

SYLLABUS

1. Course title:

Process - ecological engineering

2. Code:

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3. Cycle of study:

1

4. ECTS credits:

6

5. Type of course: Mandatory Elective**6. Prerequisites:**

Hydro-mechanical operations. Thermal Operations. Diffusion operations.

7. Class restrictions:

(max. 150 characters)

8. Duration / semester:

1

7

9. Weekly contact hours:

9.1. Lectures:

3

9.2. Seminars:

0

9.3. Laboratory/Practice classes:

1

10. Faculty:

Faculty of Technology

11. Department/study program:

Chemical engineering/Chemical Engineering and Technologies

12. Lecturer:

prof.dr.sc. Zehrudin Osmanović

13. Lecturer's e-mail:

zehrudin.osmanovic@untz.ba

14. Web site:

untz.ba

15. Course aims:

Students are introduced to the environmental impact of the industry. Environmental prevention strategies are also considered in interaction with industry. Special attention is paid to the application of mechanical, thermal and diffusion operations in the treatment of substances that occur in the industry.

16. Learning outcomes:

The learning outcomes of this curus are:

- to understand the standards of environmental protection (14001: 20015)
- the application of unit operations in the process of treatment of waste
- analysis of the balance of matter and energy for the observed process plant with the aim of minimizing waste streams.
- understanding waste management and treatment methods with the potential to use it for energy purposes.

17. Course content:

The basics of ecological engineering. Development and Environment. Influence of the process industry on the environment. Rational use of raw materials, air, water and energy, waste minimization strategy, pollution prevention strategy. Standard ISO 14001: 2015. Cleaning of gases. Characterization of solid particles, size distribution, separation efficiency. Gravity and shock absorbers. Cyclones. Electrostatic. Industrial cleaning gases. Air filters. Apparatus for absorption and hemisorption of gases. Scrubbers. Gas cleaning plants. Water purification processes. Mechanic and physico-chemical methods of wastewater purification.Using. Flotation. Coagulation. Flocculation. Spinning. Adsorption. Ionic changes. Membrane procedures. Chemical precipitation. Biochemical wastewater treatment. Evaporation. Heat treatment of sludge. The role of environmental engineering in ensuring sustainable development.

18. Learning methods:

- lectures,
- presentation,
- individual and team projects,
- visits industrial plants.

19. Assessment methods:

Part 1.	
Test No.1	30 points
Test No.2	30 points
Teaching activity	5 points
Individual Project	5 points
Team Project	5 points
Activity on exercises	5 points
Part 2.	
Final exam	20 points

20. Assessment components:

Tests on the pre-exam should have at least 50% points. Presence of lectures is compulsory.

Score points

0 - 53	5
54 - 63	6
64 - 73	7
74 - 83	8
84 - 93	9
94 - 100	10

21. Required reading list:

1. Osmanović, Z. Herceg, Z., Čorbo, S., Procesno – prehrambeno inženjerstvo, ISBN 978-9958-897-10-8, B-ELI-M, Lukavac, 2016.
2. Cheremisinoff NP. Handbook of pollution prevention practices. CRC Press; 2001 Feb 9.

22. Web sources:

<http://www.cee.ucr.edu/undergrad/envirpage.html>

23. Applicable starting from the academic year:

2015 -2016

24. Adopted in the Faculty/Academy session:

(max. 10 char.)