

## **REVIEW**

by Prof. Stanimir Nedyalkov Stoyanov, PhD  
about the materials submitted for participation in the competition  
for the academic position of 'Professor'  
at the Plovdiv University "Paisii Hilendarski"

higher education field 4. Natural sciences, Mathematics and Informatics,  
professional direction 4.6 Informatics and Computer Science  
(Informatics – Distributed systems and applications)

In the 'Professor' application, announced in the State Gazette, issue 94 from 12.11. 2021, and on the website of Plovdiv University "Paisii Hilendarski" (PU) at the Faculty of Mathematics and Informatics for the needs of the Department of Management and Quantitative Methods in Economics at the Faculty of Economics and Social Sciences, as a candidate participates Associate Professor Olga Dobрева Rachneva, PhD, from the Faculty of Economics and Social Science at the University of Plovdiv.

By order № ПД-21-37 of 10.01.2022 of the Rector of PU I was appointed a member of the scientific jury in an application for the academic position of 'Professor' at PU in the higher education field 4. Natural Sciences, Mathematics and Informatics, professional direction 4.6 Informatics and Computer Sciences (Informatics – Distributed systems and applications) announced for the needs of the Faculty of Economics and Social Sciences.

### **1. General presentation of the received materials**

The only candidate in the announced competition is Assoc. Prof. Olga Dobрева Rachneva, PhD, from the Faculty of Economics and Social Sciences.

The set of materials presented by the candidate is in accordance with the Regulations for the development of the academic staff of the Plovdiv University and includes the following documents:

1. Application to the Rector for participation in the competition.
2. CV.
3. Diploma of higher education.
4. Diploma for "PhD" degree.
5. Certificate for academic position Associate Professor.
6. List of all publications.
7. List of the publications submitted for participation in the competition.
8. Information on compliance with the minimum national requirements.
9. Information on compliance with the additional faculty requirements.

10. Abstracts of scientific papers for participation in the competition in Bulgarian.
11. Abstracts of scientific papers for participation in the competition in English.
12. Author's reference for the scientific contributions in the works for participation in the competition.
13. Information on classroom and extracurricular employment.
14. List of published textbooks and teaching guides.
15. Information on activities with students and PhD students.
16. Information on research activity.
17. Information for participation with reports at scientific forums.
18. Information for participation in research and educational projects.
19. Official note from the NAP at the PU.
20. Certificate from CIPTT at UFT.
21. Certificate of work experience.
22. List of observed citations.
23. Declaration of originality and authenticity of the attached documents.
24. Assignment letter to the Dean of FMI.
25. Order for determination of a department by competence.
26. Separation protocol.

## **2. Brief biographical data of the candidate**

In 1980, Assoc. Prof. Olga Rachneva, PhD, graduated as a mathematician at the Faculty of Mathematics at the Plovdiv University and as a Master of Finance and Accounting at the University of National and World Economy in 1995. In 2006, she defended doctoral thesis at the FMI of the Plovdiv University. From 1986 to 2008 she was successively Assistant, Senior Assistant and Chief Assistant and from 2008 to 2014 Assoc. Professor at the University of Food Technology, Plovdiv. Since 2014 she has been Assoc. Professor at the Faculty of Economics and Social Sciences of the Plovdiv University.

## **3. General characteristics of the candidate's research activities**

To date, Assoc. Prof. Olga Rachneva, PhD, has prepared and led lectures on the following disciplines in the bachelor's programs at the Faculty of Economics and Social Sciences of the Plovdiv University: "Informatics", "Information Systems and Technologies" and "Electronic Commerce" (also at Faculty of Chemistry of the Plovdiv University).

As a lecturer Assoc. Prof. Olga Rachneva, PhD, is a highly competent and demanding teacher, applying new technologies in education. She actively works with PhD students and graduates. She was a research supervisor of four PhD students; two of whom have successfully defended their PhD thesis. She was the supervisor of three defending graduates.

For the competition the candidate has submitted a total of 27 scientific papers, of which: 9 SJR, 4 WoS refereed, 11 Scopus refereed, 1 IEEE refereed. Eight publications are in Bulgarian and the remaining 19 are in English. Publications №№ 25, 26 and 27 of the list are monographs. All publications are co-authored. I accept for review all the publications submitted for participation in the competition.

Accepting the statements in the author's reference, I would summarize the candidate's contributions in groups as presented below.

**Electronic testing and electronic education.** Publications on this topic are under the numbers №№ 1,2,3,4,6,7,8,9,10,21,27 in the publication list. The publications in this group summarize the results of research related to the development of tools and software providing e-learning and e-testing services. First of all, I would like to stress the monograph (№ 27), which systematizes the results of 20 years of research in the field of distributed systems and their applications in education. The articles (№№ 1,2,3,4) are dedicated to the creation, development and improvement of an electronic testing cluster known as DeTC (Distributed e-Testing Cluster). Based on the acquired practical experience with the cluster, the Distributed Platform for e-Learning (DisPeL) was subsequently developed and presented in the publications (№№ 6,7,9). A significant contribution that I would like to point out is that the platform can be used for adaptive learning - the results are presented in the publications №№ 8,10,21.

**Sigmoidal, cumulative, adaptive functions.** The publications in this group (№№ 11,12,13,15,16,17,18,20,22,25,26) present studies of special classes of functions, which in recent years have been subject of increased scientific and practical interest. . I would like to emphasize three groups of results. The first group is related to the study of intrinsic properties for some new classes of cumulative and adaptive functions. The results can be used in functions for analysis and approximation of specific data from different fields. The second group of results is related to the efforts to develop a methodology for uniform consideration of the characteristics "confidential assessments" and "super saturation". The third group of results refers to the upgrade of existing modules to platforms for scientific calculations. Using the CAS Mathematica software environment, numerous numerical examples are given to illustrate the results obtained.

I would like to point out that the publications №№ 25 and 26 are monographs. In addition, I definitely think that the contributions in this group of publications are theoretical.

**Additional significant results.** The publications in this group (№№ 5, 14, 19) present various significant scientific results. The creation of software agents controlling the transcription based on the search for similarities between the homework of individual students is discussed in the publication № 5. 3D tools supporting music teaching of disabled children are presented in the publication № 14. An article (№ 19) presents the architecture of a regional data center for intelligent agriculture in the region of Plovdiv.

**Textbooks.** The two textbooks “Developing Business Web Applications” (№ 23) and “Insurance and Insurance Information Systems” (№ 24) were written for the Master's program “Business Software Technologies” of FMI at PU. The textbooks are in English printed in paper version and in electronic version. The electronic version is integrated into the DisPeL platform. The first textbook is structured in 15 chapters and the second in 10 chapters respectively, according to the curriculum of the master's program. Assignments are given at the end of each chapter. The textbooks were tested in the master's program including 30 students from Austria, Germany and Croatia trained and tested with the distributed learning platform DisPeL. Both textbooks are designed for people without programming experience. The e-textbooks provided by DisPeL can be easily updated and supplemented.

I am impressed by the huge number of citations in publications with IF and SJR referenced in prestigious scientific databases such as WoS, Scopus, IEEE, Zbl.

Assoc. Prof. Rachneva, PhD, has participated in a total of 15 international, national, regional and university projects being a regional coordinator of one European and one national project and participated in one European and five national projects. She has also been the leader of one and a participant in many university projects.

In summary, I would like to emphasize that the publications present significant in originality, innovation and number of results with a certain scientific and practical contribution. I believe that all submitted scientific papers are in the field of competition. The publications in renowned publications and conference materials acquaint the interested researchers with the results obtained by Assoc. Prof. Olga Rachneva, PhD, in the professional field of Informatics and Computer Science (Informatics - Distributed Systems and Applications).

#### **4. Evaluation of the candidate's personal contribution**

From the documents submitted for participation in the competition, my personal impressions and our joint work, I am convinced of the personal merit of the candidate in the contributions presented in the publications. I think that the publications despite being co-authored undoubtedly include a significant contribution from the candidate.

## **5. Personal impressions**

I personally know Assoc. Prof. Olga Rachneva, PhD, as her research supervisor of the PhD thesis. I would like to point out that I am impressed by the strict logical sequence of her research interests and the conduct of her research. I am convinced that Assoc. Prof. Olga Rachneva, PhD, is an excellently trained and highly competent lecturer, responsible and in-depth scientist, successful participant in research projects.

## **CONCLUSION**

The documents and materials applied by Assoc. Prof. Olga Rachneva, PhD, meet all the requirements of the Law and the Regulations on the Development of Academic Staff in the Republic of Bulgaria and the relevant Regulations of the University of Plovdiv "Paisii Hilendarski". The applicant has submitted a sufficient number of scientific papers, apart from those used in the defense of her PhD thesis and her application for the position of an assistant professor. The applicant demonstrates original scientific and applied contributions, which have enjoyed international recognition, and a representative part of them are summarized in three monographs and published in conference proceedings and approved scientific journals. The applicant's theoretical results have practical applicability, as some of them are directly oriented to education. The scientific and teaching qualification of Assoc. Prof. Olga Rachneva, PhD, is undoubted. The candidate's teaching and research achievements fully comply with the specific requirements of the Faculty of Mathematics and Informatics and of the Faculty of Economics and Social Sciences. After becoming acquainted with the materials and scientific works presented in the application and analyzing their significance and scientific, scientific-applied, and applied contributions, I find it reasonable to give my positive assessment and recommend to the Scientific Jury to propose to The Faculty Council of the Faculty of Mathematics and Informatics to elect Assoc. Prof. Olga Rachneva, PhD, for the academic position of 'Professor' at the University of Plovdiv in professional direction 4.6 Informatics and Computer Science (Informatics – Distributed systems and applications).

27.02.2022

Reviewer:

(Prof. Stanimir Stoyanov)