

SCIENTIFIC REVIEW

on a competition for the occupation of an academic position **Associate-Professor** in professional field: **5.2. Electrical Engineering, Electronics and Automation**, scientific specialty: **"Electrical devices"** published in **the State Gazette. 40 / 31.05.2022** with the candidate chief assistant Dr. Eng. **Tatyana Marinova Dimova** Member of the Scientific Jury: **Prof. Dr. Eng. Ventsislav Tsekov Valchev**

1. General information and biography background

The competition for JSC "Associate Professor" in professional field: 5.2. Electrical Engineering, Electronics and Automation, scientific specialty: "Electrical devices" was announced in the State Gazette 40/ 31st.May. 2022 and on the site of Technical University, Varna.

Chief Assistant Dr. Eng. Tatyana Marinova Dimova is a candidate for the competition for the occupation for an academic position Associate- Professor in professional field: 5.2. Electrical Engineering, Electronics and Automation, scientific specialty: "Electrical devices" as required by „Electrical Engineering and electrotechnologies” department at TU- Varna.

After consideration of the submitted documents, the applicant Chief Assistant Dr. Eng. Tatyana Marinova Dimova is admitted to the competition.

Chief Assistant Dr. Eng. Tatyana Dimova graduated from the "Electrical Engineering" specialty at the Technical University - Varna in 2002 with "Master - Engineer" degree.

In 2007, she was employed as a full-time assistant at the "Electrical Engineering and Electrotechnologies" department of TU - Varna.

In 2014, she was enrolled in a self-study doctoral program in the "Electrical Machines and Devices" doctoral program at the Technical University of Varna.

In 2016, she defended her thesis on "Modeling of separators with permanent magnets".

Since 2016, she has been Chief Assistant at the Department of Electrical Engineering and Electrotechnologies at the Technical University of Varna.

She is a member of the AC of TU Varna for the term 2019-2023. Member of the FC at the EF of TU Varna.

2. General description of the presented materials

For participation in the competition, Chief Assistant Tatiana Marinova Dimova, Ph.D., Eng., presented:

- Autobiography,

- a copy of the diploma for the acquired educational and scientific degree "Doctor",
- copies of the employment contracts for the employment as JSC "Assistant" and JSC "Chief Assistant", a list of publications on the dissertation work for the acquisition of the ESD "Doctor",
- a list of the publications presented in the competition for the academic position "Chief Assistant",
- a table certifying the fulfillment of the minimum national requirements for occupying the academic position "Associate Professor",
- a list of the scientific works submitted for participation in the competition for the acquisition of Associate -Professor JSC,
- reference to the scientific, scientific-applied and applied contributions,
- report on the study load for the last 3 academic years, report on graduates and work with students,
- reference for her participation in research projects,
- a document on the implementation of research results,
- statement of credibility,
- declaration of originality of the contributions, declaration of absence of plagiarism in the submitted scientific works and full-text scientific publications submitted for participation in the competition.

Chief Assistant Dr. Eng. Tatyana Marinova Dimova participates in the ongoing competition with 25 research work reports in total, 23 of which are from scientific conferences and 2 of them are articles in the annual of TU-Varna.

20 of the submitted for the competition reports have been indexed in **the Scopus database**.

She is **lead author** in **16** of the reports.

There are 3 independent publications.

The presented 25 publications in Bulgarian and English are among publications included in **the National Reference List**

The scientific production is related **to the current competition** for JSC "Associate Professor" in professional field: 5.2. Electrical Engineering, Electronics and Automation, scientific specialty: "Electrical devices"

Covering the minimum requirements for acquisition of ‘Associate Professor’ AD by the indicator groups is shown in Table 1.

Table 1. Report on Chief Assistant Dr. Eng. Tatyana Marinova Dimova, PhD, on covering the minimum requirements for acquisition of "Assoc.Prof." AD by the Indicator Groups for the OHE "5. Engineering Sciences"

Group of indicators	Content by indicators	Indicator	Minimum requirements for acquisition of AD „Associate Professor“	Points for Dr.Eng.Tatyana Dimova PhD
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A	Indicator 1	1. Dissertation work for the award of an educational and scientific degree "PhD"	50	50	
B	Indicator 4	4. Habilitation work - scientific publications (not less than 10) in publications that are referenced and indexed in world-famous databases with scientific information	100	225	
C	Sum of indicators 7 and 8	7. Scientific publication in publications that are refereed and indexed in world-renowned databases of scientific information	200	200	236
		8. Scientific publication in non-refereed peer-reviewed journals or in edited collective volumes		36	
D	Sum of indicators 12 and 14	12. Citations or reviews in scientific publications referenced and indexed in world-renowned databases of scientific information or in monographs and collective volumes	50	200	240
		14. Citations or reviews in non-refereed peer-reviewed journals		40	
E	Indicator 29	29. Hours total for delivered lectures at TU-Varna for the last three years (1 point per a delivered lecture)	30	615	

3. General characteristics of the applicant's scientific research and scientific implementation activities

The scientific research and scientific-applied activity of Chief Assistant Dr. Eng. Tatyana Marinova Dimova is presented by the enclosed publications and projects in which she has participated.

The topic is mainly focused on electrical devices and electrical technologies and corresponds to the field of the competition.

Main directions of scientific research in which the candidate works are as follows:

1. Studies of magnetic separators – 15 publications;
2. Studies of electrotechnological devices and appliances – 6 publications;
3. Studies of electric machines– 2 publications;
4. Studies of photovoltaic systems – 2 publications.

The presented research activity of Chief Assistant Dr. Eng. Tatyana Marinova Dimova makes it obvious that she is an independent researcher with good theoretical and practical knowledge, able to successfully cope with scientific research tasks.

A member of organizing committees of international conferences in the country.

My overall assessment of the candidate's Chief Assistant Dr. Eng. Tatyana Marinova Dimova scientific research and applied scientific activities is very good.

4. Assessment of the candidate's pedagogical preparation and activity

Chief Assistant Dr. Eng. Tatyana Marinova Dimova has already proven herself as a lecturer in the "Electrical Engineering and Electrotechnologies" department of TU - Varna. She leads lectures on the following disciplines:

- „Electric devices“,
- „Electric machines and devices“,
- „Contactless devices and converters“,
- „Electromechanical devices“,
- „Electronic devices in Renewable energy sources“ etc., of the students from the "Bachelor" and "Master" degrees of TU - Varna.

These disciplines overly exceed the requirements of the national minimum scientometric indicators.

Chief Assistant Dr. Eng. Tatyana Marinova Dimova is a co-author of two university textbooks in the field of the competition.

Chief Assistant Dr. Eng. Tatyana Marinova Dimova is the supervisor of 36 defended graduate students, trained at Bachelor's and Master's degree.

My overall assessment of the candidate's Chief Assistant Dr. Eng. Tatyana Marinova Dimova pedagogical preparation and activities is excellent.

5. Basic scientific and scientifically-applied contributions

I accept the candidate's reference for her main contributions as valid.

Scientifically-applied contributions of the research publications produced as a habilitation thesis.

1. New 2D and 3D computer patterns have been created and applied for the study of the magnetic field and the influence of the design parameters and the characteristics of the separated materials on the degree of purification with separators of various constructions. The developed new 2D models of systems with permanent magnets of magnetic separators show with sufficient accuracy the picture of the magnetic field and provide a theoretical possibility for the realization of set parameters.[B.4.1.], [B.4.2.], [B.4.4.], [B.4.5.], [B.4.7.], [B.4.1.], [B.4.8.], [B.4.9.].

2. An improved version of a magnetic separator system using ferromagnetic concentrators and air gaps, with increased performance, has been proposed.[B.4.1.], [B.4.2.], [B.4.3.], [B.4.5.], [B.4.6.], [B.4.9.], [B.4.10.].
3. New modeling procedures, algorithms for increasing the efficiency of magnetic separation are proposed. [B.4.1.], [B.4.2.], [B.4.9.]. [B.4.2.], [B.4.3.], [B.4.4.], [B.4.5.], [B.4.6.], [B.4.7.], [B.4.8.], [B.4.10.].
4. New results have been obtained by experimentally studying specific characteristics related to the factors that influence the separation devices and the separation process. [B.4.5.], [B.4.6.], [B.4.3.], [B.4.7.], [B.4.9.], [B.4.10.].
5. A new methodology has been developed for determining the magnetic resource of separators with permanent magnets, based on measuring the magnetic field density and temperatures at the most critical points of the magnetic filter and subsequent mathematical processing depending on the type of permanent magnets used.[B.4.1.], [B.4.2.], [B.4.3.], [B.4.4.], [B.4.5.], [B.4.6.]
6. New computer patterns have been developed for electromagnetic calculations of magnetic separators and confirmatory data using these models. [B.4.5.], [B.4.6.], [B.4.7.], [B.4.8.], [B.4.9.], [B.4.10.], [B.4.1.], [B.4.2.], [B.4.3.].

Scientific and applied contributions of the publications other than those presented as a habilitation thesis

1. New experimental and confirmatory data were obtained and the factors affecting the technological process of separation with permanent magnets were determined for various objects, for example, magnesium oxide, quartz sand, ceramic mixture, various grains and seeds, etc. [Г.7.8.], [Г.7.9.], [Г.8.1.], [Г.8.2.], [Г.8.3.].
2. A new generalized equation is derived to describe the permanent magnet separation process in order to adjust the influencing factors and confirmatory data are obtained to establish the efficiency of the designed separator. [Г.7.8.], [Г.7.9.].
3. Confirmatory data have been obtained in research in some areas of renewable energy sources, such as the production of electrical energy from oxyhydrogen and from photovoltaics. [Г.7.1.]. [Г.7.5.].
4. Improved methods for analyzing the condition of asynchronous machines have been developed to improve the diagnostics and monitoring of the operation of the most common models of electric motors. A theoretical approach has been developed to analyze the transient process during direct start of an induction motor using a 2D model. [Г.7.7.], [Г.8.5.].
5. A new theoretical approach has been developed, which overcomes one of the main problems in three-phase induction devices with a radial arrangement of the inductors, namely the presence of a rotating magnetic field.[Г.7.7.].

Basic scientific and scientifically-applied contributions

1. New data were obtained during the study of the construction of a real magnetic separator type MCR-5, produced by the company "Elika Elevator" Ltd - Silistra. The results of conducted research and developed models have been applied in practice, for which the company has presented an opinion. The developed models of real separators allow to estimate in advance the degree of purification in a specific technological mode, which improves the design of magnetic separators MCR-5. [B.4.1.], [B.4.2.], [B.4.3.], [B.4.4.] [B.4.2.], [B.4.10].
2. Improvements of two specific types of separators with a specific design are proposed, which support the development of a new technological line for the processing of sunflower seeds at the company "Sunrays" Inc, Provadia [B.4.3.], [B.4.4.].
3. A new integrated system for monitoring and analyzing the operation of a photovoltaic plant has been developed with the possibility of remote access via the Internet [Г.8.4].

6. Importance of the contributions to science and practice

За значимостта на приносите за науката може да се съди по актуалността и броя на публикациите в **база данни** The significance of contributions to science can be judged by the relevance and number of publications **in the SCOPUS database (21, visible of 1st.Jan.2022)**, as well as the Hirsch index/h-index in SCOPUS (**h-index=3, of 1st.Nov.2022**).

The significance of the contributions to the practice can be directly judged by the innovative activity of the candidate for novelties in magnetic separators.

The quantitative indicators of the criteria for holding the Academic Degree "Associate - Professor" in the Technical Sciences Higher Education Institution have been met.

7. Critical notes and recommendations

I have no significant comments on the materials submitted for participation in the competition.

I consider that Ch. Ass. Dr. Eng. Tatyana Marinova Dimova, Ph.D., has generally complied with the critical remarks made on the previously presented materials.

I recommend the candidate:

- To focus on publishing in valuable scientific journals with an impact factor. This will ensure an improvement in the applicant's citation and visibility, as well as help TU-Varna to better rank in rating systems;
- To engage more actively in scientific projects;
- To focus on establishing in the future a scientific group of PhD students and graduate students;
- Work on a new scientific laboratory in the field of electrical devices and electrical technologies.

8. Personal impressions and opinion of the reviewer

I have no direct lasting impressions of the candidate. She is actively involved in the activities of the department, as far as I know.

The materials presented for the competition create a good impression in terms of style, level and manner of work.

Ch. Ass. Dr. Eng. Tatyana Marinova Dimova, Ph.D is already an established specialist in the field of electrical apparatus with an eye to the novelties in this scientific field and available potential for development.

CONCLUSION

The presented scientific and academic production and the preparation of the candidate's documents Ch. Ass. Dr. Eng. Tatyana Marinova Dimova, Ph.D., are in compliance with the Law on the development of the academic staff in the Republic of Bulgaria and the Regulations for its application in the section for acquisition of academic degree 'Associate-Professor'. The materials presented in the competition for the appointment of AC "Associate Professor" allow to evaluate the teaching and research activities and the qualities of the candidate.

The minimum requirements for the acquisition of the academic position Associate Professor in professional field: 5.2. Electrical Engineering, Electronics and Automation, scientific specialty: "Electrical devices" defined by the Regulations for the application of Law on the development of the academic staff in the Republic of Bulgaria are met and under some criteria overachieved.

The candidate's contributions and scientometric data are sufficient for AC "Associate-Professor" in the Technical Sciences Higher Education Institution.

On the basis of the detailed familiarization with the presented scientific works, the presented contributions and the fulfillment of the minimum national requirements, I find it reasonable to propose the Chief Assistant Dr.Eng. Tatyana Marinova Dimova, Ph.D., to take up the academic position of 'Associate- Professor' in professional direction 5.2 Electrical Engineering, Electronics and Automation, department Electrical engineering and electrotechnologies, Faculty of Electrical Engineering of TU - Varna.

**.Nov.2022
TU - Varna**

**Заличена информация
по Регламент (ЕС)
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**Member of the Scientific Jury:
/ prof. Dr. Eng. Ventsislav Tsekov Valchev /**