

## STATE IN A COMPETITION

for an academic position "Associate Professor" in a professional field 5.2. Electrical Engineering, Electronics and Automation, scientific specialty ""Theory of electronic circuits and electronic circuitry" for the needs of the Department of Power Engineering and Communications, of the Faculty of Physics and Technology at the University of Plovdiv "Paisii Hilendarski", published in SG №40/14.05.2021, with candidate: Eng. Daniela Antonova Shehova, Dr., Chief Assistant

**Prepared the opinion:** Eng. Nikola Vichev Kolev, PhD and Doctor of Sciences, Professor, a member of the Scientific Jury by order of the Rector of PU, № P33-3128/18.07.2021.

### 1. General provisions and biographical data

Daniela Shehova was born in 1965. In 1989 completed a master's program in "Radio and Television Equipment" at the Technical University - Varna. She is a doctoral student at the Technical University - Sofia and in 2016 she defended a dissertation for the educational and scientific degree "Doctor" on the theme "Research and development of electronic teaching aids for analog and mixed circuits". Since 2010 she has been a Chief Assistant in the Department of Power Engineering and Communications at the Faculty of Physics and Technology at the University of Plovdiv.

### 2. General description of the submitted materials

The candidate Dr. Shehova submitted for participation in the competition for associate professor the following materials: application to the Rector; autobiography; copies of diplomas for master's degree and for educational and scientific degree "doctor"; document for work experience; list, annotations and copies of scientific papers in peer-reviewed publications, author's reference for scientific contributions; for participation in research projects; declaration of originality and authenticity of the materials; reference for fulfillment of the minimum requirements and copies of declarations of conformity, specified in Annex 1 of PPNSZAD.

### 3. General characteristics and contributions from the research and the scientific-applied activity of the candidate

The lists of 29 scientific publications and reports submitted by the candidate for review do not include the publications on the dissertation for PhD "Doctor".

The list of participations in research and implementation projects includes 10 university and national projects.

The analysis of the scientific papers and activities with which Dr. Shehova participates in the competition shows that the candidate has 2 independent papers, as all other 27 publications are in peer-reviewed editions – 3, in refereed editions and the rest - in proceedings of international scientific conferences.

The complex nature of the works with which Dr. Shehova participates in the competition has forced her to work in a team and therefore there are few independent scientific papers. It is noteworthy that the publications have an in-depth analytical part, clear conclusions and serious literary substantiation.

Publications in renowned editions are related to the development of fundamental and basic concepts embedded in digital signal processing, using the Matlab-Simulink software development for research and teaching of discrete linear time-invariant systems.

Systematically, Dr. Shehova's contributions with the publications in renowned publications, united by me, are the following:

1. An approach for systematization and study of classes of electronic circuits through integrated systems for design and simulation is developed and methodical instructions for simulation demonstration of the principles of operation and their main characteristics are applied, with subsequent verification of the results using open source platforms. and experimental modules [B4.1; B4.7 and B4.8].

2. Simulation schemes 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 environments and analysis - Proteus, TINA TI, NI Multisim and OrCad [B4.1; B4.2; B4.5; B4.7 and B4.8].

3. Hardware and software have been developed for physical experiments of analog-to-digital converters with application in engineering education and for home automation, based on the Arduino platform [B4.3 and B4.4].

4. For the purposes of the organization of the learning process have been developed and applied NextCloud technology, allowing sharing of educational resources, modernization of the learning process and accessibility for a large number of remote users, as an APRS based tracker for determining the location of objects in real time [B4.6, B4.9 - B4.10].

5. The main factors, supporting the application of the Industry 4.0 Paradigm are analyzed and their main characteristics that present challenges to STEM (Science, Technology, Engineering, Math) education are considered. Possible correspondence between the required skills and the teaching subjects is presented [D7.1].

Systematically, the contributions of Dr. Shehova with 17 publications, outside the refereed ones, are the following:

1. Computer-based methods in MATLAB Simulink for research and description of the basics of digital communication systems are proposed [D7.2 and D7.11; D8.6; D8.10]. 2. Simulation models for e-learning have been created in the Multisim, FilterPro™ and TINA-TI environments for research of: radiocommunication devices (active filters, electronic circuits; mixed signal circuits; programmable amplifiers and voltage converters) [D8.13; D8.14; D8.15; D8.20; D8.2; D8.5; D8.26; D7.3; D8.3 and D8.18]. 3. The tendencies in the development of the types of colorimetric systems used in the creation and construction of digital images are analyzed and the approaches for creation, modeling and improvement of 3D graphic forms by applying R-functions in communications and use of software environments RF-3D are visualized [D8.7, D8.8 and D8.9].

4. A meteorological station based on the Arduino Mega microprocessor system has been created, including: temperature and humidity sensor, fire presence sensor and data visualization, with application in the learning process [D8.16 and D8.19].

5. LabView based virtual tool for statistical data processing, built into a real-time software system and laboratory modules using open source platforms [D8.18; D8.21 and D8.25].

I accept that scientific papers, other than those in renowned publications, contain original contributions in the field of creating methods and tools for the synthesis of systems for educational purposes.

I support the author's reference for the contributions from the creative activity of the candidate and I classify them as scientific-applied.

The review of the documents of Dr. Shehova shows that the procedural and legal requirements arising from the Regulations for the terms and conditions for holding academic positions at the University of Plovdiv have been met and have been fulfilled.

The candidate of the competition has not been legally proven plagiarism in the scientific works (Art I-I' par. 5 of the Law on the Protection of the Rights of Persons with Disabilities).

### **3. Assessment of the pedagogical preparation and activity of the candidate**

Dr. Shehova actively publishes and has prepared 2 books, 2 textbooks and 2 manuals for the needs of teaching at the university.

On the basis of the dissertation a book was published, with independent author Dr. Shehova, which has scientific and educational value.

Chief Assistant Dr. Shehova has a full workload for the last three years and teaches in disciplines that are permanently embedded in the curriculum.

### **5. Significance of contributions to science and practice**

The significance of the created methods, devices and systems, in my opinion, is indisputable, because developments are offered, some of which are in the implementation of scientific projects and contracts. Dr. Shehova's developments are used successfully in the education of students.

### **6. Critical remarks and recommendations**

My recommendation is to more precisely systematize the contributions of the candidate for the academic position of "Associate Professor".

I recommend Dr. Shehova to strengthen her publishing activity in renowned foreign scientific journals.

### **7. Personal impressions and opinion of the reviewer**

I do not know Dr. Shehova personally, but I appreciate the results of her work, included in scientific publications and projects, as well as the accumulated knowledge and experience.

I have no common publications with the candidate in the competition and I am not a person associated with her.

### **8. Conclusion**

Based on the acquaintance with the materials, presented by the candidate in the competition (scientific papers, participation in projects and contracts, participation in pedagogical activities), their significance, the scientific-applied and methodological contributions contained in them, I find it reasonable to vote positively and propose Chief Assistant Dr. Eng. Daniela Antonova Shehova to be elected by the Faculty Council of the Faculty of Physics and Technology of Plovdiv University "Paisii Hilendarskii", to take the academic position of "Associate Professor" in the professional field 5.2. "Electrical engineering, electronics and automation", scientific specialty "Theory of electronic circuits and electronic circuitry".

August 15, 2021  
Sofia

Signature:  
/ Prof. Dr. Eng. Nikola V. Kolev, Dr. Sci /