CURRICULUM

1. **Code of subject:** HK925A603

2. **Name of subject:** Modern Physics

3. **Credit value and course structure:**

   3.1.   4 credits

   3.2.   level of theoretical and/or practical character of subject: 50 % practice, 50 % theory

4. **Name of organizational unit responsible for its education:** Military Maintenance BSc

5. **Name of organizational unit responsible for its education:** Department of Natural Sciences

6. **Name, position, academic degree of tutor responsible for the curriculum:** Dr. István HORVÁTH, professor, PhD

7. **Number and type of classes**

   7.1. total number of classes per term:

   7.1.1. full time training: 28 (14 lecture + 0 seminar + 14 practice)

   7.1.2. correspondance training: 0 (0 lecture + 0 seminar + 0 practice)

   7.2. weekly number of classes - full time training: 1+1

   7.3. Further special modes, characteristics in knowledge transfer: none

8. **The academic content of the subject:** Atoms, chemical elements, electronic configuration. The structure of the nucleus, protons, neutrons, quarks. Nuclear energy and environmental protection. The quantum hypothesis and Planck's law of radiation. Basics of quantum mechanics. Indefinite relations. Schrödinger equation. Copenhagen Interpretation of Quantum Mechanics. The Unsolved Problems of Physics 100 Years Ago. The ether and the Michelson-Morley experiment. The principle of relativity. Minkowski spacetime. Time dilation, Lorentz contraction, twin paradox.

9. **Competences to be achieved:**

   Knowledge:

   - Knows the general laws, theories, and related concepts needed to practice the specialty of aeronautics.

   Capabilities:

   - Able to select the methods and procedures required for their job, and apply them individually and complexly.

   Attitude:

   - Open to new knowledge.

   - Open for the new achievements and innovations of their specialty, seeks to know, understand and apply them, and committed to continuous self-education.

   Autonomy and responsibility:

- Able to make decisions independently in the processes emerging in his / her field of responsibility, and to implement them with responsibility and within the legal framework.

10. Required previous studies: -

11. The syllabus of the subject:

    11.1. Modern physics.

    11.2. Theory of Relativity.

12. The frequency of offering the subject/its position in the curriculum of the term: yearly / 6th term

13. Requirements of attendance, acceptable absence, opportunity for making up missed classes: Students must be present at least 70% of the classes for acceptance of the subject, or else the signature will be refused. Absence must be justified during the first class after the absence. The student is required to obtain the material of the lecture and to prepare for it independently.

14. Term assignments, testing knowledge:

Two classroom tests during the term-time. The first test deals with the section of 11.1, the second one deals with the sections 11.2.

Re-taking the classroom test is allowed once in a term.

To obtain the grade, more than 50% of the points of the classroom test or the re-taken classroom test is needed. For the pass grade (2) 51-60% of the classroom test is needed, for the satisfactory grade (3) 61-75%, for the good grade (4) 76-90%, for the excellent grade (5) 91-100%.

15. The exact conditions of obtaining signature or credits:

    15.1. The exact conditions of obtaining signature: The prerequisite to obtain the signature is to attend the classes specified in 14 and to complete the term-time assignments specified in 15 with at least a pass grade.

    15.2. Evaluation: term mark as of section 14.

    15.3. The exact conditions of obtaining credits:

    The prerequisite to obtain the credits is to obtain the signature and at least a pass grade.

16. Bibliography:

    16.1. Compulsory readings:

1. Lev Davidovics Landau és Evgenij Mihajlovics Lifsic: Elméleti fizika I., Typotex Kiadó, 2010, ISBN: 978-963-2791-28-9
2. Lev Davidovics Landau és Evgenij Mihajlovics Lifsic: Elméleti fizika II., Typotex Kiadó, 2010, ISBN:978-963-2791-29-6
3. Tayor, Wheeler: Tér-idő fizika, Typotex Kiadó, 2005, ISBN: 978-963-9548-86-2 (in Hungarian)

    16.2. Recommended readings:

1. Feynman-Leighton-Sands: Mai fizika. Műszaki Kiadó, 2003 (in Hungarian)
2. Horváth-Szigetvári: Fizika példatár I. [Problem in physics I.] ZMNE jegyzet, 2006. (in Hungarian)

Budapest, January 31, 2023

Dr. Horváth István, PhD
professor