R E V I E W

in relation to the competition for the academic position of "Associate Professor" in a professional field 5.2. "Electrical Engineering, Electronics and Automation", specialist "Electrical Apparatus", at the Department of "Electrical Engineering and Electrotechnologies" at the Faculty of Electrical Engineering of the Technical University - Varna, announced in the State Gazette issue 40 / 31.05.2022 with candidate Chief Assistant Professor, Ph.D., Eng. Tatyana Marinova Dimova.

Reviewer: Associate Professor Petko Hristov Mashkov, Ph.D.

1. General and biographical data

Tatyana Marinova Dimova graduated in "Electrical Engineering" (Master's degree) with a specialization in "Electrical Technologies" in 2002 at TU-Varna. In 2016, under the doctoral program "Electrical Machines and Apparatus", she defended her thesis "Modeling of separators with permanent magnets" and obtained the Doctorate of National Academy of Sciences. Since 2007, she has been an assistant professor, and since 2016, a chief assistant professor (in Electrical Apparatus) at the Department of Electrical Engineering and Electrotechnologies, Faculty of Electrical Engineering of TU-Varna.

Ch. assistant professor, Ph.D. Eng. Tatyana Marinova Dimova, participated in a competition for the academic position "Associate Professor" in the professional field 5.2. "Electrical engineering, electronics and automation" in the scientific specialty "Electrical devices", at the department of "Electrical Engineering and Electrotechnologies" at the Faculty of Electrical Engineering of the Technical University of Varna, announced by decision of the Academic Council of TU-Varna (prot. no. 26 / 12.04.2022).

2. General description of the presented materials

For participation in the competition ch. assistant professor, Ph.D. Tatyana Marinova Dimova, has submitted a resume, a copy of her diploma for the Master's degree obtained, a copy of the diploma for the obtained educational and scientific degree "Doctor of Philosophy", reference to the scientific publications used to acquire the Doctor's degree; reference for the scientific publications used for the acquisition of academic position "Chief Assistant"; employment contract for the employment of academic position "Chief Assistant"; publications on the competition for the acquisition of academic position "Assoc. Professor"; Declaration of credibility; Declaration of originality (for the dissertation developed by her); Plagiarism Statement.

Other related documents proving the scientific, teaching and/or entrepreneurial activity under Article 22, para. 2 and para. 3 of „Regulations for the terms and conditions for occupying academic positions at TU-Varna"and art. 27(4) of „Law on the development of the academic staff in the Republic of Bulgaria" and Art. 57a (2) of „Regulations for the implementation of the Law on the development of the academic staff in the Republic of Bulgaria":

Additional indicators related to the educational activity:

Reference on the teaching workload (reference on the horary of the lectures held at TU-Varna for the last three years by Chief Assistant Professor, PhD, Eng. Tatyana Marinova Dimova in disciplines from the professional field of the competition), certified by the head of the department, head of the educational methodical department and Dean; Reference for guided and successfully defended diploma graduates from 2016 to 2022 - 15 for " Bachelor's degree" and 15 for "Master's degree"; Reference for personal contribution to the

modernization of the material and technical base at the "Electrical Engineering and Electrotechnologies" department - for the period from 2016. until now under the leadership and with the personal participation of Chief Assistant Professor, Ph.D., Eng. Tatyana Dimova, 15 new laboratory stands were developed, and another 9 were modernized for the training of students from nine majors from different Bachelor's and Master's programs.

Additional indicators related to scientific and research activity:

Reference for participation in scientific and research projects - during the period 2017 – 2022, Chief Assistant Professor, PhD, Eng. Tatyana Marinova Dimova has participated in six state-financed research projects and has been the project manager since 2022; participated in a project under the Ministry of Education, Science and Technology. Presented are: Certificate of participation in the ERASMUS+ program 06.2016; Documents certifying the cooperation with the company "ELIKA ELEVATOR inc." - Silistra from 2013, 2014. and 2022, confirming the applicability and usefulness of the main results of the scientific activity of Eng. Tatyana Dimova.

Presented are: a detailed reference and a table certifying the fulfillment of the minimum national requirements for the occupation of the academic position "Associate Professor" from the "Regulations for the implementation 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 the occupation of academic positions at TU-Varna; a list of scientific works is , submitted for participation in the competition, including a general description and main contributions; a list of scientific publications equivalent to a monographic work in publications that are referenced and indexed in world-renowned scientific information databases; a list of scientific publications in publications that are referenced and indexed in world-renowned databases with scientific information other than those presented as a habilitation thesis; a list of scientific publications in non-refered journals with scientific review or in edited collective works; a list of citations with links for verification, summaries of the scientific publications submitted for participation in the competition in Bulgarian and English as well as copies of all publications for participation in the contest.

For participation in the competition Chief Assistant Professor, PhD, Eng. Tatyana Marinova Dimova presents a total of 25 papers, which consist of scientific articles and reports. Of the scientific articles and reports submitted for participation in the competition, 24 are in English and 1 in Bulgarian. In 16 of the submitted publications, the candidate is the first author. Referred and indexed in Scopus and Web of Science are 20 publications. The remaining 5 publications in Bulgarian and English are in editions included in the National Reference List of contemporary Bulgarian scientific publications with peer review.

The works presented are directly related to the current competition for the appointment of academic position "associate professor" and are in the professional field 5.2. "Electrical engineering, electronics and automation".

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

Indicator Group	***Content***	***Indicator***	***Number of points required to***	***Number of points of the candidate***

			occupy the academic position „associate professor“		
A	Indicator 1	1. Dissertation work for the award of the PhD "Doctor"	50	50	
C	Indicator 3 or 4	4. Habilitation work - scientific publications (not less than 10) in journals that are referenced and indexed in world-renowned databases of scientific information	100	220	
D	Sum of indicators 5 through 11	7. Scientific publication in journals that are referenced and indexed in world-renowned databases of scientific information	200	200	236,67
		8. Scientific publication in non-refereed journals with scientific review or in edited collective works		36, 67	
E	Sum of indicators 12 through 15	12. Citations or reviews in scientific publications referenced and indexed in world-renowned databases of scientific information or in monographs and collective volumes	50	240	
G	Sum of indicator 29	Schedule of lectures held at TU-Varna for the last three years (1 point for each lecture hour held)	30	Over 800	

Results by indicator group

№	**Indicator Group**	No. Points
1.	**Group of indicators A.** *At least 50 points*	50
2.	**Group of indicators C.** *At least 100 points*	220
3.	**Indicator group D.** *At least 200 points*	236,67
4.	**Group of indicators E.** *At least 50 points*	240
5.	**Group of indicators G.** At least 30 points	Over 800

Chief Assistant Professor, PhD, Eng. Tatyana Marinova Dimova, has declared that the works provided to prove compliance with the minimum national requirements according to Art. 2b of “Law on the development of the academic staff in the Republic of Bulgaria”, such as authored monographs, publications, studies, reviews, citations, reports, dissertations, manuals and/or other similar achievements, do not repeat the evidence (publications, etc.) on the various indicators presented for the acquisition of the PhD "Doctor", and for holding previous academic positions. All of them are verified and publicly available in paper and electronic format.

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

The research and scientific-applied activity of Chief Assistant Professor, PhD, Eng. Tatyana Marinova Dimova, which is reflected in the publications and in the projects in which she participated, is focused on electrical devices and is entirely in the field of the competition.

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

1. Synthesis of 2D and 3D computer models for the study of the magnetic field and the influence of the design parameters and the characteristics of the separated products (materials) on the degree of purification with separators of different constructions.
2. Mathematical models and programs for the study of magnetic fields in the device of various designs of separators with permanent magnets.
3. Experimental study of specific characteristics related to the factors that influence the separation devices and the separation process.
4. Development of experimental devices for the study of specific characteristics and processes related to the separation devices with permanent magnets.
5. Determination of dependencies between the arrangement of the magnetic system, the distribution of the magnetic field, the magnetic force that is sufficient to separate ferromagnetic impurities from non-magnetic ones and some design parameters (concentrators, air gaps, etc.).
6. Experimental determination of the dependences of the magnetic force, flow rate, speed of movement of the product, temperature and degree of purification of the separated material.
7. Research to reduce pollution from ICE vehicles by using hydrogen oxy technique where the hydrogen produced by the HHO cell is mixed with the petrol/diesel in the combustion chamber, helping to burn the fuel completely and leading to fuel savings of up to 14-20%.
8. Research related to the study, modeling and optimization of the distribution of the heat field of household appliances in order to improve their efficiency.
9. Research related to the complex of influencing technological parameters and optimization of the design features of current-carrying busbars in electrical devices.
10. Research related to the use of energy from renewable energy sources in Bulgaria.

The scientific research activity of Tatyana Marinova Dimova, Ph.D., is defined as a researcher with high theoretical and practical knowledge, necessary for successfully dealing with research tasks in parallel with the teaching activity, as well as with a high potential for future successful development.

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

Chief Assistant Professor, PhD, Eng. Tatyana Marinova Dimova is an established teacher in the Department of "Electrical Engineering and Electrotechnologies" at the Faculty of Electrical Engineering of the Technical University - Varna. She teaches lectures on disciplines: for “Bachelor's degree” - Electrical apparatus part 2; Electrical apparatus part 3; Electrical machines and apparatus Part 1; Electrical machines and apparatus part 2; Electromechanical devices; Electromechanical systems and devices; Contactless apparatus and converters; Switchgear for RES; for “Master's degree” - Electrical apparatus. I believe that her educational and teaching work meets the requirements for holding the position of associate professor.

5. Main scientific and scientific-applied contributions

The scientific work of Chief Assistant Professor, PhD, Eng. Tatyana Marinova Dimova is mainly in the field of electrical appliances and related technological processes. The proposed ideas, methods and approaches for solving the specific tasks have, for the most part, been verified experimentally. Some of the developed separation apparatuses, technological devices and mathematical models have allowed the realization of new experimental results or experimental results with better indicators than previously available.

I accept the candidate's reference for the main contributions in the works presented, which are of a scientific and applied nature and can be summarized in the following directions:

Proving by new means substantial new aspects of already existing scientific fields and problems:

- Through the synthesis of 2D and 3D computer models for the study of the magnetic field and the influence of parameters of the separation processes on the degree of purification with separators of different constructions. As a result of the developed models, the constructions of the considered separators were optimized and new results were obtained regarding: the distribution of the magnetic field in the working area of the separator; the number of permanent magnets in the device is reduced; the mass of structures is significantly reduced; the degree of purification is increased compared to initial capabilities.

- New mathematical models have been developed for the study of magnetic fields in the design of various types of separators with permanent magnets, used in various fields of industry - electrotechnical and food processing.

- New data was obtained by determining dependencies between the way the magnetic system is arranged, the distribution of the magnetic field, the magnetic force that is sufficient to separate ferromagnetic impurities from non-magnetic ones and some structural parameters.

- With the help of specially developed mathematical models based on the finite element method, new data was obtained in the study of the design of a real magnetic separator type MCR-5. The results allow to optimize the structure of the magnetic separator and to achieve a high level of purification. Using FEMM 4.2 software, different versions of the configuration of the magnetic system have been developed in order to achieve the maximum degree of purification. A comparison was made between the obtained results and a real-life experiment. An analysis of the possibilities for improving the operation mode of the separator by using new materials for permanent magnets has been made.

- New 3D models of two specific types of separators with a specific design have been proposed, which support the development of a new technological line in the company "Solar Rays" AD, Provadia in 2016. The realized 3D model in the COMSOL Multiphisics environment allows to estimate the magnetic flux in the operating air gap and minimize stray magnetic flux losses. The experiment performed showed 99% extraction of ferromagnetic impurities.

- New computer models for electromagnetic calculations have been developed, taking into account production deviations. With their help in the design of magnetic separators, considerable time and resources are saved for test trials. As input data in the programming environment are the nominal parameters, geometric dimensions and the materials used, and as output values the operating characteristics of the separating device are obtained - minimum and maximum magnetic force of attraction, flow rate of the processed product, maximum speed of the processed product, degree of purification and others.

Scientific and applied contributions related to the creation of new methods, constructions and technologies:

- New results were obtained to minimize the mass of separation apparatus with permanent magnets and electromagnets and an increased degree of purification was achieved, by analyzing the influence of numerous factors on the technological process of separation for various objects e.g., magnesium oxide, quartz sand, ceramic mixture, various grains and seeds from the food industry, etc.

- Confirmatory data has been obtained through modeling of the technological process of separation with permanent magnets at various sites, which ensures the derivation of a generalized equation for describing the process of separation with permanent magnets to adjust influencing factors.

- Positive results were achieved in the study of the technological features of an oxyhydrogen generator regarding the nature of changes in parameters such as efficiency and flow rate depending on the temperature and concentration of the electrolyte, as well as the possibilities of achieving maximum values of the studied parameters.

- Research has also been conducted in relation to the production of energy from photovoltaics, and a theoretical approach has been developed to forecast production based on data from an automated local information collection system by introducing correction model coefficients based on statistical models.

Application contributions and implementation contributions

- The results of the conducted research on separators were applied by the company "Elika Processing" - Silistra, which is a manufacturer of magnetic separators. ”The developed models of real separating devices allow to estimate in advance the degree of purification in a specific technological mode, which is a significant contribution in practice, helping to successfully optimize the technological process of purification” - opinion of "Elika Elevator" OOD - Silistra from 28.11 .2014 and "Elika Processing" - Silistra from 10.10.2022. From then until now, the manufactured separators are operating in various production units in northeastern Bulgaria.

- Laboratory benches have been developed for the study of contact systems and, in particular, the improvement of the contact resistance of current-carrying busbars.

- An integrated system for monitoring and analyzing the operation of a small photovoltaic plant with the possibility of remote access via the Internet has been developed. The system was built on the territory of TU-Varna.

- A bench has been developed to study the operation of a digital motor protection relay. The electromagnetic relay with a digital motor protection element (Micro Processor Control Unit) works with high reliability and high precision. Protection functions include: phase loss, phase reversal, supply imbalance, supply breakdown, locked rotor and short circuit protection and are fully achievable without the need for multiple and expensive fully electronic monitoring and protection modules.

6. Significance of contributions for science and practice

The relevance of research in the field of Electrical machines and devices makes the teaching and research work of Chief Assistant Professor, Ph.D., Eng. Tatyana Marinova Dimova significant for science and education.

The significance of Chief Assistant Professor, Ph.D., Eng. Tatyana Marinova Dimova's scientific contributions to science and practice is indisputable. She can be evaluated based on her publications in national and international journals and her participation in international scientific conferences (over 23 citations in SCOPUS-referenced publications).

She is well known to the scientific community in the country and abroad and is undoubtedly a leading specialist in the field of electrical machines and devices.

The quantitative indicators of the criteria for occupying the academic position "associate professor" have been met, and in all groups of indicators the candidate significantly exceeds (several times) the minimum requirements.

7. Critical notes and recommendations

I have no significant critiques on the materials submitted for participation in the competition. I would recommend that in her future work, Dr. Tatiana Dimova also include working with doctoral students and young teachers on research projects.

8. Personal impressions and opinion of the reviewer

I do not know Chief Assistant Professor, Ph.D., Eng. Tatyana Dimova personally, therefore I cannot express personal impressions about her. However, the impression created by the materials presented for the competition is 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 work of the candidate and with her direct participation.

The scientific works presented, referenced in the Scopus and Web of Science databases, as well as the interests and citations of other researchers in the field of electrical machines and devices give me the reason to believe that undoubtedly Chief Assistant Professor, Ph.D., Eng. Tatyana Dimova has established herself as a leader and a specialist in this scientific field with a marked interest in modern achievements and immense potential for future development.

CONCLUSION

The submitted materials 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 Professor, Ph.D., Eng. Tatyana Dimova and to define her as a highly qualified and established scientist in the field of electrical apparatus with national and international authority.

The minimum requirements for occupying the academic position "Associate Professor" in professional direction 5.2 "Electrical engineering, electronics and automation", 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 implementation of the Law on the development of the academic staff in the Republic of Bulgaria" are greatly exceeded.

Based on the acquaintance with the presented scientific works, their importance, the scientific-applied and applied contributions contained in them, I find it reasonable to propose Chief Assistant Professor, Ph.D., Eng. Tatyana Dimova to take the academic position of "Associate Professor" in the professional direction 5.2 "Electrical engineering, electronics and automation" in the specialty "Electrical apparatus" for the needs of the department "Electrical engineering and electrotechnologies" at the Technical University - Varna.

Заличена информация
по Регламент (ЕС)
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Reviewer:
Assoc. Prof., Ph.D., Eng. Petko Mashkov