

# REVIEW

for the procedure for the academic position of “associated professor”

the domain of High education: **4. “Natural sciences, mathematics, and informatics”**,

professional field of study: **4.6 „Informatics and computer sciences “**

scientific specialty: **„Information security”**

for the needs of the department **“Software Technologies”, Plovdiv University “Paisii Hilendarski” , Faculty of Mathematics and Informatics**

The competition is published in “State newspaper” N96/17 November 2023 for the needs of Plovdiv University “Paisii Hilendarski”

with candidate: **chief assistant Ph.D. Magdalena Asenova Veselinova** from Plovdiv University “Paisii Hilendarski”

Member of the jury: prof. D.Sc.,Ph.D. 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	Scientific degree Ph.D.	Chief assistant
Magdalena Asenova Veselinova	13.07.1989	2012-2013 Master in Business Informatics with English, Plovdiv University 2008-2012 – Bachelor of Informatics, Plovdiv University	2017 – Plovdiv University	2017- Chief assistant, Plovdiv University 2017-2017 assistant, Plovdiv University

Magdalena Veselinova completed her higher education with a master's degree at Paisii Hilendarski University of Plovdiv. He graduated with a Master's in 2013 with a specialty in "Business Informatics" with English language. She started his work in 2012 as a system administrator at Kaspela UMBAL, Plovdiv. After defending the educational-scientific degree "Doctor"/Ph.D. in 2017, she was appointed successively as an assistant and chief assistant. Since 2017, she has been an assistant at Plovdiv University.

In 2017, she defended the educational and scientific degree "doctor" in scientific specialty 4.5 Mathematics, doctoral program "Differential Equations". The topic of her dissertation work is "Distributed Delay Fractional Differential Equations".

## **II. Common presentation of the candidate's materials for the competition**

The research papers presented for the competition for "associate professor" are prepared to respect the legislative requirements in Bulgaria according to ZRAS, PPZRAS, and the specific requirements of Plovdiv University. According to the legislative requirements, the review compares the candidate's points for the individual indicators and those required by the University of Plovdiv.

The candidate submits lists of scientific publications to fulfill the group of indicators B and G.

According to indicator B, the candidate presents a co-authored monograph. A separation protocol between the authors is also presented. This fulfills the requirements of this indicator.

The list of publications by indicator G contains 13 items. A teaching book is also presented. Thus, the total number of publications in the competition is set at 15. The attached documents present a general list of publications, as well as those publications that participate in the competition.

In the document "REFERENCE for the fulfillment of the minimum legislative requirements", the candidate has calculated the points for the fulfillment of indicators B and G, taking into account the coefficients of increase for the professional field of study 4.6 under indicator G7.

A list with citations of the author's publications is also presented. The candidate has divided the publications into those participating in the competition and a general list of the publications that have received citations.

The candidate has also declared participation in scientific and scientific-applied projects according to indicators E. They are not mandatory for the competition, according to the requirements of Plovdiv University. These additional data show the qualifications and skills of the candidate, which is a positive certificate for her and increases her assessment in point terms.

*Indicator group A:* diploma for awarding the educational and scientific degree "doctor" on the topic "Fractional differential equations with distributed delay". The candidate satisfies the requirement of this indicator.

*Indicator group B:* the requirement is to collect 100 points through a habilitation thesis, monograph, or scientific publications (not less than 10) in publications referenced and indexed in world-renowned databases. The candidate

satisfies the requirement of this indicator by presenting a monograph entitled "Implementation of cloud services to improve the security of digital data" edition of Plovdiv University Press, 2024, 233 pages.

The reviewer considers that the applicant fulfills the legal requirements for this indicator.

*Indicator group G* requires the collection of 200 points. The candidate presents a list of 13 publications in categories G7. The candidate chose 9 of them to satisfy the requirements for the number of points. The remaining publications were not measured quantitatively but were applied to satisfy the internal requirements of Plovdiv University for the required number of publications.

In category G7, 1 publication is presented, which was made in the journal *Axioms* with an impact factor (IF) and quartile Q2. In this category, 8 publications that were used for scoring are indexed in SCOPUS in Journals with Impact Rank (SJR). Such are reports of the AMEE conference, which are published in the electronic journal *AIP Conference proceedings*; in the *International Journal of Differential Equations and Applications*, published in our country; one publication is in a publication indexed in SCOPUS without an impact rank.

The presented data for indicator G contains full bibliographic data. The candidate has calculated her results. A factor of increase was applied, according to the permits for the specialty 4.6 for indicator G7. Reviewer verification confirms the correctness of the data presented. It assesses that the submitted publications exceed the legally required levels.

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

*Indicator group D* requires 50 items: citations in scientific publications, referenced and indexed in world-renowned databases, and/or scientific review. The applicant submits a list of 70 citations. The candidate has also sorted them according to the participation of the cited publication in the current "associated professor" competition. The candidate uses a smaller number of citations, 22, to which a scaling factor is also applied. The result of the candidate in grade group D exceeds the required level, according to the legal requirements and those of Plovdiv University.

The reviewer accepts that the submitted data for citation in the competition fulfills the requirements of indicator D.

*Indicator group E*: participation in projects. This group of indicators is not mandatory for the minimum requirements of Plovdiv University. The candidate has submitted data on participation in 4 projects. In the attached reference, three of them are used, which achieves a level of 60 points. According to indicator E24, a teaching book on "Databases" is also presented. This textbook is used according to the internal rules of Plovdiv University for the implementation of indicator E19. The candidate's participation indicates an active university behavior in the field of scientific research and teaching activities. The candidate has included this activity as a point dimension in the indicators of group E, which increases her level of point assessment.

The reviewer considers that the activities under this group of indicators are not critical and may not be considered for the fulfillment of the minimum requirements of the PU "Paisiy Hilendarski" for the position of "associate professor".

Indicator group J: horary for guided lectures. Plovdiv University has not set requirements for this indicator for the current competition for "associate professor". The candidate has submitted her data for conducting lecture courses in the topics "Databases"; "Computer systems and communications"; "Programming"; "Software Verification and Validation". The reviewer accepts that the presented lecture delivery data shows the intensive academic engagement of the candidate under indicator J.

The reviewer concludes that the applicant fulfills and exceeds the required levels with his declared scientific output in all indicators. The reviewer confirms the correctness of the applicant's calculations when declaring the point levels for the individual group of indicators.

## **II. Assessment of the pedagogical activities of the candidate**

The candidate works as a senior assistant at the Paisii Hilendarski University of Plovdiv. The main activities at the University are teaching activity and parallel research and scientific-applied activity. Pedagogical preparation and activity of the candidate for University teacher presupposes that the candidate also has an independent lecture activity. The submitted documents show that the candidate has given lectures to bachelors in the disciplines of Databases, Computer Systems, Communications, Programming, Software Verification, and Validation. For the Master, the candidate has lectured on special disciplines such as "Configuration of Service Clusters". It was also noted that exercises were conducted for students of various majors in the disciplines "Databases", "Introduction to Programming (C#)", "Programming", "Computer Systems and Communications", and "Introduction to Web Programming". The subject of the candidate's lectures is the field of informatics and computer science.

The reviewer considers that the applicant has the necessary experience and activity required for this procedure.

## **III. Main scientific and applied scientific contributions**

The candidate submits lists of a total of 13 scientific publications, one monograph, and one teaching book for this competition. The candidate has not submitted his Ph.D. abstract, but the full list of the candidate's publications indicates the publications included in the defense of the educational scientific degree Ph.D. The majority of the publications presented in the competition were issued after 2017 when the educational-scientific degree "doctor" was awarded, and no reuse of a publication in different procedures was found.

The reviewer accepts that the submitted publications in this competition have not been used by previous procedures. Electronic versions of all publications are presented in the attached competition documents.

The candidate's main scientific and scientific-applied contributions, which are presented in the competition publications, relate to the scientific field of "informatics and computer science". The candidate's developments are aimed at ensuring cyber security when using software systems. The object of research is software solutions that aim to provide reliable user identification and secure data storage. Software

solutions have also been developed that successfully counter and repair software damage from malicious software.

Specific research and solutions that have been done and received are related to the recovery of malicious RANSOMWARE virus encryption records in Linux and Windows environments, management of disk arrays, and data recovery from cloud infrastructures.

In his publication activity, the candidate also has additional research, which stems from her dissertation major in the field of mathematics. Derivatives in Banach spaces and evaluation of solutions of fractional linear systems with distributed delays are developed. The reviewer finds that this type of research does not see a useful connection with the professional direction of the competition for informatics and computer science.

The reviewer assesses that a scientific and applied result is contained in the developed solutions for data recovery in case of malicious impact and encryption. These solutions have the potential for practical application and provide cyber security for software and information systems.

These scientific-applied results have been applied to data recovery under two types of operating systems while ensuring the reliability of disk data arrays.

The candidate has summarized part of his results in a monograph and thematically addressed to use and application in securing data arrays that are used by multiple users.

The reviewer finds that the research of the candidate is useful and has led to potentially pragmatic outcomes such as finding solutions for data recovery, previous versions of data, and overcoming crypto virus attacks.

#### **IV. Significance of the contributions to the science and practice**

The candidate's publications show the desire to implement developed system solutions in the field of informatics. The practical utility of the research lies in the recovery of deleted data, and malicious encryption. Practical use of applicant-developed scripts to overcome the actions of cryptoviruses is declared.

These scientific-practical solutions are also indirect evidence of the usefulness and significance of the candidate's scientific and scientific-applied contributions.

#### **V. Critical remarks and recommendations**

The reviewer has no substantive critical comments. He notes here his assumptions and judgments, which do not affect the competition, but may be taken into account by the candidate in the future.

The relationship between data recovery solutions from the impact of cryptoviruses and the development of information security problems that belong to the field of informatics with the candidate's formal research on distributed delay fractional linear systems is not seen. Accordingly, the specialty "Information Security"

can hardly be developed in-depth without the appropriate application of the formal methods developed by the candidate.

The reviewer appreciates the application of formal and quantitative methods in information systems, but the rationale of the formal methods for this application should be evident.

This reviewer's opinion does not relate to the content and significance of the candidate's results. They reflect the specific personal opinion of the reviewer.

The submitted documents for the competition are well organized and their processing and verification do not raise any questions.

## Conclusion

The candidate in this competition chief assistant Ph.D. Magdalena Asenova Veselinova 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 and The Rules for the application of this law and the internal rules of Plovdiv University are satisfied. All said my acquaintance with the presented documents and their contributions to research and practical results give me ground to suggest chief assistant Ph.D. **Magdalena Asenova Veselinova** to take the academic position "**associated professor**" in Plovdiv University, Faculty of Mathematics and Informatics, department "Software technologies" for the professional field of study: **4.6 „Informatics and computer sciences “**, scientific specialty **„Information security”**.

29.02.2024

Reviewer:

Prof. D.Sc. Ph.D. Todor Stoilov