

R E V I E W

of the competition for the academic position "Associate Professor"
in professional field 5.3 Communication and computer technology,
announced in State Gazette No. 31 of 19.04.2022,
with candidate Stella Savova Kostadinova, Ph.D., chief assistant, engineer
Reviewer: Evelina Nikolova Pencheva, DSc, Professor

1. General and biographical data

The competition was announced on the basis of a proposal from the Department of "Communication Techniques and Technologies" (CTT), Technical University of Varna, approved by the Council of the Faculty of Computer Science and Automation, and announced by a decision of the Academy Council in the State Gazette, number 31 on 19.04.2022. The competition is published on the website of TU-Varna.

The applicant Stella Kostadinova has attached all the necessary documents for participation in the competition according to the Regulations for the Terms and Conditions of Holding Academic Positions (RTCHAP) at the Technical University - Varna, TU-Varna, point IV, article 18, paragraph 2. Attachments include a short curriculum vitae, diplomas for completed educational and science degree Philosophy Doctor, a detailed report on the fulfillment of the minimum national requirements and the requirements defined in the RTCHAP and TU-Varna according to the applicable groups of indicators and the necessary evidence, a report on original contributions, scientific works related to the competition and their summaries, reference for yearly teaching occupancy and reference for participation in scientific research projects.

The applicant was obtained a master's degree in "Telecommunications Engineering and Technologies" from Moscow Electrotechnical Institute of Communications, Moscow, Russia. In 2014, she defended her PhD thesis at the Technical University - Varna. From 1989 to 2009, she has been working in the branches of BTC, Varna as an engineer, head office, head of the "Digital Network" department. She has started as an "Assistant Professor" at the CTT department, TU Varna in 2011 and from 2019 until now she holds the position of "Chief Assistant Professor" at the department.

2. General description of the presented materials

The candidate has submitted for reviewing a total of 34 scientific papers and a list of participations in 6 research projects. The reviewer accepts for reviewing 10 scientific papers according to C.4 indicator, 12 scientific papers according to D.7 indicator and 12 scientific papers according to D.8 indicator according to the defined minimum requirements for occupying the academic position "Associate Professor" in the RTCHAP. The submitted publications have not been used to acquire the PhD educational and scientific degree and to hold the academic position of "Chief Assistant".

The applicant has defended a dissertation for the award of PhD educational and scientific degree on the topic "Research of characteristics of the quality of service of optical access in new generation networks, based on PON technologies". She might be fully awarded **50 points** according to indicator 1 of group A.

The applicant has submitted 10 scientific publications for the 4th indicator of C group which are referenced and indexed in the world-famous scientific information database SCOPUS and are equivalent to monography. These publications correspond to **135** points at the minimum required points for this indicator of 100.

Twelve scientific publications have been submitted for the 7th indicator of D group which are referenced and indexed in the world-famous scientific information database SCOPUS. These publications correspond to **136 points**. 12 scientific publications in non-refereed peer-reviewed journals or in edited collective volumes are presented for the 8th indicator of D group, which correspond to **80 points**. The total number of points for the indicators in D group is **216**, with the minimum required points for this indicator being 200.

The applicant has submitted 28 citations for the 11th indicator of E group related to citations in collective volumes with scientific review, which correspond to **280 points** with minimum required points of 50.

The applicant has held 180 hours for courses at TU-Varna for the last 3 years which correspond to 165 points. The minimum required score for this indicator is of 30.

The reviewing of the documents submitted for the competition shows that the applicant exceeds in all indicators the minimum requirements for occupying the academic position "Associate Professor".

3. General characteristics of the applicant's research and applied activity

The applicant's research activity is in the field of optical communications and the use of artificial neural networks for studying and classification of information transmission parameters in next-generation networks.

The latency in individual segments of the optical network and the influence of noise effects during voice and data transmission were investigated in the publications presented in group C. Using artificial neural networks, transmission characteristics were studied and various parameters related to quality of service, detection of unauthorized user access were classified.

In the publications presented in group D, speech transmission parameters and tele-traffic systems were studied using different types of neural networks, and models were developed for recognition of stress states. By means of simulation modeling, the time for receiving requests in tele-traffic systems and the impact of constant white noise and pink noise in different types of signals have been investigated. Research related to the configuration of the Black Sea fiber optic cable system, interfaces, and transmission performance has been conducted. A method for identifying signals with superposed noise is proposed by using discriminant analysis.

The applied activity of the candidate is related to her participation in 6 research projects financed by TU-Varna. Virtual tools have been developed for computer modeling of digital IIR and FIR in a LabVIEW graphical environment with the possibility of remote access to them via the WEB. The structure and functionality of new virtual tools were developed to evaluate the performance of a tele-traffic system based on the LABVIEW platform.

The submitted publications for participation in the competition give reason to assign a high rating to the applicant's research and applied activity.

4. Evaluation of the pedagogical background and activity of the applicant

From the reference for the taught disciplines in the period 2019-2022, it is clear that the applicant gave lectures in the following academic courses: "Cable communication lines", "Optical cable lines and systems", "Digital transmission systems" and "Communication circuits". In addition to the listed academic courses, the applicant also held exercises on "Telecommunication networks", "Switching, multiplexing and Internet technologies", "Introduction to the specialty", "Optoelectronics and laser technology".

For the last 8 academic years, 13 masters and 27 bachelors have successfully defended their theses under the guidance of the applicant.

In addition, to support the teaching process in LabVIEW, virtual applications with an interactive, intuitive, accessible, and understandable graphical user interface, modeling filters with a finite impulse spectrum and analog low-pass filters have been developed.

A new approach in the educational process and the laboratory base is proposed, which presents the experience of the Department of Computer Science at TU-Varna to improve the material base and upgrade the educational process. The aim of the proposed project is the implementation of a modern integrated research complex for comprehensive research of telecommunication networks.

The above shows a very good degree of pedagogical background and activity of the applicant.

5. Basic scientific and applied contributions

The main scientific contributions presented in the publications which are equivalent to a monography and ones aside of that group are related to the creation of new methods and are as follow:

- A methodology has been synthesized for statistical analyzes of various types of information, for the assessment of disturbing effects on electrical signals of incoming and outgoing traffic flows in communication systems.
- An innovative method for applying discriminant analysis to identify electrical signals subjected to uniform and periodic noise levels without and with pre-FFT processing has been synthesized.

The main scientifically applicable contributions presented in the publications are related to analysis and proving with new means of dependencies in modern communication systems and are as follow:

- Artificial neural networks for identifying voice commands in voice control systems have been analyzed and synthesized.
- The possibility of applying artificial intelligence in the analysis of M/M/c/k traffic data was investigated in order to define their category in relation to serviced traffic with different number of server stations.

- The computational efficiency of artificial neural networks was evaluated in the analysis of transmitted information flows to determine the type of defined traffic categories with the help of artificial intelligence.
- Types of classifiers for quantitative identification of tele-traffic devices have been proposed and studied.
- Structures of adaptive neural-fuzzy interface systems for noise identification are investigated.
- The delays in an optical transmission network with a wave seal have been investigated and analyzed.

The main applied contributions presented in the attached publications are related to the creation of virtual instruments and are as follow:

- A virtual instrument has been using LABVIEW to test NFIS classification performance developed.
- A laboratory model of a real optical DWDM network for signal transmission has been created.

A reference for 28 citations is provided in the documents submitted to the competition. Thus, the applicant acquires 280 point for citations in scientific publications, referenced in world-famous databases with scientific information.

The applicant has attached a declaration of originality of the research and the obtained results.

6. Significance of contributions for science and practice.

The significance of the contributions in the applicant's scientific works is indisputable. As can be seen from the above, the contributions are mainly related to the use of artificial intelligence technologies in telecommunications. Artificial intelligence in the telecom industry uses advanced algorithms to look for patterns in data, enabling telcos to both detect and predict network anomalies. As a result of the use of artificial intelligence in telecommunications, telecommunications equipment suppliers and operators can proactively correct problems before consumers are negatively affected.

Compliance with the minimum requirements for holding the academic position "Associate Professor"

Group of indicators	Number of points for minimal requirements	Number of points of the applicant
A	50	50
C	100	135
D	200	216
E	50	280
F	30	165

The analysis of the attached documents for participation in the competition, summarized in the table, shows that the quantitative indicators of the criteria for occupying the academic position "Associate Professor" have been met.

The significant number of citations of the submitted publications by foreign authors indicates a very good recognition of the applicant in the scientific society.

7. Critical notes and recommendations

The documents submitted for the competition have been meticulously prepared. I have no principle and formal objections.

Considering the high evaluation of the teaching activity, my main recommendation to the applicant is to participate in writing a textbook and teaching materials for the courses she leads. I believe that she has the potential to participate in national research projects. It would be good to direct her efforts to form a group of young researchers - students and PhD students, with the aim of forming a team with sufficient capacity to participate in significant research projects, based on which to strengthen even more the publication activity in indexed journals and conferences.

CONCLUSION

According to the submitted documents and the above analysis of the applicant's work, as well as my personal conviction, I believe that Ch. Assistant Professor Dr. Stella Kostadinova has scientific and applied contributions to a sufficient extent, which have found recognition among the scientific community. She also has a significant pedagogical activity. The applicant meets the requirements defined by the Act on the Development of the Academic Staff in the Republic of Bulgaria, as well as the relevant Regulations to the law and those of TU-Varna. Based on the acquaintance with the presented scientific works, their significance, the scientific, scientifically applicable and applied contributions contained in them, I find it reasonable to propose Ch. Assistant Eng. Stella Savova Kostadinova, PhD to be awarded the academic position "Associate Professor" in the professional field 5.3 Communication and computer technology.

Date: 16.08.2022

Reviewer:

Заличена информация
по Регламент (ЕС)
2016/679

/prof. Evelina Pencheva, DSc./