

Subject Area: Advanced Methods in Biotechnology and Biodiversity

Subject: Microorganisms in the environment and their use in biotechnology

Level: III-PhD

Year: I-IV

Semester: 1-2

Speciality: N/A

Status: Facultative

ECTS: 3

Department(s): Microbiology

Cooperating Department: Biochemistry

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

<i>Lectures</i>	<i>Seminars/Conversatoria</i>	<i>Practicals</i>	<i>Total</i>
		30	30

Staff:

SUBJECT COORDINATOR: Prof. Zofia Piotrowska-Seget PhD

LECTURE/CONVERSATORIA: -

PRACTICALS: Izabela Greń PhD, Regina Galimska-Stypa PhD

Contents:

Microorganisms in the environment; microbial products; bioremediation; bioaugmentation; bioreactors.

LECTURES: -

PRACTICALS:

Screening from natural and polluted environments for antibiotics producers, anthracene-and phenanthrene utilising microorganisms, heavy metal resistant bacteria. Production of lactic acid, enzymes, biopolymer PHB by bacterial strains. Bioaccumulation of heavy metals by soil bacteria, desulphurization of coal by microorganisms, biodegradation of polyethylene films by microorganisms. Introduction of microorganisms into soil and water. Trickling filters, immobilisation of yeast cells, dynamics of biodegradation of phenol by mixed populations of activated sludge, bioreactor (fermenter) for aerobic continuous culture of microorganisms.

Methods and forms of teaching:

Laboratory practice computer aided with the use of scientific measuring equipment, use of databases.

Requirements: Basic knowledge of microbiology, biochemistry and molecular genetics.

Literature:

1. Glazer Alexander N., H. Nikaido. 2007. Microbial Biotechnology: Fundamentals of Applied Microbiology. Cambridge University Press. Cambridge, New York.
2. Kun L.Y. (ed.). 2006. MICROBIAL BIOTECHNOLOGY, Principles and Applications. Singapore National University Press. Singapore.
3. Scragg A. 2005. Environmental biotechnology. Oxford University Press, Oxford, UK
4. Ratledge C., B. Kristansen. 2002. Basic Biotechnology. Cambridge University Press. Cambridge.
5. S. Łabużek, D. Necklen, J. Radziejewska-Lebrecht, Manual of Microbial Biotechnology, 2000, Wydawnictwo Uniwersytetu Śląskiego, Katowice.