UNIVERSITY
OF WARMIA AND MAZURY
IN OLSZTYN

Faculty of Environmental Management and Agriculture

Course title: MOLECULAR DIAGNOSTICS OF PATHOGENIC MICROORGANISMS IN THE AQUATIC ENVIRONMENT

ECTS credit allocation (and other scores): 1.5

Semester: autumn

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

Branch of science: Agricultural sciences

Language: English

Number of hours per semester: 25

Course coordinator/ Department and e-mail: prof. dr hab. Agnieszka Pszczółkowska, Department of Entomology, Phytopathology and Molecular Diagnostics, agnieszka.pszczolkowska@uwm.edu.pl

Type of classes: classes and lectures

Substantive content

CLASSES: Methods of plant disease diagnosis (conventional methods, immunological techniques - ELISA, molecular biology techniques including PCR and real-time PCR assays, with particular emphasis on major fungal and bacterial pathogens). Diagnosis and identification of pathogens with the use of species-specific primers. Quantitative determination of microbial DNA and genes involved in toxin production.

LECTURES: Methods (serological techniques, PCR) for the detection and identification of microorganisms in the aquatic environment. The concept of stress. Biotic and abiotic factors determining the development of pathogen populations in the aquatic environment. The effects of trace elements on plant cells in water bodies, microorganisms and aquatic habitats. The defence responses of cells in living organisms exposed to trace elements. Molecular defence mechanisms in living organisms in aquatic habitats exposed to fertilizers and pesticides.

Learning purpose: Students will be familiarized with modern diagnostic techniques (conventional methods, immunological techniques, molecular biology techniques including PCR and real-time PCR assays) used for the detection and identification of microorganisms in the aquatic environment. Students will learn how to perform diagnostic tests.

On completion of the study programme the graduate will gain:

Knowledge: Students will demonstrate an extensive knowledge of the functioning of living organisms (crop plants, fungi, bacteria, viruses, phytoplasmas and spiroplasmas) and their interactions at the molecular level and environmental threats. Students will be familiarized with molecular biology techniques and tools based on PCR data analysis, used for the detection and identification of pathogenic microorganisms.

Skills: Students will be able to analyse and evaluate research tasks involving DNA isolation and the application of PCR techniques, conventional and immunological methods for the detection and identification of various microorganisms.

Social Competencies: Students will be able to solve problems relating to the presence of undesirable microorganisms that are harmful to human and animal health.

Basic literature: Klimiuk E., Łebkowska M. 2008. Biotechnologia w ochronie środowiska. PWN, Warszawa.

Supplementary literature: –

The allocated number of ECTS points consists of:

Contact hours with an academic teacher: 0.96 ECTS points

Student's independent work: 0.54 ECTS points