SYLLABUS

1. Course title:

Process integration

2. Code:

3. Cycle of study:

1

4. ECTS credits:

6

5. Type of course:

(•) Mandatory ( ) Elective

6. Prerequisites:

7. Class restrictions:

No restrictions

8. Duration / semester:

1 8

9. Weekly contact hours:

9.1. Lectures:	3
9.2. Seminars:	0
9.3. Laboratory/Practice classes:	2

10. Faculty:

Faculty of Technology

11. Department/study program:

Chemical Engineering and Technologies

12. Lecturer:

Elvis Ahmetović, Full Professor

13. Lecturer's e-mail:

elvis.ahmetovic@untz.ba

14. Web site:

www.tf.untz.ba

15. Course aims:

Course aims are to:
- understand basic knowledge about process integration and its application in process industry,
- understand, critically analyze and solve problems of different complexity, and present their results,
- understand the importance of considering a process as a total system composed of more sub-systems,
- improve written and verbal communication skills.

16. Learning outcomes:

After completing the course and the teaching obligations students will be able to:
- use and analyze the available literature in order to obtain the necessary information,
- understand the basics of process integration and explain its importance from economic, environmental and social aspects,
- solve problems using process integration methods, assess the results of the calculation and draw conclusions,
- design a heat-integrated flow-sheet with minimum consumption of freshwater and utilities (steam, cooling water),
- present the results in written and verbal forms.

17. Course content:

Presentation of syllabus. Introduction to process integration. The needs for process integration. History and development of process integration. Motivating example of increasing manufacturing capacity and reducing consumption of water in the process. Traditional approaches to process development and improvement. Basics of process synthesis, analysis and integration. The basic steps in the process integration. The branches of process integration. Mass integration. Modeling of mass -exchange units (mass exchangers). Synthesis of mass-exchange networks. Heat integration. The synthesis of heat exchanger network. The benefits of using the process integration and its role in the process sustainability. Examples of application of process integration in practice.

18. Learning methods:

Lectures, laboratory (computer) exercises, seminars, consultations.

19. Assessment methods:

For checking the acquired knowledge in the course, written and oral examinations are used. Written examinations consist of knowledge examinations during the semester (Test I) and after the end of the semester (Test II), and an oral examination which consists of a short talk and discussion. Tests (I and II) consist of theoretical questions and calculation problems. During the semester students will be assigned with seminar works that should be completed and submitted by the end of the semester. Assessment is performed through the oral presentation of seminar work. Students should have a positive result after each assessment with at least 50% of the required knowledge. Student must achieve a minimum of 54 cumulative points in order to pass the course.
Students who intend to access the exam should be registered by the teaching assistant at latest two days before the exam. Registration includes A4 notebook on which it is necessary to write the name of the student, department, index number and academic year.

20. Assessment components:

Students obligations:	Weight (%):
Test I	40
Seminar work	20
Test II-Final exam	40

21. Required reading list:

1. El-Halwagi, M. M. (2006). Process integration. San Diego: Academic Press.
2. Biegler, L. T., Grossmann, I. E., Westerberg, A. W. (1997). Systematic methods of chemical process design. New Jersey: Prentice-Hall.
3. Ahmetović, E. (2016). Odabrana poglavlja hemijsko-procesnog inženjerstva. Tuzla: Univerzitet u Tuzli, Tehnološki fakultet.

22. Web sources:

23. Applicable starting from the academic year:

2015/2016

24. Adopted in the Faculty/Academy session: