

REVIEW

worked out by Sotir Ivanov Sotirov, PhD, associate professor at Paisii Hilendarski
University of Plovdiv

of the materials submitted for participation in the competition
for holding the academic position of "Associate Professor"
at the Plovdiv University *Paisii Hilendarski* (PU),
field of higher education: 5. Technical Sciences

professional area: 5.2. Electrical Engineering, Electronics and Automatics

scientific specialty: *Theory of Electronic Chains and Electronic Scheme Technics*

A candidate in the present competition for "Associate Professor", announced in State Gazette /edition 40 from 14.05.2021/ and on the Internet page of PU for the needs of the Department of Electro-energetics and Communications at the Physical-Technological Faculty, is chief assistant eng. Daniela Shehova, PhD, from the Physico-Technological Faculty.

1. General presentation of the submitted materials.

With a Rector's order № P33-3128 from 16.07.2021 of the Rector of PU I was assigned a member of the scientific panel in the competition for holding the academic position of "Associate Professor" at PU in the field of higher education: 5. Technical Sciences, professional area: 5.2. Electrical Engineering, Electronics and Automatics, scientific specialty: "Theory of Electronic Chains and Electronic Scheme Technics", announced for the needs of the Department of Electro-energetics and Communications at the Physico-Technological Faculty.

One candidate has submitted documents for participation in the present competition:

chief assistant eng. Daniela Shehova, PhD, from the Physico-Technological Faculty of the Plovdiv University *Paisii Hilendarski*.

The submitted set of paper materials is in conformity with the Regulations for the Development of the Academic Staff at PU. It includes the following documents:

- An application form for admittance to participation in the competition;
- A curriculum vitae - European format;
- A diploma attesting a level of higher education – the educational and qualification degree of "Master" – an original with the corresponding applications;
- A diploma attesting the educational and scientific degree of "Doctor" – an original;
- A list of scientific works – copies of 39 publications and a published book based on a defended dissertation work for awarding the degree of "Doctor": Shehova, D. (2021). *Study and Development of Electronic Resources for Training by Analogue and Mixed Schemes*, the Union of Scientists in Bulgaria, 2021, 248 p., ISBN 978-954-397-049-0.

- A reference for conformity with the national minimum requirements for the academic position of “Associate Professor” at PU *Paisii Hilendarski*, field of higher education: 5. Technical Sciences; professional area: 5.2. Electrical Engineering, Electronics and Automatics.
- Abstracts of the materials according Art.65 of the Regulations for Development of the Academic Staff at PU (RDASPU), including self-assessment of the contributions, as well as the expanded reference for habilitation;
- A written statement for originality and authenticity of the applied documents;
- A certificate for the length of service;
- Documents for the teaching work;
- Documents for the research work;

The candidate, chief assistant eng. Daniela Shehova, PhD, has applied 40 scientific works in total: 1 published book based on a defended dissertation work for the educational and scientific degree of “Doctor” and 39 research publications.

40 research works are subject of the present review, being apart from the dissertation. 10 research projects have been reported for the final assessment. There have been submitted documents (certificates) for implemented developments worked out in the Physico-Technical Faculty of PU *Paisii Hilendarski*, as well as the relevant contributions.

2. Short biographical data of the candidate.

Daniela Shehova was born in 1965. He graduated in 1989 from the Technical university of Varna as a master engineer of electronics and automatics in *Radio and Television Technics*. Her career development started in the same year in the Vocational High School of Technics and Technologies *Hristo Botev*, the town of Smolyan. In the period 1989-2006 she worked there as a teacher. She taught theoretical and fundamental subjects in the following secondary school professional programs: Radio and Television, Industrial Electrical Engineering, Computer Technics and Technologies. In 2004 she obtained 5-th professional and qualification degree at the Department for Information and In-Service Training of Teachers at the Sofia University (SU). From 2006 to 2007 she worked as a professor assistant at the Technical College of PU *Paisii Hilendarski*, the Department of Electro-energetics and Telecommunications. She developed and provided laboratory and seminar classes of Digital Scheme Technics, Distribution of Radio-waves and Microwave Technics and Radio-communication Technics. Later, she read lectures in these disciplines. In the period 2007-2011 she held the positions of senior assistant and chief assistant at the same department. In 2010 she participated in a one-year professional and pedagogical specialization of *Informatics and Information Technologies and Their Application in Education* at the Trakia University of Stara Zagora. In 2011 she obtained 4-th professional and qualification degree at the Department for Information and In-Service Training of Teachers at SU. The following year she obtained 3-th professional and qualification degree. In 2016 she successfully defended a dissertation work for the educational and scientific degree of “Doctor” entitled *Study and Development of Electronic Resources for Training by Analogue and Mixed Schemes*. Since 2016 to the present she has been working as a chief assistant in the Department of Electro-energetics and Communications

at the Physico-Technological Faculty of PU *Paisii Hilendarski*. She reads lectures and provides seminar classes in the following disciplines: Technical and Computer Modelling, Electronic Scheme Technics I, Electronic Scheme Technics II, Digital Scheme Technics, Electricity-Supplying Devices, Computer Modelling and Engineer Projecting, Principles of Communications. In her 39-year pedagogical experience Daniela Shehova has participated in 39 scientific conferences and 10 research projects. She has published: two textbooks, 1 book based on a defended dissertation work, 1 student`s handbook, 2 manuals. Since 2016 she has been a member of the Faculty Council of the Physico-Technological Faculty at PU, she has participated in the Attestation Commission, the Commission for Admission Campaign, the Commission for State Examinations and Diploma Thesis Defences of graduates in the professional direction 5.3. She has been a member of the Union of Scientists - Smolyan since 2012, and since 2016 – a member of the Union of Electronics, Electrical Engineering and Telecommunications. The professional background of chief assistant Daniela Shehova, PhD, gives me grounds to consider that the candidate has serious scientific and teaching experience in the relevant scientific field.

3. General Characteristics of the candidate`s work.

Evaluation of the pedagogical work

Chief assistant eng. Daniella Shehova, PhD, has teaching experience of 32 years, 15 of which – at PU *Paisii Hilendarski*. In this period she developed 12 syllabuses for the following study programs: Hardware and Software Systems (Bachelor`s degree), Computer and Communication Systems (Bachelor`s degree), Hardware and Software Systems (Master`s degree), Information Security (Master`s degree), Electro-energetics and Communications (Master`s degree). She participated in the development and update of curriculums of 6 study programs. In the last 5 years her in-class work load was 3489 hours. At present she reads lectures and provides seminar classes in the disciplines as follows: Analogue Scheme Technics, Digital Scheme Technics, Electricity Supplying Devices, Technical and Computer Modelling, Practicum with Program Products for Engineer Solutions, Electronic Semi-conductor Instruments and Integral Schemes, Electronic Scheme Technics I, Electronic Scheme Technics II, Computer Modelling and Engineer Projecting, Electronics, Program Products for Engineer Solutions, Training Practice.

Chief assistant Daniela Shehova, PhD, is a co-author of two textbooks, one student`s handbook and two manuals for the needs of the University. She has independently published a book based on her dissertation work. She has supervised the diploma theses of 15 successfully defended graduates. It is obvious that she is constantly willing to improve the training and teaching quality. She includes her students in her research projects and other activities – with collaborative publications and conference participation. She has been an academic mentor of 16 students under the *Student Practices* project financed by the operative program “Science and Education for Intelligent Growth”. I consider the above mentioned an explicit evidence that chief assistant Daniela Shehova, PhD, possesses excellent skills for teamwork with students and other lecturers. Her teaching qualification and high professional qualities are undeniable. Undoubtedly, the candidate meets the necessary requirements for teaching and pedagogical practice.

Evaluation of the candidate's scientific and science-applied work

Chief assistant eng. Daniela Shehova, PhD, has participated in 10 research projects: 6 at the Research Fund of PU Paisii Hilendarski, 2 under the national program “Young Scientists and Post-doctoral Students”, 1 under the operative program “Human Resources Development” of the Ministry of Education and Science and 1 under the operative program “Science and Education for Intelligent Growth”.

There are 40 scientific works in total submitted for the present review. They are grouped as follows:

- 1 published book on the base of a defended dissertation work for awarding the educational and scientific degree of “Doctor”;
- 13 research publications in journals, referenced and indexed in world databases with scientific information (group of indicators B4, group of indicators Γ7);
- 26 research publications in non-referenced journals with scientific reviewing (group of indicators Γ8)

All scientific works are in the field of the present competition: 12 of them are in Bulgarian language, 27 are in English. The candidate is a first author in 13 of the publications, and in the rest 26 – there are two or more co-authors.

Contributions and citations

I accept the formulated science-applied and applied contributions of chief assistant Daniela Shehova in the submitted scientific works. They can be classified in two groups.

Science-applied contributions

- There have been studied the basic factors for the application of the paradigm Industry 4.0. Their general characteristics have been observed, presenting some challenges towards STEM (Science, Technology, Engineering, Math) education. There has been presented some possibility for correspondence between the necessary skills and the taught subjects [Γ7.1].
- There have been proposed computer-based methods in MATLAB Simulink for examination and description of the principles of the digital communication systems [Γ7.2], [Γ8.6], [Γ8.10] and [Γ7.11].
- There have been created simulation models for electronic training in the environments Multisim, FilterPro™ and TINA-TI for the study of: radio-communication devices [Γ8.2], active filters [Γ8.5], electronic schemes with operational amplifiers [Γ7.3], [Γ8.3], [Γ8.13] and [Γ8.14], quadrupoles [Γ8.15], schemes for mixed signals [Γ8.20], program amplifiers [Γ8.18] and voltage-converters [Γ8.26].
- There have been analyzed the tendencies of the colorimetric system types [Γ8.7] and [Γ8.9], used for the creation of digital images. There have been visualized the approaches and methods for the

creation and modeling of 3D graphic forms through the application of R-functions in communications, as well as the use of the program environments RF-3D and Matlab GUI [Г8.8.].

- It has been created an approach for the study of electronic scheme classes through the use of integrated systems for projecting and simulation, and the subsequent verification of the results through the use of open code platforms and experimental modules [B4.1], [B4.7] and [B4.8].
- There have been created and applied methodological directions for experimental confirmation of simulated demonstration of the operational principles and general features of electronic schemes [B4.1], [B4.7] and [B4.8].
- There have been developed simulation schemes for the study of electronic devices (program functional generator; digital-analogue converters; sensors for movement, fire, moisture and temperature; linear operational schemes and digital communication systems with linear coding) through the use of integrated environments for projecting and analysis – Proteus, TINA TI, NI Multisim and OrCad [B4.1], [B4.2], [B4.5], [B4.7] and [B4.8].

Applied contributions

- There have been developed and examined apparatus and programming devices for physical experiments of analogue-to-digit converters with application in engineering education [B4.4].
- There has been developed and examined a system for home automation based on Arduino platform [B4.3].
- It has been developed and applied in the training process NextCloud - a cloud technology allowing the share of teaching resources, teaching process modernization and access for a large number of distant consumers [B4.6].
- It has been developed and examined APRS based tracker for localization of an object in real time [B4.9 - B4.10].
- It has been projected and created a meteorological station based on Arduino Mega microprocessor system applicable in the training process, which includes a sensor for temperature and moisture, a sensor for fire and data visualization [Г8.16] and [Г8.19].
- It has been developed a LabView based virtual instrument for statistical data processing incorporated in a software system for real time work. The virtual instrument can be incorporated in other more complex systems for data processing [Г8.25].
- There have been developed laboratory modules with the use of open code platforms [Г8.18], [Г8.21].

The candidate has submitted in the present competition a book based on a defended dissertation work and entitled *Study and Development of Electronic Resources for Training by Analogue and Mixed Schemes*. It was published in 2021 by the Union of Scientists in Bulgaria with ISBN 978-954-397-049-0 in 248 pages. It was reviewed by assoc. prof. eng. Slavi Yasenov Lubomirov, PhD, and assoc. prof. eng. Silviya Velkova Petrova-Stoyanova, PhD. There are citations of 116 literature references. The book is devoted to the projecting and studying of specific and universal resources for training by analogue and mixed schemes. The examined methodologies combine simulation procedures and physical experiments in order to help trainees in the formation of necessary competencies needed for business. The theoretical and practical study is directed towards launching innovative apparatus and program solutions in order to create electronic teaching resources related to the operation, parameters and features of modern analogue and mixed schemes and their applications. Topical and significant issues are taken into account, which give rise to the need of change in training and the launch of new approaches and resources related to students' practical training. The book contents are directed to the search of apparatus instruments and the creation of simulation schemes and models for training.

I consider that the submitted scientific works contain original science-applied contributions in field of the present competition.

Citations

The submitted 23 citations of scientific publications are as follows:

- In scientific editions, referenced and indexed in world popular databases with scientific information or in monographs and collection volumes – 11;
- In monographs and collection volumes with scientific reviewing – 5;
- In non-referenced journals with scientific reviewing – 7.

Implementation work

Chief assistant eng. Daniela Shehova, PhD, has submitted a certificate for application of the results received from her research work and developments in the relevant field of higher education. The simulation schemes and laboratory modules, created and examined by the candidate, are based on open code platforms and at present they are used in the training of undergraduates of Computer and Communication Systems and Electro-energetic Technics in the discipline “Electronic Scheme Technics II” and in the training of students of Computer and Communication Systems in the discipline “Principles of Communications” at the Physico-Technological Faculty of PU *Paisii Hilendarski*.

4. Evaluation of the candidate's personal contribution

The analysed scientific works evidence that 2 of the candidate's publications are independent, in 13 she is a first author, in other 15 - a second author. I consider that at great extent the formulated contributions and received results by chief assistant Daniela Shehova, PhD, are her personal merits. She is an author of a book entitled *Study and Development of Electronic Resources for Training by Analogue and Mixed Schemes* published on the base of a defended dissertation work. The

developed simulation schemes and laboratory modules are used in the training of students at the Physico-Technological Faculty of PU *Paisii Hilendarski*. It evidences her unarguable teaching qualification and high professional qualities.

I consider that the candidate's science-applied and applied contributions in her works completely meet the requirements for holding the academic position of "Associate Professor"

5. Critical marks and recommendations

I have no considerable critical marks to the submitted documents and scientific works.

6. Personal impressions

I have known chief assistant eng. Daniela Shehova, PhD, since 2012 with relation to our mutual work at the Technical College – Smolyan. During this period I convinced myself that she is an exclusive professional in her field and she possesses excellent managing skills. Taking into account the submitted documents and my personal impressions, I consider that she is an excellent lecturer with thorough research potential.

CONCLUSION

The documents and materials submitted by chief assist. eng. Daniela Shehova, PhD, meet the requirements of the Act for Development of the Academic Staff in the Republic of Bulgaria (ADASRB), the Regulations for Application of ADASRB, and the relevant Regulations of PU *Paisii Hilendarski*.

The candidate has submitted sufficient number of scientific works, published after the materials that have been used for the defense of the doctoral degree. The candidate's works have original scientific and applied contributions with international acknowledgement, and some of them are published in international journals and scientific collections. The theoretical developments are applicable in practice and some of them are directly oriented to the teaching work. There is no doubt in the research and pedagogical qualification of chief assistant eng. Daniela Shehova, PhD. The achieved results in her teaching and research work completely correspond to the specific requirements of the Physico-Technological Faculty, accepted with relation to the Regulations of PU for application of ADASRB.

After I have acquainted myself with the submitted materials and scientific works, I analysed their significance and scientific, science-applied and applied contributions. It gives me grounds to evaluate positively the candidate and to recommend the Scientific Panel work-out a report-proposal to the faculty council of the Physico-Technological Faculty for the election of chief assistant eng. Daniela Shehova, PhD, for the academic position of "Associate Professor" at PU *Paisii Hilendarski* in the professional area: 5.2. Electrical Engineering, Electronics and Automatics; scientific specialty: "Theory of Electronic Chains and Electronic Scheme Technics".

07.09.2021

Reviewer and a member of the scientific panel:

/Assoc. prof. PhD Sotir Ivanov Sotirov/

