REVIEW

By Prof. Krasimir Ivanov Enimanev, DSc, Eng.

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concerning the competition for the academic position of Associate Professor

in Higher Education Area 5. Technical Sciences

Professional Field 5.13. General Engineering

Specialty: Engineering Physics

The competition for the academic position of Associate Professor, announced in the State Gazette, Issue No. 53 of 9 June 2026, and on the website of the Technical University of Gabrovo, for the needs of the Department of Mathematics, Informatics and Natural Sciences at the Faculty of Economics, has one applicant: Chief Assistant Professor Daniela Gospodinova Nedeva, PhD.

1. Brief Biographical Information

Chief Assistant Professor Daniela Gospodinova Nedeva, PhD, completed her higher education in 2001 at Konstantin Preslavsky University of Shumen, obtaining a Master's degree in Physics with a specialization in Medical Physics and Radioecology.

Her professional career at the Technical University of Gabrovo began in 2009 as an Assistant Professor of Physics in the Department of Physics. In 2014, she obtained the educational and scientific degree of Doctor (PhD) at the Technical University of Gabrovo in the scientific specialty Materials Science and Technology of Engineering Materials (Professional Field 5.6), with a dissertation entitled "Investigation of the Laser Welding Process of Rotor and Stator Laminated Cores."

Since 2017, following a successfully completed competitive selection procedure, Dr. Nedeva has held the position of Chief Assistant Professor (initially in the Department of Physics and Ecology and currently in the Department of Mathematics, Informatics and Natural Sciences at the Technical University of Gabrovo). She has more than 16 years of academic teaching and research experience at the university.

2. General Description of the Submitted Materials

For participation in the present competition, Chief Assistant Professor Nedeva has submitted a complete set of documents complying with the requirements of the Academic Staff Development Act in the Republic of Bulgaria, its Implementing Regulations, and the Regulations of the Technical University of Gabrovo:

Habilitation thesis – monograph: "Integrated Scientific and Engineering Approaches to Environmental Processes and Material Systems", Vasil Aprilov University Publishing House, Gabrovo, ISBN 978-954-683-743-1, 2026.

Scientific publications: A total of 34 scientific works (published after the award of the PhD degree), distributed as follows:

4 publications in journals or proceedings indexed and abstracted in internationally recognized scientific databases (Web of Science / Scopus);

30 publications in non-indexed peer-reviewed journals or edited collective volumes;

4 single-author publications;

3 articles with an impact factor (according to Web of Science) and 1 with an SJR indicator (Scopus).

Educational publications: 1 published university textbook ("Engineering Physics", 2025) and 1 university teaching manual ("Practical Guide to Physics", 2024).

The results of the scientometric analysis show that the applicant meets and exceeds the minimum national requirements and those of the Technical University of Gabrovo for all groups of indicators (A: 50 points; B: 100 points; G: 254.44 points against a required 200; D: 130 points against a required 50).

3. Impact of the Applicant's Scientific Publications on the Academic Community (Known Citations)

The citation report lists 17 known citations by international authors, distributed as follows:

12 citations in scientific publications indexed and abstracted in international databases (Web of Science and Scopus), including reputable high-impact international journals such as Materials Today Sustainability (IF 7.9), Ceramics International (IF 5.53), and Radiation Measurements (IF 1.4);

5 citations in non-indexed peer-reviewed journals.

These data confirm that Dr. Nedeva's scientific results have become known to both the international and Bulgarian academic communities and have had a tangible impact on research conducted by other established research teams.

4. Overview of the Content and Results of the Submitted Works

The scientific and applied research conducted by Dr. Daniela Nedeva focuses on four principal, interconnected, interdisciplinary areas:

1. Radioecological monitoring of natural environments and biological objects:

The patterns of distribution, migration, and accumulation of natural radionuclides (^{40}K, ^{226}Ra, ^{232}Th) and anthropogenic radionuclides (^{137}Cs) in soils, waters, sands, and medicinal plants have

been investigated. Seasonal variations have been analyzed and the soil-to-plant transfer factor determined. Geostatistical methods and GIS have been used for spatial mapping of radioactivity in the Shumen Plateau Nature Park and along the Bulgarian Black Sea coast.

2. Materials processing using high-intensity energy beams (laser and electron beams):

Innovative two-stage technologies have been developed for electron-beam surface modification and alloying of titanium substrates with carbon and boron, producing Ti/TiC and Ti–B composite layers with substantially increased microhardness (exceeding 4500 HV) and improved tribological properties. Theoretical and numerical modelling has been performed for heating, melting, and conduction-mode laser welding of electrical steel.

3. Thermomechanical modification and calorimetric characterization of polymer materials:

Differential scanning calorimetry (DSC) has been used to investigate supramolecular structural rearrangements, glass transition, cold crystallization, and melting in semicrystalline polyethylene terephthalate (PET) fibres under varying temperature, draw ratio, and tensile stress.

4. Thermoluminescent materials for UV and radiation dosimetry:

The thermoluminescent properties and trap kinetic parameters of oxide systems (Gd_2O_3 doped with Eu and Li, as well as BGO:V single crystals) have been investigated. Their high sensitivity and temporal stability have been demonstrated, indicating potential applications in ultraviolet and in vivo medical dosimetry.

5. General Assessment of the Applicant's Activities

5.1. Teaching Activities (Work with Students and Doctoral Candidates)

Dr. Nedeva has extensive teaching experience at the Technical University of Gabrovo. She delivers lectures and conducts laboratory classes in a number of core subjects at the Bachelor's, Professional Bachelor's, and Master's degree levels:

Bachelor's / Professional Bachelor's degree level: Physics; Vibration Analysis and Noise Protection.

Master's degree level: Physics; Air Purification Techniques; Management of Specific Waste Streams; Environmental Radiological Monitoring; Environmental Noise Assessment and Management.

She is the author or co-author of one textbook and one teaching manual, has developed four new course syllabi, and has published seven scientific articles with a methodological and pedagogical focus. She has successfully supervised four Master's thesis students and reviewed 13 Master's theses. She is actively engaged with students and has prepared six student conference papers.

5.2. Scientific and Applied Research Activities

Dr. Nedeva's research activity has been particularly intensive. She has participated in a total of 36 research and educational projects funded by the Technical University of Gabrovo, Konstantin Preslavsky University of Shumen, the Operational Programme "Science and Education for Smart Growth", and international programmes (Erasmus+ and Horizon Europe – MountResilience).

A particularly significant achievement is that Dr. Nedeva has served as principal investigator of three internal university research projects at the Technical University of Gabrovo (in 2024, 2025, and 2026).

5.3. Implementation and Technology Transfer Activities

Dr. Nedeva's applied research results have direct potential for practical implementation:

The optimized technological parameters for electron-beam formation of carbide and boride coatings on titanium enable the production of highly wear-resistant components for machinery, aerospace applications, and medical implants.

The developed models for laser welding of laminated cores provide specific engineering values for power levels and processing speeds in electrical engineering production.

The radioecological monitoring method supports practical assessment of radiation risk in recreational and coastal areas.

6. Contributions (Scientific, Scientific-Applied, and Practical)

Scientific contributions:

1. An integrated scientific framework has been formulated and substantiated for investigating environmental processes and material systems through joint analysis of material parameters, energy effects, and environmental conditions.

2. Patterns have been identified in the physicochemical behaviour, migration, and selective accumulation of natural and anthropogenic radionuclides in the soil–water–sand–plant system.

3. The influence of energy and kinetic parameters in scanning electron-beam treatment on phase formation, homogeneity, and phase defects in Ti/TiC and Ti–B composite layers has been established.

4. The kinetic parameters of electron traps and the thermal stability of thermoluminescent signals in oxide phosphors (Gd_2O_3:Eu,Li and BGO:V) have been elucidated.

Scientific-applied contributions:

1. A comprehensive radioecological approach has been developed, combining gamma spectrometry, calculation of transfer factors, and GIS-based geostatistical mapping.

2. Technological methods have been developed for electron-beam surface alloying of titanium, enabling controlled adjustment of layer thickness, hardness, and coefficient of friction.

3. Numerical calculations have been carried out to determine the critical power density and processing windows for conduction-mode laser welding of electrical steels.

4. A calorimetric approach (using DSC) has been developed to monitor crystallinity and supramolecular organization in thermomechanically treated PET fibres.

Practical contributions:

1. Titanium surface layers have been produced with several-fold increases in microhardness (Ti/TiC up to 510 HV; Ti–B up to 4500 HV) and a reduced coefficient of friction (down to 0.34).

2. Practical guidance has been proposed for using wild-growing and medicinal plants as bioindicators in environmental monitoring.

3. A new laboratory exercise in physics has been developed and introduced for studying the thermal radiation spectrum using Wien's law and the Stefan–Boltzmann law.

7. Assessment of the Applicant's Personal Contribution

The personal contribution of Chief Assistant Professor Daniela Nedeva to the submitted works is indisputable. In the monograph and single-author publications, the applicant independently formulates and develops the research hypotheses. In co-authored publications, the contributions are of equal significance, while her experience as a research project leader demonstrates her leadership abilities and skills in organizing research teams.

8. Critical Remarks and Recommendations

I have no substantial criticisms regarding the materials submitted by the applicant. For her future research activity, I would recommend the following:

That she direct her efforts toward publishing a larger proportion of her future research findings in reputable high-impact international journals (Q1 and Q2 in Web of Science/Scopus).

That she continue her active efforts to attract and independently supervise research doctoral candidates in Professional Field 5.13, General Engineering.

9. Personal Impressions

I do not know Chief Assistant Professor Daniela Nedeva personally; however, the documents submitted for my consideration demonstrate that she meets the requirements of the Technical University of Gabrovo for appointment to the academic position of Associate Professor.

10. Conclusion

On the basis of my analysis of the materials submitted for the competition, I find that

Chief Assistant Professor Daniela Gospodinova Nedeva fully meets and exceeds the requirements of the Academic Staff Development Act in the Republic of Bulgaria, its Implementing Regulations, and the Regulations of the Technical University of Gabrovo for appointment to the academic position of Associate Professor.

Her academic and teaching qualifications, the high quality of her research, her convincing scientific and practical contributions, and her compliance with the relevant scientometric criteria provide ample grounds for my POSITIVE ASSESSMENT.

In view of the above, I recommend that Chief Assistant Professor Daniela Gospodinova Nedeva be elected to the academic position of Associate Professor in Higher Education Area 5. Technical Sciences, Professional Field 5.13. General Engineering, Specialty Engineering Physics.

Date: 28 October 2026

Reviewer: Prof. Krasimir Ivanov Enimanev