SYLLABUS

1. Course title:

REACTORS AND BIOREACTORS

2. Code:

3. Cycle of study:

1

4. ECTS credits:

7

5. Type of course:

(•) Mandatory ( ) Elective

6. Prerequisites:

7. Class restrictions:

8. Duration / semester:

1 6

9. Weekly contact hours:

9.1. Lectures: 3

9.2. Seminars: 1

9.3. Laboratory/Practice classes: 2

10. Faculty:

Faculty of Technology

11. Department/study program:

Chemical Engineering and Technologies / Ecological Engineering

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 analysis of reactors and bioreactors and their application at design,
- students to be familiar with the numerical software package POLYMATH in solving problems in the field of reactors and bioreactors,
- students learn how to solve problems in the field of reactors and bioreactors.

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 definitions and concepts. Significance and role of reactors and bioreactors in the process) 2. REACTORS (Kinetics of homogeneous reactions. Stoichiometry for Batch and Flow Reactors. Design Equations. Isothermal Reactors. Reactor combinations. Non-isothermal reactors.) 3. BIOREACTORS (Bioreactors for enzymatic fermentation, mechanism, determination of kinetic parameters, design equations, inhibition. Bioreactors for microbial fermentation, mechanism, determination of kinetic parameters, design equations).

18. Learning methods:

- lectures with active participation and discussion of students,
- theoretical exercises,
- experimental exercises (Numerical Software Package Polymath, 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 Quizzes, 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. Quizzes are taken through interactive computer modules. 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. Van't Riet, K., Tramper, J. (1991): Basic Bioreactor Design, M. Dekker, New York
2. Fogler, H. S. (1999): Elements of Chemical Reaction Engineering (3rd edition), Prentice-Hall Inc., Englewood Cliffs, New Jersey

22. Web sources:

23. Applicable starting from the academic year:

2015/2016

24. Adopted in the Faculty/Academy session: