

REVIEW

Regarding the “Associate Professor” competition
in the field of higher education 5. „*Technical sciences*“,
professional field 5.5 "*Transport, Shipping and Aviation*",
scientific specialty "*Electrical equipment of the ship*",
promulgated in State Gazette, No. 13/ 07.02.2023.

with candidate: **Ch. Asst. Prof. eng. Ginka Hristova Ivanova, PhD**

Reviewer: **Prof. eng. Vasil Dimitrov Dimitrov, PhD**
Todor Kableshkov Higher School of Transport - Sofia

The review was prepared on the basis of Order for the approval of the Scientific Jury No. 275/27.04.2023 of the Rector of TU-Varna and in accordance with the decisions of the jury taken at its first meeting on 19.05.2023.

1. General and biographical data

The proposal to announce a competition for the academic position (AP) "Associate Professor" in the professional field 5.5. "Transport, shipping and aviation", scientific specialty "Electrical equipment of the ship" was opened upon a decision of the Department Board (Protocol No. 10/17.03.2022) of "Electrical Power Supply and Electrical Equipment" Department and of the Faculty Council of the Faculty of Electrical Engineering of TU - Varna (Protocol No. 11/21.03.2022).

The sole candidate who submitted documents for participation in the competition is Ch. Asst. Prof. eng. Ginka Hristova Ivanova, PhD. She graduated from the "Nikola Vaptsarov" Higher Naval School in 2001 with a Master's degree in engineering, majoring in "Ship's electrical equipment" and in 2008 with a second Master's degree in "Management of the fleet and ports". She was a PhD student at the Technical University - Varna, majoring in "Electrical supply and electrical equipment for water transport". From 2014 to 2018, she held the Academic Position of "Assistant", and from 19.12.2018 to the present, she held the Academic Position of "Chief assistant professor" at the Department of "Electrical Power Supply and Electrical Equipment" in TU – Varna. He holds the qualification for Electro-technical Officer - IMO Proficiency.

2. General description of the presented materials

The candidate Ch. Asst. Prof. Eng. Ginka Ivanova submitted a total of 24 scientific works, of which 20 were accepted for review (excluding those related to the competition for AP "Chief Assistant Professor"). Participation in 7 research projects is also documented.

Declarations for the reliability of the information provided, for originality and for plagiarism, as well as additional documents (in the form of official notes) are presented: for

implemented developments and contribution to the modernization of the material and technical base of the Department of "Electrical Power Supply and Electrical Equipment", for the reported study load and led lectures on disciplines for the Educational Qualification Degree "Bachelor" and Master's Degree for the last 3 academic years, references for supervision of graduates and reviewing diploma theses, for joint work with students and PhD students in scientific research projects, for mobilities abroad.

According to the Rules for the terms and conditions for occupying academic positions in TU - Varna (for field 5. Technical sciences), to occupy AP "Associate Professor" it is necessary to meet the requirements for Groups of indicators: A (50 points), V (100 pt.), G (200 pt.), D (50 pt.), J (30 pt.). After a thorough examination of the competition documents, it can be concluded that the requirements have been met:

Indicator A: the candidate holds an Educational Scientific Degree "PhD" for a developed and defended dissertation on the topic "Research and analysis of the quality of the ship's electrical energy and its influence on the modes of operation of the ship's power system and ship's electrical equipment" – Diploma No. TUV-NS-2018-103 / 04.04.2018 in the scientific specialty "Electrical Power Supply and Electrical Equipment" (50 points). A list of publications related to the dissertation is one of the materials submitted for this procedure.

Indicator V.4: Scientific publications in editions, referenced and indexed in world-renowned databases of scientific information – 10 publications (in co-authorship: 3 publications with 2 authors, 3 publications with 3 authors, 2 publications with 4 authors, 2 publications with 5 authors) – a total of **204 points**, which significantly exceeds the requirements.

In 4 of the publications the candidate is first author, in 4 he is second, in 1 – third, in 1 – fifth. Reports of the international scientific conferences in Bulgaria *BuLEF 2020* and *2021* (8) and *ELMA 2021* (1) have been presented - a total of 9 papers, published on the IEEE Xplore Digital Library platforms, as well as 1 paper presented at the International Scientific Conference of Communications, Information, Electronic and Energy Systems (CIEES 2020), published in *IOP Conference Series: Materials Science and Engineering Vol. 1032 (SJR 0.249 / 2021)*. All publications are indexed in Scopus.

The publications can be summarized as a habilitation work in the field of electrical equipment of the ship and research into the possibilities of increasing the energy efficiency.

Indicator G - for participation in the competition, the candidate submitted 14 scientific publications. I will not take into account 4 publications that are also described in the competition for AP "Chief Assistant Professor" (G8.1, G8.2, G8.4 and G8.5). 10 publications were accepted for review, 7 of them in English and 3 in Bulgarian. They are divided into groups as follows:

G.7 - Scientific publications in editions, referenced and indexed in world-renowned databases of scientific information - 5 publications, 4 of them are in sole authorship and 1 co-authored (2 authors, the candidate is the first author) - papers presented at international scientific conferences *BuLEF 2020* and *2021* (published in *IEEE Xplore Digital Library* and indexed in Scopus) – a total of **180 points**.

G.8 - Scientific publications in non-refereed journals with scientific review or in edited collective works: 5 publications (in co-authorship): 3 publications have 2 authors, 2 publications - 5 authors. In 1 of them the candidate is first author, in 2 - second, in 1 – third, in 1 – fourth. Reports have been presented at international conferences "BulLight / Bulgaria Light 2014", "KEIT 2018" (2) and „CIEES 2021“ (2), subsequently published in Proceedings of papers and the specialized scientific journals "Mechanics, Transport, Communications" and *IOP Conference Series: Materials Science and Engineering Vol. 1216* – a total of **38 points**.

Total number of points under **Indicator G** is **218** - the requirements are fully satisfied.

Indicator D - for participation in the competition, the candidate submitted 12 citations of her publications, divided by groups, as follows:

Indicator D.12 - citations in scientific publications, referenced and indexed in Scopus: 7; 3 of them are by foreign authors.

Indicator D.13 - citations in peer-reviewed collective volumes: 5; 3 of them are also by foreign authors.

Total number of points under **Indicator D** - **85**, which exceeds the requirements.

Indicator J – the candidate has submitted a Reference from the Head of the Department of "Electrical Power Supply and Electrical Equipment", certified by the academic department: in the last 3 academic years Ch. Asst. Prof. eng. Ivanova has conducted 570 hours of lectures at TU-Varna in a number of disciplines from the specialty of the competition, which corresponds to 570 points and significantly exceeds the requirement.

In conclusion, I believe that the submitted materials for the competition fully satisfy the minimum national requirements and those of TU - Varna for holding the academic position of "Associate Professor".

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

The scientific research and applied scientific activity of Ch. Asst. Prof. eng. Ginka Ivanova are mainly aimed at researching objects from the electrical equipment of various types of vessels (passenger and cruise ships, motor and luxury yachts, cargo platforms of ferries, etc.): electrical machines (synchronous generators, asynchronous motors, power transformers), lighting systems, cooling systems, etc., with special attention paid to the possibilities of increasing energy efficiency.

The analyses and experiments performed are related to the determination of energy quality indicators and optimization of energy processes in the ship's power systems: the implementation of vector control of asynchronous motors for driving auxiliary machines, improving the characteristics of ship lighting, implementation of PLC in the monitoring and management of electrical equipment in order to improve energy indicators.

According to the Reference from the Head of the Council for Internal Competitions at TU-Varna, Ch. Asst. Prof. eng. Ginka Ivanova has participated in six research projects at the Scientific Research Fund - TU-Varna, as well as in project BG05M2OP001-1.001-0008-C02

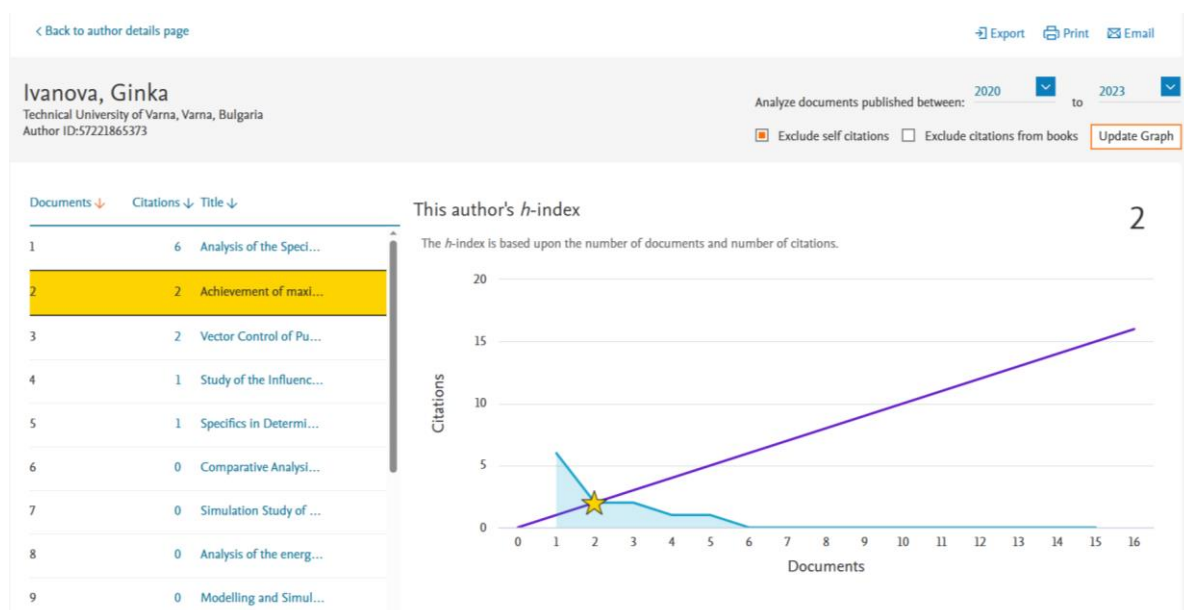
"National Center for Mechatronics and Clean Technologies", Laboratory 4 "Transport Engineering", Section 4 "Energy Efficient Electric Transport", 2018-2024 – financed by the *Operational Program "Science and Education for Smart Growth"*, co-financed by the European Union through the European Structural and Investment Funds.

Ch. Asst. Prof. eng. Ginka Ivanova has made a significant contribution to the modernization of the material and technical base of the "Electrical Power Supply and Electrical Equipment" department - actively participated in the renovation of laboratory 108E "Electrical equipment" by developing new models and laboratory stands and providing specialized equipment (with own funds). He is a member of Scientific and Technical Union.

All this shows initiative and proves the candidate's abilities and desire to perform scientific research and applied scientific activity.

The extensive composition of the author collectives in the publications is evidence of teamwork skills.

*A reference made to the world-renowned database of scientific information **Scopus** shows for the candidate **h-index = 2** (at self-citations are excluded), which is a high score for achieved prominence in scientific circles (12 citations, 6 of which in 2023).*



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

Ch. Asst. Prof. eng. Ginka Ivanova has lectured on fundamental disciplines at TU-Varna: "Operation of the ship's electronic and electrical equipment"; "Installation, maintenance, diagnostics and repair of the ship's electrical equipment"; "Ship Power Systems"; "Electrical drives and propulsion of the ship"; "Electrical power stations on specialized floating objects". In a number of disciplines, she also conducted laboratory exercises or a course project. For the last 3 years, more than 1,900 hours of study (auditory and non-auditory) have been recorded. A report on developed curricula in 11 disciplines and lecture notes in 4 disciplines is presented.

The candidate actively works with students and PhD students during their scientific research, as can be seen from the Reference submitted by the Head of the "Electrical Power Supply and Electrical Equipment" department. She has been the supervisor of three graduates and the reviewer of 9 diploma theses.

It can be concluded that the candidate's pedagogical training and teaching activities are at a high professional level and are precisely related to the subject of the competition.

5. Basic scientific and scientific-applied contributions

I agree in substance with the contributions proposed by the candidate. They are jointly summarized based on the achievements in the presented publications on Indicators V.4, G.7 and G.8. The main contributions can be summarized as follows:

Scientific contributions

Detailed definitions of Energy Efficiency Operational Indicators EEOI are proposed, which are used as a practical method for assessing the ship's energy efficiency and CO₂ emissions in the environment. An approach is presented for evaluating the resulting reduction in the consumption of a primary energy carrier (ship fuel) through the implementation of modern technical devices. The methodology takes into account the action of reactive loads, asymmetric and non-linear consumers in the ship's power system.

Scientific-applied contributions

A model is proposed for the comparative analysis and assessment of reliability indicators for conventional and hybrid ship electrical power systems, which will facilitate operational maintenance - quantitative criteria are defined for assessing the probability of failures, the overall reliability of the system, and repair cycle periods.

A hybrid ship electrical power system has been studied by simulation, the possibilities for joint work and limiting the spread of higher harmonics of the current and voltage have been proven.

The influence of various parameters of the environment on the design and operational indicators of energy efficiency EEDI and EEOI has been studied, and the obtained results are the basis for identifying specific measures to improve the indicators and bring them into normative norms.

Based on an experimental study of the relationship between luxury motor yacht speed, route, energy costs and EEOI (Energy Efficiency Indicator), an *"optimal yacht speed with improved operational energy efficiency"* is defined.

Applied Contributions

The possibility of energy saving of auxiliary electric drives and lighting systems through the implementation of contemporary methods and devices of control has been proven through performed research.

Contributions can mainly be attributed to *Creation of new classifications, methods, constructions, technologies; Proving by new means substantial new aspects of already existing scientific problems; Obtaining corroborating facts.*

*They are the **candidate's personal work**, which is evident from the large number of scientific studies carried out during international voyages to collect data from ship power systems and subsequently published in Scopus-indexed publications, from participation in a large number of research projects, from the numerous citations of scientific works in representative foreign publications.*

6. Significance of contributions to science and practice

Based on the candidate's active participation in prestigious scientific forums (in 13 international conferences in recent years), as well as the citations of the publications in publications visible in world-renowned databases with scientific information, I assess the contributions in the presented scientific works as significant.

The quantitative indicators of the criteria for occupying the academic position "Associate Professor" have been met. The necessary publicity and recognition in the professional community at home and abroad has been achieved.

7. Critical notes and recommendations

I have no significant objections to the scientific production presented. The documents are systematized and described precisely, professionally and at a high level. All notes from the Preliminary Review have been taken into account and implemented.

I have some recommendations, mostly regarding the candidate's future development:

- to participate in scientific forums abroad, as well as to develop and present reports and articles to be published in editions with an impact factor IF or an impact rank SJR;
- to participate in the preparation and publishing of books (monographs), to support the learning process with textbooks and teaching manuals;
- to share her teaching experience with universities abroad (for example, by giving lectures under the Erasmus program);
- when submitting the documents to the National Center for Information and Documentation, the report on the fulfilment of the minimum national requirements should not include the reports submitted for the awarding of AP "Chief Assistant Professor".

8. Personal impressions and opinion of the reviewer

I do not personally know Ch. Asst. Prof. eng. Ginka Ivanova. I have excellent impressions of her, acquired during our participation in international scientific forums, including the BULEF conferences.

The general characteristic of the candidate is that Ch. Asst. Prof. eng. Ginka Ivanova is an authoritative teacher who has a high level of research and applied activity, a well-known scientist in our country and abroad.

CONCLUSION

The submitted materials for participation in the competition meet the requirements of the Law on the development of the academic staff in the Republic of Bulgaria and the ordinances for its implementation, as well as the Rules for the terms and conditions for occupying academic positions in TU – Varna. Sufficient scientific, scientific-applied and applied contributions have been received. Prominence has been achieved in academia and the professional engineering community. All the requirements for the candidate's scientific and teaching activity have been met - the total number of points exceeds the requirements by more than 2.5 times:

A group of indicators	Points as required	Candidate Points	Indicator points
A	50	50	Indicator A1 – 50 p.
V	100	204	Indicator V4 – 204 p.
G	200	218	Indicator G.7 – 180 p. Indicator G.8 – 38 p.
D	50	85	Indicator D.12 – 70 p. Indicator D.13 – 15 p.
J	30	570	Indicator J29 – 570 p.
Total	430	1127	

Based on the acquaintance with the presented scientific works, their significance, the scientific, scientific-applied and applied contributions contained in them, I find it reasonable **to propose Ch. Asst. Prof. eng. Ginka Hristova Ivanova, PhD to hold the academic position "Associate Professor" in the field of higher education - 5. "Technical sciences", professional field - 5.5. "Transport, Shipping and Aviation", scientific specialty "Electrical equipment of the ship"**

16.06.2023

REVIEWER:

/ Prof. eng. Vasil Dimitrov, PhD /