

SYLLABUS

1. Course title:

Membrane processes

2. Code:

(max. 20 characters)

3. Cycle of study:

1

4. ECTS credits:

3

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

None

7. Class restrictions:

None

8. Duration / semester:

1

5

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:

Chemical Engineering and Technologies/Chemical Engineering and Technology

12. Lecturer:

Dr. Sci.Indira Šestan, assistant professor

13. Lecturer's e-mail:

indira.sestan@untz.ba

14. Web site:

www.tf.untz.ba

15. Course aims:

The aim of the course is for the students to create a clearer picture of the operating mode and the membrane functioning. Exploring the fundamental phenomena on which the membrane processes are based. The characterization of the surface selective layer of the membrane to their separation efficiency in removing various impurities in water preparation.

16. Learning outcomes:

The general knowledge on membrane processes is acquired, on materials for membrane and their properties, types of membrane and transport through the membrane, parameters in membrane processes. Special knowledge is acquired on certain processes, types of modules and application in industry. Through practical exercises designed as the fieldwork, they get to know each other and gain the independence in solving practical problems.

17. Course content:

Basic terms about membranes and principles of their operation. Classification of the membrane process. The membrane processes, microfiltration, ultrafiltration, nanofiltration, reverse osmosis. Materials for membranes and properties. Membrane morphology. The influence of the membrane on the permeation flow. Basic transmission through homogenous membranes. Adsorption, causes and types. Adsorption equilibrium. The ionic change. Change reactions, ionic equilibrium, selectivity and capacity. Membrane preparation and the characterization. Application of the membrane processes in the process industry. The polarization and contamination phenomena, concentration polarization, membrane contamination, methods of polarization and contamination reduction. Module types, plate module, spiral module of capillary module, module with hollow fiber. Basic terms.

18. Learning methods:

- Lectures,
- Laboratory exercises,
- Consultation.

19. Assessment methods:

During the course student must do two partial (I and II) tests from the theoretical part. The subject teacher writes the grade in the index after completing all obligations for the subject (the signature from the teacher in the index) for the students who have passes I and II tests from the theoretical part of the curriculum with the maximum number of points.

All students who did not pass a test (I or II), or who are not satisfied with the grade, and have done all the obligations for the subject (the signature from the subject teacher in the index) approach to the final exam.

After each test or exam, the results will be displayed on the course board within 7 days.

20. Assessment components:

The exam grade is based on the total number of points which the student acquire by completing pre-exam requirements and passing the exam, according to the quality of the acquired knowledge, and contains maximum of 100 points, and is determined as follows:

Student's obligations	Points
Attendance and participation	10 points
Seminar paper	5 points
Test in theoretical part	20 (minimum number of points to pass 10 per test)
Practical exercises	5
Final exam	40

21. Required reading list:

- Noble R.D., Stern S.A.: Membrane separations, Technology, Principles and Applications, Elsevier, (1995).
- K. Košutić, Fizikalno kemijski procesi obradbe voda.
- K. Scott: Membrane Separation Technology, 1990.
- P.W: Atkins: Physical Chemistry, Oxford University, (2007).

22. Web sources:

(max. 687 characters)

23. Applicable starting from the academic year:

2015/16.

24. Adopted in the Faculty/Academy session: