SYLLABUS

1. Course title:

BIOELEMENTS

2. Code:

3. Cycle of study:

1

4. ECTS credits:

3

5. Type of course:

○ Mandatory ◉ Elective

6. Prerequisites:

The student is not obligated to have an earlier passed exam

7. Class restrictions:

Regulated by UNTZ Statute

8. Duration / semester:

I I

9. Weekly contact hours:

9.1. Lectures:	2
9.2. Seminars:	0
9.3. Laboratory/Practice classes:	0

10. Faculty:

Faculty of Pharmacy

11. Department/study program:

Pharmacy (integrated 1st and 2nd cycles)

12. Lecturer:

D.Sc. Zorica Hodžić, Associate professor

13. Lecturer's e-mail:

zorica.hodzic@untz.ba

14. Web site:

15. Course aims:

The objective of the "Bioelements" module is to introduce students with the importance and the biological role of certain "inorganic" elements. Allocation of elements on macro and microelement, essential, non-essential and toxic, as well as their participation in biochemical processes, are the basis for studying this module. The center of the bioelement chemistry research is characterized by the interaction of individual metal centers with biological components.

16. Learning outcomes:

Through the realization of the set objectives and tasks in this module, students will master the knowledge of biological significance and the role of certain chemical elements in living systems, Develop awareness of the significance of these studies for the living world, especially for humans, its health, proper nutrition and the inclusion of essential elements at recommended doses. Due to the interdisciplinary character of this module, a solid basis for studying related science disciplines will be created at the same time. Students will acquire knowledge related to:
- Biodegradable elements, their distribution in nature and their bioavailability to living organisms.
- the average elemental composition of the human body and the characteristic symptoms of some elemental deficiency in humans
- input, transport, storage and the role of the most important metal and non-metallic elements in biological systems.

17. Course content:

Significance, development and basic principles of bioelement chemistry; Elements in living organisms and functions they perform; Paracelsus´ Principle; Synergism and antagonism of bioelements; Entering, transferring and storing O2 in organisms; biomaterials; Biological role of essential metals: Iron, copper, zinc, nickel, and cobalt; Biological function of transition elements: Mo, W, V, Cr and Mn; Alkaline and alkaline earth metals - electrolytes of body fluids; Ionic pumps, Biologically significant inorganic buffers; Toxic metals; Biological significance of nonmetals; Metal Influence on Oxidative Stress;

18. Learning methods:

Lectures with the use of multimedia resources, active learning techniques with student participation;

19. Assessment methods:

Knowledge breakthrough is done through seminars, two tests and oral exam.

Test I contains 10 questions
Test II contains 10 questions
Knowledge assessment - criteria

Criteria	Maximum number of points	Passage points
Test 1 and test 2	30	15
Final Exam	50	30
Seminars	20	10
Total	100	55

20. Assessment components:

Score Rating	(BiH)	(ECTS Rating)
<55.00	5	F
55.0 - 64.0	6	E
65.0 - 74.0	7	D
75.0 - 84.0	8	C
85.0 - 94.0	9	B
95.0 - 100	10	A

21. Required reading list:

1. W. Kaim, B. Schwedersky: Bioinorganic Chemistry, Inorganic Elements in the Chemistry of Life, Willey, Chicester, 1994.
2. J.J.R.Frausto da Silva, R.J.P. Williams: The Biological Chemistry of the Elements: the Inorganic Chemistry of Life, Oxford Univ. Press, Oxford, 2000.

3. I. Bertini, H. B.Gray, E. I. Stiefel, J. S. Valentine, Biological Inorganic Chemistry, University Science Book, 2007.

22. Web sources:

23. Applicable starting from the academic year:

2012/2013

24. Adopted in the Faculty/Academy session: