

REVIEW

by Professor Todor Stoyanov Djamiykov, Eng., PhD, Technical University - Sofia regarding the selection process to award the academic rank of Associate Professor of Plovdiv University Paisii Hilendarski in the professional area: 5.2 Electrical Engineering, Electronics and Automation, scientific discipline: Electronic Circuits and Electronic Circuit Engineering Theory

Daniela Antonova Shehova, Chief assistant professor, PhD, Eng., is a candidate in the selection process to award the academic rank of Associate Professor announced in State Gazette 40, published on 14 May 2021 and on the internet page of Plovdiv University Paisii Hilendarski.

1. General description of the materials presented

I have been appointed as member of the scientific panel for the selection process to award the academic rank of Associate Professor of Plovdiv University Paisii Hilendarski in the professional area: 5.2 Electrical Engineering, Electronics and Automation, scientific discipline: Electronic Circuits and Electronic Circuit Engineering Theory with ordinance Number P33-3128 from 12 July 2021 of the Rector of Plovdiv University Paisii Hilendarski.

Daniela Antonova Shehova, Chief assistant professor, PhD, Eng., is the only candidate for the above-mentioned selection process.

The set of materials presented by Daniela Antonova Shehova, PhD, Eng., is compliant with the Regulations for the professional development of the faculty of the University of Plovdiv, and includes the following documents: application to the Rector; CV; copies of a master's degree diploma and a PhD diploma; proof of work experience; a list of annotations and copies of scientific papers in peer-reviewed and non-peer-reviewed publications, all presented publications having been peer-reviewed; the candidate's self-assessment of her scientific contributions; a summary of the candidate's participation in research projects; a declaration of originality and authenticity of the materials; a reference attesting to the fulfillment of the minimum requirements and copies of declarations of conformity, specified in Appendix 1 of the Regulations for acquisition of scientific degrees and holding academic positions.

The candidate D. Shehova, PhD., Eng. has submitted a total of 46 scientific papers, 1 book (a defended dissertation), 5 textbooks and teaching aids and a list of 8 research papers. 39 scientific papers, 5 textbooks and 8 research projects that are not within the scope of the dissertation have been accepted for review and have been taken into consideration in the final evaluation. 6 scientific papers related to the dissertation and a book (the defended dissertation) have not been reviewed. The distribution of scientific papers by their relevant categories, within the country and abroad, is as follows: 4 publications abroad, 33

publications within the country and 3 online publications. A list of 24 citations has been presented. Documents proving participation in research projects have also been presented.

One of the publications, included in the list of textbooks, is actually classified as a book in the database of the National Library. There has been no decision of the departmental or faculty council to accept it as a textbook. Therefore, I have referred the publication in question to the general activities of the candidate, as a result of which I reduced the number of published textbooks to 4.

2. Information about the candidate

D. Shehova, PhD., Eng., was born in 1965. She finished high school in 1984 majoring in *Radio and Television Equipment* at the Secondary Vocational Technical School in Razgrad. In 1989 she received a master's degree in *Electronics and Automation* with a major in *Radio and Television Equipment* from the Higher Institute of Mechanical and Electrical Engineering (HIMEE) - Varna. The same year, 1989, she obtained her teaching qualifications from the Department of Public Professions of HIMEE - Varna. In the period between 2004-2012 she obtained successive additional qualifications from Sofia University and the Thracian University of Stara Zagora in the Department of Information and Teacher Training specializing in *Information and Information Technologies in Education*. In 2016 she defended her dissertation titled *Research and development of electronic learning tools for analog and mixed circuits* at the Technical University - Sofia. D. Shehova, PhD., Eng., began her career as a teacher at the Secondary Vocational School of Technology Hristo Botev in Smolyan. Since 2006 she has been an assistant in the Department of Power Engineering and Communications at the Technical College of the University of Plovdiv - "Paisii Hilendarski". Since 2010, she has been Chief assistant professor at the Department of Power Engineering and Communications at the Faculty of Physics and Technology of the University of Plovdiv - "Paisii Hilendarski".

3. General characteristics of the candidate's activity

The presented materials, lists and official notes show the extensive educational engagement of the candidate in the past 5 years. Her workload during the period varies from 500 to 870 study hours, which is a big enough workload. During this period she has conducted classes, lectures and exercises in a total of 14 disciplines. She has participated in the preparation and adoption of curricula for the bachelor's course in 8 disciplines and the master's course in 4 disciplines, which were adapted, respectively, for full-time and part-time study. The presented materials unequivocally show the active educational engagement of D. Shehova and her work with students.

From the presented list of a total of 40 publications, apart from those that had been published in connection with her PhD, I accept 39 publications for review. Those should be taken into account in the final evaluation. A book based on the defended dissertation was

published, which I accept, as well as the public presentation of the scientific and applied contributions of a publication that has already been reviewed.

The classification of the presented materials is as follows: All publications were presented at conferences in Bulgaria and abroad. Of 2 of the publications the candidate is the sole author, and all the others are co-authored. 13 of the publications are referenced in Scopus and Web of Science, and the rest are in peer-reviewed editions. A review of all publications shows that they are characterized by an analytical approach and depth of knowledge of the current state of use of software and hardware platforms in education. They have scientific and applied significance, directly related to the current selection process to award the academic rank of Associate Professor in the professional area: 5.2 Electrical Engineering, Electronics and Automation. I accept the publishing activity as completely sufficient in volume, at a high level and sufficiently popularized nationally and internationally.

The precise comparison of the requirements listed in "Minimum national requirements" for launching a procedure for selection of chief assistant professors, associate professors and professors by professional fields with the information submitted by D. Shehova, PhD., Eng., (6. Statement of compliance with the minimum national requirements.docx) confirms that she has fully met the minimum national requirements.

This statement of compliance with the minimum national requirements can be supported with the following sequence in analyzing the evidence presented in the documents of this selection process which are as follows: List B: minimum number of points - 100. 10 publications were presented with a total of 227 points. List G: minimum number of points - 200. 29 publications were presented with a total of 246 points. List D, minimum number of points - 50. 24 publications were presented, with a total of 176 points.

The 40 scientific publications presented for this selection process constitute significant in its volume scientific work accomplished by D. Shehova, PhD, which definitely gives grounds for an excellent evaluation when determining the general characteristics of the scientific and applied research activities of the candidate.

All scientific publications presented are within the scope of the selection process. They are the subject of analysis in the very detailed self-assessment of the contributions for the B4 group of indicators and the self-assessment of the contributions for the G group of indicators which was compiled by D. Shehova, PhD, by thematic areas. Regardless of their general focus within the scope of selection process, they can be classified and analyzed in the following categories:

Contributions based on the publications in peer - reviewed editions, list B:

1. An approach and a methodology have been developed for studying types of electronic circuits using integrated design and simulation systems, and subsequent verification and

experimental confirmation of the results using open source platforms and experimental modules [B4.1], [B4.7] and [B4.8].

2. Simulation circuits for testing electronic devices (programmable functional generator; digital-to-analog converters; motion, fire, humidity and temperature sensors; linear operating circuits and digital communication systems with linear coding) have been developed, using integrated design and analysis environments – Proteus, TINA TI, NI Multisim и OrCad [B4.1], [B4.2], [B4.5], [B4.7] and [B4.8].

3. Hardware and software tools for physical experiments using analog-to-digital converters applicable in the engineering education have been developed and examined. [B4.4].

4. A home automation system based on the Arduino platform has been developed, implemented and examined [B4.3].

5. The NextCloud cloud technology, allowing sharing of educational resources, modernization of the teaching process and accessibility for a large number of remote users has been developed and applied in the organization of the teaching process [B4.6].

6. An APRS based tracker to determine the location of an object in real time has been developed and examined [B4.9 - B4.10].

Contributions based on the publications in publications in peer - reviewed editions, list G:

1. The main factors supporting the application of the Industry 4.0 paradigm have been examined. Their main characteristics presenting challenges to STEM (Science, Technology, Engineering, Math) education have been considered. Possible correlations between the required skills and the subjects taught have been presented [G7.1].

2. Computer-based methods in MATLAB Simulink for the research and description of the basics of digital communication systems have been proposed [G7.2], [G8.6], [G8.10], [G7.11].

3. Simulation models for e-learning have been created in the Multisim, FilterProTM and TINA-TI environments for the examination of: radio communication devices [G8.2], active filters [G8.5], electronic circuits with operational amplifiers [G7.3], [G8.3], [G8.13] and [G8.14], quadripole [G8.15], mixed signal circuits [G8.20], programmable amplifiers [G8.18] and voltage converters [G8.26].

4. The tendencies of the types of colorimetric systems used in the creation and construction of digital images have been analyzed [G8.7] and [G8.9]. The approaches and methods for creating, modeling and improving 3D graphic forms by applying R-functions in communications and using the RF-3D and Matlab GUI software environments have been visualized [G8.8].

5. A meteorological station, applicable in the educational process, has been designed and built using the Arduino Mega microprocessor system, including a temperature and humidity sensor, a fire detector and visualization of the data [G8.16] and [G8.19].
6. A LabView based virtual tool for statistical data processing, built into a real-time software system, has been developed. The virtual tool can also be embedded in other more complex data processing systems [G8.25]. Laboratory modules have been developed using open source platforms [G8.18], [G8.21].

It is completely reasonable to summarize, on the basis of the presented scientific publications and the report on the contributions compiled by D. Shehova, PhD, that she has made both scientific and applied contributions. They are closely related to the presented applied contributions, and are also the basis for their application in the educational process (educational publishing) and in the development of scientific projects (a list of 8 research projects has been presented).

The importance of the contributions in the scientific publications is confirmed by the 24 citations made by other scientists from Bulgaria and abroad.

4. Assessment of the candidate's personal contribution

I believe that the personal contribution of D. Shehova, PhD in the publications presented to the scientific community is indisputable and significant. The statistics by number of co-authors in the publications shows that 2 were authored solely by the candidate, 3 have one co-author, 16 have two co-authors, 15 have three co-authors, and 3 have four co-authors. For the most part, the candidate is at the beginning of the list of authors, which speaks of the significant share in the development and presentation of publications.

5. Critical remarks and recommendations

I have the following notes to make as to the materials presented in the selection process, which do not reduce the significance of the obtained results, but rather can be considered as recommendations for the future scientific career of D. Shehova, PhD.

1. I would recommend adding the publication from indicator G7 to the list of works equivalent to habilitation work. List G7 with papers in peer-reviewed and indexed editions contains 3 titles. Thematically, they coincide with the submitted contributions in list B4, which is of the required minimum of 10 titles. Combining them would give greater importance to the equivalent habilitation work.
2. The summaries and assessments of the results of the publications could be more precise, which would lead to a more accurate and representative presentation of the contributions.
3. I would recommend focusing and devoting time to an extensive and detailed summary of the use of modern software and hardware platforms in the electronics education, so that it can be published in prestigious high-ranking foreign publications.

6. Personal impressions

I have known D. Shehova, PhD, since approximately 2015, which was the period of presentation and defense of her dissertation before the Department of Electronic Engineering at the Technical University of Sofia. My general impressions based on her participation in scientific forums and on informal talks and discussions on educational and scientific issues of mutual interest are excellent - she is a distinguished lecturer and scientist.

I have not co-authored publications with her and I am not a related person within the meaning of the law.

Conclusion

The documents and materials submitted by Daniela Antonova Shehova, PhD., Eng. meet all the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria (LDASRB), the Regulations for the implementation of the LDASRB and the relevant Internal Regulations of Plovdiv University "Paisii Hilendarski".

A sufficient number of scientific papers have been presented, published after the defense of the PhD thesis. The works of the candidate contain original scientific and applied contributions, which have received international recognition as a representative portion of them have been included in scientific journals published by international academic publishers. The papers have practical applicability, and are directly oriented to the educational field. The scientific and teaching qualifications of Daniela Antonova Shehova, PhD, Eng., cannot be questioned.

The results achieved by Daniela Antonova Shehova, PhD, Eng., in teaching and research fully comply with the specific requirements of the Faculty of Physics and Technology, adopted in connection with the Internal Regulations of Plovdiv University "Paisii Hilendarski" for the application of LDASRB.

After reviewing the materials and scientific papers presented for the selection process, analysing their significance and the scientific and applied contributions contained in them, I confidently give my positive assessment and recommend that the Scientific Panel prepare a report proposing to the Faculty Council of the Faculty of Physics and Technology to select of Daniela Antonova Shehova, PhD, Eng., for the academic position of Associate Professor at the University of Plovdiv "P. Hilendarski" in professional field 5.2. Electrical engineering, electronics and automation, scientific discipline: Electronic Circuits and Electronic Circuit Engineering Theory.

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Reviewer:

(Prof. Todor Stoyanov Djamiykov, Eng., PhD)