

OPINION

by Prof. Dr. eng. Nikolay Dimitrov Madzharov
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of the materials submitted for participation in the competition
to occupy the academic position of "Associate Professor"
by professional field 5.2. Electrical engineering, Electronics and Automation,
specialty "Elements and devices of automation and computing technology" (Microprocessor
circuit engineering).

In the competition for Associate Professor, announced in the State Gazette, no. 47 of
24.06.2022 and on the TU-Gabrovo website for the needs of Dep. "Electronics" at TU Gabrovo,
as a candidate participates Ch. Assistant Professor Dr. Eng. Valentina Vasileva Rankovska.

1. Overview of the content and results in the presented works

The scientific works that Ch. Assistant Professor Dr. Eng. Valentina Vasileva Rankovska presents for participation in the competition for Associate Professor, are in the following areas:

1.1. Dissertation, developed and defended (VAK) in the professional direction of the competition. Indicator A of the minimum national requirements, where the candidate collects 50 points, with a required minimum of 50 points.

1.2. Scientific publications

- Habilitation work – 12 scientific publications in journals that are referenced and indexed in world-famous databases with scientific information [1 – 12]. This work is related to Indicator B4, where with the publications presented, the candidate collects a total of 400 points with a required minimum of 100 points.

- Scientific publications in non-refereed peer-reviewed journals or in edited collective volumes [13 - 32]. According to the national requirements, they refer to indicator Г8, where the candidate scores 273.35 points with a minimum number of 200 points.

- A list of citations is presented, where 12 articles are cited a total of 16 times in scientific publications, referenced and indexed in world-famous databases with scientific information or in monographs and collective volumes (160 items) and 4 articles that are cited 4 times in non-refereed journals with scientific review (8 items). As a result, it has a Hirsch index of 2. The total number of citations is 20 and are related to Indicator Д of the minimum national requirements, where the candidate collects a total of 168 points with a required minimum of 50 points.

The scientific works presented for the competition can be summarized in scientific and applied fields:

- Design of digital and microprocessor devices and systems and innovative technologies in engineering education.

- Stages and tools for the design of digital and microprocessor devices and systems and the training of disciplines related to microcontrollers [1], [2], [4], [5], [7], [9], [12], [13], [14], [28], [29], [30], [31], [32].

- Stages and tools for the design of digital and microprocessor devices and systems and the training of disciplines involving programmable logic [8], [22], [23], [24], [25], [27].

- Intelligent measurement and control systems

- Intelligent systems for measuring, generating and recognizing signals and for control [3], [6], [10], [16], [17], [20], [21], [26].

- Modeling of industrial objects for the purpose of management [15], [18], [19].

- Application of big data in the economy [11].

The processing of the data from the presented scientific works and their general characteristics shows that Ch. Assistant Professor Dr. Eng. Valentina Vasileva Rankovska, fully meets the minimum national requirements for holding the academic position "Associate Professor" for the field of "Technical Sciences" in higher education, laid down in Art. 2b of ZRASRB, art. 60, paragraph 3 of the PPZRASRB and Art. 1, para. 2 of PPNSZAD in TU-Gabrovo.

2. General characteristics of the applicant's activity

2.1. Educational and pedagogical activity

Ch. Assistant Professor Dr. Eng. Valentina Vasileva Rankovska, was appointed as an assistant in the Department of Electronics at TU-Gabrovo in 1996. She is the holder of 4 disciplines for the Bachelor's degree program and 8 Master's degree programs for full-time and part-time training. She participated in the development of 3 study plans for "IAE" - OCS "Bachelor" (2019), "Electronics" - OCS "Master" (2021) and "Automotive Electronics" - OCS "Master" (2021). He is the author/co-author of study programs for the same specialties - 4 for the "IAE" specialty, 3 for "Electronics" and 5 for the "Automotive Electronics" specialty.

For the competition, she participated with 3 textbooks (without co-authors) [Y1 – Y3] and one textbook [Y4], all of which were reviewed. The language and style in them is precise and clear.

For the past five years, under her guidance, 25 graduates have successfully defended their degrees and she has reviewed 26 diploma theses. She is responsible for the educational activities in the Department of Electronics and has created educational laboratories for Microprocessor Technology and Circuit Design in a Programmable Environment.

The candidate has good language skills. She speaks English and Russian at a basic and independent level, which allows her to follow current publications in her scientific field and to contact colleagues from abroad. In this connection, 6 mobilities were carried out under the Erasmus program at a university in the Czech Republic, Turkey, Serbia and Greece.

2.2. Scientific and scientific-applied activity

Ch. Assistant Professor Dr. Eng. Valentina Vasileva Rankovska has participated in 12 scientific projects financed by the "Scientific Research" Fund at the Ministry of Education, Culture and Science, of which she was the head of 1. She also participated in 2 European projects - under the operational program "Development of human resources" in the position of "Teacher" and under the operational program "Science and education for intelligent growth" in the position of "Researcher".

For the period 2016-2022 she was a reviewer of 19 reports of MNC "UNITECH", one report of ISC ET2018 and one report of the 6th International Conference on Computer Science and Application Engineering), Nanjing, China (indexed in Scopus) and chairman of scientific sections of ICEST2013 conferences, ICEST 2014 and ICEST2022.

She is a member of USB and the Union of Electronics, Electrical Engineering and Communications.

2.3. Implementation activity

An official note from the company "EC-DEKA-2015", St. Zagora, certifying that in the period 2019 - 2021, the candidate for JSC "Docent" participated in the design and implementation of a microprocessor control system for a machine for measuring the area of skins and a system for synchronizing the speed of feeding a label on a packaging machine.

3. Contributions. Significance of contributions to science and practice

The contributions on the materials of Ch. Assistant Professor Dr. Eng. Valentina Vasileva Rankovska, I believe that they are scientific and applied. The scientific-applied contributions are related to the development of new methodologies, software algorithms and tools for studying new effects and achieving better characteristics and parameters of the developed systems.

Scientific and applied contributions can include:

1. A hybrid approach is proposed for spectral analysis and recognition of voice profiles using techniques based on machine learning and artificial intelligence. k-NN and FFNN models were synthesized in terms of personal voice identification with an accuracy level of 97.68% and 100.0% achieved.

2. A flexible educational web-based monitoring and control mockup is designed for demonstration and learning of Wi-Fi and Ethernet connectivity. The presence of a breadboard makes it possible to add other interface modules as well as additional peripherals.

3. Two approaches have been developed to study the nature and mechanism of interrupt handling in microcontrollers through an open-type Arduino development board and based on programmable logic with FPGA architecture.

4. An approach has been developed for mastering the technology of designing embedded vehicles using programmable logic and ready-made microprocessor cores.

5. Models of different types of inverters in the phase space have been synthesized and studied, which have been applied in the design of control microprocessor systems for industrial applications.

6. An ICT prototype of a big data analysis system based on data mining techniques, Hadoop information infrastructure platform for distributed data collection and MATLAB analytical environment was designed.

Applied Contributions:

1. A universal demonstration module and microprocessor development system is designed with the possibility of applying various mid-range and high-end microcontrollers in real industrial developments and the learning process.

2. A control module containing a modern 8-bit microcontroller - PIC18F25K50 was synthesized and designed for application as the core of embedded microprocessor systems with a variety of applications, depending on the added peripherals.

3. An advanced version of the skin surface measurement software using a USB camera has been developed.

4. A synchronization method was implemented by monitoring the speed of a labeling machine for automatic labeling on a glass jar.

4. Assessment of the candidate's personal contribution

I consider that the contributions are the personal business of the candidate. Proof of this is the 32 publications presented for the competition, 12 of which are independent and 20 publications in which the candidate is in first place.

The personal contribution of Ch. Assistant Professor Dr. Eng. Valentina Vasileva Rankovska in the educational activity is also serious and successful, since a large part of the scientific and applied activity is related to the educational process. In general, all necessary requirements and indicators are exceeded (2.23 times), taking into account the minimum national requirements of the current law and regulations.

5. Critical notes and recommendations

I have no serious remarks and recommendations to the presented materials. I would recommend that in his future work, the candidate devotes more time to the implementation of his research results in real business and to strengthen his publication activity in renowned scientific journals with higher scientometrics.

6. Personal impressions

I know Ch. Assistant Professor Dr. Eng. Valentina Vasileva Rankovska, as a colleague with whom we have been working in the "Electronics" department of TU Gabrovo since 1996. She is distinguished by her independence, diligence and initiative. As a responsible researcher, she strives for comprehensiveness and accuracy of research, its design and publication. The impression created by the materials presented for the competition is also very good. On her initiative, teaching laboratories on "Microprocessor circuit engineering" and "Designing circuits in a programmable environment" were built.

7. Conclusion

Bearing in mind the above, I propose Ch. Assistant Professor Dr. Eng. Valentina Vasileva Rankovska to be elected as an "Associate Professor" in the field of higher education 5. Technical sciences, professional direction 5.2. Electrical engineering, electronics and automation, specialty - "Elements and devices of automation and computing technology" (Microprocessor circuit engineering)

24.10.2022 г.

Member of the jury:

/signature/

/Prof. Dr. Nikolay D. Madzharov/