DISCIPLINE DESCRIPTION

1. Information on the study programme

1.1 Academic institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**FACULTY OF ENVIRONMENTAL PROTECTION**
1.3 Department	**ENVIRONMENTAL ENGINEERING**
1.4 Field of study	**ENVIRONMENTAL ENGINEERING**
1.5 Cycle of study	
1.6 Study programme/Qualification	**BIOTECHNICAL AND ECOLOGICAL SYSTEMS ENGINEERING**

2. Information on the discipline

2.1 Name of discipline			**Physics**				
2.2 Course holder			lecturer dr. Monica COSTEA				
2.3 Seminar/Laboratory/Project holder			lecturer dr. Monica COSTEA				
2.4 Year of study	I	2.5 Semester	I	2.6 Type of evaluation	C	2.7 Regime of discipline	C

(C) Compulsory; (O) Optional; (E) Elective

3. Total estimate time (hours per semester of didactic activities)

3.1 Number of hours per week	4	out of which: 3.2 course	2	out of which 3.3 seminar/laboratory/project	2
3.4 Total hours in the curriculum	56	out of which: 3.5 course	28	out of which 3.6 seminar/laboratory/project	28
Time allotment					hours
Study assisted by manual, course support, bibliography and notes					28
Additional documentation in the library/ on specialised electronic platforms and in the field					10
Preparation of seminars/laboratories/ topics/reports, portfolios and essays					2
Tutorship					2
Examinations					2
Other activities.....					
3.7 Total hours of individual study	**44**				
3.9 Total hours per semester	**100**				
3.10 Number of credits	4				

4. Prerequisites (where appropriate)

4.1 curriculum	
4.2 competences	

5. Conditions (where appropriate)

5.1. related to course	PC, projector, internet access
5.2. related to seminar/laboratory/ project	Instruments, tools specific physics laboratory, PC, Soft statistical processing of data

6. Specific competences acquired	
Professional competences	C1. Explain the mechanisms, processes and effects of natural or anthropogenic origin and influences that cause environmental pollution - Analysis of the quality and quantity of natural phenomena and processes to prevent and minimize environmental impact, - Aplication Basic scientific knowledge in defining and explaining the specific concepts and environmental engineering, - Definition Fundamental concepts needed to apply scientific theories and methodology of the environment. - Identify solutions professional scientific and technological project implementation, - Use Basic scientific knowledge in defining and explaining the specific concepts and environmental engineering
Transversal competences	C2 Management and resolution of specific environmental issues for sustainable development: - Aplicarea Technical and technological knowledge in defining and explaining basic concepts specific to engineering and environmental protection, - Description And applying concepts, theories and practical methods / technology / engineering for the determination of environmental quality, - Valuate the quality and quantity of natural phenomena and human activities on the quality of environmental factors, - Explicarea And interpretation of concepts, methods and models of basic environmental engineering problems, - Identify the best technical and technological solutions for implementing professional projects for engineering and environmental protection

7. Objectives of discipline (coming from the specific competences acquired)

7.1 General objective	The student should understand and be able to work with physical concepts underlying the phenomena of pollution, protection technologies and associated physical phenomena.
7.2 Specific objectives	- presentation of phenomena, laws, principles, relations and specific rules, as well as new trends and guidelines in the field,

	- emphasizing the role of information and on the formative physics, the fundamental discipline process and technical education, - understanding the discipline, in close correlation with the implications it has on the development of science, technology and engineering technology.

8. Content*/

8.1 Course	Methods of teaching	No. of hours/Remarks
Course.1 Chapter I. Biophysics and Environmental Engineering. 1.1.Introduction	Lecture, Debate, Problematization, Frontal Experiment, Guided Discovery	2
Course 2. Chapter 2. The environment and person 2.1. Introduction 2.2. Laws of thermodynamics 2.2.1. The first law of thermodynamics	Lecture, Debate, Problematization, Frontal Experiment, Guided Discovery	2
Course 3. 2.2.2. The second law of thermodynamics 2.2.3. Entropy and the third law of thermodynamics	Lecture, Debate, Problematization, Frontal Experiment, Guided Discovery	2
Course 4. 2.3. The laws of thermodynamics and the human body 2.3.1. Energy and metabolism 2.3.2. Thermodynamics and body 2.3.3. The first law of thermodynamics and the human body 2.3.4. The second law of thermodynamics and Gibbs free energy	Lecture, Debate, Problematization, Frontal Experiment, Guided Discovery	2
Course 5. 2.4. Energy transport 2.4.1. Conduction 2.4.2. Convection 2.4.3. radiation 2.4.5 The equation of energy conservation	Lecture, Debate, Problematization, Frontal Experiment, Guided Discovery	2
Course 6. 2.5. The human body and high temperature in the atmosphere 2.5.1. Thermal comfort and insulation 2.5.2. Boundary Layer 2.5.3. Wind chill 2.5.4. Hypothermia 2.5.6. The effects of heat on the human body	Lecture, Debate, Problematization, Frontal Experiment, Guided Discovery	2

Course 7. Chapter 3. Environmental protection and buildings 3.1. Heat balance of buildings 3.1.1. Thermal insulation 3.1.2. The effects of thermal conduction 3.1.3. The effects of convection 3.1.4. radiation effects 3.1.5. U-values	Lecture, Debate, Problematization, Frontal Experiment, Guided Discovery	2
Course 8. 3.2. Energy use in buildings 3.2.1. effectiveness 3.2.2. Heat loss 3.2.3. Calculation of heat loss 3.2.4. Energy gains	Lecture, Debate, Problematization, Frontal Experiment, Guided Discovery	2
Course 9. 3.3. Air circulation in buildings 3.3.1. natural ventilation 3.3.2. Ventilation 3.5. Heat pumps 3.6. Condensation 3.6.1. Water vapor 3.6.2. Humidity 3.6.3. Condensation in buildings	Lecture, Debate, Problematization, Frontal Experiment, Guided Discovery	2
Course 10. Chapter 4. Environmental protection and urban 4.1.Energia in cities 4.1.1. Electromagnetic induction 4.1.2. Power transmission 4.2. Urban transport 4.2.1. Energy and urban transport	Lecture, Debate, Problematization, Frontal Experiment, Guided Discovery	2
Course 12 4.10. Noise pollution	Lecture, Debate, Problematization, Frontal Experiment, Guided Discovery	2
Course 13 Chapter 5. Sources of Energy 5.1. Conventional energy sources 5.1.1. Fossil fuels 5.1.2. Nuclear energy	Lecture, Debate, Problematization, Frontal Experiment, Guided Discovery	2
Course 14 5.2. Renewables energy sources 5.2.1. Solar Energy 5.2.2. Wind energy 5.2.3. Hydro energy 5.2.4. Biomass and biofuels 5.2.5. Geothermal energy	Lecture, Debate, Problematization, Frontal Experiment, Guided Discovery	2

Bibliography

1. E. Boeker, R. Van Grondelle, Environmental Phzsics, John Wiley & Sons, Chichester, 1995
2. G.M. Master, Introduction to Environmental Engineering and Science, Prentice Hall, Englewood Cliffs, New Jersey, 1991.
3. V. Simon, Introducere in fizica mediului, Presa Universitara, Cluj, 2001.
4. V.Simon, Radiatiile nucleare si mediul inconjurator, Casa Cartii de Stiinta, 2004.
5. Journal of Environmental Quality, http://jeq.scijournals.org/

Journal of Environmental Health, http://www.neha.org/JEH/

8.3 Laboratory

1. Size and measurement units. terminology		
2. Determination of surface tension		
3. Determination of specific heat liquids		
4. Determination of specific heat at some solid		
5. Determination of atmospheric parameters: temperature-pressure		
6. Determination of atmospheric parameters: wind speed		
7. Determination of the parameters of the atmosphere: aeorodynamic resistance force		
8. Analysis of heat tranfer in a building with thermovision camera.		
9. Calculation of heat loss from buildings		
10. The study movements of air masses from one room.		
11. Study the principle of converting thermal energy into electricity.(health punp and geothermal energy)		4
12. Study the principle of conversion of wind energy into electricity. Wind statistics.		4

Bibliography

1. E. Boeker, R. Van Grondelle, Environmental Phzsics, John Wiley & Sons, Chichester, 1995
2. G.M. Master, Introduction to Environmental Engineering and Science, Prentice Hall, Englewood Cliffs, New Jersey, 1991.
3. V. Simon, Introducere in fizica mediului, Presa Universitara, Cluj, 2001.
4. V.Simon, Radiatiile nucleare si mediul inconjurator, Casa Cartii de Stiinta, 2004.
5. Journal of Environmental Quality, http://jeq.scijournals.org/
6. Journal of Environmental Health, http://www.neha.org/JEH/

* The content, respectively the number of hours allocated to each course / seminar / laboratory / project will be detailed during the 14 weeks of each semester of the academic year.

9. Corroboration of discipline content with the expectations of the epistemic community, professional associations and representative employers from the field corresponding to the study programme

- Course content can be found in the curriculum specialization Environmental engineering, environmental engineering and biotechnical systems and other universities that have accredited the specializations. During the course builds useful knowledge both environmental officers in local authorities, industry and companies active in the management of environmental factors.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the final grade
10.4 Course	Knowledge of theoretical concepts delivered in class	Evaluation of theoretical knowledge	70%
10.5 Seminar			
10.6 Laboratory	The ability to make measurements with the instruments, computerized statistical processing of a data set	Assessment of practical skills	30%
10.7 Project			
10.8 Minimum standard of performance			

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