# SYLLABUS

**1. Course title:**

Pharmaceutical chemistry I

**2. Code:**

**3. Cycle of study:**

1

**4. ECTS credits:**

8

**5. Type of course:**

(•) Mandatory ( ) Elective

**6. Prerequisites:**

NONE

**7. Class restrictions:**

NONE

**8. Duration / semester:**

1 5

**9. Weekly contact hours:**

9.1. Lectures: 4

9.2. Seminars: 0

9.3. Laboratory/Practice classes: 3

**10. Faculty:**

Faculty of pharmacy

**11. Department/study program:**

Pharmacy (Integrated study I and II cycle)

**12. Lecturer:**

Dr.sc. Amra Džambić, assistant professor

**13. Lecturer's e-mail:**

amra.dzambic@untz.ba

**14. Web site:**

www.frmf.untz.ba

**15. Course aims:**

Students will acquire basic knowledge in pharmaceutical chemistry, which they will apply to mastering pharmaceutical chemistry II and other professional subjects.
The student will acquire basic knowledge in the physicochemical properties of pharmacologically active molecules, the reactivity of their functional groups, the mechanisms of drug action, the structure-activity relationship QSAR, chemical drug interactions, drug-receptor interactions, drug metabolism reactions (in vivo and in vitro).

**16. Learning outcomes:**

- acquiring knowledge about the physical and chemical properties of pharmacologically active molecules,
- acquiring knowledge about the reactivity of functional groups, degradation reactions and chemical stability of molecules
- understanding the basic mechanisms of drug action
- ability to analyze the relationship between chemical structure and properties, action and selectivity of substances for pharmaceutical use
- understanding the chemical aspects of drug metabolism
- understanding and analysis of the basic mechanisms of action of drugs from the studied pharmacotherapeutic groups

**17. Course content:**

Introduction to pharmaceutical chemistry, Research and development of new drugs, Relationship between molecular structure and biological activity, Physicochemical properties of drugs, Fncional groups, Solubility, pKa, Lipophilicity, chemical stability. Stereochemistry and biological activity, isosteres and bioisosteres, functional group modifications, prodrug. Metabolism, phase I, Cyt P 450, Oxidation, reduction reactions, second phase of metabolism, first-pass metabolism, extrahepatic metabolism. Disinfectants and antiseptics, Iron preparations in the treatment of anemia, Calcium preparations, Acidolytics and alkalolytics, Cytostatics, Cytostatic antimetabolites; Cytostatics acting on structural proteins; Cytostatics - hormone therapy and drugs related to hormones; Cytostatics - inhibitors of various enzymes; Antiseptics and disinfectants, Antivirals, Antibacterial drugs (synthetic antibacterial drugs and antibiotics), Quinolones and fluoroquinolones; Nitro-compounds; Sulfonamides; Methenamine, Antibiotics that inhibit the cell wall synthesis.

**18. Learning methods:**

Oral lectures - mandatory attendance
Interactive teaching - active participation in lectures, revision of material, solving specific problems and cases, simulation of the exam.
Computer exercises - drawing structures, searching the Merck index, calculating the physical and chemical parameters of substances for pharmaceutical use.
Experimental exercises - proof reactions for individual FGs

**19. Assessment methods:**

Laboratory exercises:
Laboratory exercises: Auditory exercises: physical-chemical properties of functional groups, heterocycles, metabolism and metabolic stability of drugs, bioisosteres, prodrugs, lipophilicity.Practical exercises: reagents and preparation, identification reactions for functional groups of drugs, lipophilicity, theoretical and practical calculation of Log P.
Test – Written and/or oral exam
First partial exam: assessment of knowledge in physical-chemical properties of drug functional groups, stability and degradation reactions, metabolism and metabolic stability of drugs, quantitative structure–activity relationships (QSAR), bioisosteres, prodrugs, lipophilicity. First partial exam: 21–40 points.
Second partial exam: assessment of knowledge in the following units: disinfectants, antiseptics, acidotics and alkalotics, iron and calcium preparations, cytostatics, antibiotics, antivirals, antiparasitics, antituberculars, antimycotics, antiparasitics, steroid hormones, thyroxine, thireostatics, insulin, oral antidiabetics; vitamins and coenzymes.Second partial exam: 21–40 points.

**20. Assessment components:**

The exam grade is based on the total number of points that the student has earned by fulfilling the pre-exam requirements and taking the exam, it contains a maximum of 100 points, and is determined according to the following scoring scale: Colloquium I: 6–10
Colloquium II: 3–5
Test I: 21–40
Test II: 21–40
Total:
10 (A) - 95-100 points,
9 (B) - 85-94 points,
8 (C) - 75-84 points,
7 (D) - 65-74 points;
6 (E) - 55-64 points,
5 (F) - less than 55 points.

**21. Required reading list:**

Farmaceutska kemija 1 – D. Završnik, S. Muratović, S. Špiritović- Halilović, E. Veljović, A. Osmanović, M. Bojić, M. Medić-Šarić; Uvod u hemiju lijekova – Z. Vujić, M. Smajić, J. Brborić, N. Mulavdić. Vujić Z.: Odabrana poglavlja farmaceutske hemije

**22. Web sources:**

William Foye, Thomas Lemke, David Williams; Principles of Medicinal Chemistry; , Willams & Wilkins, Baltimore, USA
Textbook of Organic medicinal chemistry

**23. Applicable starting from the academic year:**

2023/2024.

**24. Adopted in the Faculty/Academy session:**

17.11.2025.