Subjects of the comprehensive examination
http://phd.physics.bme.hu/komplex_vizsga?language=en

PHYSICS

Condensed matter physics

1. Electrons in solids
2. Semiconductors
3. Magnetism
4. Superconductivity
5. Material characterization methods

Optics

6. Models of light
7. Optical and photonic devices
8. Laser physics
9. Optical metrology and spectroscopy
10. Optical materials

Statistical physics and thermodynamics

11. Quantum statistical mechanics
12. Non-equilibrium systems and chaotic dynamics
13. Complex systems and game theory
14. Computational methods and simulations
15. Phase transitions

Quantum theory

16. Many-body physics
17. Quantum field theory and particle physics
18. Quantum physics of electron systems
19. Quantum optics and quantum information science
20. Mesoscopic and strongly correlated systems

NUCLEAR TECHNIQUES

Fusion plasma physics

1. Concepts of fusion power generation
2. Magnetic confinement fusion technology
3. Theoretical fusion plasma physics

Medical physics

4. Teletherapy – photon and electron therapy
5. HDR and LDR brachytherapy
6. Medical imaging by ionizing radiation
7. Medical imaging by non-ionizing radiation

Nuclear metrology and radioanalytics

8. Radiation and particle sources
9. Detection of electromagnetic radiation and particles
10. Radioanalytical methods

Radiation protection

11. Radiation protection and its legislation
12. Pollution propagation and radioactive waste management

Nuclear reactor physics

13. Nuclear physics
14. Reactor physics
15. Thermal hydraulics
16. Monte Carlo particle transport methods
17. Nuclear reactors and fuel cycle
18. Operation and maintenance of nuclear reactors
19. Nuclear reactor safety