Study Programme : MSc**. In Ecology**

Degree level: Master degree

Course Title: Exobiology

Professor: Dr Zorica Svirčev

Elective Course

Number of ECTS: 6

Prerequisites: -

Course Objective:

Course objective is to create a students attitude that refers to the questioning of existing definitions, attitudes and prejudices about life as a universal category and form, through scientific approach and scientific principles.

Course Outcome:

After completion of the course of Exobiology students are expected to: demonstrate an understanding of the basis of life on Earth and the possibility of its formation on Earth and other celestial bodies; show a willingness to solve tasks and problems related to the analysis of current attitudes, goals and projects of the two global organization for space research (NASA and ESA) in the domain that refers to the possibility of life beyond Earth, and the possibility of life transmission from our planet to the other celestial bodies.

Course Content:

Theoretical part:

Exobiology - definition, objectives, goals and role. The importance of exobiology. NASA and ESA programs. Main characteristics of the Earth as a celestial body in terms of creation and maintenance of life. What is life, where and when it was created. Origin of the living organisms on the Earth. Evolution of matter and the living organisms on the Earth. The reasons for the extinction or reduction in population abundance of species or groups of species on Earth. Examples of extinct species. Epochs of mass extinctions. Paleobiology. Basic principles for the functioning of living systems on Earth. Structure and function of DNA and RNA. Genetic code. The processes of replication, transcription and translation. Mutations. Extreme habitats on Earth. Definition and classification of extremophiles. The importance of extremophiles. Physiological groups of extremophiles: cryophiles, halophiles, barophiles, osmophiles, acidophiles, alkaliphiles. Modifications of extremophiles: morphological, physiological, biochemical, environmental. Bacteria, archaebacteria, and cyanobacteria -possible forms of life on other planets. Conditions for the existence of the living organisms on other solar system bodies. Mars. Terraforming of Mars. Satellites of Jupiter. Possibility of life on Europa and Titan. Cosmic-chemical evolution. Interstellar space and comets. Galactic habitable zone. Analysis of the likelihood of life in the Universe. Scientific methods of searching for traces of the life and living organisms (spectral analysis and paleoclimate reconstruction). The origin and evolution of the consciousness. SETI project. Current scientific projects and expeditions.

Reading List:

1) Grady Monica (2001): Astrobiology.Smithsonian Institution Press, Washington.
2) Flores J-C. (1997): Exobiology: Matter, energy and information in the origin and evolution of life in the Universe. Kluwer Academic Publishers. Dordrecht, Boston, London.
3) Jakovsky B. (1998): The search for life on other planets. Cambridge University Press.
4) Segan Karl (1983): Kosmos. Otokar Keršovani, Rijeka.
5) Matić Gordana (1997): Osnovi molekularne biologije. Zavet, Beograd.

Total hours:				
Lectures: 2	Practicals:	Other: 2	Student research work: 5	

Methods of instruction:

Lectures, practicals and lab- practicals Classes will be realized in the form of lectures, practicals and seminars. Lectures are conducted using a computer presentation to a video projector, projection of films and slides, as well as fieldwork.

Assessment (maximum number of points 100)

Requirements	**points**	**Final exam**	**points**
Active participation in lectures	10	Practical exam	
Active participation in practicals		Oral exam	40
Test(s) or		Seminar	10
Pre-exam testing	40		