional works and tasks in the pharmaceutical field (pharmacy services, industry, clinical biochemical and other diagnostic laboratories), and, at the same time, provide them with an adequate fundamental knowledge to continue the studies at the doctoral level.

General competences:

- ability of analysing, critically evaluating, searching for solutions and solving relevant professional pharmaceutical, clinical biochemical, pharmaceutical technological, pharmaceutical biotechnological and toxicological problems arising in different working environments;
- skills and relevant knowledge for further training at the doctoral level;
- appropriate qualifications for autonomous and responsible implementation of professional work and analysis of subject-specific problems;
- capacity to perform individual professional work, to work in a team, and knowledge needed for professional communication with the patients and the experts from their field and related fields of expertise;
- proper skills for understanding and application of modern techniques and methods at all levels of complexity within the entire fields of pharmacy and clinical biochemistry;
- competence for assurance of quality medicinal products and procedures;
- appropriately ethically shaped professional personality for the realization of pharmaceutical mission.

3. Enrolment requirements and selection criteria in case of restricted enrolment

The uniform master’s pharmacy programme is intended for the students:

a) who have passed matura examination,
b) who have passed vocational matura examination

- at the end of the high school programme Pharmacy Technician and chemistry or physics exam within the matura examination, and Cosmetic Technician with a physics exam within the matura examination;
- at the end of the high school programme Chemistry Technician and biology exam within the matura examination;
- at the end of the high school programme Veterinary Technician and physics exam within the matura examination.
exam within the matura examination.
c) who completed any four-year secondary programme prior to June 1st 1995.

In case of restricted entry,
candidates under point a) will be selected based on:
- general success in the matura examination 60% of the points,
- general success in years 3 and 4 40% of the points;

candidates under point b) will be selected based on:
- general success in vocational matura examination 40% of the points;
- general success in years 3 and 4 – 40% of the points;
- success in the mandatory subject exam within the matura examination 20% of the points.

4. Criteria for recognition of knowledge and skills acquired prior to the enrolment in the programme

Upon the candidate’s request, the Academic Affairs Commission may submit to the Senate a proposal for recognition of knowledge and skills that have been acquired by the candidate prior to their enrolment in the study programme Pharmacy and may be recognised as fulfilled study obligations. Passed foreign language exam, for example, may therefore be recognised within the general optional courses in the fourth year.

5. Requirements for advancement within the programme

• Requirements for advancement from one year to another:

Students may enrol in the next year of study if they complete by the end of the year all the obligations determined in the curriculum for the enrolment in the next year.
To be able to advance to the second year, students must meet all academic requirements laid down in the curriculum and course schemes for the first year, in the amount of 60 ECTS credits.
To be able to advance to the third year, students must meet all academic requirements laid down in the curriculum and course schemes for the second year, in the amount of 60 ECTS credits.
To be able to advance to the fourth year, students must meet all the requirements laid down in the curriculum and course schemes in the amount of 55 ECTS credits, with the exception of the optional course, which amounts to 5 ECTS credits. To be able to advance to the fifth year, students must meet all the requirements laid down in the curriculum and course schemes in the amount of 50 ECTS credits.

• Requirements for the repetition of the year:

During their studies, students are allowed to repeat a year once, provided they have met half of the requirements for the attending year, which amounts to no less than 30 ECTS credits.
During their studies, students are entitled to one exceptional enrolment in the next year. This is decided upon by the FFA Academic Affairs Commission which can, according to the UL Statute and the FFA Academic Regulations, allow exceptional advancement when it determines the student has failed to fulfil required conditions due to substantial and verified reasons.

6. Requirements for completion of studies
To be able to complete the studies, students of the uniform master’s pharmacy programme must fulfill all obligations determined by the study programme and course curricula, in total amount of 300 ECTS credits. Based on the research work, students must submit master's thesis in written form and defend it orally in front of the commission appointed by the FFA senate. One of the requirements for finishing the studies is a successful completion of practical training, which is concluded by professional exam. All the information will be provided in detail in the FFA Academic Regulations.

7. Transfers between study programmes

In the field of medicinal product design, manufacture and evaluation, the uniform master's pharmacy programme is the only programme that provides the education for a regulated pharmacist profession, and is therefore subject to stricter verification in case of potential transfers of students from other programmes than in case of pharmacy students transferring to other programmes.

- Transfers between the university education study programmes within the UL
  Direct transfers of the students from other programmes of the UL members are not envisaged. Students from university programmes may enrol in the first year of pharmacy studies if they meet the requirements for the enrolment in the uniform master's study programme Pharmacy, but only as new candidates. After the enrolment, the Academic Affairs Commission may recognise some of the obligations fulfilled at the other faculties.

- Transfers between the study programmes of other universities
  Pharmacy students from other universities may transfer to the second or higher year of the uniform master's study programme Pharmacy, provided they meet the requirements for the enrolment in the next year that apply to the study programme they are enrolled in. The FFA Senate approves the advancement on a proposal from the FFA Academic Affairs Commission that also determines a year a student may enrol in, potential bridge exams or other obligations.

- Transfer between the FFA programmes
  Transfer from other education programmes of 1st cycle to the uniform master's programme Pharmacy is not possible.

- Old - new programme transfer
  In case the student enrolled in the university study programme Pharmacy fails to fulfil the current obligations for the enrolment in the next year, and therefore the students of the uniform master's programme Pharmacy catch up with him/her, he/she may enrol in the next year upon the fulfilment of all obligations within the old programme, whereas the Academic Affairs Commission determines potential additional obligations and the deadline to fulfil them.

- Enrolment in doctoral programmes
  When they complete the training and gather 300 ECTS credits according to the last paragraph of article 38.a and article 16 of the previous provisions of the Higher Education Act, the students of the uniform master’s study programme Pharmacy may enrol in the university doctoral programme Biomedicine or any other doctoral studies.

8. Assessment schemes
Each course has its own assessment scheme which is set in the course curriculum.
Assessment schemes include oral and written exams, partial exams, seminar papers, etc. The assessment scale ranges from 6 – 10 (positive) and 1 – 5 (negative). Assessment is subject to the provisions laid down in the Statute of the University of Ljubljana and FFA Academic Regulations.

### 9. Programme curriculum

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### 3rd year

### 4th year

### 5th year

### 6th year

### 7th year

### 8th year

### 9th year

### 10th year

### 11th year

### 12th year
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### Semester 9 and 10

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L – lectures; S – seminar; P – practice; O – other forms of direct pedagogical work (especially project work); ECTS – European Credit Transfer System (1 credit equals to 30 hours of student workload)

#### Alternative Courses

**Alternative Courses A2**
- 28. Design and Synthesis of Active Substances
- 29. Toxicological Chemistry

**Alternative Courses A3**
- 33. Clinical Pharmacy
- 34. Industrial Pharmacy

#### Optional courses

- 35. Biopharmaceutical Evaluation of Pharmaceutical Forms
- 36. Biochemistry of Cancer Development and Progression
- 37. Hospital Pharmacy
- 38. Eutomers
- 40. Pharmaceutical Engineering
- 41. Pharmaceutical Marketing and Management
- 42. Pharmacoeconomics
- 43. Pharmacogenomics and Genetic Medicines
- 44. Phytopharmaceuticals
- 45. Immunology
- 46. Selected Topics in Pharmaceutical Biotechnology
- 47. Selected Topics in Clinical Biochemistry
- 48. Selected Methods of Pharmaceutical Analysis
- 49. Quality of Medicinal Products
- 50. Cosmetology
- 51. Nutritional Supplements
- 52. Psychotropic substances and Abuse of Medicinal Products
- 53. The Use of Genetic and Cellular Testing in Biomedicine and Pharmacy
- 54. Medicinal Products of Alternative Medicine
- 55. Instrumental Analytical Methods in Pharmacy
- 56. Research Methods in Social Pharmacy

#### 10. Information on available optional courses and mobility

There are 26 optional courses. They are divided in two groups, namely optional courses (22) and alternative optional courses (4). In case of alternative courses, students may choose from two courses offered. Two alternatives are planned in the third year – A2 and A3:
A2 – alternative 2: Design and Synthesis of Active Substances or Toxicological Chemistry;
A3 – alternative 3: Clinical Pharmacy or Industrial Pharmacy.

Among the optional courses offered, the students choose three – one in the third year and two in the fourth year of studies. A2 and A3 comprise 60 contact hours or 5 ECTS credits. One of the optional courses may also be selected from the general optional courses of other UL members or other universities. General optional course must be approved by the pro-dean responsible for the field of study. Students may select it in the fourth year.

Optional courses offer in-depth knowledge from strictly specialised fields with respect to students' professional interest and desired profession. At the same time, they represent a welcome acquaintance with a relevant field of research necessary for the preparation of the master’s thesis. Topical subjects and wide offer enable free selection. The conditions for the admission into certain course are provided in individual curricula. Their percentage in the programme amounts to 50 ECTS credits or 16.7%.

According to point 6 of Criteria for credit evaluation of study programmes, students can transfer no less than 10 ECTS credits gathered within programme obligations or optional units from one study programme to another. A part of study obligations can be fulfilled within international student exchange programmes.

11. Presentation of individual courses

1. Mathematics (7 ECTS credits):

2. Physics (8 ECTS credits):

3. General and Inorganic Chemistry (8 ECTS credits):

4. Pharmaceutical Biology with Genetics (7 ECTS credits):
5. Anatomy and Histology (4 ECTS credits):
Anatomy of the digestive tract, respiratory tract, urinary tract, cardiovascular system, endocrine glands, musculoskeletal apparatus, nervous system. Tissue histology: epithelial, glandular, connective and support tissue, cartilage, bone and muscle. Histology of the digestive tract, respiratory tract, urinary tract, blood, cardiovascular system, lymphatic organs, endocrine glands, nervous system, skin and reproductive organs.

6. Pharmaceutical Chemistry I (6 ECTS credits):

7. Pharmaceutical Informatics (5 ECTS credits):
Healthcare information systems: the elements of information systems in healthcare settings, biomedical databases, bibliography search with the use of online tools. Research design with statistical analysis and interpretation of results: basic principles of statistics and sampling, descriptive statistics, probability theory, statistical inference, z-test, t-test, F-test, variance analysis, multiple comparisons, regression and correlation.

8. Introduction to Pharmacy (3 ECTS credits):

9. Analytical Chemistry (8 ECTS credits):

10. Microbiology (4 ECTS credits):

11. Organic Chemistry (9 ECTS credits):

12. Physical Chemistry (6 ECTS credits):
equilibrium. Electrochemistry.

13. Physiology (6 ECTS credits):

14. Pharmaceutical Technology 1 (20 ECTS credits):

15. Physical Pharmacy (5 ECTS credits):

16. Pharmaceutical Chemistry II (7 ECTS credits):
Classification of active substances on the basis of their functional groups: carbohydrates, alcohols, ethers, acids, esters, aldehydes, ketones, aromates, amines, amides, heterocyclic systems. The relationship between structure and function: vitamins, hormones, chemotherapeutic agents, anti-parasitic agents, anti-mycotic agents, disinfectants and antiseptics, local and general anaesthetics, prostaglandins and leukotrienes, indole alkaloids, contrast agents and radiopharmaceuticals.

17. Pharmaceutical Biochemistry (7 ECTS credits):

18. Instrumental Pharmaceutical Analysis (4 ECTS credits):

19. Social Pharmacy (4 ECTS credits):

20. Pathologic Physiology (6 ECTS credits):
Disease-inducing mechanisms. Causes (etiology) and mechanisms (pathogenesis) of the appearance and development of various pathological processes and diseases.
Biochemical basis of disease processes.

21. Pharmacognosy I (9 ECTS credits):

22. Pharmaceutical Chemistry 3 (20 ECTS credits):

23. Pharmaceutical Technology 2 (8 ECTS credits):

24. Pharmacognosy II (4 ECTS credits):

25. Pharmacology (5 ECTS credits):

26. Biopharmaceutics with Pharmacokinetics (9 ECTS credits):

27. Pharmaceutical Biotechnology (6 ECTS credits):
28. Design and Synthesis of Active Substances (5 ECTS credits):

29. Toxicological Chemistry (5 ECTS credits):

30. Stability of Medicinals (5 ECTS credits):

31. Clinical Chemistry (7 ECTS credits):

32. Analysis and Control of Medicinals (8 ECTS credits):

33. Clinical Pharmacy (5 ECTS credits):

34. Industrial Pharmacy (5 ECTS credits):
35. Biopharmaceutical Evaluation of Pharmaceutical Forms (5 ECTS credits):

36. Biochemistry of Cancer Development and Progression (5 ECTS credits):

37. Hospital Pharmacy (5 ECTS credits):

38. Eutomers (5 ECTS credits):


40. Pharmaceutical Engineering (5 ECTS credits):

41. Pharmaceutical Marketing and Management (5 ECTS credits):
Marketing: market segmentation, target market selection, supply positioning, marketing forms, micro and macro marketing environment, marketing network, the concept of medicinal product's life cycle, marketing strategies, marketing research, marketing plan, communication network, pharmaceutical marketing. Management in pharmaceutical industry: innovative drug development management, generic drug development management. Pharmacy management: public pharmacy, hospital pharmacy.

42. Pharmacoeconomics (5 ECTS credits):

43. Pharmacogenomics and Genetic Medicines (5 ECTS credits):

44. Phytopharmaceuticals (5 ECTS credits):
Phytopharmaceuticals and phytotherapy. Overview of plant drugs based on pharmacodynamic groups. Phytopharmaceuticals for: cardiovascular, gastrointestinal, respiratory and urogenital tract as well as the nervous system. Adaptogenic phytopharmaceuticals. Immunostimulatory phytopharmaceuticals.

45. Immunology (5 ECTS credits):

46. Selected Topics in Pharmaceutical Biotechnology (5 ECTS credits):

47. Selected Topics in Clinical Biochemistry (5 ECTS credits):

48. Selected Methods of Pharmaceutical Analysis (5 ECTS credits):

49. Quality of Medicinals (5 ECTS credits):
qualification.

50. *Cosmetology (5 ECTS credits)*:

51. *Nutritional Supplements (5 ECTS credits)*:

52. *Psychotropic Substances and Abuse of Medicinal Products (5 ECTS credits)*:

53. *The Use of Genetic and Cellular Testing in Biomedicine and Pharmacy (5 ECTS credits)*:

54. *Medicinal Products of Alternative Medicine (5 ECTS credits)*:

55. *Instrumental Analytical Methods in Pharmacy (5 ECTS credits)*:
Spectroscopic and resonance methods (Upgrade of theoretical principles with practical use in pharmaceutical analytics. Selected methods of NMR, IR, EPR, fluorescence spectroscopy, mass spectrometry, capillary electrophoresis, complex analytical systems: LC-MS, GC-MS.

56. *Research Methods in Social Pharmacy (5 ECTS credits)*:
Pharmacoepidemiology, pharmacovigilance, evidence based medicine, evidence based pharmacy practice, research of structure, processes and health outcomes, problems connected with drug use, qualitative methods of research: questionnaire, interview, opinion poll, focus groups.

57. *Practical Training (30 ECTS credits)*:
Training to become a medical professional. Professional and legislative practice: code of ethics, clinical surveillance, personal professional development, dispensing and supply of medicinal products, conditions for managing pharmacies, legislation on pharmaceutical activity, health and safety at work, protection of personal information and medical records. Clinical and pharmaceutical practice: mechanisms of action and usage of medicinal
products, adverse effects, contraindications, interactions, health promotion and disease prevention, good dispensing practice, labelling. Systems and procedures: financing of health services, the rules on and limitation of prescription practices, procedures in primary and secondary healthcare. Hospital pharmacy. Clinical pharmacy. Clinical diagnostics.

Master's thesis is an independent research project. Each student selects a topic and a supervising faculty member. Contents overview: definition of the central question, the aim of the study, scientific approach and methods. Understanding of the mentoring process. Use and overview of available bibliography data. Understanding of the central question. Basic approaches, methods and experimental techniques. Independent experimental work with adequate recording. Analysis of results, making partial decisions and their testing. Written submission of the scientific work. Research as a creative interdisciplinary teamwork.

59. Master's Thesis Defence (5 ECTS credits)
The student presents his/her own research project and demonstrates a broader understanding of the selected research topic. The master's thesis structure contains all elements of a scientific article (title, contents, summary, list of abbreviations, introduction, aim of the study with a working hypothesis, materials and methods, results, discussion, conclusions, bibliography). The thesis defence is marked by a clearly presented research topic, methods used, results obtained and the evaluation of the results. Master exam's aim is to test the student's ability to synthesize knowledge of a broader research area.