SYLLABUS

1. Course title:

INDUSTRIAL MICROBIOLOGY

2. Code:

3. Cycle of study:

1

4. ECTS credits:

5

5. Type of course:

(•) Mandatory ( ) Elective

6. Prerequisites:

Biology

7. Class restrictions:

8. Duration / semester:

1 3

9. Weekly contact hours:

9.1. Lectures:	2
9.2. Seminars:	0
9.3. Laboratory/Practice classes:	2

10. Faculty:

Faculty of Technology

11. Department/study program:

Environmental Protection Engineering

12. Lecturer:

13. Lecturer's e-mail:

14. Web site:

www.untz.ba

15. Course aims:

To introduce a student with:
-systematics and microbial distribution, the main characteristics of microorganisms (bacteria, yeast, mold, protozoa, algae and viruses).
- cultivation of microorganisms in industrial microbiology and the impact of physical and chemical factors on the growth and reproduction of microorganisms.
- importance and functions of microorganisms in oxidative and anoxidative fermentations and microbiological synthesis.
- importance and role of microorganisms in aerobic and anaerobic sewage treatment processes.

16. Learning outcomes:

After successfully mastering the course, students will be able to:
- Analyze the properties of genera and species of bacteria, yeast, mold, protozoa, algae and viruses that are significant in the industry
- differentiate the microscopic, cultural and biochemical properties of cellular microorganisms;
- organize and provide necessary conditions for work in the microbiology laboratory, preparing material for sterilization and disinfection and funeral same;
-connecting the metabolic activity of microorganisms with their use in industrial microbiology.

17. Course content:

1. Introduction to Microbiology and Systematics 2. General Features of the Mo 3.4.5. General characteristics of bacterial, fungi (yeast and molds), protozoa and algae of importance to the industry 6. Metabolism mo 7. The effect of physical and chemical agents on mo 8. Cultivation in industrial microbiology 9. Microorganisms and alcohol fermentation 10. Milk-acid fermentation, 11. Microorganisms and propionic and acetone-butanol fermentation 12. Microorganisms and oxidative fermentation (acetic, citric, gluconic) 13. Microbiological Synthesis of Antibiotics, Vitamins, Enzymes 14. Microorganisms and Water Purification 15. Microorganisms in the production of energy sources. The content of laboratory exercises follows theoretical instruction so students individually perform:
-Microscopic and macroscopic examination of bacteria, fungi and protozoa of importance to the industry,
-Microbiological testing of drinking water and waste water and microscopic examination of active biocenosis of sludge.

18. Learning methods:

Presentation method and discussion method - lectures
Presentation method, demonstration method, perception method, laboratory methods of microscoping, analysis and synthesis of results method - practical classes.
Students must attend all practical classes/seminars and minimum 80% of the lectures. Absence from lab classes should be justified and made up for.

19. Assessment methods:

Knowledge and skills are evaluated continuously during the semester through: Test 1 and Test II, Practical exam (K1 and K2), and Final exam.
Practical exam I and Practical exam II contain open questions: questions with multiple answer, questions "true-false" , recognition of microscopic slides. The practical exam I is organised after seven exercises and the practical exam II after all the exercises. Students can earn a total of 15 points on both practical exams.
Test 1 includes the assessment of knowledge covering the topics dealt with and is held after Week 5 of the classes. Students can earn up to 15 points on Test 1.
Test 2 includes the assessment of knowledge covering the topics dealt with and is held after Week 10 of the classes. Students can earn up to 15 points on Test 2. Test I and Test II is performed in writing.
Students can work seminar of course issues (max 3 points). The presence at lectures and exercises is evaluated with a maximum of two points (lectures and exercises are mandatory). At pre examination activities students can win a maximum of 50 points.
The final exam is organized in writing and / or orally and covers the entire course.The condition for taking the oral exam is passed the written final exam. Written final exam carries 20 points. The student must win at least 50% of the points. At the oral part of the exam, the student draws three questions from the complete course. Each question carries ten points. The student must answer all three questions (he can win from 18 to 30 points).
Written and oral final exam contains a total of 50 points.
In order for a student to complete a course, they must have a minimum of 54 cumulative points of which at least 28 points (10 in the written and 18 in the oral) on the final exam.
The final grade is shown in the form a numerical grade, descriptive grade or a letter grade, according to the following scale:
Points Numerical grade-Descriptive grade-Letter grade
0-53 5 (five) fail F
54-63 6 (six) satisfactory E
64-74 7 (seven) good D
74-83 8 (eight very good C
84-93 9 (nine) excellent B
94-100 10 (ten) outstanding A

20. Assessment components:

The final grade is formed according to the following scale:

Criterion	Maximum points
Attendance	2
Test I	15
Test II	15
Practical exam I i II /practical test I i II	15
Seminar paper/project	3
Final exam	50
Total	10

21. Required reading list:

1. Duraković S. (1996) Opća mikrobiologija, Zagreb
2. Pejin D. (2003) Industrijska mikrobiologija, Novi Sad

22. Web sources:

htpp.// www.ncbi.nlm.nih.gov

23. Applicable starting from the academic year:

2015/2016

24. Adopted in the Faculty/Academy session: