Important information related to the running of competitions, posted according to art. 3, paragraph 5 of H. G. 457/2011

FACULTY OF SCIENCES

Department of Physics

Description of open position for competition:
Reader Position, pos. No.8

Subjects: Numerical methods and simulation in physics, Molecular physics and heat, Numerical and analogue modelling of biological processes, Methods and multiscale problems in numerical simulations

Scientific domain: **PHYSICS**

Tasks / activities related to the vacant position, including teaching time and types of activities included in their teaching or research time:

I. Teaching Norm:

Teaching activity	250 hours;
Practical lessons activities	56 hours;
Evaluation activities	80 hours.

Total time of teaching norm (teaching activity, practical works, mentoring for students in undergraduate diploma and master diploma examination, other educational activities) 1420 hours.
Weekly average working hours 16 conventional hours.

II. Research Norm: 300 hours (working out and developing scientific papers for communications, drafting of studies and articles, editing of books, participation in national and international scientific events and meetings)

The theme of competition tests, including lectures, courses or other similar works or topics of which the competition committee can choose themes of tests actually held:

1. The finite difference method.
2. Monte Carlo methods.
3. The first law of thermodynamics. Equivalent formulations.
4. The second law of thermodynamics. Reversible bi-thermal cyclic processes. Carnot's theorem.
5. Entropy. Clausius's equality. Clausius's inequality.
6. Irreversible cyclic processes. The law of increase of entropy.
7. Ordinary differential equations.
8. Stochastic Differential Equations.
9. Multiscale physical processes. Examples.
10. Multiscale numerical simulations performed for fluids and plasma fusion.

Selected Bibliography:

1. I. Simionescu, M. Dragnea, V. Moise, Numerical methods in technique, Technical Publishing House, Bucharest, 1995.
2. O. Sima, Monte-Carlo method in the study of radiation transport, Ed. All, Bucharest, 1994.
3. Şerban Ţiteica, Thermonynamics, RSR Academy Publishing House, Bucharest, 1982.
4. W. Greiner, L. Neise, H. Stocker, Thermodynamics and Statistical Mechanics, Springer Verlag, 1995.
5. Gh. Ciobanu, O. Gherman, L. Saliu, Molecular physics, thermodynamics and heat, Ed. Didactică și Pedagogică, Bucharest, 1983.
6. J. Mathews, K. Fink, Numerical methods using Matlab, Prentice Hall, 1999.
7. Grigorios A. Pavliotis, Andrew M. Stuart, Multiscale Methods, Averaging and Homogenization, Springer 2008.
8. Pang, Tao, An introduction to computational physics, Cambridge University Press, 1997.
9. Balescu Radu, Statistical Dynamics. Matter out of equilibrium, Imperial College Press, London, 1997.
10. M. O. Steinhauser, Computational Multiscale Modeling of Fluids and Solids. Theory and Applications, Springer-Verlag Berlin Heidelberg 2008.

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