



ACADEMIC STANDARD

FOR THE DISCIPLINE „PHARMACEUTICAL CALCULATIONS”

1. Aim

The main objective of the course „Pharmaceutical calculations“ is to introduce students to the quantitative and qualitative principles that cover the calculations performed by pharmacists in various practical areas. This course covers the basic principles and techniques that are applied in pharmaceutical calculations and solving problems applicable to pharmaceutical practice. The scope of the course includes primarily calculations related to drug prescriptions.

The discipline develops a solid foundation for the principles of calculation and includes operations and application of ratios, proportions, percentages, etc. in the routine work of pharmacies (drug preparation, dosage, filling, pricing, inventory control, calculation of doses for parenteral forms, dosage calculations based on weight and surface area, rate of intravenous infusion, dilutions, substitutions, etc.).

This objective correlates with the university mission and vision; the place of the discipline within the overall curriculum in terms of discipline’s importance and timing in the curriculum.

2. Learning

The topics and the hours for lectures and practical exercises are posted on the university website. Learning content is organized chronologically in such a way that each consecutive lesson and related practical classes use previously studied topics and terms.

The program of the lectures and the seminars includes the following topics:

- Introduction to pharmaceutical calculations.
- Systems of units. Pharmaceutical measuring units.
- Density, displacement volumes, and displacement values.
- Concentrations.
- Dilutions.
- Dosage forms.
- Dose calculations.
- Calculations involving molecular weights. Parenteral solutions and isotonicity.
- Selected calculations in modern pharmaceutical technology.

3. Prerequisites

The students must have obtained basic knowledge in Inorganic chemistry, Organic chemistry, Analytical chemistry, Physicochemistry and Mathematics in order to begin and successfully complete the Pharmaceutical calculations course.

4. Academic resources

The academic staff of the discipline includes 1 professor and 2 assistant professors – 3 of them holding an educational and scientific degree „Doctor (PhD)“ and a specialization in Pharmaceutical technology with Biopharmacy.

5. Material resources

For the discipline „Pharmaceutical calculations“ the department has laboratories, equipped with the necessary computer system.

6. Lectures

Lectures are prepared and given in the form of multimedia presentations. Lectures' content and format are chosen by the leading lecturer.

7. Practical classes

Practical classes are held separately for each student group. Methodological guidelines are provided for every particular practical task within an exercise. Each student works individually and prepares the assigned for the particular exercise. Tasks may also require working in groups. During the training, examination is carried out, which check student's self-preparation, knowledge and results (obtained knowledge and skills) of the particular exercise.

8. Information resources. Basic literature. Websites

A list of the main reference literature is presented, with a priority being given to the available resources that are published. Internet resources are also recommended, where appropriate materials for the student's preparation can be found.

1. Howard C. Ansel; Mitchil J. Stoklosa, Pharmaceutical Calculations, 13th ed. 2010, ISBN 978-1-58255-837-0
2. Savva Michalakis, Pharmaceutical Calculations: a conceptual approach, Springer, 2019, ISBN 978-3-030-20334-4

9. Control assignments

Students are occupied dynamically and intensively during the semester. It is assumed that the way in which knowledge and skills are acquired is an important factor in their depth, durability and applicability. Ongoing control of the students' progress is performed through oral examination.

After completing the course students must have acquired the following knowledge and skills:

- demonstrate competence in performing pharmaceutical calculations to ensure accuracy and precision and minimize the risk of errors.

- interpret and apply commonly used abbreviations and symbols used in prescriptions to perform correct calculations.

10. Individual work and commitment of the students

The individual work of the students must be led by the assistant professors, who have to guide them in the literary sources, and methods for learning, as well.

11. Collaboration between students and the teaching staff

This collaboration consists of:

- The teacher's commitment to the students' preparation on current difficulties in learning the subject and the opportunities with an individual learning program.
- Use of meeting hours for consultations.
- Including students in teams for scientific tasks, research projects, etc.

12. Exams

Ongoing assessments provided on the curriculum of the specialty are given for:

1. Student's results in practical classes, individual tasks, work of the student with the lecturer in scientific research etc.

2. At least one oral examination.

13. Standards of evaluation:

The final grade in the discipline „Pharmaceutical calculations” is determined on the basis of two main elements:

The first one includes the assessment of the student's academic activity throughout the semester. It includes all the assessments from the ongoing control – oral examinations.

The second one includes the theoretical exam grade. The exam regulations are designed to minimize the possibility of manipulating the results.

Clear standards for evaluation are developed for the discipline.

The level of reproduction and use of knowledge by students is defined as information-reproductive, technological-productive, problem-productive, innovative-creative. Based on the above, the standards for evaluation are developed as follows:

Poor (2) – for showing scant knowledge and gross errors that cannot be the basis for the next levels of training;

Satisfactory (3) – simple reproduction and key knowledge of the subject; not ready for analysis of the knowledge gained; poor language culture with a lot of mistakes;

Good (4) – for developed additional knowledge, good knowledge of the subject; but without being able to develop learning to analysis; comparatively good language culture; but with inaccuracies in the use of different concepts and terms;

Very good (5) – for well-developed key and additional knowledge, thinking and understanding the subject, good skills to apply the knowledge, adequate use of scientific concepts from the studied field, good language culture.

Excellent (6) – for shown individual and logical thinking, additional knowledge and skills, for excellent knowledge of the subject, creativity, interpretation of the concepts, skills to solve complex tasks and right argumentation for the decisions taken, accuracy and rich language culture of the presentation

When starting classes, students should be familiar with the evaluation standards, the procedures for conducting ongoing control, and the opportunities to receive feedback on their progress during the semester.

14. Final grade formation

Forms of evaluation:

Ongoing control – oral examination during the practical exercises;

Final control – written examination (semester exam).

Formation of a final grade:

A final grade is formed as a result of the the examination during the semester and the final exam at the end of the semester.

The Final Grade (FG) of the acquired knowledge in the course is rounded to a whole unit and is derived from the equation:

$$FG = 0.2 OG + 0.8 EG$$

where: OG - ongoing grade from the control throughout the semester; and – EG - exam grade (must not be „Poor 2“).

If EG is „Poor 2“, the final grade is „Poor 2“.

The final grade is rounded to a whole unit and is written in the documentation.

Semester examination:

The semester exam includes a written examination and an oral examination.

Aspects of the evaluation:

The system for controlling the preparation of the students during the semester includes their presence at lectures and practical exercises, questions on the topic of the exercise. At the end of each exercise, the acquired knowledge is monitored and a control is performed by discussing the exercise. The practical exercises are performed by the students independently or in a team. The grade for each student is formed on the basis of his/her theoretical preparation for the developed exercise and the accomplishment of the assigned tasks. The semester grade is formed through a written examination and an oral examination.

15. Documentation, result storage and control of the assessment procedure

- Assessed students have the right and obligation to be informed about the assessment regulation procedures and results, and to make claims and complaints in case of violation of the current rules.

- The students' rights, in accordance with the meaning of the preceding paragraph, are guaranteed provided that technical omissions or errors have occurred (e.g. in the calculation or assessment) or that there are reasons for a vast contrast between the knowledge, skills and competencies the student have actually shown and his/her final grade.

- Corrections of the grades in cases regarding the provisions of the previous paragraph shall be made in the Student Book, the examination report or the account in the General Registry only by the leader of the discipline.

- Potential disagreements and claims on the part of the students should be directed in a written form to the assessment team, whose responsibility is to provide an argued answer by the end of the next working day.

- Revealed and proven cases of serious violation of the rights of the student in terms of assessing his / her knowledge, skills and competences are directed with a written complaint to the Vice-rector for quality and accreditation.

Exam materials are preserved and the students are informed about them. The period during which the students have access to the examination tests and results is up to 3 working days after the examination.

This requirement shall be in accordance with the Higher Education Act Art. 56. par. 1, „The members of the academic board shall be obliged to develop and announce in an appropriate way a description of the provided by them course of lectures, including number, titles and sequence of topics of the curriculum, recommended literature, method of evaluation of the mark and form of checking of knowledge and skills.“.

The Academic Standard for the discipline „Technology of medical cosmetics” was approved by the Department council with a Protocol № 10/28.10.2025.