Module name	**Microbiology – a basic course**
Module code	**B-BT.022E**
ISCED code	0511: Biology
Study cycle	I°
Semester	winter
Responsible for this module	dr hab. Iwona Komaniecka, dr hab. Sylwia Wdowiak-Wróbel, dr hab. Marta Palusińska-Szysz, dr hab. Anna Turska-Szewczuk Department of Genetics and Microbiology email: iwona.komaniecka@poczta.umcs.lublin.pl; s.wdowiak@poczta.umcs.lublin.pl; marta.szysz@hektor.umcs.lublin.pl; aturska@hektor.umcs.lublin.pl
Language of instruction	English
Website	-
Prerequisites	Basic knowledge of biology
ECTS	6.5
ECTS points hour equivalents	Contact hours (work with an academic teacher) – 75 - lectures: 30 - laboratories: 45 Non-contact hours (students' own work) – 90 - preparation for the exam: 30 - preparation for labs: 30 - preparation of reports from laboratory exercises:15 - literature study: 15 **Total number of ECTS points for the module – 6.5**
Learning outcomes verification methods	presence (90 %) and activity at laboratories, written tests at laboratories (after every 3 meetings), presence at lectures (min. 50 %) final test written at the end of lectures
Course full description	**Lectures**: Introduction to microbiology. History of microbiology. Evolution of life on the Earth. Prokaryotic and eukaryotic microorganisms. Prokaryotic cell structure and functions. Endospores and other resting forms of bacteria. Microbial growth and development. Control of microorganism growth by physical and chemical agents. Microbial nutrition: requirements for carbon, nitrogen, iron, phosphorus, sulfur, oxygen, hydrogen. Bacterial metabolism: aerobic and anaerobic respirations, fermentations, chemosynthesis, photosynthesis. Interactions between microorganisms and other organisms in the environment. Bacterial viruses: structure, lytic and lysogenic cycles. Economic and environmental importance of bacteria. **Laboratories**: 1. Laboratory operations and safety rules.

	2. Microscopy - Gram staining, acid-fast staining, endospore staining, negative staining. 3. Transfer, culture and isolation techniques of bacteria; aseptic techniques; inoculation of media; tube transfers; streak plate and spread plate techniques; bacteria titration. 4. Colony and cellular morphology; agar plate colonial characteristic and agar slant growth. 5. Media for bacterial cultures. Procedures of sterilization and disinfection 6. Bacteriophages isolation, detection, testing for plaque forming units. 7. Physical and chemical factors affecting microbial growth. Effect of temperature, osmotic pressure, pH value, UV exposure. 8. Antibiotics and phytoncides. 9. Microbial metabolism – fermentation, aerobic and anaerobic respiration; biochemical assays. 10. Microbiology of milk and dairy products. 11. Microbe interactions (microbe-microbe, plant - microbe). 12. Dermatophytes and pathogenic yeasts.
Bibliography	1. Microbiology Principles and Explorations. J.G. Black 8th edition. 2. Prescott's Microbiology, Willey Sherwood Woolverton, 7th and 8th edition.
Learning outcomes	**KNOWLEDGE** The student has knowledge on: the microbial cell structure and function, microbial nutrition and growth, microbial metabolism, antimicrobial drug used against different pathogens, bacterial viruses and bacteriophage therapy in medicine, microbial interactions in environment, the role of microorganisms in the natural environment and the potential uses of their products in biotechnology. **SKILLS** The student is able to: describe the structure and function of the major components of the bacterial cell, explain metabolic strategies of bacterial cell and their impact on the environment, describe the role of microorganisms in the natural environment and the human economy, use appropriate methods of microorganisms identification, apply the appropriate physical and chemical agents to combat microorganisms, define the benefits and risks associated with the metabolic processes of microorganisms, put hypotheses. **SOCIAL COMPETENCES** The student is able to: perceive the importance of learning science, participate in different kinds of

	learning activities, assess the importance of science in society and in its personal live, improve the professional competence by deepening the knowledge and practical skills.
Practice	-
Teaching methods	lecture with presentation, laboratory classes, experience, observations, discussion