SYLLABUS

1. Course title:

SOIL PHYSICS

2. Code:

3. Cycle of study:

1

4. ECTS credits:

6

5. Type of course:

(●) Mandatory ( ) Elective

6. Prerequisites:

None

7. Class restrictions:

for students of Agronomy department

8. Duration / semester:

1 2

9. Weekly contact hours:

9.1. Lectures:	3
9.2. Seminars:	1
9.3. Laboratory/Practice classes:	0

10. Faculty:

Faculty of Technology

11. Department/study program:

Agronomy

12. Lecturer:

dr. sc. Amira Kasumović, associate professor

13. Lecturer's e-mail:

amira.kasumovic@untz.ba

14. Web site:

15. Course aims:

- acquirement of fundamental knowledge in the areas of general physics (mechanics, heat, thermodynamics, atomic and nuclear physics)
-acquirement of fundamental knowledge about physical processes in environment with special emphasis on soil and atmosphere
- training students for solving specific problems in general physics, soil physics and atmosphere physics
- development students' skills and competencies for the further self-education
- training students to apply the theoretical knowledge in practice

16. Learning outcomes:

At the end of this course and after completed obligations students will be able to:
- distinguish and determine the basic physical parameters of soil
- define a basic concepts of mechanics of solids and liquids
- interpret and apply basic basic principles of fluid mechanics, thermodynamics, atomic and nuclear physics
- indicate and analyze physical processes in soil and atmosphere
- apply a different physical methods and procedures for the soil parameters analyses
- apply acquirements for specific problem solving

17. Course content:

The subject matter and classification of physics. Physical quantities and units. Vector and scalar quantities. Importance of soil physics and its relation with other sciences. Soil as system. Basic physical parameters of soil. Basic concepts of kinematics. Motions along a straight line and circular motion. Newton's laws of mechanics. Impulse and linear momentum. The law of conservation of linear momentum. Energy. The law of conservation of energy. Pressure in a liquid. Buoyancy. Surface tension and capillarity. Ideal fluids. The continuity equation. Bernoulli's equation. Viscous liquids. Newton's law. Poiseuille's law. Stokes' law. The method of sedimentation. The states of water and water flow in the soil. Temperature and quantity of heat. Equation of state for an ideal gas. Ideal gas processes. Work done by ideal gas. The first and second law of thermodynamics. Phase transition. Heat transfer. The states of air in soil. Air properties of the soil. Air regime of the soil. Thermal properties of soil. Sources of soil heat. Heat transfer in a soil. Soil temperature. Planck's radiation law. Photoelectric effect. Compton effect. The models of atom. Atomic spectra. Bohr model of atom. Pauli principle. Basic properties of molecules. The nature and types of molecular bonds. Molecular spectra. Luminescence. Basic properties of atomic nucleus. Radioactive decay. Interaction of radiation with matter. Soil radioactivity. TENORM. The structure of the atmosphere. Atmosphere as ideal gas.

18. Learning methods:

Lectures and problem solving classes are carried out using following teaching methods:
oral presentation, discussion, active learning, self-learning, consultations.

19. Assessment methods:

Assessment of student knowledge is performed with following methods: exams -partial tests and final exam. During the semester two exams (tests) are organized each after 18 hours of lecture classes (generally 7th and 14th week of semester). Each test is valuated with maximum of 25 points. These tests are in written form and include certain number of questions and problems. Final written exam of the course contains questions and problems from all lecture materials. If student after final examination does not score enough points for pass grade (minimum 54 points) then he/she goes to re-exam. If student does not pass re-exam student goes to additional re-exam. Re-exam and additional re-exam are the same form as the final exam.

20. Assessment components:

Final grade is based on the total score of points that students achieved on pre-exam obligations and on final exam. Final grade is determined according to the following scale and conditions:

	maximum points	
exam I	25	
exam II	25	
final exam	50	
total:	100	54 (minimum points for pass grade)

21. Required reading list:

1. Gajić, B. (2006). Fizika zemljišta, Poljoprivredni fakultet, Beograd
2. Vučić, V., Ivanović, D. (1990) Fizika I, II, III, Naučna knjiga, Beograd
3. Hillel, D. (2004) Environmental soil physics, Academic Press, San Diego, SAD
4. Lal R., Shukla M.K. (2004) Principles of soil physics. Marcel Dekker, New York
5. Andrews, D. (2010) An introduction to atmospheric physics, Cambridge Univ.press
6. Dimić, G., Mitrinović, I. (1990) Zbirka zadataka iz fizike (D), Građevinska knjiga, Beograd

22. Web sources:

23. Applicable starting from the academic year:

2016/17

24. Adopted in the Faculty/Academy session: