HUMAN PHYSIOLOGY AND BIOPHYSICS DEPARTEMENT

Common requirements for the 2nd cycle laboratory works, Pharmacy Faculty,

2nd semester (2025-2026 academic year)

Each student must have in advance, written in a special notebook for practical works, the following:

1) Number of the current practical work and its subject;
2) Devices and equipment used in the practical work;
3) Important definitions and working formulas. The explanation of the quantities and the unit of measurements (SI);
4) Scheme (flow-chart) of the laboratory installation for the current practical work;
5) Table for recording the results of the measurements and calculus.

ANNOTATION:

- The required formula and figures (schemes) for each laboratory separately are indicated in the common requirements.
- After performing the laboratory work, the values of the studied measurements, the mean values, the errors and the conclusions must be written in the laboratory notebook.
- In order to better understand the material of the laboratory work and then to successfully complete the work, the student is encouraged to repeat and to know the answer to the questions for the repetition. The ignorance of the suggested material for repetition will be negatively appreciated.
- According to the questions from the paper and the questions for repetition, computer tests are performed in order to evaluate the achieved knowledge.

REFERENCIES:

1. „Practical papers of medical biophysics", D. Croitoru, V. Vovc, N. Gubceac, V. Tonu, I. Cojocaru, 2015
2. „Medical Biophysics, Lectures, exercises" , D. Croitoru, 2014.

LABORATORY No.11

SUBJECT: DETERMINATION OF THE CONCENTRATION OF A SOLUTION BY THE REFRACTIVE METHOD

Is performed in the Laboratory No. 3

QUESTIONS FOR WORKING

1. Refractometry. Refraction phenomenon. Refractive index definition and formula.
2. Abbe refractometer. Components. Principle of working.
3. Determination of concentration of a solute in solution using the Abbe's refractometer. Working mode.
4. The importance of refractometry in medical practice

LABORATORY No.9

SUBJECT: DETERMINATION OF CONCENTRATION OF OPTICAL ACTIVE SUBSTANCES

Is performed in the Laboratory **No. 4**

QUESTIONS FOR WORKING

1. Electromagnetic radiation. Electromagnetic spectrum. Unpolarized and plane polarized light.
2. Polarization of light by use of a polaroid filter.
3. Polarization of light by reflection and by refraction.
4. Polarization by scattering.
5. Determination of the sugar concentration in a solution by polarimeter.
6. The importance of polarized light in biological research and medical practice.

LABORATORY No.10

SUBJECT: STUDY OF COLORED SOLUTION BY PHTOCOLORIMETRIC METHOD

Is performed in the Laboratory No. 5

QUESTIONS FOR WORKING

1. Absorption of light. Bouguer -Lambert law.
2. The Beer's law. The Bouguer-Lambert-Beer's law.
3. Optical transmission coefficient and extinction of the solution.
4. The scheme and working principles of a photo-colorimeter. The way of operation with the photo-colorimeter.
5. The importance of photo-colorimetric methods in medical practice.

LABORATORY WORK № 2.

SUBJECT: ULTRASOUNDS EFFECTS.

It is performed in the laboratory No. 3

QUESTIONS FOR WORKING

1. Sound. The spectral diagram of the sound.
2. Ultrasound. Wave properties and characteristics (frequency, wavelength).
3. Ultrasound production based on the invers piezoelectric effect. The piezoelectric transducer.
4. Ultrasound production based on the magnetostrictive effect. The magnetostrictive transducer.
5. Ultrasound detection based on the direct piezoelectric effect.
6. Physical effects of ultrasound.
7. Biological effects of ultrasounds.
8. Doppler's effect. Doppler's effect applications in medicine.
9. Determination of the blood velocity by Doppler's effect.
10. Applications of the ultrasounds in medicine:
    a) the ultrasonic wave nebulizer (inhaler)
    b) emulsion formation by ultrasound
    c) ultrasonic cleaners etc.

LABORATORY No.12

SUBJECT: DETERMINATION OF FOCAL LENGTH OF CONVERGING AND DIVERGING LENS

Is performed in the Laboratory No. 4

QUESTIONS FOR WORKING

1. Lens definition. Types of Lenses. Lenses characteristics.
2. Converging and diverging lens image formation.
3. Lens Equation and the Magnification Equation. Compound lenses formula.
4. Determination of focal length for a converging and for a diverging lens. Working mode.
5. The importance of lenses medical practice

LABORATORY No.13

SUBJECT: OPTICAL MICROSCOPY

Is performed in the Laboratory No. 5

QUESTIONS FOR WORKING

1. Components of a microscope. Image formation in the optical microscope.
2. Microscopy Basics. Magnification, Numerical Aperture and Resolution.
3. Determination of the microscope magnification. Working mode.
4. Determination of the small object sizes (red blood cells). Working mode.
5. Applications of optical microscopy in medical practice.