

REVIEW

on a competition for the occupation of
an academic position "Associate Professor" in
professional direction 5.4. " Power engineering",
scientific specialty "Electrotechnical materials and cable technology"
with candidate Chief Assistant Dr. Eng. Milena Dimitrova Ivanova



Reviewer: Prof. Dr. Eng. Bohos Rupen Aprahamyan

1. General and biographical data

Chief Assistant Dr. Eng. Milena Dimitrova Ivanova graduated from the Technical University of Varna in 2005 with a major in "Communication Engineering and Technologies" and acquired the qualification of "Communications Engineer" with a bachelor's degree. In 2007, she graduated with a master's degree in "Communication Techniques and Technologies" at the Technical University - Varna and acquired the qualification "Master - Engineer". Since 2005, she has been a part-time assistant, and since 2007, a full-time assistant at the Electrical Power Engineering department of TU - Varna. In 2015, she was enrolled in doctoral studies in the doctoral program "Electrical supply and electrical equipment in industry (of the ship)" at the Naval Academy "N. Vaptsarov" - Varna and in 2016 he successfully defended her PhD thesis on the topic "Electrical processes in circuits for generating a high-voltage discharge pulse in a liquid medium" with supervisor Prof. Dr. Eng. Stefan Todorov Barudov. Since 2017, she has been a Chief Assistant at the Department of Electrical Power Engineering at the Technical University of Varna.

Chief Assistant Dr. Eng. Milena Dimitrova Ivanova participated in a competition for the academic position "Associate Professor" in professional direction 5.4. "Power Engineering", scientific specialty "Electrotechnical materials and cable technology" for the needs of the "Electroenergetics" department of TU - Varna. The competition was announced in SG No. 4 of 13.01.2023 and on the TU-Varna website.

2. General description of the presented materials

For participation in the competition, Chief Assistant Dr. Eng. Milena Dimitrova Ivanova has submitted a curriculum vitae, a copy of the diploma for the acquired educational and scientific degree "Doctor", copies of the employment contracts for holding the academic positions of "Assistant" and "Chief Assistant", a list of publications on the PhD thesis for acquisition of the "Doctor" degree, a list of the publications presented in the competition for filling the academic position "Chief Assistant", a table certifying the fulfillment of the minimum national requirements for filling the academic position " Associate Professor" from the Regulations for the Application of the Law on the development of the academic staff in the Republic of Bulgaria and the minimum requirements from The regulations for the terms and conditions for occupying academic positions at the TU - Varna, a list of the scientific works submitted for participation in the competition for the acquisition of the academic position "Associate Professor", a reference to the scientific, scientific-applied and applied contributions, a reference to the horary of the conducted study activity, report on the educational activity, report on defended graduates and work with students and doctoral students on scientific research projects, report on participation in research projects, report on scientific and scientific-applied developments, report on developed educational materials, report on personal contribution in the case of modernization of the material and technical base of the "Electrical Power Engineering department, a certificate of membership in a professional

organization in the relevant scientific field, a declaration of credibility, a declaration of originality of the contributions, a declaration of the absence of plagiarism in the presented scientific works, a declaration of correspondence of the names and the full-text scientific publications submitted for participation in the competition.

For participation in the competition, Chief Assistant Dr. Eng. Milena Dimitrova Ivanova presents a total of 31 scientific works, of which 1 article in a scientific journal, 29 reports at scientific conferences and 1 article in the Annual Journal of Technical University of Varna. Of the scientific articles and reports submitted for participation in the competition, 19 are indexed in the Scopus database, 25 are in English and 6 in Bulgarian. In 9 of the submitted publications, the candidate is the first author, in 9 he is the second and in 13 he is the third or subsequent author. There are 2 independent publications. 20 publications in Bulgarian and English are in editions included in the National Reference List of contemporary Bulgarian scientific publications with peer review.

The presented works are generally directly related to the current competition for the appointment of the academic position "Associate Professor" and are in the professional direction 5.4. "Power Engineering", scientific specialty "Electrotechnical materials and cable technology".

When comparing the presented materials with the minimum required points by groups of indicators for occupying the academic position "Associate Professor" according to the Regulations for the terms and conditions for occupying academic positions in TU - Varna, the following results are obtained:

Group of indicators	Content	Indicator	Number of points, required to occupy the academic position "Associate Professor"	Number of points of the candidate	
A	Indicator 1	1. Thesis for the award of the educational and scientific degree "Doctor"	50	50	
C	Indicator 4	4. Habilitation work - scientific publications (not less than 10) in journals and periodicals that are referenced and indexed in world-renowned databases of scientific information	100	232	
D	Sum of indicators 7 and 8	7. Scientific publication in journals and periodicals that are referenced and indexed in world-renowned databases of scientific information	200	123	226
		8. Scientific publication in non-refereed peer-reviewed journals or in edited collective volumes		103	
E	Indicator 12	12. Citations or reviews in scientific publications referenced and indexed in		60	

		world-renowned databases of scientific information or in monographs and collective volumes	50		
F	Sum of indicators 18, 19, 24 and 26	18. Participation in a national scientific or educational project	0	40	120
		19. Participation in an international scientific or educational project		20	
		24. A published university textbook or a textbook that is used on the school network		20	
		26. A recognized application for a utility model or patent		40	
G	Indicator 29	29. Horarium of lectures held at TU-Varna for the last three years (1 point for each held lecture hour)	30		692

3. General characteristics of the candidate's scientific research and scientific-applied activities.

The scientific research and scientific-applied activity of the Chief Assistant Professor Dr. Eng. Milena Dimitrova Ivanova, who is reflected in the publications and in the projects in which she participated, is mainly focused on electrotechnical materials and power engineering and is in the field of the competition.

I accept the basic directions of scientific research formulated by the candidate, which are summarized as:

- Research of high voltage discharges in liquid medium – 8 publications
- Investigations of the soil as a material with a complex structure and electrical parameters, significantly influencing the design of grounding and lightning protection installations – 7 publications
- Research in the field of cable technology - 2 publications
- Studies of new materials for protection against the influence of electromagnetic fields - 1 publications
- Research on polymer insulators – 1 publication
- Studies of indicators for the quality of electrical energy - 2 publications
- Research on discrete AC voltage regulators - 6 publications
- Research on LED control circuits - 2 publications.
- Research on technical safety - 1 publication

The research activity of the Chief Assistant Professor Dr. Eng. Milena Dimitrova Ivanova, defines her as a researcher with good theoretical and practical knowledge in order to successfully cope with scientific research tasks in parallel with teaching activities, as well as with a high potential for future successful development.

4. Evaluation of the pedagogical preparation and activity of the candidate.

Chief Assistant Dr. Eng. Milena Dimitrova Ivanova is an established lecturer in the Electrical Power Engineering department of TU - Varna. Conducts lectures on disciplines such as "Electrotechnical materials", "Technical safety", "Control and diagnostics of electrical insulation systems", "Diagnostics of cable power lines", "Special materials and technologies in the power industry", "Management of working conditions and production risk" and others for the students from the "Bachelor" and "Master" degrees programs of TU - Varna.

She is the co-author of 2 university textbooks.

Chief Assistant Dr. Eng. Milena Dimitrova Ivanova is the supervisor of 12 graduate students studying at the Bachelor's and the Master's degrees programs.

I believe that her educational and teaching work meets the requirements for employment at the academic position "Associate Professor".

5. Basic scientific and scientific-applied contributions.

I accept the applicant's reference for the main contributions in the works presented. Based on the publications presented for review, it can be generally concluded that a number of positive results of a contributing nature have been achieved, the most significant of which are as follows:

Scientific contributions:

1. A new methodology for determining the maximum contact voltage has been created, which is applicable in the presence of data on the distribution of the potential on the sides of the cells of the grounding installation and for arbitrary construction of the grounding network [C.4-7].
2. A new method was created for determining the permissible values of leg voltages in grounding installations under the influence of impulse discharge currents of a certain form [D.7-8].
3. A new type of analysis of an autotransformer discrete AC voltage regulator, represented as a four-pole with a load, was created by using a simulation model of the regulator in a Matlab environment [D.7-5].

Scientific and applied contributions:

1. A new model for calculating the water resistance during the first half-period of a periodically decaying high-voltage discharge pulse in water was created by using a capacitive energy storage system based on experimental studies [C.4-2].
2. A new simulation model was created to study the variation of contact voltages in the grounding installations caused by lightning strikes at different points of the grounding network. [C.4-8].
3. A new configuration of a lamp high-frequency generator with a matching section was created - an L-shaped inductive-capacitive converter, which, at a generated frequency of 2MHz, provides a start-up and operating mode for the excitation of a transverse discharge [D.8-3].
4. Confirmatory data were obtained on the correlation between electrical and thermal resistivity of soil for the purpose of thermal sizing of cables. Confirmatory facts were also obtained about the applicability of a linear regression model for evaluating the correlation between the two types of resistances [C.4-10], [C.4-9].
5. A new system for expert assessment of the quality of electric energy and power supply has been developed, based on the existing regulatory framework, characterized by the introduction of a sufficient number of discrete assessment levels [D.8-1].
6. Confirmatory data have been obtained on the causes of power outages in the medium and high voltage electrical networks on the territory of the Republic of Bulgaria, covering the main types and locations of occurring power outages in power lines, substations and power transformers, and their causes have been summarized [D.7-7].

7. A new simulation model of an earthing network with and without vertical earthing conductors was created to determine the maximum possible potentials in the area of the network in the event of a direct lightning strike, and a special module was created in Matlab Simulink for a horizontal earthing network with a length of 1 meter [D.8 -10].
8. Confirmatory data were obtained for determining the soil specific volume resistivity and dielectric permittivity depending on the frequency of the electromagnetic field, the multi-layered structure of the soil, the moisture content and the density of the soil using a gravimetric method for measuring soil moisture. A new approach for obtaining data on the specific volume resistance and dielectric permittivity of the soil through a precise analysis of soil processes under the impact of lightning impulses is proposed. [C.4-5], [D.8-11].
9. Confirmatory data were obtained for the existing diagnostic methods for the maintenance of polymer composite insulators. Guidelines for development in the field of in-service diagnostics are outlined [C.4-3].
10. Confirmatory data were obtained during a comparative study between single-circuit and double-circuit regulating devices for controlling the direct current discharge in terms of the stability of the discharge current (load current stabilization coefficient) and the power parameters of the regulating devices (dissipated power from the regulating element and efficiency factor) [D.8-4].
11. Confirmatory data were obtained during the experimental determination of the change in the resistance of two types of high-voltage switches - trigatron and thyatron, and a mathematical model of the obtained dependencies for the change in the resistance of the high-voltage switches over time was compiled [D.8-8].
12. A new algorithm has been developed for analyzing the electrical processes in an autotransformer discrete AC voltage regulator using the state variable approach. Confirmatory data were obtained through a simulation study in a Matlab environment of the processes and efficiency of an autotransformer discrete AC voltage regulator with different loads [D.7-1], [D.7-2], [D.7-4], [D.7-6].
13. A new simulation model was developed in the Matlab environment of an autotransformer discrete AC voltage regulator with maximum current and overvoltage protections, including the nonlinearities of all circuit elements [D.7-4].
14. The automatic disconnections from relay protection were analyzed depending on the type of damage and the type of lines in a 110/20 kV electrical substation for a certain period. An approach for fault analysis on medium voltage lines is proposed, which can be used by power distribution companies to increase power supply reliability [D.7-9].

Applied Contributions:

1. Confirmatory data were obtained from an experimental study of the switching capabilities of a three-electrode controllable air discharger [D.8-5].
2. Confirmatory data were obtained on the influence of temperature and energy characteristics on the change in the resistance of a liquid medium during the formation of a high voltage discharge pulse [D.8-9].
3. Confirmatory data were obtained from an experimental study of the generated harmonics and the change of the amplitude of the supply voltage of a system for generating high-voltage discharge pulses for water purification [D.8-12].
4. Confirmatory data were obtained on the change of electromagnetic field parameters at different sources of electromagnetic field shielded using protective flexible screens (conductive textile fabrics with silver and copper-nickel fibers) [C.4-4].
5. Confirmatory data were obtained during an experimental study of the electromagnetic field in buildings near a radar installation with a slotted waveguide antenna with certain parameters [D.7-3].

6. Confirmatory data were obtained during an experimental study of a system with capacitive energy storage for generating a periodically decaying high-voltage discharge pulse [C.4-1].
7. Confirmatory data were obtained in the comparative analysis of circuits with different LED driver topologies. On the basis of the analysis, the energy-efficient topologies of the drivers and the ways of connecting the LEDs in a matrix were determined. The functional capabilities of an integrated circuit, specialized for LED, were analyzed, and specialized computer modeling was used in the study [D.8-6], [D.8-7].
8. Confirmatory data were obtained for the frequency dependences of the specific volume resistance and the dielectric permittivity of soil samples from different regions of the territory of the Republic of Bulgaria. The obtained data can be used to improve the accuracy of dimensioning of grounding installations of power plants by using simulation models in Matlab [C.4-6].
9. Implementation of e-learning in the Faculty of Electrical Engineering of TU-Varna [D.8-2].

6. Significance of the contributions for science and practice.

The relevance of research in the field of electrotechnical materials makes the teaching and research work, as well as the publications of the Chief Assistant Professor, Dr. Eng. Milena Dimitrova Ivanova significant for science and education.

The significance of the scientific contributions of the Chief Assistant Dr. Eng. Milena Dimitrova Ivanova for science and practice is indisputable. She can be judged by her publications and participation in international scientific conferences. She is well known to the scientific community in the country and abroad and is undoubtedly a leading specialist in the field of electrotechnical materials.

The quantitative indicators of the criteria for occupying the academic position "Associate Professor" have been met, and in most groups of indicators the candidate significantly exceeds the minimum requirements.

7. Critical notes and recommendations.

I have no significant comments on the materials submitted for participation in the competition. As a preliminary reviewer of the draft habilitation materials, I had made several specific comments to improve the material presented.

It is noteworthy that Chief Assistant Dr. Eng. Milena Dimitrova Ivanova generally complied with the critical remarks made on the previously presented materials.

I have two recommendations:

1. The candidate's active work on scientific projects is recommended to lead to the creation and management of a new scientific laboratory in the field of electrotechnical materials. Upon successful habilitation, the candidate will be the only qualified lecturer of electrotechnical materials at TU - Varna and will have the responsible task of attracting followers in this field - young lecturers and doctoral students.
2. In the candidate's materials, there are no submitted documents about the results of scientific research applied in practice. It would be good to think about specific applications in practice, as well as patent or utility model protection.

8. Personal impressions and opinion of the reviewer.

My personal impressions from my more than 10-year acquaintance in the professional sphere with the Chief Assistant, Dr. Eng. Milena Dimitrova Ivanova are very good. As a responsible researcher, she strives for comprehensiveness and accuracy of research, its presentation and publication.

The impression created by the materials presented for the competition is also very good. For me, as a reviewer, there is no doubt that the main scientific and scientific-applied contributions in the works presented for the competition are the personal contribution of the candidate and with her direct participation.

Undoubtedly, Chief Assistant Dr. Eng. Milena Dimitrova Ivanova has established herself as a good specialist in the field of electrotechnical materials with a marked interest in modern achievements in this scientific field and great potential for future development.

CONCLUSION

The materials presented in the competition for the appointment of academic position "Associate Professor" allow to evaluate the teaching and research activities and the qualities of the candidate, Chief Assistant. Dr. Eng. Milena Dimitrova Ivanova and to define her as a highly qualified and established scientist in the field of electrotechnical materials with national and international authority.

The minimum requirements for occupying the academic position "Associate Professor" in professional direction 5.4 "Power Engineering", determined by the Regulations for the terms and conditions for occupying academic positions in TU - Varna, which also cover the minimum national requirements according to the Regulations for the application of the Law on the development of the academic staff in the Republic of Bulgaria, have been met.

Based on the acquaintance with the presented scientific works, their importance, the scientific, scientific-applied and applied contributions contained in them. I find it reasonable to propose Chief Assistant Professor. Dr. Eng. Milena Dimitrova Ivanova to take the academic position "Associate Professor" in professional direction 5.4. "Power Engineering", scientific specialty "Electrotechnical materials and cable technology" for the needs of the Electrical Power Engineering department of Technical University - Varna.

Заличена информация
по Регламент (ЕС)
2016/679

Date: 01.06.2023

REVIEWER:

Prof. Dr. Eng. Bohos Aprahamyan