

OPINION

regarding the submitted materials so as to participate in a competition for holding the academic position of **Associated Professor** in the professional trend: 5.2. Electrical Engineering, Electronics and Automation for the discipline “Design of electronic equipment”, at the Department of “Electronic Equipment and Microelectronics” at the “Faculty of Automation and Computing”, published in the State Gazette, issue. №108 / 22.12.2020,

with candidate: Senior Assist. Prof. eng. Toncho Hristov PAPANCHEV, PhD, Department of “Electronic Equipment and Microelectronics”, Technical University of Varna.

Member of the scientific jury: Prof. Dr. Eng. Nikolay Dimitrov Madzharov, Department of “Electronics”, TU-Gabrovo

In the competition for Associate Professor, announced in the State Gazette, issue №108 / 22.12.2020 and on the website of TU-Varna for the needs of the Department of „Electronic Equipment and Microelectronics” of TU-Varna, as a candidate participates Senior Assist. Prof. eng. Toncho Hristov Papanchev, PhD.

1.General characteristics of applicant`s scientific research and applied-research activities

The scientific works that Senior Assist. Prof. eng. Toncho H. Papanchev, PhD, presents for participation in the competition for “Associate Professor”, can be summarized in the following main areas:

- 1.1. *Monograph - 11 scientific articles in editions, which are referenced and indexed in World famous databases with scientific information [B1 - B11].*
- 1.2. *Reliability of electronic elements - analysis and evaluation of quantitative indicators of reliability [Г8.1, B4.7, B4.10, B4.2, Г7.3, Г7.5].*
- 1.3. *Reliability of electronic systems - analysis of the design features of complex electronic systems, modeling, comparative analysis [B4.6, B4.9, B4.3, Г8.5, Г8.8].*
- 1.4. *Operational reliability and maintenance of electronic systems [B4.1, Г8.9, B4.5, B4.8, Г7.2, Г7.4].*
- 1.5. *Stimulation models and elements of artificial intelligence [B4.11, Г7.6, Г7.1, Г8.3, Г7.7, Г8.10].*

The research and applied activity of the only candidate in the competition is in the field of analysis and research of the two main ways to obtain a quantitative assessment of the electronic components reliability, comprehensive assessment of the electronic system reliability by simultaneously assessing the reliability of all components and the influence between them.

The candidate Senior Assist. Prof. eng. Toncho H. Papanchev, PhD, presented materials – 11 scientific publications - equivalent to a monograph, scientific publications, reference to citations, participation in international and national scientific and educational projects, lectures and exercises in disciplines, participation in the modernization of the material and technical base of a number of laboratories in the Department of “Electronic Equipment and Microelectronics” of TU Varna, which fully covers the minimum national requirements for the academic position of Associate Professor for the field of Technical Sciences in higher education. Art. 2b of ZRASRB.

For the groups of indicators, the candidate submitted evident material of the collected points as follows:

Group of indicators A (at least 50 points) - dissertation - **50 points**;

Group of indicators B (at least 100 points) – **B4** scientific publications equivalent to a monograph – **11 publications with different numbers of authors - 179 points**;

Group of indicators G (at least 200 points) - **G7** publications in issues that are referenced and indexed in world-renowned databases – *seven pieces of the publications with different numbers of*

authors - 129.99 points; G8 scientific publications in non-refereed journals with scientific reviewing or in edited collective works – 12 pcs. with different number of authors 107.3 points. A total of 237.29 points.

Group of indicators D (*at least 50 points*) - **D12** citations or reviews in scientific journals, referenced and indexed in world-renowned scientific information databases with scientific information or in monographs and collective volumes - *six publications are cited ten times (Scopus) - 100 points; D14* citations or reviews in non-refereed journals with scientific reviewing – *two publications are cited two times - 4 points. A total of 104 points.*

Group of indicators G (*at least 30 points*) - the hours of the lectures held at Technical University of Varna for the last three years - 439 hours - **439 points.**

2. Assessment of the pedagogical preparation and activity of the candidate

Senior Assist. Prof. eng. Toncho H. Papanchev, PhD, defended in 2015 his doctoral dissertation in TU Varna. His teaching work is mainly in the Department of “Electronic Equipment and Microelectronics” at the Technical University of Varna - he started as an assistant in 2010, and since 2016 he has been a Senior Assist. Prof. During this period he participated in the educational process (lectures and exercises) in 12 disciplines with a bachelor's degree, 2 with a master's degree and 2 with a professional bachelor's degree. These disciplines are from the curricula of the specialties “Electronics”, “Biomedical Electronics”, “Telecommunications and Mobile Technologies”, “Information and Communication Technologies”, “Electrical Engineering and Renewable Energy Sources” and have quite diverse content, which is proof of its high qualification as a teacher. He is a co-author of 9 curricula of the bachelor's and master's degree. For the last ten years under his leadership they have successfully defended 9 graduates for a bachelor's degree and 7 for a master's degree.

For the period 2011-2020 he has participated in a total of 12 projects: financed from the state budget - 7 projects, one of which is a manager; funded by the Ministry of Education and Science, research program „Young Scientists and Postdoctoral Students“ - 1 project; financed under the Operational Program "Human Resources Development" - 2 projects; financed under Operational Program "NOIR" - 2 projects. The candidate has a significant contribution to the expansion and modernization of the material and technical base of the Department of “Electronic Equipment and Microelectronics” at the Technical University of Varna, using the funds for these projects, which are over BGN 32,000. He realized one mobility under the ERASMUS program at the University of Patras, Greece in 2016. He is a co-author of a textbook, including 10 topics in the discipline "Reliability of electronic equipment".

3. Main scientific and applied scientific contributions

I accept the contributions formulated by the candidate, systematizing them briefly as follows:

Scientific contributions

Innovative algorithms have been developed: to extract additional information and assess the impact of impact factors, by analyzing data collected from two-factor reliability tests of electronic devices [Г.7.5], [B.4.3]; for dynamic assessment of the operational reliability of complex technical systems [B.4.5], [Г.8.5], [Г.8.8]; for overcoming emerging difficulties in the calculation of quantitative estimates of parameters of the operational reliability of electronic equipment [B.4.8], [Г.7.2]; for non-parametric analysis of the reliability of electronic devices by applying graphical methods for estimating the probability of failure-free operation [Г.7.4].

Applied scientific contributions

An innovative approach has been developed to select the most appropriate structural scheme of an electronic system [B.4.6] and to assess the acceleration coefficient of reliability tests [Г7.3].

Based on algorithms and techniques of artificial intelligence [B.4.11], [Г.7.6], [Г.7.1] and the derived mathematical dependences, nomograms have been compiled [Г.8.9], [B.4.1], with the help of which they can determine and optimize the required number of spare parts and the terms of maintenance of complex technical systems in accordance with the level of reliability.

Applied contributions

Mathematical models [Г.8.1] have been developed and verified regarding the reliability characteristics of modern semiconductor elements [B.4.2], [B.4.7], [B.4.10] and electronic converters [B.4.9]. An algorithm for the design of magnetic components [Г.8.3], simulation models of charging stations [Г.7.7] and a system for monitoring the processes in the reverse osmosis system [Г.8.10] have been developed.

4. Significance of contributions inputs to science and practice

The scientific and applied research of Senior Assist. Prof. eng. Toncho H. Papanchev, PhD, have contributed to the theory, practice and training, as they are related to the reliability of electronic elements and systems and their simulation models. Evidence of this are the citations from the reference in Scopus - 41 citations for 2020. As a result of his publishing activity, he is known in the scientific community and has a H-index of 6. The presented quantitative indicators meet the criteria for holding the academic position of “Associate Professor”.

5. Critical remarks and recommendations

I have no critical remarks on the materials submitted by the candidate for the competition. To continue work in the field of research of the reliability indicators of electronic elements and electronic systems, as well as to deepen and increase the work with graduates and doctoral students, in order to pass on its extensive experience in training young researchers and lecturers at TU Varna.

CONCLUSION

My general assessment is that the performance of the candidate in the competition for the academic position of “Associate Professor” meets the requirements. **On the basis of the acquaintance knowledge with the presented scientific publications, their significance, with the included scientific and applied contributions, I find it reasonable to propose the candidate Senior Assist. Prof. eng. Toncho Hristov Papanchev, PhD to take the academic position of “Associate Professor” in the professional field 5.2. Electrical Engineering, Electronics and Automation in the discipline "Design of electronic equipment".**

Date: 31 March 2021

Scientific Jury Member:

(Prof. Dr. Eng. Nikolay Dimitrov Madzharov)