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 ofeducational and scientific doctorate degree

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

professional field *5.3 Communication and computer technology*

Doctoral program *Automation of areas of the intangible sphere (medicine, education, science, administrative activities, etc.)*

Author: *M.Eng. Snezha Ventsislavova Shotarova*

Subject: *INTERACTIVE LABORATORY FOR INFORMATION PROCESSING WITH REMOTE ACCESS*

Scientific supervisor: *Assoc. Prof. Dr. Silvia Velkova Stoyanova-Petrova*

1. General presentation of the procedure and the doctoral student

The set of materials on paper submitted by M.Eng. Snezha Ventsislavova Shotarova is in accordance with Art. 36 (1) of the Regulations for the Development of the Academic Staff of the University of Plovdiv 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.Маг. инж. Snezha Ventsislavova Shotarova was born on December 14, 1975. In 2019, she earned a Bachelor's degree in Computer and Communication Systems at Paisii Hilendarski University of Plovdiv. In 2020, she earned a Master's degree in Hardware and Software Systems at the same university. On 01.03.2022, the candidate was enrolled as a full-time doctoral student at the Department of "ELECTRONICS, COMMUNICATIONS AND INFORMATION TECHNOLOGIES" of Plovdiv

University "Paisiy Hilendarski", and from 01.03.2025 she was enrolled with the right to defend by order No. RD-22-599 of 28.02.2025.

The professional path of the doctoral student (in the period from 1998 to the present) shows accumulated experience in various fields, including in leadership positions, which is a prerequisite for enrichment and effective application of the acquired knowledge in the field of higher education.

2. Relevance of the topic

The submitted dissertation addresses the topic of developing an interactive laboratory with real equipment, for processing information with remote access to support the educational process and scientific research activities. Such solutions are extremely relevant against the backdrop of modern technological progress and digitalization.

3. Knowing the problem

The review part of the dissertation is 26 pages long. The literature review provides an overview of existing solutions for interactive laboratories. 138 literary and 5 electronic sources are included, most of which are from the last 10 years. I believe that the doctoral student's analysis of existing solutions and modern trends in solving the tasks of the dissertation demonstrates in-depth preparation on the topic.

4. Research methodology

The methods for modeling, simulation and experimental verification chosen by the doctoral student, implemented through web-based software platforms, communication protocols and embedded hardware tools for real-time data management and processing, meet the defined tasks and the set goal.

5. Characterization and evaluation of the dissertation work and contributions

The dissertation has a volume of 187 pages. It is organized into an introduction, 4 chapters, general conclusions, scientific and applied contributions, a list of used notations and abbreviations, a list of the author's publications and a list of used literature. The first chapter provides a literature review of the existing methods, technologies and tools for building interactive and remote laboratories used in engineering education in the field of photovoltaic systems. The second chapter examines the main physical models, formulas and computational dependencies describing the operation of photovoltaic elements. The third chapter of the dissertation describes the design and implementation of a web-based interactive laboratory for photovoltaic systems, including simulation modules, visual tools, administrative functionalities and training components, implemented in an integrated platform for engineering training and analysis. The fourth chapter presents the implementation of the interactive laboratory with remote access, designed to conduct real experiments with photovoltaic systems. The doctoral candidate has defined 8 contributions, 4 of which are defined as applied science, and the rest as applied. I believe that the defined contributions reflect the achieved results and are directly related to the set goals and objectives.

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

The doctoral student has attached 4 publications to the dissertation, one of which is independent, and in the others she is the first author, which testifies to a thorough scientific preparation and ability for independent research work. Two of the publications are in English and two - in Bulgarian. One of the articles is published in a journal that is refereed and indexed in the world-famous database of scientific information Scopus. The publications correspond to the topic of the dissertation and reflect the results obtained. With the presented scientific publications and accompanying scientific results, the doctoral student covers the minimum national requirements for group of indicators Г, according to the Act on the Development of the Academic Staff of the Republic of Bulgaria

7. Autor's abstract

The abstract submitted for review is in two versions – one in Bulgarian and one in English. The volume of the abstracts is 32 pages and meets all the regulatory requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria (LAADRB), the Regulations for the Implementation of LAADRB and the relevant Regulations of the University of Paisiy Hilendarski. The abstract includes the defined goal and objectives, summaries of all chapters of the dissertation, the main experiments and results obtained, as well as the defined contributions. A list of publications related to the dissertation work is also attached.

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

In the future, possibilities for expanding the system to work with multiple simultaneously monitored and controlled installations can be explored, which would contribute to its applicability in larger energy networks.

CONCLUSION

The dissertation work of M. Eng. Snezha Ventsislavova Shotarova fully complies with the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria (LAADRB),, the Regulations for the Implementation of LAADRB and the relevant Regulations of the PAISIY HILENDARSKY PU.

Based on the results obtained in the dissertation work, I give **my positive assessment**. ***I propose to the esteemed scientific jury to award the educational and scientific degree "doctor"*** to M. Eng. Snezha Ventsislavova Shotarova in the field of higher education 5. Technical sciences, professional field 5.3 Communication and computer technology, doctoral program Automation of areas of the intangible sphere (medicine, education, science, administrative activities, etc.).

24.03.2026 г. **Prepared the opinion:** .....

/Assoc. Prof. Vladimira Ganchovska /