SYLLABUS

1. Course title:

Analysis and simulation of processes

2. Code:

3. Cycle of study:

1

4. ECTS credits:

5

5. Type of course:

(•) Mandatory ( ) Elective

6. Prerequisites:

Mass and energy balances, Heat and mass transfer operations, Unit operations

7. Class restrictions:

no restrictions

8. Duration / semester:

1 7

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:

Chemical Engineering and Technologies/Chemical Engineering and Technology

12. Lecturer:

Midhat Suljkanović, Full Professor

13. Lecturer's e-mail:

midhat.suljkanovic@untz.ba

14. Web site:

www.tf.untz.ba

15. Course aims:

Aim of the course is studying of basic principles and methods of modeling, analysis and synthesis of process flow sheets e.g. acyclic and cyclic chemical systems including interactions between units and satisfying process and units' constraints.

16. Learning outcomes:

After finishing the course, students that have successfully completed their tasks will be able to: see and analyses and production system as and integrated system consisting of elementary unit processes; know and learn to apply basic principles of process synthesis of chemical systems; to analyze process structures; to know basics of mathematical modeling of chemical processes using computer tools; use Excel in solving chemical engineering simulation problems

17. Course content:

1. The course goals and tasks. The importance of the discipline for chemical process engineers. Application of course knowledge on the real time production processes. Basic principles of process synthesis (decomposition, heuristics, integrated-hypothetical, evolutionary).
2. Cyclic and acyclic systems. Basic stages and tasks of process analysis, Representation of chemical processes by using tables, graphs and matrices. Methods of process flow sheets calculations, advantages and disadvantages. Matrix and iterative methods of solving models. Methods of solution convergence. 3. Unit operators: mixers, splitters, heat exchangers, pump, compressor, turbine, valve, piping. Operators with chemical reaction: stoichiometric and equilibrium reactor. Unit operators of vapor-liquid equilibrium: partial evaporator and condenser, distillation column, flash unit, isothermal evaporator, vacuum crystallizer.

18. Learning methods:

-Lectures
-Exercises
-Individual work
-Lecture methods: unit lectures (lessons) presented by using computer technologies and multimedia as well as traditional lectures
-Choice of the methods depends on the unit lectures content; exercises are conducted in the groups of 10-12 students
-Active interaction of the students during exercises: one or two students work on the one computer

19. Assessment methods:

-Individual work (two by semester)
-Final/makeup exam

Individual student work involves the following abilities of the student to:
-understands and formulate the problem
-make the solution algorithm
-make a report of the problem solution steps
Final/makeup exam implies the software implementation of the individual works. The student is required to implement solution steps by using software packages such as (Microsoft Excel, Matlab, Polymath, Fortran, Basic etc.). The choice of the software package is on the student based on their knowledge of the software. However, students will be taught to solve simulation problems by using Excel and Visual Basic for Applications (VBA).

20. Assessment components:

Grade is based on the total number of points acquired during semester as well as final/makeup exam and the maximum number of points is 100 as follows:
- Lectures and exercise attendance (10 points), I individual work (25 points), II individual work (25 points).
-Final/makeup exam (40 points). In order to pass the exam student is to acquire minimum of 54 points.

21. Required reading list:

1. Seider, W.D, Seader, J.D. & Lewin, D. R. 1999. Process Design Principles, Synthesis, Analysis and Evaluation, John Wiley and Sons, Inc.
2. Himmelblau, D.M. 2004. Basic Principles and Calculations in Chemical Engineering, Prentice-Hall.

22. Web sources:

23. Applicable starting from the academic year:

2015/2016

24. Adopted in the Faculty/Academy session: