UNIVERSITY OF WARMIA AND MAZURY IN OLSZTYN

Faculty of Medicine

Course title: BIOPHYSICS

ECTS credit allocation (and other scores): 5

Semester: autumn

Level of study: ISCED-7 - second-cycle programmes (EQF-7)

Branch of science: Natural sciences

Language: English

Number of hours per semester: 55

Course coordinator/ Department and e-mail: dr hab. Krzysztof Bryl, prof. UWM, Department of Physics and Biophysics, Krzysztof.bryl@uwm.edu.pl

Type of classes: classes and lectures

Substantive content

CLASSES: Ionizing radiation. Determination of linear and mass absorption coefficient of gamma rays. Electrocardiography. Determination of the heart's electrical vector. Measurement of fluid viscosity. The sense of hearing. Measures of auditory threshold. Ultrasonography. Determination of blood pressure. Modeling the electrical properties of biological objects. Measurement of absorption spectra and the concentration of riboflavin in aqueous solutions using a spectrophotometry and fluorescence. Optical rotation of solutions. Measurement of the concentration of optically active substances by using a polarimeter. Determination of changes in the entropy of the system.

LECTURES: 1. MECHANICS OF THE BODY1.1 Skeleton, forces, and body stability,1.2 Muscles and the dynamics of body movement,1.3 Physics of body crashing, 2. ENERGY HOUSEHOLD OF THE BODY, 2.1 Energy balance in the body, 2.2 Energy consumption of the body, 2.3 Heat losses of the body, 3. PRESSURE SYSTEM OF THE BODY, 3.1 Physics of breathing, 3.2 Physics of the cardiovascular system, 4. ACOUSTICS OF THE BODY, 4.1 Nature and characteristics of sound, 4.2 Production of speech, 4.3 Physics of the eye, 6. ELECTRICAL SYSTEM OF THE BODY, 6.1 Physics of the nervous system, 6.2 Electrical signals and information transfer.

Learning purpose: Transfer of knowlege about physical laws and phenomenas with particular application in medicine.

On completion of the study programme the graduate will gain:

Knowledge: Understanding physical phenomena and processes and their connection with functioning of living organisms.

Skills: Can perform simple observations in open area or in the laboratory.

Social Competencies: Is able to perform any roule in the team.

Basic literature: Halliday D., John Wiley & Sons, Fundamentals of Physics Extended 8ed, 2008

Supplementary literature: R. K. Hobbie, B. J. Roth, Springer, Intermediate Physics for Medicine and Biology 4ed, 2007

The allocated number of ECTS points consists of:

Contact hours with an academic teacher: 60

Student's independent work: 65