Course Information Sheet

University: *University of Prešov in Prešov*	
Faculty: *Faculty of Humanities and Natural Sciences*	
Code: *2FYZ/mSTAFY/22*	**Title of Course:** *THEORETICAL PHYSICS 2 - STATISTICAL PHYSICS AND THERMODYNAMICS*
Form of Study: *Lectures, seminars* **Number of contact hours:** *48* **per week:** *3/1* **per level/semester:**	
Number of credits: *4*	
Semester: *summer*	
Degree/Level: *2. level*	
Prerequisities: *The basics of molecular-kinetic theory of gases and thermodynamics from the general course in physics. The basics of the mathematical analysis and the theory of probability.*	
Grading Policy (Assessment/Evaluation): *individual work, written assignments, oral exam*	
Aims and Objectives: *To teach state values of the statistical systems (bodies), using the determination of the distribution functions (density of probability) of the traditional and quantum statistical physics. To show the application of the methods of the statistical physics to explain the principles of radiation of the bodies, the origin of superconductivity and superfluidity of the matters.*	
Syllabus/Indicative Content: 1. *The basic concepts of the statistical physics. The basic concepts from the theory of probability. Gibbs phase space.* 2. *Gibbs canonical distribution. Maxwell – Boltzmann, Bose – Einstein and Fermi – Dirac distribution* 3. *Statistical search of the characteristics of the ideal gas based on Maxwell – Boltzmann distribution.* 4. *The basics of the statistical thermodynamics. 1st and 2nd thermodynamical theorem.* 5. *Ideal gas entropy, 3rd thermodynamical theorem.* 6. *Statistical search of the characteristics of the real gas.* 7. *Statistical theory of the electric and magnetic susceptibility of the matters.* 8. *Bose – Einstein distribution. The principles of radiation of the absolutely black body.* 9. *The classical and quantum theory of the molar thermic capacities.* 10. *The laws of Bose gas.* 11. *The laws of Fermi gas.* 12. *Using the quantum statistical physics in the matters at low temperatures. Superfluidity and superconductivity.* 13. *Nonequilibium statistical physics. Boltzmann kinetic equation.*	
Suggested readings: 1. Čulík, F., Noga, M. 1982. *Úvod do štatistickej fyziky a termodynamiky*. Bratislava. 2. Chalupka, S. 1983. *Kvantová a štatistická fyzika II*. Košice: UPJŠ. 3. Kvasnica, J. 1983. *Štatistická fyzika*. Praha: Academia. 4. Beiser, A. 1978. *Úvod do moderní fyziky*. Praha. 5. Helrich, Carl S. 2009. *Modern Thermodynamics with Statistical Mechanics*. Springer.	
Language of Instruction: *English*	
Other course information:	
Lecturer/Instructor: *prof. RNDr. Marián Reiffers, DrSc.*	
Last update: *9. mája 2024*	
Approved by: *prof. RNDr. Marián Reiffers, DrSc.*	