SYLLABUS

1. Course title:

ANAEROBIC DIGESTION OF BIOMASS

2. Code:

3. Cycle of study:

1

4. ECTS credits:

3

5. Type of course:

○ Mandatory ◉ Elective

6. Prerequisites:

7. Class restrictions:

8. Duration / semester:

1 8

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:

Environmental protection engineering

12. Lecturer:

Vahida Selimbašić, Ph.D., associate professor

13. Lecturer's e-mail:

vahida.selimbasic@untz.ba

14. Web site:

www.tf.untz.ba

15. Course aims:

The objective of the course is to introduce students with advanced principles of anaerobic treatment of biomass and the importance of using anaerobic treatment of organic waste streams. One of the goals is also the application of anaerobic processes as a prerequisite for the realization of economic, environmental and social benefits for the individual and the wider community. During the course, students will be introduced to the basic concepts and technology of anaerobic degradation of biomass and the advantages of its use.

16. Learning outcomes:

Students will acquire basic knowledge on the advanced course of anaerobic treatment of biomass and the importance of applying anaerobic treatment of organic waste streams. They will be enabled to apply these principles and technologies in practice. Students will be familiar with the importance of anaerobic processes as a condition for achieving economic, environmental and social benefits for the individual and the wider community.

17. Course content:

Global supply and use of energy and fuels; Renewable energy sources: basic definitions; Physical basics of technology and dynamic characteristics of natural OIEs, Harmonization of needs and availability-storage of energy; Biomass, Biodegradable Organic Waste; Anaerobic digestion; Parameters of anaerobic processes; Substrate for anaerobic degradation; Characterization of Substrate, Principal Characteristics of Biogas, Energy and Power of Plant for Production and Use of Biogas; Biogas plant; digesters; Storage of biogas; Purification of biogas; Digestate, use in agriculture; Safety equipment; Biodegradation and anaerobic waste regulation - EU Directives; Bioplin in state laws. Administrative obstacles and incentives.

18. Learning methods:

Teaching methods are based on multimedia lectures and experimental exercises. In the lectures the problems are framed and the facts are analyzed and theoretically approaches the problem, and the exercises are done in interactive form and through practical work within laboratory exercises. Teaching methods imply that at least forty percent of time is devoted to the active participation of students through laboratory work.

19. Assessment methods:

Throughout the course, students are required to attend lectures and exercises on a regular basis, which will be monitored by the subject teacher and associates and, on special forms, keep records. During the semester, the student can be absent from a maximum of three lectures and three exercises, being obliged to bring proof of justification of absence (medical certificate, etc.). In the case of more unexcused absences, the student loses the right to the signature of the teacher.

• TESTS - Two tests throughout the semester. Each test consists of a maximum of 20 short theoretical questions related to the previously processed material and carries 20 points (for a passing grade, one should achieve a minimum of 8 points). Tests are usually conducted after every six weeks of classes, whereby the subject teacher will announce them to the students at least two weeks before each test.

LABORATORY EXERCISES: the student is obliged to do all laboratory exercises, and based on activity in exercises can achieve a maximum of 25 points (for a passing grade should achieve a minimum of 12 points).

• FINAL PART OF THE EXAM - Students who have collected the minimum required number of points for the pass grade (54 points) by all criteria, have the right on deserved grade or to use the option of additional (verbally or in writing) exam for a higher final grade. The maximum number of points that can be obtained on the final exam is 30. The minimum number of points, which must be reached on the final exam is 18.

All the students who did not meet the conditions in one of the tests or who are not satisfied with the grade, but who have completed all other obligations of the course (have the signature of the subject teacher in the index) take the final exam. The student can not get a final grade if he has not passed both

• SEMINAR WORK OF STUDENTS: students have the opportunity to do one seminar work. Successfully prepared and defended seminar work is evaluated with a maximum of 10 points (minimum 6 points), which are added to the total number of points achieved on other grounds in the formation of the final grade.

20. Assessment components:

The final grade is based on the total number of points obtained through pre-requisites and the final exam, according to the quality of the acquired knowledge and skills. It contains a maximum of 100 points, according to the following scale:
Regularity of teaching attendance (lectures + exercises): 5 points
Activity in laboratory exercises: 30 points
Tests (theory): 10 points
Final Exam: 30 points

21. Required reading list:

Đulbić M (1986). Biogas, Acquisition, Use and Construction of Equipment, Technical Book, Belgrade.
At Seadi T i sar, (2008). Biomass Handbook, Intelligent Energy Europe.
Đonlagić M (2010). Renewable Energy Sources, Renewable Energy Study En

22. Web sources:

http://www.kogeneracija.rs/biogas.html;
http://www.zelenaenergija.org/clanak/mala-skola-bioplina-sirovine-i-proces-dobivanja-bioplina/403

23. Applicable starting from the academic year:

2015/2016

24. Adopted in the Faculty/Academy session: