# OPINION

**by Prof. Daniela Ananieva Orozova, DSc, Trakia university**

**on a competition for the occupation of an academic position "Associate Professor",**

**field of higher education: 4. Natural sciences, Mathematics, and Informatics**

**in professional field 4.6 Informatics and computer sciences**

**(Artificial Intelligence)**

**for the needs of the „Paisii Hilendarski" University of Plovdiv,**

**Faculty of Mathematics and Informatics (FMI),**

**announced in State Gazette No. 96/17.11.2023**

The opinion was prepared by: **Prof. Daniela Ananieva Orozova, DSc** - Trakia University, in my capacity as a member of the scientific jury for competition in field of higher education: 4. Natural sciences, Mathematics, and Informatics, professional field 4.6 Informatics and computer sciences (Artificial Intelligence), according to Order No. РД -21-70 / 16.01.2024 of the Rector of Plovdiv University.

Two candidates from the Department "Computer Systems" submitted documents for participation in the announced competition, Faculty of Mathematics and Informatics at Plovdiv University „Paisii Hilendarski":**Chief Asst. Prof. Veneta Veselinova Tabakova-Komsalova, PhD** and **Chief Asst. Prof. Asya Todorova Toskova, PhD**.

## 1. **Application data**

The documents submitted by the candidate in the competition **Chief Asst. Prof. Veneta Tabakova-Komsalova, PhD** correspond to the requirements of the Development of Academic Staff Act in the Republic of Bulgaria (ADASRB) and the Regulation for application of ADASRB (Decree No. 26 of February 13, 2019) and Additional requirements for the academic position "Associate Professor" of the Faculty of Mathematics and Informatics.

Chief Asst. Prof. Veneta Tabakova-Komsalova, PhD meets the conditions of Art. 29(1).1 as she submitted the Diploma for the educational and scientific degree PhD in the field of higher education 1. Pedagogical sciences, by professional direction 1.3. Pedagogy of training in..., doctoral program: Methodology of training in informatics and information technologies, No. 1000310, dated 2.04.2018, topic: "Formation of algorithmic thinking among students in primary school and junior high school through training in informatics and information technologies technologies".

Chief Asst. Prof. Veneta Tabakova-Komsalova, PhD meets the conditions of Art. 29(1).2 because she works on a basic employment contract (with Rector's order No. P34-678/20.10.2020) in the Department of "Computer Systems" of the Faculty of Mathematics and Informatics at Plovdiv University "Paisii Hilendarski". She has 14 years and 7 months of teaching experience and 3 years and 2 months of experience as a "Chief Assistant Professor" (Certificate No. RD-38-4/2.01.2024). Leads compulsory courses in Artificial Intelligence and Databases and optional courses in the field of artificial intelligence.

Chief Asst. Prof. Veneta Tabakova-Komsalova, PhD meets the conditions of Art. 29(1).3 because she presents two monographs (Habilitation thesis): "Artificial intelligence in 24 ..." / book one, BAS Publishing House, 2023, Sofia and "Presentation of knowledge in systems with artificial intelligence", University "Paisii Hilendarski" publishing house, 2024 (total 200 points).

From the presented reference for research work, I find that she is the author of 48 scientific works, of which 2 monographs, 1 teaching aid, there are 53 noted citations.

Chief Asst. Prof. Veneta Tabakova-Komsalova, PhD has presented other original scientific research works, and other scientific and scientific-applied developments. Attached are official notes for participation in 8 scientific research projects - 1 international, 3 to the "Scientific Research" fund of the PU, 2 to national programs, 2 to the Ministry of Education and Culture (one of which she is the head of).

Chief Asst. Prof. Veneta Tabakova-Komsalova, PhD is a member of the Union of Automation and Informatics "John Atanasov" and of the Bulgarian Union of Mathematicians.

The documents submitted by the candidate in the competition **Chief Asst. Prof. Asya Todorova Toskova, PhD** correspond to the requirements of the Development of Academic Staff Act in the Republic of Bulgaria (ADASRB) and the Regulation for application of ADASRB (Decree No. 26 of February 13, 2019) and Additional requirements for the academic position "Associate Professor" of the Faculty of Mathematics and Informatics.

Chief Asst. Prof. Asya Todorova Toskova, PhD meets the conditions of Art. 29(1).1 as she submitted the Diploma for the educational and scientific degree PhD in the field of higher education: 4. Natural sciences, mathematics and informatics, professional direction 4.6. Informatics and computer sciences, PhD program Informatics, No. 1000392, dated 23.09.2019, subject: "Models for self-teaching and learning in the field of robotics".

Chief Asst. Prof. Asya Todorova Toskova, PhD meets the conditions of Art. 29(1).2 because she works on a basic employment contract (with Rector's order No. P34-195/22.04.2016) in the

Department of "Computer Systems" of the Faculty of Mathematics and Informatics at Plovdiv University "Paisii Hilendarski". She has 3 years and 9 months of experience as " Chief Assistant Professor" (Certificate No. RD-38-250/5.12.2023) at the "Computer Systems" department, where she leads mandatory disciplines in the field of Software Engineering and elective disciplines in the field of Artificial Intelligence.

Chief Asst. Prof. Asya Todorova Toskova, PhD meets the conditions of Art. 29(1).3 because she presents a monograph (Habilitation thesis): "Some Studies in Machine Learning - Computer Vision & Recommendation", ISBN: 978-619-245-399-2, BAS Publishing House, 2023, Sofia (100 points).

From the presented reference for research work, I find that Dr. Asya Toskova is the author of 20 scientific publications, 1 monograph, one teaching aid, 53 citations have been noted.

Chief Asst. Prof. Asya Todorova Toskova, PhD has presented other original scientific research works, and other scientific and scientific-applied developments. Attached are service notes for participation in 6 scientific research projects, of which 1 is international, 2 under National Programs, 1 for the Ministry of Education and Culture and 2 for the "Scientific Research" fund of the Plovdiv University.

Chief Asst. Prof. Asya Todorova Toskova, PhD has been a member of the John Atanasov Automation and Informatics Union (SAI) since 2017.


## 2. Characteristics and assessment of the candidate's teaching activity

**Asst. Prof. Veneta Tabakova-Komsalova, PhD** presented a report on classroom and extracurricular activity, according to which from 2020 until now she leads bachelor's and master's classes in the disciplines: *Databases*, *Artificial Intelligence* and *Intelligent Systems* for a total of 1667 study hours. The disciplines are taught to bachelors in full-time and part-time majors. She also participates in the creation, modernization and updating of the teaching materials for these disciplines. She developed and led the elective course "*Introduction to Artificial Intelligence and Prolog Logic Programming*" for the majors: "Business Information Technologies", "Software Technologies and Design", "Business Mathematics" and "Information Technologies, Mathematics and Educational Management" at FMI of PU. She also led classes on "*Computer Modeling*" at the Department for Qualification and Professional Development of Pedagogical Specialists at PU "P. Hilendarski". Veneta Tabakova-Komsalova's study load is high and exceeds the annual norm of 360 hours, with an average of 555 classroom hours over the last 3 years.

Participated in the competition with a textbook "Artificial Intelligence Guide", 2022, (co-authored with T. Glushkova and S. Stoyanov). There are three graduates who have successfully defended their diploma in the period from 2020 to 2023 inclusive.

**Chief Asst. Prof. Asya Todorova Toskova,** PhD has submitted a certificate of educational activity, according to which, from 2015 to now, she has taught classes of bachelors and masters in the disciplines: *Software Technology*, *Java Programming*, *Cognitive Robotics*, *Machine Learning*, *Software Technology Practicum*, *Introduction to software engineering*, a total of over 4,000 study hours. Develops the *Cognitive Robotics* and *Machine Learning* courses. Asya Toskova's study load is high and exceeds the annual hours of 360 hours, and she has an average of 595 hours in the classroom over the last 3 years.

One study guide "UML modeling - software success planning" has been published, 2023, PUI "P. Hilendarski". The guide was developed for the exercises in the disciplines "Software Technologies" and "Introduction to Software Engineering". There is one graduate who successfully defended his diploma (in 2022).

Both candidates have a large annual work schedule, with a norm of 360 hours, they perform an average of over 550 hours.

**3. Analysis of the scientific and applied scientific achievements contained in the materials for participation in the competition**

In the current contest **Chief Asst. Prof. Veneta Tabakova-Komsalova, PhD** participated with a total of 48 scientific papers, which are in the direction of the competition. A total of 25 scientific papers were published in 13 foreign and international publications and 23 scientific papers in 10 Bulgarian publications. Two of the scientific works are independent. From the list for participation in the competition, 19 publications are indexed in the scientific databases Scopus/Web of Science, one of them is with IF (75 items) and 4 of them are with SJR without IF. An independent monograph in Bulgarian, published by Plovdiv University publishing house "P. Hilendarski" and a monograph also in Bulgarian in co-authorship, published by "Prof. Marin Drinov". Presented by Chief Asst. Prof. Veneta Tabakova-Komsalova, PhD "List of noticed citations" includes a total number of citations of 53, of which 27 citations are indexed in the scientific databases Scopus/Web of Science (excluding self-cited).

The main results of **Chief Asst. Prof. Veneta Tabakova-Komsalova, PhD** have been achieved during her project work, which is described in the self-assessment of contributions document and can be summarized in the following three thematic areas:

- Systems with artificial intelligence. The two monographs submitted for participation in the competition and knowledge-based applications in various fields, such as: training [1.14], knowledge assessment [2.1], CPSS educational environments [2.2], Bulgarian folklore [2.24], belong to this direction.

- Introduction of artificial intelligence in secondary school (in particular logic programming). Publications [1.1; 1.2; 1.3; 1.4; 1.6; 1.7; 1.8; 1.9; 1.10; 1.13; 1.15; 1.23; 2.3; 2.6; 2.7; 2.8; 2.13; 2.14; 2.25; 2.28], which present results from the introduction of artificial intelligence in middle school, learning Prolog and logic programming. Curriculums presented in [1.11; 2.12; 2.29, 2.30].

- Application of artificial intelligence in smart agriculture. A smart farming platform ZEMELA has been developed [1.5, 2.4, 2.15, 2.18, 2.19, 2.27]. Developments of the individual components of its architecture (operational assistants, event model, knowledge base) and its extensions are presented [2.10, 2.11, 2.16, 2.15, 2.17, 2.21, 2.22]. In [2.20], a model of an irrigation system was created.

Asst. Prof. Veneta Tabakova-Komsalova, PhD meets the minimum national requirements for the occupation of an academic position "Associate Professor" in professional field 4.6 Informatics and computer sciences. According to the submitted documents, the candidate for the competition covers: **50 points** by group of indicators **A**; **200 points** by group of indicators **B**; **497 points** by group of indicators **G**; **216 points** by group of indicators **D** and **77 points** by group of indicators **E**.

In the current contest **Chief Asst. Prof. Asya Toskova, PhD** participated with a total of 21 scientific developments that are in the direction of the competition, and 13 of them are referenced in the SCOPUS and/or Web of Science databases. Of them with IF (45 items) is 1 publication: Genetic Algorithm for a Learning Humanoid Robot. In Comptes rendus de l'Academy bulgare des Sciences, 72 (8) pp. 1102-1110, which is co-authored. Six of the publications are SJR without IF. There are 8 scientific papers published in Bulgarian publications. Three of the works from the list of scientific works for participation in the competition are independent, the remaining 18 are co-authored. An independent monograph in English, published by "Prof. Marin Drinov" of the BAS. The presented "List of noticed citations" for participation in the competition includes 27 citations indexed in the scientific databases Scopus/Web of Science (212 points).

According to the self-assessment reference of the contributions of **Chief Asst. Prof. Asya Toskova, PhD**, main contributions are in the field of machine learning and intelligent recognition and can be grouped into the following three modules based on three different classification algorithms:

- Weed detection in wheat - a critical problem in agriculture. Characteristic weeds in winter wheat grown on the territory of Bulgaria are classified, and the recognition is based on a convolutional neural network (CNN). 8 different algorithms have been trained and the results obtained have a high recognition rate.

- Recognition of Bulgarian embroidery in real time (with a mobile device) based on the Hopfield recurrent network. A module has been developed to automatically recognize complex traditional art forms and offer follow-up information.

- Recognizing user preferences and recommending personalized resources in a game-based learning platform for children with special educational needs. A Bayesian classifier was created to train the recommender system that enables intelligent delivery of personalized learning content.

I note that in the self-assessment of the contributions of Chief Asst. Prof. Asya Toskova, PhD not all works from the list of scientific works for participation in the competition and scientific achievements in them are reflected.

Chief Asst. Prof. Asya Todorova Toskova, PhD meets the minimum national requirements for the occupation of an academic position "Associate Professor" in professional field 4.6 Informatics and computer sciences. According to the submitted documents, the candidate for the competition covers: **50 points** by group of **indicators A**; **100 points** by group of **indicators B**; **345 points** by group of **indicators G**; **212 points** by group of **indicators D**, **70 points** by group of **indicators E**.

## 4. Notes and recommendations

Candidates' documents Chief Asst. Prof. Veneta Tabakova-Komsalova, PhD and Chief Asst. Prof. Asya Todorova Toskova, PhD show a successful and fruitful research activity. I recommend to both candidates a more active self-publishing activity, aimed at reputable publications and those with an impact factor/impact rank.

## 5. CONCLUSION

Having become acquainted with the materials and scientific works presented in the competition and on the basis of the analysis of their importance and the scientific and applied contributions contained therein, I confirm that **the scientific achievements of both candidates meet the minimum national requirements of the Development of Academic Staff Act in the Republic of Bulgaria**, the Regulations for its implementation, the corresponding Regulations of the Plovdiv University „Paisii Hilendarski" and the additional requirements of the Faculty of

Mathematics and Informatics for the position of the candidate in the academic position of "Associate Professor" in the scientific field and professional direction of the competition.

Both candidates: Chief Asst. Prof. Veneta Tabakova-Komsalova, PhD and Chief Asst. Prof. Asya Todorova Toskova, PhD have submitted a sufficient number of scientific works after the materials provided for the defines of the educational and scientific degree "PhD" and the academic position "Chief Assistant Professor". In their developments, there are original scientific-applied and applied contributions. In the reference to the minimum national requirements according to Regulation for application of ADASRB (Decree No. 26 of February 13, 2019), Chief Asst. Prof. Veneta Tabakova-Komsalova, PhD collect a total of 1040 points while Chief Asst. Prof. Asya Todorova Toskova, PhD collects a total of 777 points. Achieved by Chief Asst. Prof. Veneta Tabakova-Komsalova, PhD results in research activity significantly exceed the additional requirements of the FMI adopted in connection with the Regulations of the Plovdiv University "Paisii Hilendarski" for application of ADASRB and the minimum national requirements in the Regulation for application of ADASRB. I find it reasonable to give my **positive assessment** and to recommend the Scientific Jury to propose to the Faculty Council of the Faculty of Mathematics and Informatics for the selection of **Chief Asst. Prof. Veneta Tabakova-Komsalova, PhD** to occupy the academic position of "Associate Professor" in the professional field 4.6. Informatics and Computer Science (Artificial Intelligence), scientific field 4. Natural Sciences, Mathematics and Informatics.

6.03.2024       Opinion prepared by: ...........................................

                    (Prof. Daniela Orozova, DSc)