SYLLABUS

1. Course title:

ANALYTICAL CHEMISTRY

2. Code:

3. Cycle of study:

1

4. ECTS credits:

8

5. Type of course:

(•) Mandatory ( ) Elective

6. Prerequisites:

no course prerequisites

7. Class restrictions:

none

8. Duration / semester:

1 2

9. Weekly contact hours:

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

10. Faculty:

Faculty of Technology

11. Department/study program:

Chemical Engineering and Technologies, Food Technology, Environmental Protection Engineering

12. Lecturer:

Mirsad Salkić

13. Lecturer's e-mail:

mirsad.salkic@untz.ba

14. Web site:

www.tf.untz.ba

15. Course aims:

- the theory of analytical chemistry,
- practical introduction in laboratory work and numerical solution to analytic problems,
- solving problems of chemical quality and monitoring of technological processes of chemical and food industries, as well as the environment.

16. Learning outcomes:

- principles of chemical equilibrium in aqueous solutions of acids, bases, salts, slightly soluble compounds, complexes and redox systems,
- a connection between the principles of chemical equilibrium and methodology of analysis in technological processes,
- application of methods for separation of cations and anions,
- application of principles of gravimetric methods to the determination of analytes in real samples,
- application of principles of volumetric methods to the determination of analytes in real samples,
- application of extraction and chromatographic methods of separation,
- numerical solution to analytical problems.

17. Course content:

The classification of methods of analysis. Sampling and sample preparation. Chemical equilibrium. Equilibria in solutions of weak and strong acids and bases. Calculation of successive and cumulative equilibrium constants and pH of solutions. Diagrams of distribution. Buffers. Ampholytes. Solutions of salts. Equilibria in solutions of complexes, successive and cumulative stability constants. Diagram of distribution. Precipitation.
Factors which influence the precipitaion. Redox reactions. Factors which influence the electrode potential. Systematic analysis of cations and anions. Methods of quantitative analysis. Gravimetric analysis of elements and their mixtures. Volumetric analysis. Methods of sample preparation. Separation methods, extraction, ion-exchange, chromatogaphy. Principles of spectral methods. UV/VIS, IR, NMR.

18. Learning methods:

- lectures with students' active participation and discussion,
- seminars,
- practical laboratory work.

19. Assessment methods:

After one third of the semester, the students take the first mid-term test which includes the topics covered in the lectures and exercises. The test consists of tasks and theoretical questions. Maximum score in the first test is 20 points. After the second third of the semester, the students take the second mid-term test which includes the topics covered in the second third of the semester. The test consists of tasks and theoretical questions. Maximum score in the second test is 20 points. Students can score a maximum of 30 points for continuous activity in the lectures, practical laboratory work and seminars during the entire semester. At the end of the semester, students take a written final exam which covers the remaining topics from the lectures. The test consists of theoretical questions. Maximum score in the written final exam is 10 points.
All examination forms form part of the cumulative grade. Students pass the exam only if they pass each individual part of it.
The minimum requirement to pass the exam is 54 cumulative points.

20. Assessment components:

The final grade is based on the total number of points before and during the exam. The maximum score is 100 points, and it is calculated according to the following:

Students' tasks	Points
Attendance	10
Colloquia	20
Laboratory work and seminars	20
Tests	40
Final examination	10

21. Required reading list:

1. Skoog D. A., West D. M., Holler F. J. (1999). Osnove analitičke hemije. Zagreb: Školska knjiga.
2. Savić J., M. Savić M. (1990). Osnove analitičke hemije. Sarajevo: Svetlost.
3. Harris D. C. (1999). Quantitative Chemical Analysis. New York: W.H.

22. Web sources:

23. Applicable starting from the academic year:

2015/2016

24. Adopted in the Faculty/Academy session: