

R E V I E W

by **Prof. Eng. Tsvetana Grigorova Grigorova-Shtarbeva, PhD,**

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of the materials submitted for participation in a competition

for occupying the academic position of **“Associate Professor”**

at the University of Plovdiv “Paisii Hilendarski”,

in: higher education area 5. Technical Sciences,

professional field 5.2. Electrical Engineering, Electronics and Automation,

scientific specialty **“Theoretical Electrical Engineering”**.

In the competition for “Associate Professor” announced in the State Gazette, issue 34 of 07.04.2026, and on the website of the University of Plovdiv “Paisii Hilendarski” for the needs of the Department of Electricity and Communications at the Faculty of Physics and Technology, the candidate participating is Chief Assistant Professor Eng. Velislava Hristova Raydovska, PhD, of the University of Plovdiv “Paisii Hilendarski”.

1. General presentation of the received materials

This review has been prepared in my capacity as a member of the scientific jury appointed by Order No. ПД-22-1116 of 05.06.2026 of the Rector of the University of Plovdiv “Paisii Hilendarski” (PU) for the competition for the academic position of “Associate Professor” in higher education area 5. Technical Sciences, professional field 5.2. Electrical Engineering, Electronics and Automation, scientific specialty “Theoretical Electrical Engineering”. The competition was announced in the State Gazette, issue 34 of 07.04.2026, and on the university website for the needs of the Department of Electricity and Communications at the Faculty of Physics and Technology (FPT).

A single candidate has submitted the participation documents: Chief Assistant Professor Eng. Velislava Hristova Raydovska, PhD, of the same department.

The set of documents has been prepared in accordance with the Regulations for the Development of the Academic Staff of PU and contains: an application to the Rector; a curriculum vitae in European format; copies of the diplomas for the Master’s degree and for the educational and scientific degree “Doctor”; a certificate of total teaching service; a list, annotations and copies of the scientific works; the author’s self-assessment of the scientific contributions; a reference on the fulfilment of the minimum national requirements; a list of the noticed citations; references on the teaching activity, on the work with students, on the published teaching materials, a reference on participation in research projects, and on other activities; a declaration of originality and authenticity of the submitted materials. The candidate also presented a list of 5 publications related to the educational and scientific degree “Doctor.” I found no omissions or inconsistencies in the documentation.

For review, the candidate submits: a Habilitation thesis – a single-author monograph; a published single-author book based on the defended dissertation; a total of 29 scientific publications, of which 5 in journals and proceedings refereed and indexed in world-renowned

databases of scientific information (list Г7) and 24 in non-refereed peer-reviewed editions (list Г8); 4 published teaching editions (a textbook, a study aid and two manuals); a list of 30 noticed citations. Documents (in the form of an official certificate) have also been presented for participation in 4 internal research projects (with the “Scientific Research” Fund of the University of Plovdiv “Paisii Hilendarski”) and 1 participation within project BG-RRP-2.004-0001-C01 “Digital Sustainable Ecosystems – Technological Solutions and Social Models for Ecosystem Sustainability (DUEcoS)”, funded by the European Union – NextGenerationEU through the National Recovery and Resilience Plan of the Republic of Bulgaria, 2023 – 2026 (Д23-ФТФ-019 “Innovative Laboratory for the Study of Electronic Systems Intended for Hybrid and Electric Vehicles”).

None of the submitted works repeats materials used to obtain the educational and scientific degree “Doctor”. I regard the book, published on the basis of the successfully defended doctoral dissertation, as an independently peer-reviewed scholarly publication through which the results of the dissertation research are given broader dissemination and a more complete presentation. Given that the work is submitted in the present procedure under indicator Г6 and is based on previously defended doctoral research, I take it into account within the framework of the corresponding indicator. I accept the monograph and all 29 publications for review and take them into account in forming my assessment. No reduction in the number of submitted works is necessary, as I have identified no publications that should be excluded from the review due to duplication with the doctoral dissertation, overlap in content, or deviation from the subject area of the competition.

2. Brief biographical data about the candidate

Chief Asst. Prof. Eng. Velislava Hristova Raydovska, PhD, was born in 1969. She completed her secondary education in 1987 at the “Vasil Levski” Unified Secondary Polytechnic School in Stara Zagora, specialty “Communications Technician”, after which she worked at the “Disk Storage Devices” State Enterprise in Stara Zagora, producing flexible printed circuit boards. In 1993, she graduated as a Master Engineer in Electronics and Automation from the Higher Institute of Mechanical and Electrical Engineering – Sofia, Plovdiv Branch.

She began her academic career on 1 March 1996 as an assistant at the Institute of Mechanical Engineering and Transport in Smolyan, whose legal successor is the Technical College of Smolyan at the University of Plovdiv “Paisii Hilendarski”; from 2000 she was a senior assistant, and from 2003 – a chief assistant at the College; in the period 2004 – 2007 she was deputy head of the Department of Electrical Power Engineering and Communications. In 2015, she defended a dissertation at the Technical University of Sofia on the topic “Investigation of the Possibilities for Measuring the Tangent of the Dielectric Loss Angle $\tan(\delta)$ of Equipment under Operational Conditions” and acquired the educational and scientific degree “Doctor” in professional field 5.2. Electrical Engineering, Electronics and Automation, scientific specialty “Electrical Engineering Materials and Cable Technology”. Since September 2017, she has been a chief assistant at the Department of Electricity and Communications, Faculty of Physics and Technology, University of Plovdiv “Paisii Hilendarski”. According to a certificate issued by the University of Plovdiv “Paisii Hilendarski”, her total teaching service as of May 2026 is 30 years and 2 months, entirely within the higher education system.

Dr. V. Raydovska participates actively in the academic life of the faculty and the university: she is a member of the Faculty Council of the FPT (2017 – 2025), of the attestation committee (Dec. 2021 to Feb. 2026), of the quality committee (since 2026), and of committees for state examinations and defenses of diploma theses; she has taken part in the working teams that prepared the documentation for the programme accreditations of professional fields 5.2 and 5.3 and for the opening of a doctoral programme in professional field 5.2 at the FPT. She is a member of the Union of Scientists in Bulgaria – Smolyan (since 2012; member of its Managing Board 2021 – 2024), a member of the organizing committee of the Olympiad in Theoretical Electrical Engineering (2022 – 2025), and a member of the editorial board of the Journal of Physics and Technology (since 2026). She systematically upgrades her teaching qualifications through training courses in English, working with e-learning and virtual reality platforms, development of interactive multimedia resources, artificial intelligence in education, and the competence-based approach in academic teaching (2014 – 2026). She has knowledge of English and Russian.

3. General characteristics of the candidate's activity

The candidate's teaching workload, documented in the attached references, is considerable in volume and diverse in content. Chief Asst. Prof. Eng. V. Raydovska, PhD, delivers lectures, seminars, and laboratory exercises in 12 disciplines in the fields of electrical engineering, electrical engineering materials, electrical measurements, high-voltage technology, power conversion technology, relay protection, and renewable energy sources in the Bachelor's degree programs of the FPT. Her classroom workload in the period 2021/2022 – 2024/2025 varied from 830 to 1020 teaching hours per year, and her total workload (including extracurricular activities) ranged from 927 to 1293 hours. In her teaching activity, the candidate has developed, independently or in co-authorship, and has updated the curricula of 6 disciplines at the Bachelor's and 2 disciplines at the Master's level of study. In addition, she has participated in developing and updating 7 study curricula for Bachelor's and Master's degree programs. She is the author of 4 published teaching editions: a textbook on "Electrical Engineering and Electronics" (co-authored), a study aid, "Computer Simulations in the Teaching of Electrical Engineering and Electronics" (co-authored), and two single-author manuals. She has been the academic supervisor of 8 successfully defended diploma students and a reviewer of 8 diploma theses, is a co-author of 12 publications and papers with students, is the academic mentor of the students of the "Automotive Electronic Systems" program, and is among the organizers and coaches of the FPT teams for the Olympiad in Theoretical Electrical Engineering. During the COVID-19 pandemic, the candidate developed and applied methodologies for the remote delivery of lectures and laboratory exercises through virtual simulation environments, documented also in her scientific production [Г8.22 – Г8.24] and summarized in the Habilitation thesis (monograph). These data outline a lecturer with consistent, dedicated, and effective work with students.

In the present competition the candidate participates with: a Habilitation thesis – the monograph "Possibilities for Teaching Students through Simulation Studies in Electrical Engineering under Pandemic Conditions" (2026, ISBN 978-619-7207-32-3) under indicator B3; a published book based on the defended dissertation (indicator Г6); 5 scientific publications in journals and proceedings refereed and indexed in the world databases of scientific information Scopus/Web of Science (list Г7), and 24 scientific publications in non-refereed peer-reviewed

editions (list Γ8). I accept the monograph and the published book based on the defended dissertation as works that have already undergone review.

The distribution of the publications by type of edition is as follows. Of list Γ7, three are papers of the International Conferences of Education, Research and Innovation ICERI (Seville, Spain), indexed in Web of Science, and two are articles in the scientific journal *Ecologia Balkanica*, refereed and indexed in Scopus (SJR – Q4). List Γ8 comprises articles in international scientific journals, articles in the Annual Journal of Electronics, and papers of international and national scientific conferences (UNITECH – Gabrovo, ICERI, INTED, the “Smolyan” scientific conferences, the Scientific Works of the Union of Scientists in Bulgaria – Smolyan and of the University of Plovdiv “Paisii Hilendarski”). Eight of the publications appeared in foreign editions and in the proceedings of international forums held abroad, while the rest appeared in editions within the country. Thirteen of the publications are in English. The monograph, the book based on the dissertation, and 8 of the publications are single-authored, while the rest are co-authored. I have familiarized myself with the full texts of the works: they are distinguished by analytical depth, correctly applied mathematical apparatus, and strong knowledge of both the modeling of electrical engineering objects and modern software and hardware platforms for education. The subject matter of all works falls within the scope of the competition and of professional field 5.2. Electrical Engineering, Electronics and Automation. In volume and level, the publication activity is sufficient for the competition, and the results have been presented to both national and international audiences.

According to a decision of the Faculty Council of the FPT (Protocol No. 14 of 20.03.2019), candidates for academic positions at the faculty are assessed against the minimum national requirements, without additional faculty criteria. I compared the reference submitted by the candidate with these requirements for the position of “Associate Professor” – they are covered in all groups of indicators, in some of them many times over: under indicator A – 50 points (defended dissertation); under indicator B – 100 points (monographic habilitation thesis); under indicator Γ – 357.34 points (published book based on a defended dissertation – 30 pts; 5 publications under indicator Γ7 – 49.33 pts; 24 publications under indicator Γ8 – 278.01 pts); under indicator Д – 156 points (12 citations in scientific editions refereed and indexed in Scopus/Web of Science – 120 pts, and 18 citations in non-refereed peer-reviewed journals – 36 pts). Under indicator E, from the review of the submitted documents, I establish the presence of an additional 74 points, distributed over indicators E18 (participation in a national scientific or educational project), E23 (published university textbook or a textbook used in the school network), and E24 (published university study aid or a study aid used in the school network). Table 1 summarizes how the candidate’s scientific production submitted for the competition meets the minimum requirements.

Table 1. Compliance with the Minimum National Requirements by Groups of Indicators.

Group of indicators	Minimum points RI-DASRBA	Candidate's points	Points by main indicators within the group	
A	50	50	Diploma No./date: TYC-EΦ83-HC1-013 / 18.05.2015; professional field 5.2. Electrical Engineering, Electronics and Automation; scientific specialty "Electrical Engineering Materials and Cable Technology".	
B	100	100	B3	100
			B4	-
Γ	200	357.34	Γ6	30
			Γ7	49.33
			Γ8	278.01
Δ	50	156	Δ12	120
			Δ14	36
E	-	74	E18	10
			E23	20
			E24	44
Total	400	737.34		

The candidate's contributions are described in the attached self-assessment under indicators B and Γ. For this review, I group them thematically, following the content of the works themselves.

The Habilitation thesis (monograph) is a single-author monograph of 200 pages, structured into an introduction, four chapters and a conclusion. Chapter One examines modern environments for simulation studies; Chapter Two covers their application in the study of electric circuits, with developed source code; Chapter Three is devoted to the design and construction of a universal kit for exercises in electrical engineering; Chapter Four covers remote-access laboratories. The exposition is consistent, well illustrated, and directly tied to teaching practice.

Contributions formulated based on the Habilitation thesis (monograph) (indicator B):

1. A conceptual model has been developed for integrating simulation studies as an intermediate stage between theoretical instruction and the real experiment in engineering education, applicable both in distance and in-person forms of teaching.
2. The role of virtual laboratory environments in increasing the effectiveness of electrical engineering education has been substantiated, with an analysis of the possibilities and limitations of modern simulation environments – NI Multisim, MATLAB/Simulink, TINA-TI, OrCAD, LabVIEW, LTSpice, PhET, and Edison.

3. Methodologies have been developed for teaching electrical engineering through virtual laboratories and simulation environments, as well as simulation models and algorithms for the analysis of electric circuits, transient processes, and electronic devices.
4. A practical approach has been proposed for conducting laboratory exercises and experimental studies through virtual environments and computer modeling; source code and simulation laboratory exercises have been developed and tested in the training of students in engineering programs for the effective and safe conduct of classes in electronic and hybrid educational environments.

Contributions formulated based on the publications (indicator Γ):

1. Equivalent models of polarizing dielectrics and of inductive coils without a ferromagnetic core have been developed, with increased adequacy in describing the electromagnetic processes; bridge measuring circuits for determining their parameters with good convergence of the measurement have been applied and analyzed, including a measuring installation for the specific volume and surface resistivities of dielectrics [Γ 8.1, Γ 8.3 – Γ 8.6, Γ 8.9, Γ 8.10]; an application of negative resistance as a linearizer in temperature measurements has been proposed [Γ 8.2].
2. Approaches have been proposed for the modeling, diagnostics, and operational control of electrical insulation systems – equivalent circuits of cable insulation structures [Γ 8.11], a methodology for the continuous monitoring of high-voltage bushings through measurement of $\text{tg}(\delta)$ with a model program in the MATLAB environment [Γ 8.15], and a methodology for teaching insulation structures through software environments [Γ 8.23]. An electromechanical generator of ultra-low-frequency sinusoidal voltage for testing high-voltage insulation has been developed [Γ 8.18].
3. Simulation models and integrated virtual environments for engineering education have been developed and tested: digitally programmable oscillators through modelling in TINA-TI and open-source platforms [Γ 7.1], linear electronic circuits in NI Multisim [Γ 7.2], linear operational circuits [Γ 8.17], programmable amplifiers [Γ 8.20], unbalanced modes in three-phase electric circuits [Γ 8.22] and start-up processes of wound-rotor induction motors [Γ 8.24]; source codes in the MATLAB environment have been developed for the automated calculation, analysis and visualization of the studied modes.
4. Computer-based methods in MATLAB/Simulink have been proposed for the study of the transmitting part and of the communication channel of digital communication systems [Γ 8.14, Γ 8.16]; a method has been developed for the approximate determination of the instantaneous frequency in the superposition of two harmonic signals of close frequencies, applicable in radio engineering and digital signal processing [Γ 8.8].
5. Microprocessor and embedded systems with application in the educational process have been developed, implemented, and studied: a software platform for a security alarm system based on Arduino Mega 2560 and a GSM module [Γ 8.13], a microprocessor weather station with sensor and visualization modules [Γ 8.19, Γ 8.21], and a working model of an air ionizer [Γ 8.12].

6. A methodology has been tested for the application of the NextCloud cloud platform in the organization of the educational process, allowing the sharing of educational resources and accessibility for a large number of remote users [Γ7.3].
7. A hybrid automotive training test bench based on the Toyota C-HR Hybrid has been implemented and tested for experimental studies of emissions, energy characteristics, and regenerative modes in electromobility education [Γ7.4]; the ecological and energy characteristics of DC-DC converters in hybrid electric vehicles have been analyzed [Γ7.5].
8. Recommendations have been presented for determining the optimum of graphic models built with R-functions, with application in computer graphics and computer-aided design [Γ8.7].

Overall, the contributions are predominantly scientific-applied and applied in nature and are directly reflected in the teaching process and in the modernization of the Faculty's laboratory facilities.

4. Assessment of the candidate's personal contribution

The candidate's personal contribution to the submitted scientific production stands out distinctly. The Habilitation thesis (monograph) – the monograph, as well as the book published based on the defended dissertation, are single-authored, for which reason the authorship of the main research thesis of the competition belongs to her entirely.

The distribution of the 29 publications according to the number of co-authors is as follows: single-authored – 8; with one co-author – 7; with two co-authors – 4; with three co-authors – 6; with four co-authors – 4. In 15 of the publications, the candidate is the first author, and in 7 – the second, which corresponds to a leading or principal role in the conception and preparation of the greater part of the works. Two single-author teaching aids have also been presented.

It deserves to be emphasized that the models of polarizing dielectrics and inductive coils and the bridge circuits for measuring their parameters [Γ8.4, Γ8.6, Γ8.9 – Γ8.11], as well as the methodologies for teaching through virtual environments developed and tested during the COVID-19 pandemic [Γ8.22 – Γ8.24], are single-authored works of the candidate. All her publications under indicator Γ8 from the period 2020 – 2023 [Γ8.22 – Γ8.24] are single-authored, as are the monograph (2026) and the book based on the dissertation (2025), which testify to her scientific maturity and her ability to independently formulate, solve, and publish results on topical applied scientific problems. In the co-authored publications on the subject of microprocessor systems and simulation environments, her contribution to the electrical engineering and measurement aspects of the developments stands out clearly.

The 30 noted citations, including by foreign authors, confirm that the candidate's results have reached the scientific community and enjoy recognition. I have no grounds to doubt the personal contribution of Dr. V. Raydovska to the works submitted for the competition.

5. Critical remarks and recommendations

My remarks on the submitted materials have the character of recommendations for the candidate's future creative work and do not call into question the results she has achieved:

1. I recommend that the candidate continue to develop her publication activity by directing more results of her research work to international refereed and indexed scientific editions, including journals with an impact factor and/or impact rank.
2. The candidate's research line related to the modeling and diagnostics of electrical insulation systems has been developed consistently over the years. Its core, the continuous monitoring of $\text{tg}(\delta)$ of high-voltage bushings, has been summarized in the book published on the basis of the dissertation. Outside it, however, remain results that naturally belong to the same line: the equivalent models of dielectrics and inductive coils and the bridge circuits for measuring their parameters [$\Gamma 8.1$, $\Gamma 8.3 - \Gamma 8.6$, $\Gamma 8.9$, $\Gamma 8.10$], the modeling of cable insulation structures [$\Gamma 8.11$], and the electromechanical generator for testing high-voltage insulation [$\Gamma 8.18$]. I recommend systematizing and consolidating these results in a future extended monograph, which would represent a natural continuation of the research line and a solid basis for the candidate's further academic development.
3. The proposed electromechanical generator of sinusoidal voltage of ultra-low frequency [$\Gamma 8.18$] has been developed at the conceptual and circuit-design level, and its advantages over static inverter solutions are convincingly argued. I recommend continuing development with the experimental realization and testing of a prototype, which would allow validation of the proposed technical solution and its transformation into a completed applied scientific development with potential for practical application in testing cable lines and high-voltage insulation systems at ultra-low frequency.

6. Personal impressions

I do not know the candidate, Chief Asst. Prof. Eng. Velislava Hristova Raydovska, PhD, personally and therefore cannot express direct personal impressions of her. The submitted competition materials and scientific works, however, give me grounds to form a positive professional assessment of the consistency and focus of her teaching and research activity. I have no joint publications with the candidate, and I am not a related party to her within the meaning of the applicable legislation.

CONCLUSION

The documents and materials submitted by Chief Asst. Prof. Eng. Velislava Hristova Raydovska, PhD, meet all the requirements of the **Development of Academic Staff in the Republic of Bulgaria Act** (DASRBA), of the Regulations on the Implementation of the DASRBA, and of the respective Regulations of the University of Plovdiv "Paisii Hilendarski".

The candidate in the competition has submitted a sufficient number of scientific works published after the materials used in the defense of the educational and scientific degree "Doctor", on the basis of which a single-author habilitation monograph is based. The candidate's works contain original scientific-applied and applied contributions – in the modeling and diagnostics of electrical engineering objects and electrical insulation systems and in the development of simulation environments and methodologies for engineering education – which have received recognition, a representative part of them having been published in refereed and indexed editions in world-renowned databases of scientific information, with 30 citations noticed by Bulgarian and

foreign authors. The developments have practical applicability and are directly oriented toward teaching work. The scientific and teaching qualifications of Chief Asst. Prof. Eng. Velislava Raydovska, PhD, is beyond doubt.

The results achieved by Chief Asst. Prof. Eng. V. Raydovska, PhD, in teaching and research activities fully comply with the minimum national requirements adopted in accordance with the Regulations of Plovdiv University on the Implementation of the Development of Academic Staff in the Republic of Bulgaria Act; according to a decision of the Faculty Council of the FPT (Protocol No. 14 of 20.03.2019), no additional faculty requirements are introduced.

After acquainting myself with the materials and scientific works submitted for the competition, and in view of the analysis of their significance and of the scientific-applied and applied contributions contained in them, I find it justified to give my positive assessment and to recommend to the Scientific Jury to prepare a report-proposal to the Faculty Council of the Faculty of Physics and Technology for the election of Chief Asst. Prof. Eng. Velislava Hristova Raydovska, PhD, to the academic position of “Associate Professor” at the University of Plovdiv “Paisii Hilendarski” in higher education area 5. Technical Sciences, professional field 5.2. Electrical Engineering, Electronics and Automation, scientific specialty “Theoretical Electrical Engineering”.

Date: 03.08. 2026

Scientific Jury member:

(Prof. Eng. Tsvetana Grigorova, PhD)