UNIVERSITY OF WARMIA AND MAZURY IN OLSZTYN

Faculty of Food Sciences

Course title: PHYSICS

ECTS credit allocation (and other scores): 5

Semester: autumn

Level of study: ISCED-6 - first-cycle programmes (EQF-6)

Branch of science: Natural sciences

Language: English

Number of hours per semester: 60

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

Type of classes: classes and lectures

Substantive content

CLASSES: First (starting) laboratory contains introduction, description of different instruments, measurement methodology, practical assessment of the accuracy of the results obtained. Students perform 8 experiments from the set given. Experiments include: heat energy transport, measurement of liquid and solid density, air humidity, surface tension and liquid viscosity, determination of specific heat, evaporation heat, melting heat; measurement of physical quantities of direct and alternating current; temperature measurement methods; light scattering in the material medium; absorption and emission spectral analysis of the interaction of gamma radiation with matter.

LECTURES: Physics as a natural science. Interactions in nature. Newton's principles of dynamics. The principle of energy and momentum conservation in mechanics. Matter structure. Fundamentals of hydrostatics and hydrodynamics. Viscosity and surface tension of liquids. Molecular theory of the structure of matter. Diffusion, thermal diffusion, osmosis. Thermodynamic parameters and functions. Phase transitions. Principles of thermodynamics. Transfer of heat energy. Electric current. Spectroscopy and its applications. Nuclear physics. Atomic nucleus. Radioactive decay, ionizing radiation and its interaction with matter.

Learning purpose: (Understanding the physical phenomena on which operation of devices and processes used in food technology are based.

On completion of the study programme the graduate will gain:

Knowledge: Knows and understands the basic physical phenomena on which food technology is based.

Skills: Performs basic measurements and experiments using appropriate research methods and tools.

Social Competencies: Able to work in a team of two, assuming different roles in conducting the experiment and preparing the report.

Basic literature: Halliday & Resnick Principles of Physics International Student Version, Jearl Walker, John Wiley & Sons, Ninth Edition, 2011.

Supplementary literature: Sears and Zemansky's University Physics with Modern Physics, 13th Edition, Addison-Wesley, 2012.

The allocated number of ECTS points consists of:

Contact hours with an academic teacher: 64 h

Student's independent work: 61 h