Study Programme : Ecology

Degree level: Doctoral degree

Course Title: Extreme biochemistry

Professor: dr Gordana Grubor Lajsic, Danijela Kojić

Elective Course:

Number of ECTS: 15

Prerequisites: Biochemistry, Animal Physiology

Course Objective:

The aim of this course is to introduce students to broad biochemical and physiological strategies of organisms that adapted to the extreme habitats – high/low temperatures, high/low pH, high salinity, drought, anoxia etc.

Course Outcome:

Students should be able to understand common/specific molecular and biochemical basis of adaptations of organisms to various stressfull environmental factors as well as how these mechanisms could be exploited in commercial purposes.

Course Content:

Theoretical part

Lectures will cover following topics: Overview of Extreme Biochemistry; Extremophiles and Adaptation; Introduction to Water Properties; Protein structure and functions. Water-solute problems: osmosensors and regulation of osmolytes; Hypobiosis - the states of suppressed metabolism. Cryptobiosis: the forms of "hidden" lives; Hight/low temperature adaptations of cells and organisms. Cell stress proteome – evolution and adaptation (HSP, LEA, AQP). Cell membrane integrity and adaptation to stress.

Practical part

Student research paper on extreme biochemistry application in the field of biotechnology, medicine, pharmacy and exobiology/astrobiology.

Reading List:

1. Hochachka W. P. Somero G.N.(2002): Biochemical Adaptation, Oxford University Press
2. Wilmer P., Stone G., Johnston I.(2000): Environmental Physiology of Animals, Blackwell Science Ltd.

Total hours:				
Lectures: 70	Practicals:	Other:	Student research work: 70	

Methods of instruction:

Assessment (maximum number of points 100)

Student research paper: 40 points, **Paper presentation:** 10 points , **Oral exam:** 50 points

Requirements

Remark: