SYLLABUS

1. Course title:

PHYSICS

2. Code:

3. Cycle of study:

1

4. ECTS credits:

5

5. Type of course:

(•) Mandatory ( ) Elective

6. Prerequisites:

None

7. Class restrictions:

None

8. Duration / semester:

1 2

9. Weekly contact hours:

9.1. Lectures: 3

9.2. Seminars: 0

9.3. Laboratory/Practice classes: 1

10. Faculty:

Faculty of Pharmacy

11. Department/study program:

Pharmacy (integrated first and second cycle of study)

12. Lecturer:

dr. sci. Amira Kasumović, associate professor

13. Lecturer's e-mail:

amira.kasumovic@untz.ba

14. Web site:

www.frmf.untz.ba

15. Course aims:

Adopt the basic knowledge in selected field of physics, fundamental laws and methodology of physics in order to understand the new scientific achievements in modern pharmacy.
Adopt the basic concepts of physics of living matter.
Acquire knowledge of the principles, procedures and instrumentation in modern physics that are applicable in pharmacy.
Carrying out verifications of the selected physical laws by laboratory work.

16. Learning outcomes:

Student will be able to formulate basic physical laws and phenomena, to understand the concepts of modern theory and experimental achievements in physics that are used in processes, procedures and methods in modern pharmacy.
Students will acquire the skills needed for conducting the physics experiments, for measurement data analyze using analytical and graphical methods, and for writing the report about experiment and measurement data.

17. Course content:

Basic concepts of physical measurements. Measurement data analyses. Basic concepts of kinematics. Motion of physical objects.Newton's laws. Impulse. The law of conservation of linear momentum. Energy. Pressure in liquids. Buoyancy. Surface tension. Capillarity. The continuity equation. Bernoulli's equation. Poiseuille's law. Stokes' law. Heat and thermodynamics. Ideal gas processes. The laws of thermodynamics. Carnot cycle. Entropy. Thermodynamics state functions. Thermodynamic equilibrium. Phase transitions. Electric charge. Coulomb's law. Electric field. Dipole. Polarization of dielectrics. Electric current. Ohm's law. Electric current in electrolytes. The nature and sources of light. Geometrical optics. Mirrors and lenses. Optical instruments. Interference, diffraction and polarization of light. Optical activity of matter. Absorption and scattering of light. Atomic models. Wave-particle duality. X-rays. QM model of atom. Schrödinger equation. Quantization of electronic angular momentum. Bohr magneton. Spin of an electron. Total angular momentum:one electron and multi-electron atoms. Pauli principle. Physics of molecules. Molecules in electric and magnetic fields. The types of molecular bonds. Molecular spectra. Luminescence. Basic properties of atomic nucleus. Nuclear binding energy. Radioactive decay. Ionizing radiation. UV radiation. Interaction of radiation with matter. Radiation detection and dosimetry. Quantities and units in radiation dosimetry. Radiation protection.

18. Learning methods:

Classes will be realized through lectures and exercises using the following teaching methods: oral presentation, discussion, active learning, self-learning, demonstration, practical work, laboratory work, consultations.

19. Assessment methods:

Assessment of student knowledge is performed with the following methods: tests - partial exams, laboratory exam and final exam.
During the semester two tests - partial exams are organized (7th and 14th week of semester). Each partial exam is valuated with a maximum of 20 points. These tests are done in written form and include questions related to a certain part of the matter covered before/between the tests. In order to pass the partial exams, student needs to achieve a minimum of 14 points on both tests together. As part of the pre-exam obligations student takes a written exam from the laboratory work, where student can obtain a maximum of 10 points. In case that student does not pass the course in current academic year obtained points from laboratory exam will be transferred to the following academic year, except if student requests to take this exam again in next year. In order to get the professor signature in index student must complete all laboratory exercises, according to the work plan. The Final exam of the course is done in written form and consists of questions covering the part of the matter that was not included at the partial exams. Maximum points for the final exam are 50 points. In regular exam and re-exam periods student takes the final exam and unpassed part of the exam. In order to pass the course, student must obtain a minimum of 55 points.

20. Assessment components:

Final grade is based on the total score of points that students achieved on pre-exam obligations and on final exam.
Final grade is determined according to the following scale and conditions:

	maximum points	Grading scale (according to the achieved points)
Partial exam I	20	0-54 points - grade 5 (five)
Partial exam II	20	55-64 points - grade 6 (six)
Lab exam	10	65-74 points - grade 7 (seven)
Final exam	50	75-84 points - grade 8 (eight)
Total	100	85-94 points - grade 9 (nine)
		95-100 points - grade 10 (ten)

21. Required reading list:

1. Kasumović, A., Kasić, A., Osnove fizike I za studente hemije, OFF-SET Tuzla, 2016.
2. Kasić A., Kasumović, A., Osnove fizike II za studente hemije, OFF-SET Tuzla, 2023.
3. Adrović, F., Fizika - odabrana poglavlja iz metrologije, mehanike, termodinamike i elektromagnetizma, Copygraf Tuzla, Tuzla, 2006.
4. Adrović, F., Fizika - odabrana poglavlja iz optike, atomske i nuklearne fizike, Copygraf Tuzla, Tuzla, 2006.

22. Web sources:

23. Applicable starting from the academic year:

2023/2024

24. Adopted in the Faculty/Academy session:

17.11.2025.