REVIEW

for procedure for academic position “**professor**”

Domain of High education: **4. "Natural sciences, mathematics and informatics",**

Professional field of study: **4.6 "Informatics and computer sciences" (**Context Modeling)

The competition is published in “State newspaper” N92/18 October 2022 for the needs of the Faculty of Mathematics and Informatics of Plovdiv University "Paisiy Hilendarski", Department “Computer technologies”.

Candidate: **Associated Professor Ph.D. Todorka Atanasova Glushkova** from Plovdiv University "Paisiy Hilendarski"

Member of the jury: **prof. DSc, PhD Eng. Todor Atanasov Stoilov**, Institute of information and communication technologies – Bulgarian Academy of Sciences, Sofia, Acad.G.Bontchev str., BL.2

I. Common biographical data of the candidate

Main data about the education and for his scientific degree and academic position of the candidate are summarized in Table1

Table 1.

Name	born	High education	Ph.D.	Associated prof.
Todorka Glushkova	19 November 1962	2003 г. – Plovdiv University, Master in informatics 1986г.– Plovdiv University, Master in mathematics	2011 - Plovdiv University, Ph.D. degree, specialty 4.6. Informatics and computer sciences	2018 г. Associated prof. in Plovdiv University in specialty 4.6. Informatics and computer sciences

In the submitted documents from the candidate, it has been written that she graduated from higher education as a bachelor and master in “mathematics” at Plovdiv University. In 2003 she completed a second master's degree in “informatics” and in 2011 she defended the educational and scientific degree "Ph.D" in the specialty

"informatics" again at University of Plovdiv. Since 2011 she was appointed as an "associate professor" at the same University. She declares also second appointment as a teacher in the Secondary school "Hristo Smirnenski", town of Bresovo, where she is responsible in training and education students in ICT (Information and Communication Technologies)

The candidate's current position is "associate professor" in the "Computer Technologies" department of University of Plovdiv.

II. General characteristics of the candidate's research and scientific-applied activities

The presented research papers for the competition for the academic position "professor" are prepared according to the legislative requirements in Bulgaria: The Law for academic promotion, The Rules for the application of this law. Additional proves and lists for the implementation of the Specific Requirements at Plovdiv University and on the specific requirements for professional field of study 4.6 "Informatics and Computer Sciences" are also added.

To participate in the competition, the candidate submits a total list of 35 scientific publications, one monograph and six University textbooks and study aids. These publications are included and categorized in the document "REFERENCE-Declaration of fulfillment of the minimal requirements for occupying the academic position of professor". The scientific publications are included in categories B and G of the reference for the minimal requirements, and textbooks and teaching aids are included in category E of the minimal requirements.

The reviewer uses only the data from the general list of the candidate's publications to determine which of them were used for the defense of the educational-scientific degree "Ph.D." and for the competition for the academic position "associate professor". Other data for such a check is not attached and it is not possible to check whether some of the submitted publications were used in the previous procedure.

However, taking into account the date of the defense, the date of confirmation of the academic position "associate professor" and the dates of the submitted titles of publications in the current procedure, it can be seen that a predominant number of publications were made after the dates of the previous two procedures and they satisfy the legislative requirements.

Indicators group A: it is presented a diploma for defense of the educational and scientific degree Ph.D. The title of the Ph.D. thesis is " Adaptive Learning Environments in Secondary School ".

The candidate satisfies the requirements for this indicator.

Indicator group B: These indicators insist that the candidate achieves 100 points with habilitation thesis or to have (at least 10) publications, which are indexed and referred to world known data bases. The candidate satisfies this indicator, presenting a title of a monograph “Modelling in Cyber-Physical Systems" edition of Plovdiv University”.

The reviewer assumes that criterion B is met according to the legal requirements.

Indicator group G: it requires the collection of 200 points. The internal requirements of Plovdiv University determine that it is necessary to present no less than 25 publications. The candidate presents a list of 35 scientific publications in referenced and indexed editions in world-recognizes scientific information databases /only Web of Science and Scopus/and others. For the national requirements for category G7 of indexed scientific publications, the candidate presents 23 scientific publications.

The publications, which are indexed in world databases are published in journal Mathematics (Q1, IF2.258), the journal Mathematical biosciences and engineering (IF=0.63, Q3), the journal International Journal of Computing (SJR=0.184), in the electronic library of IFAC papers online (SJR 0.21), book chapter published by Springer international publishers (Q4), the electronic library of AIP Conference Proceedings (SJR=0.19).

The publications, which are only referenced are published in proceedings of international conferences such as "Digital preservation of cultural heritage", "International Conference of Higher Education Advances", "Intelligent Systems", "Informatization of Education and Methodology of Electronic Education",

The publications in non-refereed proceedings were made at conferences in our country, Varna, Lovech, Plovdiv, Sofia.

The peculiarity of the professional field of study 4.6 applies a coefficient of increase of corresponding points for the individual categories of publications by 3. Thus, the candidate's result significantly exceeds the national requirements.

The reviewer checked the list of submitted titles only until the required level of 200 points. It has been not checked the full set of submitted points. The candidate's score exceeds the requirements for this procedure.

The reviewer accepts that the publications submitted for participation in the competition fulfill the requirements of indicator G.

Indicator group D: it requires achieving 100 points by: citations in scientific publications, referenced and indexed in world-recognized databases and/or editions with scientific reviews. The candidate presents a list in which all citations, obtained by all author's publications is given. She estimated that there were 171 citations at all. The internal requirements for this procedure of the University of Plovdiv requires presentation at least of 20 citations. The candidate applies for this requirement and make the corresponding evaluations with a list with 45 citations, which are less than the total available citations. The peculiarities of the professional field of study 4.6 applies an increasing coefficient of 4. Thus, the total number of points of the candidate in this professional field significantly exceeds the national legal requirements.

The reviewer assumes that the submitted data for citation for this procedure satisfies the requirements for indicator group D.

Indicator group E: the requirements for this indicator insist supervision of doctoral student, who had defended his Ph.D. thesis, management and participation in projects, publishing university textbook. The requirements for this indicator are for 100 points for the professional field of study 4.6. The candidate declares that she was the joint supervisor of a successfully defended doctoral student. Lists for participation in national projects and international projects are presented. She is the co-author of university textbook and University textbook.

The numerical evaluation of these activities exceeds the National requirements. Additionally, the joint supervision of the doctoral candidate satisfies the internal requirements of the University of Plovdiv.

The reviewer assumes that the candidate satisfies the legislative requirement for this indicator group E.

The reviewer makes a conclusion that the candidate has sufficient academic and scientific publications and activities, which satisfy the legislative requirements for participation in this competition. The presented lists of activities make it possible to positively evaluate the performance of the candidate and to see that the levels of indicators groups, exceed the required legislative levels for scientific production and scientific-applied activities.

III. Assessment of the pedagogical activities of the candidate

The primary job of the candidate is on position as associate professor at University of Plovdiv “Paisii Hilendarski”. The main activity in an University institution is teaching students. The pedagogical background and the corresponding activities of the candidate are presented in his CV as in the officially issued document by the University about the courses, which she teaches. The set of lecture courses are topically referenced as: Discrete Mathematics, Web Design, Block Programming, Databases, Computer Modeling. The candidate also has activities in conducting exercises in the University, which are also documented: object-oriented programming, information technology in mathematics, e-commerce.

The reviewer assesses that the candidate has professional training and experience in broad professional fields and has gained significant experience in leading educational processes at a University.

IV. Main scientific and scientific-applied contributions

The candidate submits a list of 35 scientific publications and one monograph for this procedure. Thematically, they refer to the development of solutions for modeling processes of different natures in a computer environment. The processes that are modeled are of the type of:

- educational process using computer tools;
- monitoring the feeding of cattle on pastures by using computerized means;
- virtualization (presentation in an electronic environment) of knowledge about cultural heritage;
- modeling in a computer environment of irrigation objects and their functioning;
- modeling of processes in an electronic environment for creating tourist routes.

The results of modeling concern solutions for the internal information-program architecture of an information system that implement a relevant information services. This internal structure includes the creation of:

- definition of agent interactions, design of individual agents supporting the general functioning of the information system, support of user interaction and his guiding for service operation;
- Logical representation of knowledge through a relevant hierarchy in a problem ontology.

As an University teacher, the candidate also has publications related with the increase of the quality of the teaching and learning processes by implementing means of education and training using virtual tools and environments.

The presented content in her scientific publications illustrates that the author achieves scientific and applied results by solving problems with informatics nature for development information systems, for structuring their internal functional architecture, for the design of information services in the fields of training, tourist services, analyzing of proposals for irrigation tasks, supporting activities in management of crop and animal husbandry systems.

These results have been presented in scientific publications that have been published in representative scientific journals with Q1, Q3, Q4 quantile scores, in papers published by the international academic publishing house Springer, in electronic libraries of international research organizations and publishing houses IFAC papers online, AIP, at international conferences abroad (Egypt, Poland, Russia, Morocco) and at home (Varna, Lovech, Plovdiv, Sofia).

The reviewer considers that the candidate demonstrates and proves scientific and applied results through the appropriate design of information systems and the development of relevant models for their functioning and application.

The reviewer also finds elements of scientific contributions in the substantiation of information architecture in programs and computer systems, which have the character of application of informational solutions in various practical areas.

The reviewer assesses that the candidate's publications present good examples of realized scientific and scientific-applied and applied informatics solutions.

V. Significance of the contributions for the science and practice

The content of candidate's publications makes visible the efforts of the candidate to apply modern informatics solutions in the subject areas of the educational process at a university and in a secondary education school, in various subject areas such as cultural heritage, tourism, analysis of the need for irrigation, agricultural activity. Informational and algorithmic solutions have been developed and illustrations for their implementation are given concerning the design of information systems and information services. The reviewer has the impression that the candidate has made his experiments in a wide range of objects and systems: in areas of economic life (agriculture, water resources management, tourism), in areas with a substantial educational and cultural character (information services for cultural heritage, University learning processes). This is evidence of the professionalism achieved by the candidate, who can lead complex academic researches. Indirect evidence of this assessment is also the high teaching experience in a several complex subjects, presented in the documents for the candidate's pedagogical activity.

In the presented list of participation in projects, it is evident that the candidate can lead and participate in projects, which address the application of distant and virtual means which support the educational processes in high school. In addition, the candidate also participates in projects, which develop particular program tools for info services in information systems.

These developments and participation in projects are also indirect evidences of the usefulness and significance of the candidate's scientific and scientific-applied contributions.

VI. Critical remarks and recommendations

The reviewer finds that the candidate makes his research in different domains concerning systems with different nature. This wide areas of research is a prerequisite for limitation of the significance of the obtained results. I recommend that the candidate concentrates his researchers on narrow areas. This is a prerequisite for obtaining substantial research results that will be accepted in international academic publications and journals.

I assess that the candidate Todorka Glushkova has extensive research and practical experience in the research field for the development and implementation of IT solutions for the use of modern technologies in the educational process, effective functioning of information systems, development of information services.

This experience of the candidate is applied in teaching students in a Higher Education Institution.

I express my personal opinion that it is useful to include in the scientific publications an evaluation of the effect of her IT developments. This can be done by comparing and quantifying criteria and parameters of information systems.

Conclusion

The candidate in this competition Associated Prof. PhD. Todorka Glushkova is presented with enough set of research works. In the candidate’s works there are original research and practical contributions.

I find that the legislative requirements of The Law for academic promotion, The Rules for the application of this law and the internal rules of University of Plovdiv are satisfied. All upper said and after my acquaintance with the presented documents and their contributions with research and practical results give me ground to suggest **Associated Prof. PhD Todorka Atanasova Glushkova to take the academic position “professor”** in University of Plovdiv “Paisiy Hilendarski”, for the scientific domain of High education **4. "Natural sciences, mathematics and informatics",** Professional field of study **4.6 "Informatics and computer sciences" (Context Modeling),** for the needs of the Faculty of Mathematics and Informatics of Plovdiv University, Department “Computer technologies”.

7.03.2023 Reviewer:

Prof. DSc Ph.D.Todor Stoilov