

The Midterm Exam program
on the discipline «**High Energy Physics**» for students of the fourth year of the
specialty «6M060400 – Physics»

The proposed MidtermExam program on discipline «**High Energy Physics**» is made according to the discipline syllabus. The program determines the requirements for the levels of mastering the academic discipline: what the student should have *an idea* after studying the course for 7 weeks, which should know what *skills* and *habits* should be formed.

At MidtermExam, students will be asked two theoretical questions and one task.

Midterm addresses the following questions:

1. Introduction: matter and forces.
2. Matter content of the Universe.
3. Forces, Grand unified theories.
4. The weak force.
5. The strong force.
6. Grand unified theories.
7. Experimental possibilities.
8. Neutrino experiments.
9. High-energy colliding-beam experiments.
10. Bubble chambers.
11. High-energy colliding-beam experiments.
12. Heisenberg and interaction picture.
13. Harmonic oscillator using Dirac operators.
14. Relativistic kinematics.
15. Centre-of-mass energy.

BIBLIOGRAPHY

1. D.H. Perkins, Introduction to High Energy Physics, Cambridge University Press, 2000.
2. Hochenergiephysik, Addison-Wesley, 1990. (out of press)
3. B. Povhu.a., Teilchen und Kerne, Springer, 8. Auflage, 2009. (Paperback)
4. Encyclopedia of Applied High Energy and Particle Physics, Ed. R. Stock, Wiley 2009.