The Midterm Examprogram
on the discipline « Physical theory of nuclear reactor and installations » for students of the fourth year of the speciality «6D060500 – Nuclear Physics»

The proposed MidtermExam program on discipline «Physical theory of nuclear reactor and installations» 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. Physics of Elementary particles
2. List of particles and characteristics
3. Discovering of Nucleon (proton and neuteron)
4. Introduction to Nuclear Reactor.
5. Classification of reactors
6. Mechanism of nuclear power reactors
7. Fission and heat generation
8. Mechanism of reactors: Cooling and reactivity control.
9. Electrical power generation
10. The theory of interactions.
11. Classification by type of nuclear reaction
12. Current technologies
13. How to work with reactors: emergency, security. mechanism

BIBLIOGRAPHY

***Basic*:**

1. A. Lyubimov., D.Kish. Введение в экспериментальную физику частиц. 2nd edition. 2001.
2. "DOE Fundamentals Handbook: Nuclear Physics and Reactor Theory". *2008*
3. Enrico, Fermi and Leo, Szilard U.S. "Neutronic Reactor" issued . 1955
4. Wilson, P.D., The Nuclear Fuel Cycle, OUP (1996)
5. Foster, Arthur R. and Wright, Robert L. Jr., Basic Nuclear Engineering, 3rd Edition, Allyn and Bacon, Inc., 1977.
6. Jacobs, A.M., Kline, D.E., and Remick, F.J., Basic Principles of Nuclear Science and Reactors, Van Nostrand Company, Inc., 1960.

Additional:

1. Technical and Economic Aspects of Load Following with Nuclear Power Plants, OECD Nuclear Energy Agency (June 2011)
2. Golubev, V. I.; Dolgov, V. V.; Dulin, V. A.; Zvonarev, A. V.; Smetanin, É. Y.; Kochetkov, L. A.; Korobeinikov, V. V.; Liforov, V. G.; Manturov, G. N.; Matveenko, I. P.; Tsibulya, A. M. (1993). "Fast-reactor actinoid transmutation"
3. Alex P. Meshik, The Workings of an Ancient Nuclear Reactor, Scientific American (26 January 2009; originally published in the October 2005 edition of *Scientific American*)

4. Knief, Ronald Allen, Nuclear Energy Technology: Theory and Practice of Commercial Nuclear Power, McGraw-Hill, 1981.

5. Lamarsh, John R., Introduction to Nuclear Engineering, Addison-Wesley Company, 1977