

Course title: ENVIRONMENTAL TOXICOLOGY

ECTS credit allocation (and other scores): 2.5

Semester: spring

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

Branch of science: Medical and health sciences

Language: English

Number of hours per semester: 25/5

Course coordinator/ Department and e-mail: Prof. Paweł Brzuzan, Department of Environmental Biotechnology;  
brzuzan@uwm.edu.pl

Type of classes: classes and lectures

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#### Substantive content

**CLASSES:** Subject description and formal matters. General laboratory procedures, equipment use, and safety considerations. Part I: Analysis of gene expression after exposure to a toxic substance (total RNA isolation, measurements of RNA quantity and purity, reverse transcription, PCR primer design, quantitative PCR, writing a lab report, overview of the current scientific literature available online). Part II: Analysis of genetic polymorphism associated with detoxication mechanisms (isolation of genomic DNA from mouth swabs, multiplex PCR, agarose gel electrophoresis, analysis and interpretation of the results).

**LECTURES:** I am introducing the basics of toxicology from a risk analysis perspective. The lectures are organized into 3 basic threads and include the following topics. Toxic chemical risk. Environmental pathways of toxic chemicals. The body's defenses against chemical toxicity. Mechanisms of chemical disease. PCR-based protocols in molecular toxicology.

**Learning purpose:** to know physiological targets and endpoints, and to explain toxicity of environmental contaminants.

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On completion of the study programme the graduate will gain:

**Knowledge:** about target organs and toxic endpoints for environmental poisons, will understand toxicity mechanisms of various contaminants,

**Skills:** the graduate will become an expert in various molecular biology laboratory techniques,

**Social competencies:** the graduate will be able to explain the community importance of toxicological approaches in human risk assessment.

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#### Basic literature:

Brzuzan P., Woźny M., Toxicology. Student's coursebook, Department of Environmental Biotechnology, d. University of Warmia and Mazury in Olsztyn, Poland, 2020

Penningroth, S., Essentials of Toxic Chemical Risk Science and Society, CRC Press, London, 2010

Walker C. H., Hopkin S. P., Sibly R. M., Peakall B., Principles of Ecotoxicology, Third Edition., CRC Press., 2005

McCarthy J.F., Shugart L.R., Biomarkers of environmental contamination, Lewis Publishers, 1990

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#### Supplementary literature:

Brown T.A, Genomes 3, Garland Science Publishing, 2007

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The allocated number of ECTS points consists of:

Contact hours with an academic teacher: 1.36

Student's independent work: 1.64