

SYLLABUS

1. Course title:

REMEDICATION OF CONTAMINATED LAND

2. Code:**3. Cycle of study:**

1

4. ECTS credits:

3

5. Type of course: Mandatory Elective**6. Prerequisites:****7. Class restrictions:****8. Duration / semester:**

1

7

9. Weekly contact hours:

9.1. Lectures:

2

9.2. Seminars:

0

9.3. Laboratory/Practice classes:

1

10. Faculty:

Faculty of Technology

11. Department/study program:

Environmental protection engineering

12. Lecturer:

Abdel Dozić, Ph.D., associate professor

13. Lecturer's e-mail:

abdel.dozic@untz.ba

14. Web site:

www.tf.untz.ba

15. Course aims:

The educational goal of the subject is to introduce students with pedology bases, spreading pollution in different environmental media, as well as modern methods of remediation. One of the goals is to understand the source, the type and concept of soil contamination, and the remediation technique of contaminated land. During the course, students will be familiar with the significance and effects of contamination and solutions to reduce the risk of anthropogenic soil contamination.

16. Learning outcomes:

Students are able to learn about the problem and complexity of land remediation by getting acquainted with all the relevant factors that emerge in these processes. The key outcome is understanding and addressing the problem of contaminated land by developing a multidisciplinary approach to soil remediation problems. Students should evaluate problems that may arise as a result of soil contamination and that the most important chemical and biological techniques for remediation of contaminated land are applied.

17. Course content:

Basic concepts of pedology, Physical and chemical characteristics of the soil, Geological characteristics and quality of land in BiH and Europe, Distribution of pollutants in soil, Basic types of pollutants, Method of estimating the level of soil pollution and the level of risk. Review of the Methods of Remediation, Basic Principles of Biodegradation of Pollutants in Land, Biological, Physical, Chemical and Thermal Methods of Land Remediation. Techniques for Remediation of Polluted Land - Bioremediation, Victory Mediation, Refiner Effects in Phytomediation, Chemical Stabilization, Oxidation / Reduction, Neutralization, Electrokinetics. Selection of techniques and methods of remediation.

18. Learning methods:

Teaching methods are based on multimedia lectures and experimental exercises. In the lectures the problems are framed and the facts are analyzed and theoretically approaches the problem, and the exercises are done in interactive form and through practical work within laboratory exercises. Teaching methods imply active student participation, laboratory work and visits to manufacturing and service organizations.

19. Assessment methods:

Throughout the course, students are required to attend lectures and exercises on a regular basis, which will be monitored by the subject teacher and associates and, on special forms, keep records. During the semester, the student can be absent from a maximum of three lectures and three exercises, being obliged to bring proof of justification of absence (medical certificate, etc.). In the case of more unexcused absences, the student loses the right to the signature of the teacher.

- TESTS - Two tests during the semester for the oral exam. Each oral exam test consists of 20 short theoretical questions related to the material being studied and carries 15 points (min passage 8 points). The tests are performed approximately every six weeks of instruction, and the subject teacher will announce them to the students at least two weeks before each test.
- LABORATORY EXERCISES: The student is obliged to undertake all laboratory exercises and can exercise up to 25 points (minimum 12 points) on the basis of exercise activities.
- FINAL PART OF THE EXAM - Students who have compiled the required number of points according to all criteria (54 points) have the possibility to additionally (verbally or in writing) correspond to a higher closing score. The maximum number of points that can be reached on the final exam is 30. The minimum number of points to be compulsory on the final exam is 18.

All the students who did not meet one of the tests or who are not satisfied with the grade and who have completed all the obligations on the subject (have the signature of the subject teacher in the index) approach all exams. A student can not enter a grade if no tests have been passed.

- SEMINAR WORK OF STUDENTS: students have the opportunity to do one seminar work. Successfully prepared and defended seminar work is evaluated with a maximum of 10 points (minimum 6 points), which are added to the total number of points achieved on other grounds in the formation of the final grade.

20. Assessment components:

The final grade is based on the total number of points obtained through pre-requisites and the final exam, according to the quality of the acquired knowledge and skills. It has a maximum of 100 points, according to the following scale:

Classroom attendance (P + V): 5 points

Activity in laboratory exercises: 25 points

Tests (theory): 30 points

Seminar work: 10 points

Final Exam: 30 points

21. Required reading list:

Mirsal I (2008). Soil Pollution: Origin, Monitoring and Remediation, Springer.

Terry N, Banuelos G (2000). Phytoremediation of contaminated soil and water, Boca Raton.

Kisić I (2012). Remediation of Soil Soil, Faculty of Agriculture, Zagreb.

22. Web sources:**23. Applicable starting from the academic year:**

2015/2016

24. Adopted in the Faculty/Academy session: