

Annex 6

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	BACHELOR
1.6 Study programme/Qualification	BIOTECHNICAL ENGINEERING AND ECOLOGICAL SYSTEM /ENGINEER

2. Information on the discipline

2.1 Name of discipline	ENVIRONMENTAL MICROBIOLOGY I						
2.2 Course holder	Lecturer PhD eng. Oneț Aurelia						
2.3 Seminar/Laboratory/Project holder	Lecturer PhD eng. Oneț Aurelia						
2.4 Year of study	II	2.5 Semester	III	2.6 Type of evaluation	Ex	2.7 Regime of discipline	I

(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					17
Additional documentation in the library/ on specialised electronic platforms and in the field					10
Preparation of seminars/laboratories/ topics/reports, portfolios and essays					11
Tutorship					0
Examinations					2
Other activities.....					0
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	Biochemistry, General ecology, English.
4.2 competences	Action ability: information capacity and documentation, group work, utilisation of informatics technologies and data processing; ability to apply knowledge actively and practically.

5. Conditions (where appropriate)

5.1. related to course	Using modern means of presentation and projection – video projector and computer
5.2. related to seminar/laboratory/ project	Equipment of the laboratory with specific devices for microbiological techniques.

6. Specific competences acquired	
Professional competences	C1. Explaining the mechanisms, processes and effects of anthropogenic or natural origin that determine and influence environmental pollution C3. Analysis of the technical solutions needed to prevent, reduce and eliminate negative environmental phenomena C3.1 Identification and use of instrumental instruments and instruments necessary to monitor environmental factors
Transversal competences	CT2. Identifying roles and responsibilities in a multidisciplinary team and applying effective relationship and work techniques within the team

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

7.1 General objective	Knowledge of the morphological and physiological characteristics of the microorganisms present in air, water, soil and food.
7.2 Specific objectives	Knowledge of ecological factors influencing the spread and distribution of microorganisms in nature. Knowledge of the interdependent relationships between microorganisms and between them and the superior plants

8. Content*/

8.1 Course	Methods of teaching	No. of hours/Remarks
1. Importance and the object study of the discipline <i>Environmental microbiology.</i>	Lecture and video projector exposure	2
2. General characters of bacteria.	Lecture and video projector exposure	2
3. Microorganisms nutrition.	Lecture and video projector exposure	2
4. Microorganisms respiration.	Lecture and video projector exposure	2
5. Elements of bacterial taxonomy.	Lecture and video projector exposure	2
6. General characters of the yeasts.	Lecture and video projector exposure	2
7. General characters of the molds.	Lecture and video	2

	projector exposure	
8. Virology elements.	Lecture and video projector exposure	2
9. Air microflora.	Lecture and video projector exposure	2
10. Microbiota of the water.	Lecture and video projector exposure	2
11. Soil microorganisms.	Lecture and video projector exposure	4
12. Microbial activity of the different soil types.	Lecture and video projector exposure	2
13. Interdependence between the activity of microorganisms and the main soil works	Lecture and video projector exposure	2
Bibliography		
<ol style="list-style-type: none"> 1. Barton, Larry L., Northup, Diana E., 2011, <i>Microbial Ecology</i>. Wiley-Blackwell. Oxford: John Wiley & Sons. p. 22. ISBN 978-1-118-01582-7 2. Bowler, Chris, Karl, David M., Colwell, Rita R., 2009, "Microbial oceanography in a sea of opportunity". <i>Nature</i> 459 (7244); 3. Fenchel, Tom et al., 2012, <i>Bacterial Biogeochemistry: The Ecophysiology of Mineral Cycling</i> (3 ed.). Boston, Mass.: Academic Press/Elsevier. p. 3; 4. Hugenholtz, P., 2002, "Exploring prokaryotic diversity in the genomic era" <i>Genome Biology</i>; 5. Konopka, Allan, 2009, "What is microbial community ecology?" <i>The ISME Journal</i> 3 (11); 6. Konopka, A., 2009, "Encyclopedia of Microbiology". pp. 91–106; 7. Lupp, Claudia, 2009, "Microbial oceanography". <i>Nature</i> 459 (7244): 179; 8. Ott, J. (2005). "Marine Microbial Thiotrophic Ectosymbioses". <i>Oceanography and marine biology</i> 42: 95–118. ISBN 9780203507810 9. Verstraete, Willy, 2007, "Microbial ecology and environmental biotechnology". <i>The ISME Journal</i>; 10. Whitman, W. B., Coleman, DC, Wiebe, WJ, 1998, "Prokaryotes: The unseen majority" <i>Proceedings of the National Academy of Sciences</i> 95; 11. Zarnea Gh. – <i>Compendium of general microbiology</i>, Romanian Academy Publishing House, Bucharest, Vol. I - 1983, Vol. II - 1984, Vol. III - 1986, Vol. IV - 1990, Vol. V - 1994. 		
8.3 Laboratory		
1. Occupational safety standards in the microbiology laboratory.	Practical methods	2
2. Equipment and materials used in the microbial eology laboratory.	Practical methods	4
3. Sterilization techniques.	Practical methods	4
4. Study of the yeasts cultures by examination techniques of the fresh preparations.	Practical methods	2
5. Microscopic examination of the molds.	Practical methods	2
6. Microscopic examination of bacteria.	Practical methods	2
7. Gram staining method	Practical methods	2
8. Preparation and sterilization of the culture media.	Practical methods	4
9. Methods of culturing microorganisms (in tubes).	Practical methods	4
10. Laboratory practical evaluation		2

Bibliography

1. Barton, Larry L., Northup, Diana E., 2011, [Microbial Ecology](#). Wiley-Blackwell. Oxford: John Wiley & Sons. p. 22. [ISBN978-1-118-01582-7](#);
2. Bowler, Chris, Karl, David M., Colwell, Rita R., 2009, "Microbial oceanography in a sea of opportunity". *Nature*459 (7244);
3. Fenchel, Tom et al., 2012, [Bacterial Biogeochemistry: The Ecophysiology of Mineral Cycling](#) (3 ed.). Boston, Mass.: Academic Press/Elsevier. p. 3;
4. Hugenholtz, P., 2002, ["Exploring prokaryotic diversity in the genomic era"](#) *Genome Biology*;
5. Konopka, Allan, 2009, "What is microbial community ecology?" *The ISME Journal*3 (11);
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7. Lupp, Claudia, 2009, "Microbial oceanography". *Nature*459 (7244): 179;
8. Ott, J. (2005). ["Marine Microbial Thiotrophic Ectosymbioses"](#). *Oceanography and marine biology*42: 95–118. [ISBN9780203507810](#);
9. Verstraete, Willy, 2007, "Microbial ecology and environmental biotechnology". *The ISME Journal*;
10. Whitman, W. B., Coleman, DC, Wiebe, WJ, 1998, ["Prokaryotes: The unseen majority"](#). *Proceedings of the National Academy of Sciences*95;
11. Zarnea Gh. - *Compendium of general microbiology*, Romanian Academy Publishing House, Vol. I - 1983, Vol. II - 1984, Vol. III - 1986, Vol. IV - 1990, Vol.V - 1994.

* 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

By acquiring knowledge about microorganisms' ecology, students acquire complex knowledge in accordance with the partial competencies required for the possible occupations provided by RNCIS. The content of the course is adapted to the requirements of the epistemic community, professional associations and employers in the field of Environmental Engineering, as it addresses the main techniques for investigating the activity of microorganisms within the natural and anthropic ecosystems in order to conserve biodiversity. The course acquires useful knowledge both for environmental protection representatives from local authorities, industry and companies with activities in the field.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the final grade
10.4 Course	Presence at courses and knowledge of matter	Oral exam	70%
10.6 Laboratory	Attendance at seminars and active participation in seminars	Evaluation	30%
10.8 Minimum standard of performance. Ability to respond correctly to 50% of the questions asked.			

Date of completion

Signature of course holder**

Signature of seminar
laboratory/project holder **

Lecturer PhD eng. Oneț Aurelia **Lecturer PhD eng. Oneț Aurelia**
e-mail: aurelia_onet@yahoo.com e-mail: aurelia_onet@yahoo.com

Date of approval in the department

Signature of the Head of Department

Assistant professor PhD eng. Laslo Vasile
laslovasile@yahoo.com

Dean signature
Professor PhD eng. Chereji Ioan
ichereji@uoradea.ro

** - Name, first name, academic degree and contact details (e-mail, web page, etc.) will be specified.