

**Subject Area: Advanced Methods in Biotechnology and Biodiversity**

**Subject: Biomarkers in monitoring exposure and effects of xenobiotics in the environment**

**Level: III -PhD**

**Year: I-IV**

**Semester: 1-2**

**Speciality: N/A**

**Status: Facultative**

**ECTS: 3**

**Department(s): Animal Physiology and Ecotoxicology**

Cooperating Department:

**Form of teaching (Number of hours; Form of assessment: Exam or Credit) C**

Lectures	Seminars/Conversatoria	Practicals	Total
<b>4</b>		<b>26</b>	<b>30</b>

### **Staff:**

SUBJECT COORDINATOR: Prof. Pawel J. Migula Ph.D.

LECTURE/CONVERSATORIA: Prof. Pawel J. Migula Ph.D

PRACTICALS: Prof. Pawel J. Migula Ph.D., Piotr Łaszczycza Ph.D., Andrzej Kędziorski Ph. D.,  
Jadwiga Bembenek Ph.D.

### **Contents:**

Biomarkers (any biological response to environmental chemical at the individual level) are in the primary focus of toxicology, ecotoxicology, pharmacology or epidemiology. They are invaluable tools for identifying and preventing diseases of humans and other organisms. Recent efforts to discover and validate biomarkers of adverse exposure to or effects of exogenous chemical agents significantly contribute to early warning systems. The course will cover applied approaches to the toxicology and ecotoxicology, introducing biomarkers as tools for assessing environment quality and human health.

#### **LECTURES:**

Regulatory guidance and validation of toxicologic biomarkers; biomarkers of exposure to xenobiotics; use of biomarkers in health risk assessment; ethical and legal considerations in application of biological biomarkers.

#### **PRACTICALS:**

Biomarkers of metal metabolism; biomarkers of xenobiotic susceptibility; biomarkers of exposure and effects of POPs and other congeners; bioanalytical approaches to detection of specific organic compounds; biomarkers in population and community studies; nanotechniques and biomarkers; challenges in the statistical analysis of biomarker data.

### **Methods and forms of teaching:**

Interactive lectures with the use of audio-video techniques; laboratory practices in biomarker analysis based on case study experiments and group analysis of the obtained data.

**Requirements:** Basic knowledge on biochemistry, ecotoxicology, animal physiology, genetics and statistics.

### **Literature (maximum 5, preferably recent sources, all in English):**

1. Armstrong D. 2002. Oxidative stress biomarkers & antioxidant protocols. Humana Press.
2. DeCaprio A.P. (ed.) 2006. Toxicologic biomarkers. Taylor & Francis
3. Korsloot A., et al. 2004. Environmental stress and cellular response in arthropods. CRC Press
4. Van Straalen N. M., Roelofs D. 2006. Ecological genomics. Oxford Univ. Press
5. Wilson S.H., Suk W.A. 2002. Biomarkers of environmentally associated disease. Lewis Publ.