REVIEW

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of the materials submitted for participation in a competition
for the academic position of "associate professor"
in the field of higher education 5. Technical Sciences, professional field 5.13. General Engineering,
specialty "Engineering Physics", announced by the Technical University - Gabrovo for the needs of the
Department of "Mathematics, Informatics and Natural Sciences" (MIPN),
State Gazette, issue 53 of 09.06.2026.
Candidate: Senior Assistant Professor Daniela Gospodinova Nedeva PhD

This review has been prepared in accordance with the Act on the Development of the Academic Staff in the Republic of Bulgaria (ADSRB), the Regulations for its implementation and the Regulations on the terms and conditions for acquiring scientific degrees and occupying academic positions at the Technical University of Gabrovo. One candidate participated in the competition – Senior Assistant Professor Dr. Daniela Gospodinova Nedeva. The submitted documents and materials are complete, systematized and allow an objective assessment of the candidate's scientific, teaching and project activities.

1. Brief biographical data

Daniela Gospodinova Nedeva graduated from Shumen University "Bishop Konstantin Preslavski" in 2001, with a Master's degree, majoring in Physics (full-time), specialization in Medical Physics and Radioecology, with a professional qualification of "physicist, physics teacher".

He started working at TU - Gabrovo in 2009 as an assistant professor in physics in the Department of Physics (until 2017). In 2014, he obtained the ONS "doctor" (at TU - Gabrovo) in the field of higher education 5. Technical Sciences, professional field 5.6. Materials and Materials Science, scientific specialty "Materials Science and Technology of Mechanical Engineering Materials", after defending a dissertation on the topic "Research of the Laser Welding Process of Rotor and Stator Packages" (diploma No. 0026/09.09.2014).

In 2017, he participated in a competition for a chief assistant in the field of higher education 5. Technical Sciences, professional field 5.13. General Engineering, specialty "Air Purification Techniques". From 2017 to now, he has been a chief assistant first in the Department of Physics and Ecology, and now in the Department of Mathematics, Informatics and Natural Sciences at the Technical University of Gabrovo.

The candidate has a specialization at the Hochschule Mittweida , Germany (01.06 – 31.08.2013) and teaching mobility under the Erasmus+ program at the University of Craiova, Romania (08.01 – 23.01.2023). He speaks German and Russian. He is a member of the Union of Physicists in Bulgaria, the Union of Automation and Informatics and the Union of Scientists in Bulgaria.

2. General description of the materials presented

To participate in the competition, Senior Assistant Professor Dr. Daniela Nedeva has submitted the following scientific papers:

• **habilitation thesis – monograph** "Integrated scientific and engineering approaches to ecological processes and material systems", Vasil Aprilov University Publishing House – Gabrovo, 2026, ISBN 978-954-683-743-1 (indicator B.3);

• **4 scientific publications in journals referenced and indexed in Web of Science and/or Scopus** (indicator D.7), of which 3 in journals with impact factor (1 in *Zeitschrift for Naturforschung A* and 2 in *Coatings* , Q2) and 1 in *Journal of Physics : Conference Series* with SJR;

• **30 scientific publications in non-refereed journals with scientific review or in edited collective volumes** (indicator D.8);

• **university textbook** "Engineering Physics" (Nedeva D., N. Angelov), University Publishing House "V. Aprilov", 2025, 250 p., and **textbook** "Practical Guide to Physics" (Nedeva D., F. Padikova), "Ex-Press" publishing house, 2024, 96 p.

The total number of scientific publications with which the candidate participates in the competition is 34, of which 4 are independent (G.7.1, G.8.1, G.8.2, G.8.3), and in another 4 she is the first author (G.8.6, G.8.9, G.8.25, G.8.28). 7 publications with a methodological focus, 6 student works under her supervision, a list of 36 projects with participation and 3 projects with supervision, as well as an author's report on the contributions, a habilitation report and summaries of the works in Bulgarian and English are presented separately. The publications used in the acquisition of the ONS "doctor" are presented in a separate list and are not repeated in this competition.

According to the submitted certificate, the candidate meets and exceeds the minimum national requirements for holding the academic position of "associate professor" in professional field 5.13. General Engineering:

Group	Indicator	Minimum for Associate Professor	Candidate
A	Indicator 1 – dissertation for the ONS "doctor"	50	**50**
B	Indicator 3 – habilitation thesis – monograph	100	**100**
B	Indicators 7 and 8 – scientific publications (4 in WoS / Scopus and 30 in non-refereed publications with scientific review)	200	**254.44**
Г	Indicators 12 and 14 – citations (12 in WoS / Scopus and 5 in non-refereed publications)	50	**130**

The additional requirements of TU - Gabrovo have also been met: 34 publications out of the required 15 (of which 4 independent out of the required 4 and 4 with IF/SJR out of the required 1), 17 citations by other authors out of the required 5, 1 textbook and 1 teaching aid on the topic of the competition. The topic of the submitted works corresponds to the professional field 5.13. General Engineering and the specialty "Engineering Physics".

3. Impact of the candidate's scientific publications in the scientific community (known citations)

The candidate has submitted a list of **17 citations** by other authors, excluding auto-citations, of 9 of her works. Of these, **12 citations are in publications referenced and indexed in Web of Science and/or Scopus** , and 5 – in non-refereed publications with scientific review.

Among the citing publications there are journals with a high scientific rating, including *Materials Today Sustainability* (IF 7.9, Q1), *Ceramics International* (Q1), *Radiation Measurements* (Q1), *Applied Physics A* (Springer), *Powder Metallurgy and Metal Ceramics* (Springer), *International Journal of Design & Nature and Ecodynamics* (Scopus , Q3) etc. The most cited publication is D.7.4 on the thermoluminescent properties of Gd_2O_3: Eu,Li (4 citations in WoS / Scopus and 1 in another publication). It is noteworthy that the independent review article D.7.1 in *Zeitschrift for Naturforschung A* (2025) already has 3 citations in Scopus . The articles in *Coatings* (D.7.2 and D.7.3) are also cited by foreign authors. The citations come from authors from India, Great Britain, China, Ukraine, Kyrgyzstan, Armenia, Kazakhstan and Vietnam. This shows that the candidate's results are known in the international scientific community.

The number of citations (130 points in group D out of the required 50) significantly exceeds the minimum requirements and is a good indicator of the scientific significance of the works.

4. Overview of the content and results in the presented papers

The works presented after obtaining the ONS "doctor" have been grouped by the candidate into four thematic areas. The thematic scope is broad, but is united by the physical-engineering approach to the study of processes, materials and the environment.

4.1. Habilitation thesis – monograph

The monograph "Integrated Science and Engineering Approaches to Ecological Processes and Material Systems" summarizes the results of two main areas of the candidate's research. The guiding idea is that complex technical and environmental problems must be considered systematically, taking into account the interaction between *material, energy impact and environment* .

The first part is devoted to the distribution, migration and accumulation of natural and technogenic radionuclides in plants, soils, sands and waters. The soil is considered as the main accumulating system, plants – as an indicator of biological accessibility, sands – as a reflection of the geological background, and waters – as an active environment for migration. Special attention is paid to the soil-plant transfer factor and the factors on which it depends: chemical form of the radionuclide, soil properties, plant species and organ, sampling season . The use of medicinal plants as bioindicators is justified.

The second part covers the processing of materials with high-energy fluxes: theoretical analysis and numerical calculations of the process of laser welding of packages of electrical steel lamellae, as well as electron beam surface modification of titanium by forming Ti / TiC and Ti –B layers. The influence of the speed and power of the electron beam on the thickness, phase composition, homogeneity, microhardness and friction coefficient is studied. A comparative analysis of carbide and boride layers is made and criteria for choosing between them are formulated.

The monograph is logically structured, has a clearly expressed generalizing character and is based on a significant volume of own experimental and theoretical results published in indicators D.7 and D.8.

4.2. Radioecological monitoring of natural environments and biological sites

This is the most voluminous direction (17 works: G.8.1, G.8.2, G.8.4, G.8.7, G.8.8, G.8.10 – G.8.14, G.8.16 – G.8.18, G.8.21, G.8.22, G.8.27, G.8.30). By means of low-background gamma-spectrometry, the specific activities of ^{226}Ra, ^{232}Th, ^{238}U, ^{40}K, the decay products (^{214}Pb, ^{214}Bi, ^{208} Tl , ^{228}Ac) and the technogenic ^{137}Cs were determined in a number of medicinal plants (yarrow, St. John's wort, blue gall, plantain, shepherd's purse, ivy, etc.), in soils from the Shumen plateau, in sands from the Black Sea coast and in atmospheric aerosols. Soil-plant transfer factors, radiation hazard indices and annual effective doses were calculated. Maps of the spatial distribution of radionuclides were constructed using GIS and geostatistical methods: 19 soil samples from the Shumen plateau (D.8.7) and 33 sand samples from the Bulgarian Black Sea coast (D.8.8). The highest concentrations were found in the area of Irakli beach. Seasonal and multi-annual changes (2011 – 2017) have been tracked and it has been shown that the accumulation of radionuclides has a clear species, organ and time specificity. The two separate publications D.8.1 and D.8.2 (2026) summarize the mechanisms of entry, accumulation and transfer of radionuclides in the soil–plant–food system.

4.3. High-intensity energy flows: physical foundations, materials processing and applications

The direction includes 9 works (D.7.1 – D.7.3, D.8.3, D.8.5, D.8.6, D.8.25, D.8.28, D.8.29). In the separate article D.7.1, a thorough analysis of the methods for obtaining TiC coatings (CVD and PVD), their mechanical, tribological and thermal properties, as well as TiC – hydroxyapatite composites for biomedical applications, was made. In the articles D.7.2 and D.7.3 and the reports D.8.3 and D.8.5, Ti / TiC layers with a thickness of about 55 μm and a microhardness of about 510 HV (about 2.5 times that of the substrate) and Ti – B layers with TiB_2 phase and a microhardness of up to about 4500 HV at a friction coefficient of about 0.34 were obtained by electron beam surface alloying. The influence of the speed (4 – 6 mm/s) and the beam power (900 – 1500 W) was studied. In D.8.28 and D.8.29, the critical values of the power density and the operating modes for laser welding in the thermal conductivity mode of M330-50A steel with a diode laser were determined. D.8.25 and D.8.6 are of an overview nature and consider medical lasers and methods for high-energy processing of materials.

4.4. Thermomechanical modification and calorimetric characterization of polymer materials

In the papers D.8.15, D.8.19, D.8.20, D.8.23 and D.8.26, the influence of temperature (80 – 95 °C), elongation (20 – 60 %) and tensile stress (40 – 120 MPa) on the structure of partially crystalline PET fibers was studied by differential scanning calorimetry. It was found that up to a certain limit, loading leads to orientational ordering and homogenization of the structure. However, when high temperature and maximum stress are combined, signs of defect formation appear. The highest degree of crystallinity was found when processed at 95 °C.

4.5. Thermoluminescent materials for UV and radiation dosimetry

Gd_2O_3 doped with Eu_2O_3 and Li_2CO_3 were studied . It was found that an addition of 16% Li_2CO_3 leads to the highest intensity of the peaks at 87 and 145 °C. The spectral sensitivity and time stability of the signal were determined: the peak at 145 °C was preserved for up to about 120 hours. In D.8.24, the kinetic parameters of four thermoluminescent peaks in BGO:V single crystals irradiated with ^{99m} Tc and ^{188} Re were determined . The possibility of estimating the beta component of the dose by the ratio of the peak areas was shown. Publication D.8.9 is primarily of an educational and applied nature. It develops a

laboratory exercise for determining the temperature of a tungsten filament according to Wien's law and for experimental verification of the Stefan–Boltzmann law.

5. General characteristics of the candidate's activities

5.1. Educational and pedagogical activities (work with students and doctoral students)

Senior Assistant Professor Dr. Daniela Nedeva has over 16 years of teaching experience at TU - Gabrovo: as an assistant since 2009 and as a chief assistant since 2017. She lectures and exercises in the discipline "Physics" in the Bachelor's, Professional Bachelor's and Master's degree programs, as well as in " Vibration Analysis and Noise Protection" (Bachelor's). In the Master's degree program, she teaches "Air Purification Techniques", "Management of Specific Waste Streams" and "Radiological Monitoring of the Environment". She has prepared curricula for 4 disciplines, including "Assessment and Management of Environmental Noise" and "Interaction of Laser Radiation with Matter". She was a guest lecturer at the Bishop Constantine Preslavski University of Shumen (2017-2018) and participated in an Erasmus+ teaching mobility at the University of Craiova.

The candidate is a co-author of the university textbook "Engineering Physics" (250 p.) and the teaching aid "Practical Guide to Physics" (96 p.), which directly provide physics education at the university. She has 7 publications with a methodological focus, related to the independent work of students, laboratory practicum and distance learning.

She has supervised 4 graduate students in the Master's program and reviewed 13 master's theses in the field of environmental protection. She works actively to include students in scientific activity: 6 student reports have been presented in student scientific conferences ("From the Atom to the Space", Shumen, 2015 - 2016; Student Scientific Session'25, Technical University - Gabrovo).

5.2. Scientific and applied scientific activities

The candidate's scientific activity is consistent and continuous. It is aimed at the application of physical methods for solving engineering and environmental problems: radioecological monitoring, processing of materials with high-energy flows, characterization of polymer and thermoluminescent materials. She uses modern experimental methods: low-background gamma-spectrometry, energy-dispersive X-ray fluorescence analysis, differential scanning calorimetry , thermoluminescent analysis, electron beam processing, microstructural and tribological studies. She also applies numerical modeling and GIS mapping.

The candidate has participated in **36 scientific and educational projects** , including projects under the Operational Program "Human Resources Development" (BG051PO001), the Operational Program "Science and Education for Smart Growth" (BG05M2OP001-2.016-0022), intensive programs (summer schools) under "Erasmus", and an ongoing project under the "Horizon Europe" program MountResilience (HORIZON-MISS-2022-CLIMA-01) jointly with the Municipality of Gabrovo, as well as numerous university projects of TU - Gabrovo and SH "Bishop Konstantin Preslavski". She was **the head of 3 university research projects** (2024, 2025 and 2026) in the field of modern engineering solutions for environmental protection and intelligent, ecological and energy-saving technologies. This shows that the candidate already has experience in organizing and leading scientific teams.

The candidate has long-term scientific collaboration with teams from the University of Shumen, as well as with researchers in the field of electron beam processing of materials and with foreign co-authors (D.7.4). This is a prerequisite for her development as an independent researcher.

5.3. Implementation activity

The applicant has not submitted any official documents for implementation (implementation acts, patents or utility models). However, the applied focus of her research is clearly expressed. She has participated in a contract with the company "BISON" - South Korea, for the development of a laser technology system with a CuBr laser (2011 - 2013), as well as in projects with direct application for the industry (laser cutting, marking and welding of stator and rotor packages). She is currently participating in the MountResilience project with the Municipality of Gabrovo. The obtained technological regimes for electron beam alloying of titanium, guidelines for laser welding, radioactivity maps and proposals for radioecological monitoring programs have the potential for practical application in industry and in the activities of environmental control bodies.

6. Contributions (scientific, applied science, applied)

I generally accept the contributions formulated by the candidate. They are correctly reflected in the author's reference and in the habilitation reference.

7. Assessment of the candidate's personal contribution

The candidate's personal contribution is undoubted. She is **the sole author** of the habilitation thesis - a monograph, and of the article in *the Zeitschrift. for Naturforschung A* (D.7.1) and 3 reports (D.8.1 – D.8.3), and in 4 more publications she is the first author. She is the first author of both the university textbook and the teaching aid. A significant part of the works are collective, which is natural for experimental research in the field of radioecology and materials science. The works were carried out in sustainable scientific teams from TU-Gabrovo, SH "Bishop Konstantin Preslavski" and partner scientific organizations. I accept that in the joint works the candidate has a significant participation in the conduct of the experiments, the processing and the interpretation of the results. The monograph and the independent publications show that she is able to summarize and develop her research independently.

8. Critical notes and recommendations

I have no critical comments on the materials presented.

I recommend that he publish his summarized radioecological results in international refereed journals. This will increase their visibility and citations .

I recommend that Dr. Nedeva intensify her work on attracting and supervising doctoral students, focus on leading national and international projects with external funding, and document the applied results through applications for patents or utility models and implementation acts.

9. Personal impressions

I know Senior Assoc. Prof. Dr. Daniela Nedeva as a colleague from TU-Gabrovo and from our joint work on research projects in the field of environmental protection. My impressions are that she is a responsible, correct and dedicated teacher and researcher. She works with desire and skill with students, engages them in scientific activity and is respected among her colleagues. She is distinguished by her hard work, precision in conducting experiments and ability to work in a team. Her professional development is consistent and upward.

10. Conclusion

The materials presented by Senior Assistant Professor Daniela Gospodinova Nedeva PhD comply with the requirements of the Act on the Promotion of Higher Education in the Republic of Bulgaria, the Regulations for its implementation and the Regulations of TU - Gabrovo for holding the academic position of "associate professor". The candidate's scientometric indicators meet and exceed the minimum national requirements and the additional requirements of TU - Gabrovo. The scientific works contain scientific, scientifically applied and applied contributions that have echoed in the international scientific literature. The candidate has many years of successful teaching and teaching experience, is the author of a textbook and a teaching aid on the topic of the competition and has experience in managing scientific projects.

Based on the above, I give my **positive assessment** and I strongly recommend that the esteemed Scientific Jury propose to the Faculty Council of the Faculty of Economics to elect **Senior Assistant Professor Daniela Gospodinova Nedeva PhD** to the academic position of **"Associate Professor"** in the field of higher education 5. Technical Sciences, professional field 5.13. General Engineering, specialty "Engineering Physics", for the needs of the Department of "Mathematics, Informatics and Natural Sciences" at the Technical University - Gabrovo.

20/10/2026

Reviewer: ……

Assoc. Prof. Dr. Eng. Dragomir Vassilev