

BACHELOR 'S PROGRAMME
1st YEAR OF STUDY, 2nd SEMESTER

COURSE TITLE	INTRODUCTION IN PHYSICS OF COMPLEX SYSTEMS
COURSE CODE	
COURSE TYPE	full attendance
COURSE LEVEL	1 st cycle (bachelor's degree)
YEAR OF STUDY, SEMESTER	3 st year of study, 2 nd semester
NUMBER OF ECTS CREDITS	4
NUMBER OF HOURS PER WEEK	4 (2 lecture hours + 2 seminar hours)
NAME OF LECTURE HOLDER	Prof. Dr. Diana Mihaela MARDARE
NAME OF SEMINAR HOLDER	Prof. Dr. Diana Mihaela MARDARE
PREREQUISITES	Advanced level of English
A	GENERAL AND COURSE-SPECIFIC COMPETENCES
	<p>General competences:</p> <ul style="list-style-type: none"> → Achievement of professional tasks efficiently and responsibly, in compliance with the field-specific deontology legislation, with qualified assistance. → Realization of a project/ team activity and identification of specific professional roles <p>Course-specific competences:</p> <ul style="list-style-type: none"> → Description of physical systems, using specific theories and tools (experimental and theoretical models, algorithms, schemes, etc.) → Application of the principles and laws of Physics in solving theoretical or practical problems, under qualified assistance conditions. → Make of necessary connections to use physical phenomena, using basic knowledge from close domains (Chemistry, Biology, etc.) → Responsible performing independent work tasks and interdisciplinary approach of topics. → Making connections between knowledge of Physics and of other domains (Chemistry, Biology, Informatics, etc.).
B	LEARNING OUTCOMES
	<p>After succesfully finishing this discipline, the students will be able to:</p> <ul style="list-style-type: none"> • Explain the global ecological problems • Describe the physical systems using theories algorithms, schemes, etc. • Utilise adequately the main laws and physical principles in a given context. • Understand the physical phenomena in the environment. • To be aware of the fact that our environment is organised by certain laws and the human factor plays an important role
C	LECTURE CONTENT
	<p>GENERAL PROPERTIES OF THE BIOLOGICAL SYSTEMS ENVIRONMENT. ENVIRONMENTAL FACTORS</p> <p>Mechanical Factors: Global Atmospheric Circulation. (Coriolis Effect. Trade Winds. East and West Winds.) Monsoon. Onshore-Offshore Winds. Cyclone.Tornado.</p> <p>Horizontal and Vertical Currents of Water. ElNino southern Oscillation.</p> <p>Physical Factors:</p> <ul style="list-style-type: none"> - Water Properties: Density - Thermal Dilatation Anomaly. Boiling and Melting Temperatures. Latent Vaporization Heat. Surface Tension. Specific Heat. Solubility. Osmosis. -Temperature. Humidity -Electromagnetic waves. The Sun and Our solar System. The Ecosystem Energetics (The Principles of Thermodynamics. Types of Energy Transfer Ecosystem-Environment). IR Radiation. Physical Explanation of the Greenhouse Effect UV Radiation (The Formation and the Destruction of the Ozone Layer).
D	RECOMMENDED READING FOR LECTURES
	<ol style="list-style-type: none"> 1. Diana Mardare - Introducere în fizica mediului și ecologie, Editura "Politehnicum", Iași-2005. 2. F.W. Taylor, Elementary Climate Physics, , Dept. of Physics, Oxford University Press, UK, 2007 3. Harold V. Thurman - Introductory Oceanography, Fifth Edition, Merrill Publishing Company, S. U. A., 1988
E	SEMINAR / LABORATORY CONTENT
	The influence of some dissolved substances in water on some of its properties: Density, Specific Heat, Surface Tension, Latent Heat

	Evidencing the Greenhouse Effect .Thermal Conversion of the Solar Energy. Greenhouse Gases and Their Evolution in Time. Discussion of some environment phenomena in close correlation with the subject presented during the course.	
F	RECOMMENDED READING FOR SEMINARS	
	[1] Laboratory papers [2] Scientific papers ISI quoted [3] Harold V. Thurman - Introductory Oceanography, Fifth Edition, Merrill Publishing Company, S. U. A., 1988 [4] Films, DVDs	
G	EDUCATION STYLE	
LEARNING AND TEACHING METHODS	Lectures supported by slides and video Driven experiment.Work reports	
ASSESSMENT METHODS	<ul style="list-style-type: none"> • Written paper • Work projects 	
LANGUAGE OF INSTRUCTION	English	