

OPINION

by Assoc. Prof. Dr. Eng. Vladimira Krasteva Ganchovska

Acting Head of the Computer Systems and Technologies Department at the University of Food Technology - Plovdiv

of a dissertation for the award of educational and scientific doctorate degree

in: field of higher education 5. *Technical sciences*

professional field 5.2. *Electrical Engineering, Electronics and Automation*

Doctoral program "*Electronization (by industrial sectors and scientific specialties)*"

Author: *M. Eng. Angel Hristov Chekichev*

Subject: *REMOTE LABORATORY FOR ELECTRONIC MEASUREMENT TECHNOLOGY*

Scientific supervisor: *Prof. Dr. Eng. Rumen Kostadinov Popov*

1. General presentation of the procedure and the doctoral student

The set of materials on paper submitted by submitted by Angel Hristov Chekichev, MSc (Eng.), complies with Article 36(1) of the Regulations on the Development of the Academic Staff at Plovdiv University and includes the following documents:

- a request to the Rector of the University of Plovdiv for the opening of the procedure for the defense of a dissertation;
- a CV in European format;
- a protocol from the departmental council, related to reporting the readiness to open the procedure and with a preliminary discussion of the dissertation;
- dissertation;
- an abstract;
- a list of scientific publications on the topic of the dissertation;
- copies of the scientific publications;
- a declaration of originality and authenticity of the attached documents;
- a certificate of compliance with the specific requirements of the respective faculty.

Angel Hristov Chekichev, was born on 21.07.1987. In 2009, she graduated from Plovdiv University "Paisiy Hilendarski" and obtained a bachelor's degree from the Academy of Sciences in the fields of Communication Engineering and Technologies and Computer and Communication Systems. In 2012, he received an OKS master's degree at TU Varna, majoring in Communication Techniques and Technologies. In 2021, he received an OKS master's degree in Physics Education in the secondary school at PU "Paisiy Hilendarski", and in 2025 he graduated with a master's degree in Eco-technological systems in industry, at the same university. The long-term professional experience of the doctoral student (from 2017 to 2024) in the field of computer and communication technologies,

including in management positions, provides a significant practical context for the conducted research.

Angel Hristov Chekichev is a doctoral student pursuing independent study at the Department of Electric Power Engineering and Communications at Plovdiv University "Paisii Hilendarski." As of May 1, 2026, he has been removed from the doctoral program with the right to defend his thesis, pursuant to Order No. RD-22-893/April 27, 2026, issued by the Rector of Plovdiv University.

2. Relevance of the topic

Nowadays, the rapid development of information and communication technologies and the need for flexible forms of training are paving the way for the increasingly widespread use of distance education and virtual laboratories in engineering training. The need to maintain specialized laboratory equipment creates a rationale for implementing virtual laboratory environments that provide accessible, safe, and cost-effective practical training, regardless of the learners' location. In this context, the dissertation focuses on the development and study of a virtual laboratory designed to support the modernization and increased efficiency of engineering education, as well as to foster the development of practical competencies aligned with the requirements of the modern digital engineering environment.

3. Knowing the problem

The literature review section of the dissertation spans 38 pages. It includes 108 references, a significant number of which are from recent years. This demonstrates that the doctoral candidate has gained an in-depth understanding of the subject matter and the current trends relevant to addressing the dissertation's objectives.

4. Research methodology

I consider that the theoretical, analytical, simulation, and experimental methodologies selected by the doctoral candidate for the design, implementation, and testing of tools and methods for conducting remote laboratory exercises in the course "Electronic Measurement Technology" meet the established aim and objectives.

5. Characterization and evaluation of the dissertation work and contributions

The dissertation comprises 232 pages. It consists of an introduction, five chapters, general conclusions, scientific-applied and practical contributions, a list of abbreviations and notations, and a list of the author's publications. The first chapter examines contemporary solutions regarding systems and tools for creating virtual laboratories. The second chapter discusses the methodology for developing, implementing, and evaluating a remote laboratory as an innovative educational tool for the course "Electronic Measurement Technology." The design of the remote laboratory—used for modeling and analyzing basic analog modules—is presented in the third chapter. The fourth chapter describes the results of experimental studies aimed at validating the developed remote laboratory system and assessing its practical applicability.

The doctoral candidate has presented a total of 10 contributions in Chapter 5 of the dissertation, with 4 classified as scientific-applied and 6 as applied. I consider that the defined contributions meet all the requirements of the Act on the Development of the Academic Staff in the Republic of Bulgaria (ADASRB), the Regulations for the Application of the ADASRB, and the corresponding regulations of Plovdiv University "Paisii Hilendarski." The contributions reflect the results achieved and are directly linked to the established aim and objectives.

6. Assessment of the doctoral student's publications and personal contribution

A total of five articles related to the dissertation are included—three co-authored and two single-authored. Three of the articles are in English, while the others are in Bulgarian. It is noteworthy that the doctoral candidate is listed as the first author on the co-authored papers, which attests to his personal contribution to their execution.

7. Autor's abstract

The abstract submitted for review is provided in two versions—one in Bulgarian and one in English. Both versions are 32 pages long and comply with all regulatory requirements of the Act on the Development of the Academic Staff in the Republic of Bulgaria (ADASRB), the Regulations for the Application of the ADASRB, and the relevant regulations of Paisii Hilendarski University of Plovdiv. They cover the research methodology as well as the main results and analyses.

8. Recommendations for future use of the dissertation contributions and results

A recommendation for the future development of the system is to expand its simulation and implementation capabilities by incorporating additional types of low-pass filters and models with varying characteristics and parameters. This would broaden the scope of the system's application and create further opportunities for comparative analysis and practical training.

CONCLUSION

The dissertation submitted for review fully complies with the requirements of the Act on the Development of the Academic Staff in the Republic of Bulgaria (ADASRB), the Regulations for the Application of the ADASRB, and the relevant regulations of Paisii Hilendarski University of Plovdiv. I consider that the doctoral candidate, Angel Hristov Chekichev (MSc Eng.), demonstrates a high level of theoretical preparation and established professional competencies.

Based on the scientific-applied and applied contributions achieved, I **give a positive assessment of the dissertation. I propose that the esteemed scientific jury award the educational and scientific degree of "Doctor" to Angel Hristov Chekichev** in Higher Education Field 5 (Technical Sciences), Professional Field 5.2 (Electrical Engineering, Electronics, and Automation), under the doctoral program "Electronization (by sectors and groups of scientific specialties)."

16.09.2026 г.

Prepared the opinion:

/Assoc. Prof. Vladimira Ganchovska /