

OPINION

in a competition for the academic position "Associate Professor" in the professional field 5. Technical science, 5.2. Electrical engineering, electronics and automatics,

Scientific specialty Elements and Devices of Automation and Computing (Microprocessor circuit engineering),

promulgated in State Gazette, issue 47/24.06.2022

for TU-Gabrovo, Department of "Electronics"

Candidate: Valentina Rankovska, PhD, Assistant Professor

Member of Scientific Jury: Assoc. Prof, PhD, Eng. Dimitar Arnaudov, TU-Sofia, Department of Power electronics

1. Summary of the scientific activity and achievements of the candidate

The research and scientific applied activity of Assistant Prof. Valentina Rankovska is in the field of microprocessor systems. It is related to the research of microprocessor systems as a part of the control of various electronic devices. The topics are topical and cover automation systems for smart homes, audio and video data processing, motor control systems, demonstration of microprocessor system functions for learning purposes.

In the competition for Associate Professor the candidate participates with publications equivalent to a monographic work. The performance of the indicators by groups according to the national minimum requirements of the LDASRB are as follows:

Group A – Indicator 1: The candidate has submitted a diploma for PhD in field 5.2., issued by the Higher Attestation Commission in 2010 for a dissertation developed at TU-Gabrovo and defended at Specialized Scientific Council in Electronics and Computer Engineering.

Group B – Indicator 4: There are 12 publications, equivalent to a monographic work. They are in the field of application of microprocessor systems in different directions. With a total of 400 points (min. 100 points required). The publications are in the Scopus and WoS world databases. Seven of them have been presented at conferences whose proceedings have SJR.

Group Γ – Indicator 7:

There are 20 publications with a total of 273.35 points (total for Group Γ - 273.35 points (min. 200 points required). Eight of the publications are stand-alone.

Group Д – Indicator 12: The contestant has submitted 168 points on this indicator (50 points are required).

Indicator - lectures on the last years – Assistant Prof. Rankovska has held lectures on various disciplines in the field of the competition, she has given lectures, but their number for the last three years is not indicated.

2. General characteristics of the candidate's activity

2.1. Evaluation of the pedagogical preparation and activities of the candidate.

Teaching activity of Ch. Assistant Rankovska started as an assistant professor in 1996 at TU - Gabrovo. Currently holds the position of "Ch. Assistant Professor" at the Department of Electronics. In 2010 she received her PhD degree. Rankovska is the author of three textbooks and one laboratory manual. One of the textbooks is available electronically and was published in 2021. She has participated in the development of three curricula and twelve courses as an author or co-author. A document on the created and modernized the laboratory base of two laboratories as a laboratory base for the disciplines taught at TU - Gabrovo has been submitted. She has supervised 25 graduate students in the last 5 years. I believe that he has satisfied the indicators in terms of methodological provision of the educational process, which should be one of the basic requirements for holding the academic position of "Associate Professor" in a higher education institution.

2.2. Scientific and scientific-applied activity

The scientific activity of the candidate is reflected in the publications submitted. She has participated in two scientific research projects co-funded under the programs OP SEIG of the Ministry of Education and Science. She has participated in twelve projects and is the leader of one research project funded by TU-Gabrovo.

2.3. Implementation activity

For the implementation activity, one document is presented - implementation of a microprocessor system for synchronization of the speed of label feeding in "EC-DECA-2015" - city Stara Zagora. From the publication activity it is seen that the presented microprocessor systems can be the basis for automations in the field of smart homes. Arduino-based multifunction devices, FPGA-based control synthesis, web-based system have been implemented in the educational process. Developments involving the author that can be applied in practice are, for example, in publications [20, 21] - the algorithm for generating sinusoidal signals, [30, 31] - application in smart homes, [3] - surface measurement of irregular surfaces with image processing from cameras, etc.

3. Basic scientific and applied contribution. Significance of contributions to science and practice

Scientific contributions - These contributions are related to the creation of new software implementations and algorithms for the operation of microprocessor systems. For example: direct digital synthesis and an innovative variant of a vector rotation and angle recoding method; a hybrid approach for spectral analysis and voice profile recognition using machine learning and artificial intelligence based techniques.

Applied scientific contributions - These contributions are related to the creation of training approaches in the field of microprocessor systems and the development of laboratory stands for the acquisition of various basic knowledge and skills for the application of microprocessor systems in different areas of household and industry. Also such a contribution is the creation of a universal demonstration module with development systems for training purposes. As another contribution from this group, one can consider

the presented innovative tool for complementary distance learning and self-testing of students to verify the acquired knowledge and skills.

Another group of applied contributions are related to the realization of laboratory stands for demonstration of functional capabilities and specific functions of microprocessor systems. The application of innovative approaches and best practices in the teaching and learning of embedded systems based on project-based learning. Applied contributions are also presented in the area of measurements - an improved version of skin surface measurement software using a USB camera and a circuit solution of an active power meter that can be used for a wide frequency range.

4. Evaluation of the personal contribution of the candidate

I had the opportunity to talk to the candidate, as a participant or as part of an organizing committee of scientific forums. From the interview with her I am convinced of her personal contribution to the publishing and research activities. No separation protocols have been submitted for the publications.

5. Critical remarks and recommendations

In her long-standing work as a lecturer at the Technical University of Gabrovo, the candidate for the academic position of Associate Professor has updated the laboratory facilities on which she conducts the training at the university in the rapidly developing field of microprocessor systems. The presentation of research in publications in this field, from the point of view of teaching, do not make it easy to highlight the author's applied contributions to these systems. I recommend that the author's research results be presented in future publications in an appropriate manner in scientific journals with impact factor and impact rank. Also to increase the number of scientific forums in which she presents her results. It would be good if the publications of these forums were indexed in Scopus and/or WoS in order to be visible and thus cited by a wider range of authors.

6. Personal impressions

My personal impressions are that Ch. Assistant Professor PhD Eng. Valentina Rankovska is a promising university lecturer and scientist. She has the necessary competencies. I am confident that her advancement in her academic career will enhance the scientific capacity of the department and the university.

7. Conclusion

Having in mind the above, **I propose** Ch. Assistant Professor PhD Valentina Rankovska **should be awarded with the academic rank of “Associate Professor”** in professional field **5.2. Electrical engineering, electronics and automatics**, scientific speciality **“Elements and Devices of Automation and Computing”**.

31.10.2022

Scientific Jury member: /signature/
/ Assoc. Prof. PhD Dimitar Arnaudov /