

REVIEW

**on the competition for holding the academic position of “Associate Professor”
in professional field 1.3. Pedagogy of education in ... (Informatics and Infor-
mation Technology)**

**for the needs of Sofia University “St. Kliment Ohridski” (SU),
Faculty of Mathematics and Informatics (FMI),**

**announced in the State Gazette issue 61 of 02.08.2022 and on the web pages of
FMI and SU**

This review is prepared by Professor Kosta Andreev Garov, PhD, University of Plovdiv “Paisii Hilendarski”, Plovdiv, in my capacity as a member of the Scientific Jury in the competition in professional field 1.3. Pedagogy of education in ... (Informatics and Information Technology) based on order № RD-38-564/30.09.2022, issued by the Rector of Sofia University.

To participate in the competition, documents have been submitted by **only one candidate** – Chief assistant Philip Petrov Petrov, PhD, from FMI of Sofia University “St. Kliment Ohridski” (SU).

I. General description of the submitted materials

1. Application data

In my capacity as a reviewer, I have received and carried out a verification of all the documents submitted by the candidate for participation in the competition. I have determined the accuracy of the filed administrative documents and scientific publications and their compliance with the Act for the Development of the Academic Staff in the Republic of Bulgaria (ADASRB), the Rules for the Implementation of the ADASRB (RIADASRB), and the Rules on the Conditions and Procedure for Acquiring Science Degrees and Holding Academic Positions in Sofia University “St. Kliment Ohridski” (RCPASDHAPSU).

To participate in the competition for occupying the academic position of “Associate Professor”, the candidate Chief assistant Philip Petrov, PhD, has presented a list of 17 scientific papers in total, including 15 publications in Bulgarian and foreign scientific journals and scientific forums and 2 monographs. The total number of publications by Philip Petrov is impressive – 2 monographs, 22 scientific papers, 4 textbooks, and books. In addition, 7 other documents are presented in the form of official notes and certificates from the employer, supporting the candidate’s achievements and the regularity of the competition.

1. Biographical data

Philip Petrov Petrov has a solid education in the field of mathematics, informatics, and information technology. He completed his secondary education at the innovative 151 Secondary Comprehensive School Profiled by Interests (SOUPI) in the city of Sofia, profile: program products and systems. In 2006, he successfully completed his higher education in the

specialty of “Applied Mathematics” at FMI of Sofia University and obtained the educational degree “Bachelor”. In 2008, he successfully completed the master’s program “Technologies for Teaching in Mathematics and Informatics” at FMI of SU.

Philip Petrov’s working career began in 2004 at Abacus Trade Ltd., which deals with web hosting. Until 2008, he held the positions of Technical Support Operator and Head of a Technical Support Team in the company, mainly consulting clients from the USA on the services offered by the company. During the period 2009-2015, Philip Petrov worked as an assistant professor at the Faculty of Computer Systems and Management (FCSM) of the Technical University (TU) in Sofia. There he taught courses in Databases, Computer Programming and Use, Programming Technologies for Secure Code, etc. For some time, he was a teacher in mathematics and information technology at the Private Profiled High School of Educational Technologies, teaching the subjects of *Mathematical Logic* and *Java Programming*. From 2010 to 2014, he was a doctoral student at the South-West University “Neofit Rilski” in the doctoral program Methodology of Education in Mathematics. Since 2015, he has been a Chief assistant at FMI of Sofia University “St. Kliment Ohridski”. Philip Petrov conducts lectures and seminars in the academic disciplines of *A School Course in Informatics*, *A School Course in Information Technology*, *Basics of Secure Web Programming*, *Programmed Learning*, etc.

Philip Petrov’s educational qualification and professional realization logically lead him to develop a dissertation thesis in the field of methodology of teaching mathematics. In 2014, he successfully defended a dissertation titled “An Organizational Model for the Application of Interactive Methods in Algebra Education” and obtained the educational and scientific degree “Doctor” in professional field 1.3. Pedagogy of education in ... (Mathematics).

2. General characteristics of the scientific papers and achievements of the candidate

The scientific works presented by the candidate for participation in the competition **meet** the minimum national requirements (according to Article 2b, Paragraphs 2 and 3 of the Act for the Development of the Academic Staff in the Republic of Bulgaria (ADASRB)) and, accordingly, the additional requirements of SU “St. Kliment Ohridski” for occupying the academic position of “Associate Professor” in the field of higher education 1. Pedagogy, professional field 1.3. Pedagogy of education in... (Informatics and information technology). The following conclusions can be drawn from the certificate of fulfillment of the minimum national requirements by the applicant:

According to indicator **A** of the requirements, with a minimum number of required **50** points, Chief assistant Philip Petrov, PhD has **50** points. According to indicator **B**, with a minimum number of required **100** points, the candidate has **100** points. According to indicator **C**, with a minimum number of required **200** points, Chief assistant Philip Petrov, PhD has **225** points. According to indicator **D**, with a minimum number of required **50** points, Chief assistant Philip Petrov, PhD has **55** points. The total number of points of the candidate is **430** and **exceeds** the minimum number of points required for holding the academic position of “Associate Professor” in the field of higher education 1. Pedagogy, professional field 1.3. Pedagogy of education in ... – **400 points**.

The scientific works and achievements of the candidate are mainly in the field of methodology of teaching in mathematics, informatics, and information technology in secondary and higher education in Bulgaria. The scientific works presented by Philip Petrov for participation in the competition **do not repeat** those from previous procedures for obtaining a scientific degree and academic position. There is no evidence of plagiarism in the scientific works submitted for the competition. He has followed the rules of scientific ethics – he has not published the same manuscript in different journals, there is **no plagiarism**, and he has not used the “**copy-paste**” technique in the publications submitted for review.

3. Characteristics and assessment of the candidate’s teaching activity

The presented documents show that almost all of Philip Petrov’s professional experience consists of teaching activities. He has conducted training in:

- “Databases” to students from the Faculty of Computer Systems and Management (FCSM) at the Technical University of Sofia (TU);
- “Programming and use of computers” to students from FCSM at TU;
- “Software technology for secure code” to students from FCSM at TU;
- “A school course in informatics” to students from FMI at SU;
- “A school course in information technology” to students from FMI at SU;
- “Fundamentals of secure web programming” to students from FMI at SU;
- “Programmed instruction” to students from master’s programs of FMI at SU;
- “Linear algebra” to students from the Southwest University “Neofit Rilski” (SWU);
- “Analytic geometry”, to students from the SWU “Neofit Rilski”;
- “Mathematical logic” to students from the Private Profiled High School of Educational Technologies;
- “Java Programming”, to students from the Private Profiled High School of Educational Technologies and other academic disciplines in the educational institutions where he worked.

The feedback regarding the teaching activity of Chief assistant Philip Petrov is very good. It is also confirmed by the fact that he regularly raised his qualifications and advanced in his academic career.

4. Scientific and scientific and applied achievements of the candidate contained in the materials for participation in the competition

Chief assistant Philip Petrov, PhD has indicated 5 groups of scientific contributions from his scientific activity. The contributions of the scientific works presented for the competition are in the field of theory and practice of education in mathematics, informatics, and information technology, programmed instruction, and technological tools to support education in mathematics, informatics, and IT. The reviewer **acknowledges** the mentioned contributions and considers that the most important of them are the following:

Contribution 1: Solving problems of education in informatics in Bulgarian schools.

In the **monograph “Challenges to Education in Informatics in Bulgarian Secondary Schools”**, an in-depth analysis is made of the current problems in the curricula and educational content of the school courses in informatics and IT. It is proposed to restructure the existing curricula so that, with minimal displacement of learning content between different classes, the

basic knowledge of informatics is more accessible to students. A review of the current state of the curricula in universities is made for the majors in which informatics teachers are trained, and more specifically, hands-on experience is shared from the Department of Education in Mathematics and Informatics at the University of Sofia "St. Kliment Ohridski". A positive opinion has been expressed regarding the new school subject that has been gaining popularity – "Computer Modeling"; however, it is a motivated and justified opinion that even a substantially increased curriculum in pre-primary and primary education cannot fully **compensate** for the dropout of the subject of "Informatics" from the curriculum of compulsory subjects in non-specialized secondary schools.

Contribution 2: Programmed instruction

Programmed instruction and, in particular, Prof. Ivan Ganchev's developments for educational dialogue computer programs were the first contact with scientific work of Philip Petrov as a university student. His master's thesis is related to them and later some of these publications became the basis for part of his doctoral dissertation.

In the **monograph "Theory of educational dialogue computer programs"**, a literary review of the history of programmed learning is made as well as a summary of all scientific works related to educational dialogue computer programs, a significant part of which is with the participation of Philip Petrov. The author's contributions are highlighted and part of his experience is presented associated with working on student projects in recent years.

Contribution 3: Innovative methods for teaching informatics and IT

In the **article "Adapting interactive methods in the teaching of Linear Algebra – results from pilot studies"**, a summary is made of the results of five experimental organizational models for teaching students in Linear Algebra. Interactive methods for teaching during seminars and an electronic system with technological aids have been introduced to support the learning of university students while doing their homework.

The article "Combining the procedural and the set-based approaches in the teaching of SQL SELECT statements in the introductory databases course" presents the candidate's experience of reforming the educational content for laboratory seminars in the academic subject of "Databases". Two main approaches to solving problems from the subject area are described and a combined approach is proposed for their parallel introduction as opposed to the classic sequential one; in addition, results are shared by comparing control and experimental groups.

In the **article "Introduction of elements of parallel and network programming in an object-oriented programming course"**, experience is shared from a five-year experiment for early introduction of threads and sockets as early as the second year of student education in the course of "Programming and use of computers – 3" (PIK-3). A detailed comparison of examination grades in two academic subjects is made between the control and experimental groups. The experimental model has been permanently established and the created educational materials are used in teaching the PIK-3 subject to this day.

The article “Organizational model for conducting classroom observation and current pedagogical practice in informatics and IT” share the candidate’s experience of implementing an organizational model for conducting pedagogical practice, where pairs of groups of university students exchange the schools they attend in the middle of the semester. The main goal is for students to observe more basic teachers and gain experience with learners of different age groups. The results of the experiment were evaluated as positive, and at least within the Department of Education in Mathematics and Informatics, the team of lecturers in informatics and information technology intends to continue it in the long run.

The article “Application of the game “I have..., who has...?” in revision lessons on Information Technology in lower and upper secondary education” describes a specific method of teaching young children, which was adapted and applied in the IT education of students in lower and upper secondary schools. The game element was reported to increase concentration and discipline and students were more focused on the learning tasks. No significant increase in grades was recorded but a distinctly positive result was observed from a psychological point of view for both the students and their teacher.

Contribution 4: Technological tools to support the teaching of mathematics and informatics

The article “Practical examples of technological tools for implementation of web 2.0 education in mathematics” presents and analyzes the functionalities of software applications for integrating technologies for displaying mathematical formulae and entering mathematical text into web forms. Special attention is paid to the possibilities of transferring information between a website and desktop applications (and vice versa), as well as the possibilities of indexing the entered mathematical text by search engines.

In the article “Online collection of sophism problems in mathematics, informatics, and informational technology”, an author’s website is presented with a collection of problems with sophisms. Their usefulness as a method of creating cognitive dissonance in students is emphasized. The collection of problems is available online to date and is being supplemented with new problems.

In the article “Hybrid Classroom – the Experience of the 107th Khan Krum Primary School in Sofia, Bulgaria”, a set of technological tools is presented for conducting hybrid training (where teaching is carried out in a physical and an online classroom at the same time). An innovative system for capturing the blackboard in the classroom is shown so that the teacher becomes semi-transparent and does not obscure the writing for students watching the lesson remotely. A pilot experiment with this technique is described and feedback is taken from teachers and student trainees in various academic subjects.

The results of the studies of Chief assistant Philip Petrov, PhD have found an echo in the specialized scientific literature – he has presented **6 known citations** of his publications, 4 of which are in publications referenced in the world-famous **Web of Science** database.

5. Critical remarks and recommendations

I have no critical remarks. The scientific production provided for participation in the competition does not contain significant weaknesses that would detract from its merits. As a recommendation, I can point out that would be appropriate for the candidate to publish more independent research and ultimately have more publications in scientific journals abroad.

6. Personal impressions of the candidate

I know the candidate vaguely from joint participation in various scientific conferences and forums. He is a respected teacher and a reliable colleague.

7. Conclusion on the application

After getting acquainted with the materials and scientific works presented in the competition and based on the analysis of their significance and the scientific and scientific and applied contributions contained in them, I **confirm** that the scientific achievements meet the requirements of the Act for the Development of the Academic Staff in the Republic of Bulgaria (ADASRB), the Rules for their implementation, and the relevant Rules on the Conditions and Procedure in Sofia University “St. Kliment Ohridski” for acquiring the academic position of “Associate professor” in the field of higher education and the professional field of the competition. In particular, the candidate **meets the minimum** national requirements in the professional field and **no plagiarism has been found** in the scientific works submitted for the competition.

I give my **positive conclusion** on the application.

II. GENERAL CONCLUSION

Based on the above, I **recommend** to the scientific jury to propose to the competent authority at the Faculty of Mathematics and Informatics at Sofia University “St. Kliment Ohridski” to elect Chief assistant **Philip Petrov Petrov**, PhD for the academic position of “**Associate professor**” in professional field 1.3. Pedagogy of education in...(Informatics and IT).

12.11.2022

Reviewer:

/Prof. Kosta Garov, PhD/