SYLLABUS

1. Course title:

REACTION ENGINEERING II

2. Code:

3. Cycle of study:

1

4. ECTS credits:

5

5. Type of course:

(•) Mandatory ( ) Elective

6. Prerequisites:

Reaction engineering I

7. Class restrictions:

8. Duration / semester:

1 7

9. Weekly contact hours:

9.1. Lectures: 4

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. Ivan Petric, PhD, Associate Professor

13. Lecturer's e-mail:

ivan.petric@untz.ba

14. Web site:

www.tf.untz.ba

15. Course aims:

- students to be familiar with the basics of reaction engineering and analysis of phenomena with chemical reactors,
- students to be familiar with the numerical software package POLYMATH in solving problems in the field of reaction engineering,
- students learn how to solve problems in the field of reaction engineering using interactive computer modules and simulation software.

16. Learning outcomes:

After the successful completion of the learning process, the student is expected to know, understand and be able to:
- review, evaluate and differentiate different principles demonstrated through teaching,
- solve different weight-weighted problems with or without application of the numerical software package Polymath,
- analyzes the available literature for solving various problems of this course,
- compares the results of the calculation obtained in different simulation cases.

17. Course content:

1. INTRODUCTION (Basic concepts). 2. REACTOR DESIGN FOR MULTIPLE REACTIONS (Qualitative and quantitative consideration of product distribution in parallel, consecutive and consecutive-parallel reactions. Instantaneous and total yield.) 3. INFLUENCE OF TEMPERATURE AND PRESSURE ON REACTION PERFORMANCE (Dependence of heat reaction from temperature. Definitions of equilibrium constants and their dependence on temperature. Optimum temperature regime. Heat balances for various types of reactor for single and multiple reactions. Non-stationary state.). 4. CATALYTIC REACTORS (Fixed-Bed Reactor Reactor. Spherical Reactor with fixed catalytic layer. Membrane Reactor. Advantages and Disadvantages of multi-staged adiabatic reactors with fixed catalytic layer). 5. RESIDENCE-TIME DISTRIBUTION (Residence-time distribution function. Characteristics. Diagnosis.). 6. MODELS FOR NEIDEAL (REAL) REACTORS (Models with zero, one and two parameters).

18. Learning methods:

- lectures with active participation and discussion of students,
- experimental exercises (Numerical Software Package Polymath, Reactor Lab Simulation Software, Interactive Computer Modules),
- consultations.

19. Assessment methods:

After approximately every five weeks in the semester, students take one Quiz, Test-Theory and Test-calculation problem, which cover up to date the topic from lectures and exercises. During the semester, three Quizes, three Tests-theory and three Tests-calculation problem will be organized. The professor will promptly notify students of the terms of each test of knowledge. For each Quiz, Test-theory, and Test-calculation problem, a student must achieve at least 50% of the total points predicted for specific test of knowledge. Quiz 2 is taken through interactive computer module (Heat Effects 1), and Quizzes 1 and 3 are taken through ten short questions with four offered answers (with more than one correct answer). The Tests-theory and the Tests-calculation problem are taken in writing. Each Test-theory is consisted of 20 short theoretical questions related to the material being studied. Each Test-calculation problem consists of one problem with several items to be solved. The final exam can be organized in writing and orally, depending on the number of points awarded.

20. Assessment components:

The exam score is based on the total number of points that a student has accomplished by completing the preexamination commitments and taking the exam, and it contains a maximum of 100 points, and is determined as follows: attendance and activity (4 points), Quizzes (each 6 points) , Tests-Theory (each 10 points), Tests-calculation problems (10 each), Final Exam (18 points). In order to pass the course, a student has to accomplish at least 54 points.

21. Required reading list:

1. Fogler, H. S. (1999): Elements of Chemical Reaction Engineering (3rd edition), Prentice-Hall Inc., Englewood Cliffs, New Jersey
2. Petric, I. (2014): Osnove hemijsko-inženjerske kinetike i reakcijskog inženjerstva, OFF SET, Tuzla

22. Web sources:

23. Applicable starting from the academic year:

2015/2016

24. Adopted in the Faculty/Academy session: