

REVIEW

Reviewer: Prof. Valentina Ilieva Markova, Technical University of Varna

On the materials submitted for participation in the competition for the academic position of "Associate Professor" in the field of higher education – 5. Technical Sciences, in the professional direction – 5.3. Communication and Computer Engineering, specialty – "Communication Networks and Systems" (Communication and Computer Systems, Measurements in Communications)

In the competition for associate professor, announced in the State Gazette, issue 54/25.06.2024, and on the website of TU-Gabrovo for the needs of the Department of "Communication equipment and Technologies" at the faculty of "Electrical Engineering and Electronics", the candidate is Chief Assist. Prof. Georgi Ivanov Georgiev, PhD – TU-Gabrovo.

1. **Brief Biography** The candidate, Chief Assist. Prof. Georgi Georgiev, PhD, was born in Pleven in 1983. He graduated with a degree in "Automation, Information, and Control Engineering," bachelor's degree from the Technical University of Gabrovo in 2007, and in 2008, he obtained a Master's degree in "Occupational Safety." He began his teaching career at the Department of "Fundamentals of Electrical Engineering and Power Engineering" as an "assistant" from 2009 to 2017. In the academic year 2017/2018, he worked as a "practical teacher" at High school "Dr. Nikola Vasiliadi" in Gabrovo. He obtained his PhD in the doctoral program "Theoretical Foundations of Communication Technology" with a dissertation on "Statistical Methods for Identification and Forecasting of Traffic Stream Parameters in Teletraffic Systems" from "Angel Kanchev University of Ruse." Since November 2019, he has held the position of "chief assistant" at the Department of "Communication Technology and Technologies," TU-Gabrovo. He is a member of the "Union of Electronic, Electrical Engineering, and Communications - UEEC." He has completed several specializations under the Erasmus + program at universities in Nis – Serbia, Edirne – Turkey, Kavala – Greece, Stip – North Macedonia, and Craiova – Romania.

2. **General Description of the Submitted Materials** In connection with the competition for the academic position of "Associate Professor," Chief Assist. Prof. Georgi Georgiev, PhD participates with a total of 39 scientific works, which should be categorized as follows:

- Scientific publications (conference papers and articles in specialized journals) – 36;
- Textbook – 1 (E.23.1) and teaching aids – 2 (E.24.1; E.24.2);
- Scientific publications structured in the habilitation work – 10 (B.4.1 to B.4.10);
- Papers presented at international conferences in the country and abroad - 25 (B.4.2, B.4.3, B.4.5, B.4.6, B.4.7, B.4.8, B.4.9, G.7.3, G.7.5, G.7.7, G.7.9, G.7.10, G.7.11, G.7.12, G.7.14, G.8.3, G.8.4, G.8.5, G.8.6, G.8.9; V.4.1, V.4.4, G.7.2, G.7.6, G.8.1);
- Articles in specialized scientific journals in the country and abroad - 8 (G.8.7, G.8.8; V.4.10, G.7.1, G.7.4, G.7.8, G.7.13, G.8.2);

- Papers in refereed world-renowned databases - 19 (B.4.1, B.4.2, B.4.3, B.4.4, B.4.5, B.4.6, B.4.7, B.4.8, B.4.9, G.7.2, G.7.3, G.7.5, G.7.6, G.7.7, G.7.9, G.7.10, G.7.11, G.7.12, G.7.14);
- Papers in non-refereed scientific publications - 9 (G.8.1, G.8.3, G.8.4, G.8.5, G.8.6, G.8.9, G.8.10, G.8.11, G.8.12);
- Articles in publications that are refereed and indexed in world-renowned databases - 5 (V.4.10, G.7.1, G.7.4, G.7.8, G.7.13);
- Articles published in non-refereed publications - 3 (G.8.2, G.8.7, G.8.8);
- Scientific publications with WoS Impact factor – 1 (G.7.1);
- Scientific works with SJR Impact rank – (B.4.1, B.4.4, B.4.7, B.4.9, B.4.10, G.7.1, G.7.4, G.7.6, G.7.8, G.7.13, G.7.14);
- Scientific works in Bulgarian – 6 (G.8.3, G.8.6, G.8.9, G.8.10, G.8.11, G.8.12);
- Scientific publications in English – 30 (B.4.1 – B.4.10, G.7.1 – G.7.14, G.8.1, G.8.2, G.8.4, G.8.5, G.8.7, G.8.8);
- Independent scientific publications – 4 (G.8.9, G.8.10, G.8.11, G.8.12);
- Co-authorship in scientific works: 2 co-authors – 7 (B.4.4, B.4.5, B.4.6, B.4.10, G.7.3, G.8.5, G.8.6); 3 co-authors – 13 (B.4.1, B.4.3, G.7.2, G.7.4, G.7.6, G.7.7, G.7.10, G.8.1, G.8.2, G.8.3, G.8.4, G.8.7, G.8.8); 4 co-authors – 9 (B.4.2, B.4.7, B.4.8, G.7.1, G.7.5, G.7.8, G.7.9, G.7.11, G.7.12) and 5 co-authors – 3 (B.4.9, G.7.13, G.7.14).

3. Reflection of the Candidate's Scientific Publications in the Scientific Community (Known Citations)

According to a survey conducted in Scopus, Chief Assist. Prof. Georgi Georgiev, PhD is a co-author of a total of 38 scientific works with 61 citations in 55 scientific works, with an h-index metric of 5 – (partial sample: (6 - 2019; 6 - 2020; 18 – 2021; 7 – 2022; 1 – 2023 and 9 – 2024). According to the latest data from Google Scholar, since 2019, the candidate has recorded 132 citations (20 - 2019 and 2020; 25 – 2021; 21 – 2022; 28 – 2023 and 18 – 2024) with an h-index of 6. These facts lead me to conclude that the achievements of his research work are widely accessible to the scientific community in the country and abroad. In the materials for the current competition, the candidate presented information on 15 citations in scientific publications that are refereed and indexed in world-renowned databases Scopus and IEEE – indicator "D.12" with an equivalent of 150 points, with a required minimum of 50 points, of which 7 were made by authors from the country and 8 by foreign authors.

4. Overview of the Content and Results in the Submitted Works

According to the analysis of the materials submitted for the competition, it is established that Chief Assist. Prof. Georgi Georgiev, PhD exceeds the necessary minimum scientific indicators regulated according to "Appendix 1 to Art. 1a, para. 1 of the PPZRAS – Area 5. Technical Sciences" and "Minimum requirements of TU – Gabrovo from Amend. - AS, Protocol No. 9 of 27.04.2021)" from the "REGULATIONS for acquiring scientific degrees and holding academic positions at the Technical University - Gabrovo." Regarding the group indicators "A," the candidate holds a "doctoral degree" according to "Diploma No. RU-NS-

2019-14," issued on 10.09.2019 - "Angel Kanchev University of Ruse," Faculty of "Electrical Engineering, Electronics, and Automation." Assistant Prof. Dr. Georgi Georgiev has systematized 10 scientific works from refereed and indexed publications, equivalent to habilitation work - indicator "B" with achieved 217 points against a required minimum of 100 points. Regarding the main indicators "G.7" – scientific works refereed and indexed in world-renowned databases, and "G.8" – scientific publications in non-refereed publications with scientific review, a metric of 302.67 points was formed (162.65 for indicator "G.7" and 140.02 points for indicator "G.8") with a required minimum of 200 points. In connection with the group indicator "E," data were presented as follows: "E.18" – participation in national projects 40 points; "E.20" – leadership of a national scientific project 20 points; "E.23" – published university textbook 20 points; "E.24" – published teaching aids 20 points; "E.27" – awards from competitions 10 points, or a total of 110 points.

5. General Characteristics of the Candidate's Activity

5.1. Teaching Activity (Working with Students and Doctoral Students)

The teaching activity of Chief Assist. Prof. Georgi Georgiev, PhD covers a work experience of 12 years. He is a leading lecturer in the subjects "Communication and Computer Systems" and "Measurements in Communications" for second and third-year students of the "Communication Technologies and Cybersecurity" specialty in Bachelor's degree programs. At the Master's level, he teaches lectures in the subjects "Information Protection Systems," "Web-Based Access Control Systems," and "Project Management in Communications" for students from the specialties "Communication Technology and Technologies" and "CTCS." He teaches seminar and laboratory exercises in "Communication and Computer Systems," "Databases and Cybersecurity," "Measurements in Communications," "Telecommunication Networks and Protocols," and "Application of Artificial Intelligence in Communications" for students in II, III, and IV years of the "CTCS" specialty. He actively participates in research activities in teams with students and doctoral students in the Department of "Communication Technology and Technologies." According to reports under his supervision, during the period 2019 – 2024, 24 students from the specialties "CET", "CTCS", and "IM" have obtained professional qualifications at the Bachelor's and Master's levels. With his participation and guidance, scientific works have been realized related to the research and experimental activities from the listed materials for participation in the competition V.4.1, G.7.2, G.7.6, G.8.3, and G.8.4, as well as reports at the "Student Scientific Session" at TU – Gabrovo. The candidate is a co-author in the development of one textbook "Multiplex Optical Systems and Networks" and two teaching aids "Modelling and Analysis of Teletraffic Processes in Communications" and "Guide to Telecommunication Transmission Lines and Optical Communications." The mentioned teaching materials reflect the latest technological innovations, trends, platforms, and applications for training highly qualified specialists.

5.2. Scientific and Research Activity The research and publication activity of Chief Assist. Prof. Georgi Georgiev, PhD covers a wide range of international forums in the country and abroad. Among the more significant ones are "BIA - Biomedical Innovations and Applications," "EEPES - Electronics, Engineering Physics and Earth Science," "CIEES - Communications, Information, Electronic and Energy Systems," "TELECOM," "ET - Electronics," "EAEEIE - Education in Electrical and Information Engineering." Additionally, the international specialized publications include "Journal of Electrical Engineering," "Journal

of Engineering Science and Technology Review,” and “MDPI Engineering Proceedings.” The directions of the candidate’s scientific and applied research concern the technologies of "Machine Learning" and "Artificial Intelligence," integrated in the development of approaches, methodologies, and applications in the regulated scientific fields "monitoring the transmission environment in communications," "monitoring and control of disturbances in communication channels," and "biometric voice diagnostics and facial recognition in hierarchical access administration." These areas are widely covered in the studies for which Chief Assist. Prof. Georgi Georgiev, PhD has presented information for participation in internal projects at UCNT, implemented at the Faculty of "Electrical Engineering and Electronics":

- No. 2305E / 15.03.2023 "Development of ICT-based Systems for Research and Monitoring of Traffic and User Access with Artificial Intelligence";
- No. 2208E / 22.03.2022 "Synthesis of Intelligent Systems for Object Recognition in Information and Communication Structures";
- No. 2105E / 22.03.2021 "Synthesis and Study of Models for Recognition of Speech, Images, and Biometric Information, Evaluation and Optimization in Teletraffic Data Transmission in Information and Communication Systems";
- No. 20075E / 16.03.2020 "Processing Information, Studying Basic Processes, and Increasing Security in Communication Systems." The candidate has participated in a national project "Digitalization of the Economy in the Big Data Environment," funded under the Operational Program "Science and Education for Intelligent Growth." The project was implemented within the framework of a partnership between "University for National and World Economy," "Varna University of Economics," "TU - Gabrovo," "Plovdiv University "Paisii Hilendarski"," "Angel Kanchev University of Ruse," and "Bulgarian Academy of Sciences – Institute of Information and Communication Technologies."

5.3. Implementation Activity The materials submitted for participation in the competition do not contain documentary data confirming created patents, inventions, or others. In the scope of the provided additional information, it was found that the candidate’s implementation activity mainly concerns the activities related to the project "Digitalization of the Economy in the Big Data Environment." Specifically, this involves the creation of prototypes of analytical tools based on "Artificial Intelligence" and "Machine Learning" with resource-distributed processing and manipulations aimed at clustering, classification, and forecasting tasks regarding indices of core business functions across various economic sectors for companies from Gabrovo and the region.

6. Contributions (Scientific, Applied, Practical) The materials for this procedure present several contributions of a scientific, applied, and practical nature, which I essentially accept. Based on the analysis of the competition materials, the following significant contributions can be synthesized:

- **Scientific and Applied Contributions:**
 - Development of approaches for regression diagnostics and derivation of models for predictive analysis regarding performance indices of the transmission environment in ICT simulation modeling.

- Creation of a methodology for integrating conventional and unconventional methods and algorithms for nonlinear optimization in the search for extrema and analytical diagnostics of data clusters concerning derived regression models for predictive analysis of transmission environment performance indices and disturbances in ICT communication channels.
 - Development of approaches for diagnosing the behaviour of performance indices of the transmission environment to ensure optimality and improve efficiency in packet transmission.
 - Development of approaches for monitoring broadband access to services and network route load in an active urban environment through training and selection of FFNN, PNN, k-NN, DT tools.
 - Composition of hybrid approaches for identifying spectrally processed tones in various frequency bands and at varying RMS noise levels, personalized, specific speech profiles through the integration of multi-layer FFNNs, ANFIS, DA, NB, k-NN, DT analytical tools.
 - Synthesis of approaches for spectral analysis and identification of disturbances, analog and digital signals with added noise impact in communication channels during the derivation and selection of DA, FFNN, k-NN, NB, SVM, ANFIS models for identifying specific output groups.
 - Development of approaches for voice analysis, image processing to extract and select specific characteristics, and subsequent recognition of personalized profiles by including Fast Fourier Transform and Discrete Wavelet Transform in user access authentication and verification systems.
 - Synthesis of a methodology for implementing the principles of deep learning in the creation and verification of FFNNs, PNNs, ANFIS, k-NN with Deep Learning Principles when analyzing user voice profiles and recognizing facial images in systems for administering physical access and cybersecurity in accessing information resources.
- **Applied Contributions:**
 - Synthesis of neural models for voice diagnostics, user authentication, and control of electronic devices and appliances through voice commands in "Smart Home" systems.
 - Adaptation of linear neural architectures regarding reducing the influence of noise and reported disturbances in the transmission of analogue and digital signals in communication channels.
 - Design of interactive GUIs with remote control via the web environment for modelling and diagnosing the characteristics and effectiveness of tuning recursive and non-recursive filters used in communications and electronics.

7. Evaluation of the Candidate's Personal Contribution The research achievements of Chief Assist. Prof. Georgi Georgiev, PhD are the result of his thorough work and constant striving to adapt the concepts of "Artificial Intelligence" and "Machine Learning" in the context

of communication technologies. The results of his research and applied scientific activity have received significant resonance in the international scientific community, confirmed by numerous citations of his publications by researchers from various countries. According to the Scopus database, the h-index of Chief Assist. Prof. Georgi Georgiev, PhD is 5. In the documentation presented for the competition, no separation protocols for the individual publications were submitted, which led me to accept that the candidate's individual contribution to the realization of the research and the presented scientific and applied results is significant.

8. Critical Remarks and Recommendations I have no significant remarks regarding the scientific works of the candidate, which have been prepared and formatted according to the requirements and established standards in the scientific field. I recommend that Chief Assist. Prof. Georgi Georgiev, PhD in the future expand his research activities by participating in national and international scientific projects and publishing in journals with an impact factor.

9. Personal Impressions I have known Chief Assist. Prof. Georgi Georgiev, PhD from our long-standing collaboration with the Department of "Communication Equipment and Technologies". He is a responsible, creative, and diligent professional who constantly seeks innovations and new approaches in his field of work. I believe the candidate possesses the necessary professional qualifications to hold the academic position of "Associate Professor."

Conclusion Considering the above, I propose that Chief Assist. Prof. Georgi Ivanov Georgiev, PhD be elected as "Associate Professor" in the field of higher education – 5. Technical Sciences, professional direction – 5.3. Communication and Computer Engineering, specialty – "Communication Networks and Systems" (Communication and Computer Systems, Measurements in Communications).

07.10.2024

Reviewer: .../signature/.....

/Prof. Valentina Markova, PhD/