

STATEMENT

by Assoc. Prof. Sevil Aptula Ahmed-Shieva, PhD, Technical University of Sofia, Plovdiv Branch

of a dissertation for the acquisition of an educational and scientific degree "**Doctor**"

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: Angel Hristov Chekichev, M.Eng

Topic: Remote Laboratory for Electronic Measurement Technology

Supervisor: Prof. Rumen Kostadinov Popov, PhD – Plovdiv University "Paisii Hilendarski"

1. General presentation of the procedure and the PhD student

By Order No. ПД- ПД-22-1398/16.07.2026 of the Rector of the Plovdiv University "Paisii Hilendarski" (Plovdiv), I am appointed as a member of the scientific jury for providing a procedure for defending a dissertation authored by M. Eng. Angel Chekichev according to the described procedure.

The author graduated from the University of Plovdiv “Paisii Hilendarski”. In 2009, he obtained a Professional Bachelor’s degree in the specialties “Computer and Communication Systems” and “Communication Equipment and Technologies” at the Technical College in Smolyan. During the period 2012-2025, he completed Master’s degree programmes in “Communication Equipment and Technologies” (Technical University of Varna), “Physics Teaching in Secondary Education” (University of Plovdiv) and “Ecotechnological Systems in Industry” (University of Plovdiv).

Subsequently, he was appointed as Assistant Professor in the Department of Electrical Power Engineering and Communications at the Faculty of Physics and Technology, University of Plovdiv “Paisii Hilendarski”, and enrolled as a doctoral student under the supervision of Prof. Dr. Eng. Rumen Popov. His professional experience includes work as a teacher of mathematics, informatics and information technologies, as well as a computer analyst. His scientific interests are focused on communication and computer technologies, development of virtual educational environments, innovative educational platforms and resources with remote access.

The set of materials submitted by M.Eng. Chekichev is in accordance with Art. 36 (1) of the Regulations for the Development of the Academic Staff at the University of Plovdiv and includes all required documents.

2. Topicality

The dissertation of Angel Chekichev, M.Eng., is dedicated to the development of a Remote Laboratory for Electronic Measurement Technology. The topic is highly relevant in the context of the digitalization of education, the increasing implementation of distance learning approaches, and the growing need for access to laboratory infrastructure independent of spatial and temporal constraints. The development of virtual and remote laboratories is particularly important in engineering education, where practical training and experimental work constitute essential components of students’ professional preparation. Therefore, the objective of the dissertation possesses both scientific and practical significance. The topic provides opportunities for achieving scientific-applied and applied contributions.

3. Knowledge of the problem

The PhD student demonstrates very good knowledge of the investigated field. An extensive literature review of distance learning and virtual laboratories has been conducted. I positively evaluate the focus placed on engineering education and the analysis of existing solutions. At the same time, the review section could have been more concise, and part of the discussion on software products and hardware concepts could have been linked more directly to the objectives of the dissertation. A review of existing virtual and remote-access laboratories has been carried out, focusing on their functionality and potential for educational and research applications. Various aspects of their operation are presented, including user interfaces, experimental capabilities, and integration into the educational process. The challenges related to hardware and software implementation are also identified, which naturally leads to the formulation of the dissertation objectives and tasks.

4. Research methodology

In my opinion, Chapter 2, entitled Research Methodology, places considerable emphasis on the theory and design of active filters. The presented methodologies for the design of filters are well established in the scientific literature and cannot be considered original contributions of the dissertation. I would have expected a stronger focus on the architecture, organization, and design methodology of the remote laboratory itself, since this constitutes the core contribution of the dissertation.

5. Characteristics and evaluation of the dissertation and contributions

The dissertation is motivated by the need to develop a remote laboratory for Electronic Measurement Technology.

The dissertation comprises 231 pages, including 38 pages of appendices, and is supported by a bibliography of 126 references in English, Russian, Bulgarian, and online sources. The lists of abbreviations and symbols contribute positively to the overall structure of the work.

The main body of the dissertation is presented in Chapters 2 and 3, where the author discusses the theoretical foundations of the investigated objects (active filters, Chebyshev filters, band-pass filters, and peak detectors) as well as the software and hardware solutions selected to achieve the objectives and tasks defined in Chapter 1.

The objective of the dissertation, namely the design, implementation, and testing of tools and methods for the remote conduct of laboratory exercises in Electronic Measurement Technology, has been achieved through:

1. A review and analysis of software environments for virtual and remote laboratories;
2. Design of the hardware modules and simulation models;
3. Development of software for remote access to the laboratory environment;
4. Development of laboratory exercises and system testing.

The main weakness of the dissertation is the lack of a sufficiently clear overall concept of the developed remote laboratory. Although filters, simulation models, and virtual instruments are discussed in detail, the relationships among these modules and their role within the overall laboratory architecture are not always clearly presented. Additional block diagrams and system-level visualizations would have facilitated the evaluation of the proposed solution.

Despite these remarks, I consider the developed hardware modules, the LabVIEW virtual instrument, the simulation models, and the organization of remote access to represent a substantial engineering development with practical applicability in the educational process.

The author identifies four scientific-applied and six applied contributions. I recognize the existence of contributions, particularly in the application of engineering approaches to the

development of modern educational resources in a virtual environment with remote access and control.

The contributions claimed by the author may be summarized as follows: ***Scientific-applied contributions:***

1. A concept of a remote laboratory environment for Electronic Measurement Technology has been proposed.
2. Experimental validation has been performed through a comparison of theoretical, simulation, and experimental results. ***Applied contributions:***
 1. Hardware modules for laboratory experiments have been developed and implemented.
 2. A virtual measurement instrument has been developed in the LabVIEW environment.
 3. A remote-access environment for conducting laboratory exercises has been implemented.
 4. Laboratory exercises and methodological guidelines have been developed.

6. Assessment of the publications and personal contribution of the PhD student

The publications related to the dissertation are five in number. Three are co-authored papers published in English, while the remaining two are single-author publications in Bulgarian. The publication activity associated with the dissertation research has been focused mainly on a single scientific journal and a single international conference series, namely: i) *Scientific Works, Volume 4 (2024), published by the Union of Scientists in Bulgaria – Smolyan, ISSN 1314-9490 (online)*, in which the author has published two papers in 2024; and ii) *the ICERI International Conference of Education, Research and Innovation*, where the author has presented and published two papers in 2021 and one paper in 2022.

The publications adequately reflect the main ideas and results of the dissertation and provide evidence of the doctoral candidate's substantial contribution to the reported research results. At the time of writing this opinion, no citation data were available.

7. Dissertation Abstract

The abstract presents in a concise manner the implemented remote laboratory for conducting laboratory exercises in Electronic Measurement Technology. It adequately reflects the stages of development and summarizes the main contributions of the dissertation.

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

The dissertation addresses a relevant research problem and proposes contemporary solutions. The stated objective has been achieved. The obtained results provide a solid basis for further development and implementation of innovative educational platforms operating in virtual environments with remote access. The remarks and recommendations presented above do not diminish the significance of the achieved results and do not affect my overall positive assessment of the dissertation.

CONCLUSION

The dissertation of M.Eng. Angel Chekichev addresses a relevant and contemporary research problem and represents a completed research work with scientific-applied and applied contributions. The PhD student fulfils the national minimum requirements for the acquisition of the degree of Doctor in accordance with the Law on the Development of Academic Staff in the Republic of Bulgaria, Rules

for Application of Law on the Development of Academic Staff in the Republic of Bulgaria and the relevant Regulations of the Plovdiv University "Paisii Hilendarski".

In view of the above, I confidently give my positive assessment and propose to the honorable scientific jury to award the educational and scientific degree of "Doctor" to M. Eng. Angel Hristov Chekichev in the 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)“.

17.09.2026

Prepared by:

(Assoc. Prof. Sevil Ahmed-Shieva. PhD)