

STANDPOINT

from DPSc. Vasil Borisov Milushev – professor in Faculty of Mathematics and Informatics, University of Plovdiv „Paisii Hilendarski“, retired since 2013

of the materials presented for participation in competition
for filling an academic position „**associate professor**“
in University of Plovdiv „Paisii Hilendarski“

by Field of higher education 1. Pedagogical sciences
Professional direction 1.3 Pedagogy of teaching ...
Scientific specialty Methodology of teaching Physics

In the competition for associate professor/ professor, announced in National newspaper, copy 40 from 14th May 2021 and in the web page of University of Plovdiv „Paisii Hilendarski“ for the needs of the department „*Educational technologies*“ to Faculty of Physics and Technology, chief assistant PhD **Hristina Georgieva Petrova** from University of Plovdiv „Paisii Hilendarski“ participates as a candidate.

1. General presentation of the procedure and the candidate

With order № P33-3129 from 12th July 2021 of the Rector of University of Plovdiv „Paisii Hilendarski“ (PU) I am determined for member of the scientific jury in competition for taking an academic position ‘**associate professor**’ in PU by Field of higher education 1. Pedagogical sciences, Professional direction 1.3 Pedagogy of teaching ... , Scientific specialty Methodology of teaching Physics **announced for the needs of** the department „*Educational technologies*“ to Faculty of Physics and Technology of Plovdiv „Paisii Hilendarski“.

For participation in the announced competition **one candidate** has handed over documents: chief assistant PhD Hristina Georgieva Petrova from Department Educational technologies to Faculty of Physics and Technology of Plovdiv „Paisii Hilendarski“.

Presented by chief assistant PhD Hristina Georgieva Petrova set of materials on electronic carrier is in correspondence with the Regulations for development of the academic staff of PU and includes the following documents:

- Application form to the rector for admission to the competition;
- Curriculum vitae in European format;
- Diploma for educational qualification degree "Master";
- Diploma for educational and scientific degree PhD;
- List of scientific works;
- Verification on the implementation of the minimum national requirements for acquiring the academic position "Associate Professor", according to NACID and Art. 65. (3) of PRASPU;
- Annotations of the materials under Art. 65 of PRASPU, including self-assessment of contributions;
- Annotations of the materials in English;
- Declaration of originality and authenticity of the attached documents;
- Certificate of work experience;
- Documents for educational work (curriculums and published teaching materials);
- Documents for scientific and research work;
- Other documents (certificates for participation in projects, official notes, certificates);
- Set of documents (monography, articles) on electronic carrier.

Chief assistant PhD Hristina Georgieva Petrova is the author/co-author of a total of 57 scientific works.

Brief biographical data about the candidate

Hristina Georgieva Petrova is born on 11th August 1966 in Karnobat. She finished secondary school in SOU 'Cyril and Methodius' in Karnobat. In 1990 she acquired Master degree in PU 'Paisii Hilendarski' with qualification teacher of Physics and teacher of Chemistry. She has after-diploma specialization on Methodology of teaching Chemistry in PU 'Paisii Hilendarski' (1992-1993) and one month specialization on Didactics of Physics, Chemistry and Biology in Department of agronomical sciences, Gembloux, Belgium. Hristina Petrova's total work experience which is entirely pedagogical is 28 years. More concrete from 1993 to 1995 she had worked as an assistant in the Department of Mathematics, Physics and Informatics of Pedagogical Institute in Smolyan. From 1996 until now she has worked consecutively as an assistant, senior assistant and chief assistant in PU 'Paisii Hilendarski' in Department Methodology of teaching physics, which was renamed in 2012 as Educational technologies. From 2008 to 2011 she is working on a dissertation on independent preparation in Department Methodology of teaching physics to Faculty of Physics in PU. On 15 th December 2011 chief assistant Hristina Petrova defended a dissertation on topic: Use of the graphical method in physics education in secondary school (sections Kinematics and Thermal phenomena), with she acquired Educational and Scientific Degree 'PhD'.

Chief assistant Hristina Georgieva Petrova has command of English and Russian (excellent level) and French (very good level). She has organizational, technical, social and other skills and competences: guidance of pedagogical practice, practice and exercises, teamwork, participation in national and international science conferences, work with computer systems and webs (MS Office, Windows, Internet Explorer, CorelDraw and others). This information shows that chief assistant Hristina Petrova practically carries out continuously education and increasing her professional qualification. From them it can be seen permanently expressed interest in the chosen occupation and in the science specialty Methodology of teaching physics, solid theoretical and pedagogical preparation and ambition for professional improvement.

Personal impressions

I have known Hristina Petrova since she started working at the University of Plovdiv, as well as from her participation in various scientific forums - conferences, seminars, etc. My impressions of her as a teacher and researcher are excellent.

2. General characteristics of the candidate's activity

Assessment of educational and pedagogical activity and preparation of the candidate

The professional activity of chief assistant professor PhD Hristina G. Petrova as a university lecturer is in the field of: Methodology of teaching physics, Theory and methodology of the didactic test, Methodology of the teaching experiment in physics, ICT and work in digital environment, Applied Physics, General Electrical Engineering, Electrical engineering part 1, Electrical engineering part 2, The graphical method in teaching physics, Docimology, Educational technologies in physics with graphical modeling and physics learning experiment, Learning tasks with physics content in teaching "Man and Nature" in fifth and sixth grade, AVITO. In these disciplines chief assistant PhD Hristina Petrova has developed relevant curriculums (12) and lecture courses.

She also leads workshops and seminars for students from the Faculty of Physics and Technology, Faculty of Chemistry and Faculty of Biology at PU 'Paisii Hilendarski' University of Plovdiv, as well as laboratory exercises in AVITO and ICT for students from the Faculty of Biology,

Faculty of Pedagogy, Faculty of Chemistry, Faculty of Philology, Faculty of Philosophy and History, as well as the management and organization of the pedagogical practice in physics of the students of bachelor's and master's degree.

For some of the mentioned academic disciplines chief assistant PhD Hristina Petrova has developed (independently) educational appliances- two methodological manuals and a book of graphical problems in physics for secondary schools, designed for students and pupils.

In addition, chief assistant PhD Hristina Petrova conducts organizational and methodological work with teachers and principals of schools with which the University of Plovdiv has concluded contracts for the practical training of students. She has lectured in the courses for obtaining additional qualification at the Department at the University of Plovdiv "Paisii Hilendarski". She has participated in seminars with teachers on various current issues in teaching physics in secondary school.

From the attached reference for the auditorium work load it is evident that during the last five academic years the candidate in the competition chief assistant professor PhD Hristina Petrova has always exceeded the annual standard, reaching even 543 hours in the academic year 2018/2019. She is the scientific supervisor of seven successfully defended graduates, 4 of which are from bachelor's programs and 3 - from master's.

Evaluation of the scientific and scientific-applied activity of the candidate

For the current competition chief assistant Professor PhD Hristina Petrova has presented a total of **37** scientific works. The distribution of scientific works by relevant sections is as follows:

1 monography, **2** methodological manuals and **1** book of graphical problems in physics, **7** scientific articles (all without co-authorship) are in journals with Impact factor or Impact rank, **2** articles are in referenced and indexed journals abroad, **18** articles in refereed and indexed Bulgarian journals and scientific papers, **1** article from a scientific conference in Bulgaria with international participation and **5** articles from national scientific conferences or scientific sessions. Of the publications submitted for the competition, **5** are in English (**3** independent and **2** co-authored), and the rest are in Bulgarian (all are independent). I accept all 37 scientific works for review, as they are outside the dissertation. Therefore, all are taken into account in the final evaluation of the candidate in the competition.

The monography "Graphical Modeling in Physics Education" is 157 pages long and is structured in a preface, three chapters, a conclusion and literature. In it chief assistant PhD Hristina Petrova presents a comprehensive concept of the nature and use of graphical modeling in physics education in secondary school. As a result of analyzing a significant number of world-famous literature sources, the following are highlighted: the main didactic and applied aspects of graphical modeling in secondary school; some psychological features in the realization of various aspects of the uses of graphical modeling of physics objects, processes and phenomena. A number of author's works on the considered subject are systematized, as well as a lot of researches of other authors, which have been successfully interpreted by Hristina Petrova for the purposes of teaching physics.

Specific uses of graphical modeling in the study of many topics of the school course in physics are precisely presented.

Appropriate algorithms for plotting functional dependencies set in different ways (formulas, experimentally obtained values, verbal description, etc.) are derived, as well as algorithms for determining a formula for graphically presented dependence, for graphically determining a physics quantity, for plotting a "family" of graphs of similar processes, etc.

Many graphical tasks have been developed for different topics of the school course.

A special paragraph is dedicated to computer graphical modeling, which is realized with the help of the Internet resource *Volfram Mathematica online*, which is based on the program

Mathematica, developed by Prof. Gocheva.

The theoretical foundations of the problem of the importance and use of the graphical method in the teaching of physics in secondary school are presented in the methodological manuals [2] and [3]. Specific methodological developments on topics from "Kinematics" and "Thermal Phenomena" are proposed in [2]. The possibilities for application of the graphical method in teaching topics from the sections "Dynamics" and "Statics" are considered in [3]. These guides offer generalized rules for using the graphical method and original visualization tools. Systems of tasks which are systematized in groups according to certain features are presented. In each of the groups various, interesting and tasks of varying difficulty are presented. They suit requirements of the main didactic principles – scientific, orderliness, succession and clarity) and help develop students' thinking. Increased difficulty tasks for elective physics training are also included.

The methodical manuals can be used effectively in the teaching practice of physics - both by the students in their pedagogical practice and by the current teachers of physics.

The book with graphical problems in physics [1] refers to the section "Thermal phenomena". It contains training problems and problems with increased difficulty, which suppose quick wits, logical thinking and creativity during solving them.

The publications presented for the competition by chief assistant PhD Hristina Petrova refer to the following thematic research directions:

1. Research and developments related to the methodology of graphical modeling in physics education [monography and articles № 1; 2; 3; 4; 10; 15; 24; 30; 33].
2. Research aimed at developing a methodology for the use of innovative educational technologies in physics education, including ICT - [6; 7; 13; 26; 28; 30].
3. Construction of algorithms (for plotting functional dependencies, set in different ways, as well as for finding formulas for given graphs) - [1; 2; 4].
4. Research on the content, methodology and technique of the physics experiment - [9; 13; 32].
5. Creating a methodology for the formation of physical knowledge, based on the graphical modeling of physical laws, processes and phenomena - [monography and articles № 3; 11; 12; 15; 19; 20; 22; 23; 25; 27].
6. Developments related to the formation of meta-subject universal skills in students - [4; 5; 13; 14; 30].
7. Development of classification of graphical tasks and methodology for their solution - [monography and articles № 1; 2; 4; 10; 12; 16; 18; 21; 33].
8. Developments related to the using of the reflexive approach in physics education - [6; 29; 31].
9. Development of educational appliances and methodical manuals for students and pupils – [Educational appliances № 1; 2; 3].

I will note that in general I accept the scientific contributions described in the self-assessment of the candidate in these thematic directions. I think that the contributions are significant for the theory and practice of the methodology of teaching physics in secondary school. The contributions are personal work of chief assistant PhD Hristina Petrova.

Her publications, especially the monography, the two methodological manuals and the book of graphical tasks for students and pupils are implemented in the teaching practice. They fully meet the specific requirements of the FTF at the Paisii Hilendarski University of Plovdiv.

35 of 37 publications presented for the competition, are independent, only one is with one co-author and another one is with two co-authors.

Chief assistant PhD Hristina Petrova has a total of 19 citations.

Article № 8 is cited in 8 publications by foreign authors, 6 of which have an impact factor. Article № 9 is cited in 5 publications by foreign authors, 1 of which has an impact factor and 2 have an impact rank. Article № 6 is cited in 1 publication by a foreign author. Another five articles were cited once.

Participation in projects

Chief assistant PhD Hristina Petrova had participated in the developing of projects – 2 international (member of a team) and 2 national (expert teacher in one of them and leader of the expert group in the other one).

3. Critical remarks and recommendations

I don't have critical remarks. Documents and materials for the competition are precisely formed. Only in article 14 there are missing pages in the electronic variant, which I have received.

I suggest that Hristina Petrova should lead development of dissertations.

CONCLUSION

The documents and materials submitted by chief assistant PhD Hristina Georgieva Petrova meet all the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria, the Regulations for implementation of the Law on the Development of Academic Staff in the Republic of Bulgaria and the relevant Regulations of PU "Paisii Hilendarski".

The candidate in the competition has submitted a **sufficient** number of scientific works published after the materials used in the defense of Educational and Scientific Degree 'PhD'. In the works of the chief assistant PhD Hristina Petrova there are original scientific and applied contributions, which have received international recognition and most of them are published in journals and scientific books, published by international academic publishers. Her theoretical developments have practical applicability and most of them are directly oriented to the educational work.

The scientific and teaching qualification of chief assistant PhD Hristina Petrova is undoubtedly at a very high level.

The results achieved by her in the teaching and research activities **fully** comply with the specific requirements of the Faculty of Physics and Technology of PU "Paisii Hilendarski", accepted in connection with the Rules of Plovdiv University for application of Law on the Development of Academic Staff in the Republic of Bulgaria.

After getting acquainted with the materials and scientific works presented in the competition, analysis of their significance and the containing scientific, scientific-applied and applied contributions, I find it reasonable to give my **positive conclusion** and recommend to the Scientific Jury to prepare a report-proposal to the Faculty Council of the Faculty of Physics and Technology for the election of chief assistant PhD Hristina Georgieva Petrova for the academic position 'Associate Professor' at the University of Plovdiv "P. Hilendarski" by professional field 1.3. Pedagogy of teaching .. (Methodology of teaching physics).

11th August 2021

Prepared the standpoint:

/ DPSc., Vasil Borisov Milushev/