REVIEW

for a competition for the academic position of **Associate Professor**

Professional field:	5.2. Electrical Engineering, Electronics and Automation
Scientific specialty:	*"Elements and Devices of Automation and Computer Engineering"* (*"Application of Additive Technologies in Education"*)
Announced in:	State Gazette, issue No. 39 / May 13, 2025
For the needs of:	Laboratory "Unmanned Robotic Systems"
Candidate:	Chief Assistant Dr. Neda Venelinova Chehlarova
Reviewer:	Associate Professor Dr. Eng. Neli Atanasova Simeonova, Burgas State University e-mail: neli_simeonova@btu.bg

Based on Order No. 76/16.07.2025 of the Director of the Institute of Electrical Engineering-BAS, I am appointed as an external member of the Scientific Jury, under the procedure for occupying the academic position of "Associate Professor" in Professional Field 5.2 Electrical Engineering, Electronics and Automation, scientific specialty - "Elements and Devices of Automation and Computing" ("Application of Additive Technologies in Education"). Based on the Decision of the first meeting of the Scientific Jury of 17.07.2025, I am appointed as a reviewer.

1. General information and biographic data

The only candidate in the announced competition for the academic position of Associate Professor in the Department of Electrical Engineering, Electronics and Automation is Senior Assistant Professor Dr. Neda Venelinova Chehlarova. She is a Chief assistant at the Institute of Robotics "St. Ap. and Ev. Matej" – BAS.

Chief Assistant Professor Dr. Neda Chehlarova graduated in "Business Management" at the University of Forestry, Sofia, Bulgaria in 2018. In 2023, she will defend her PhD Thesis at the University of Forestry, Sofia in Professional Field 3.8 Economics, specialty "Application of Computing in Economics". Since 2023, she has been a Chief assistant at the Institute of Robotics "St. Ap. and Ev. Matej" – BAS, laboratory "Unmanned Robotic Systems".

2. General description of the presented materials

Article 24 (1) i.3 of LDASRB requires that the candidate must "have published monography or to present equivalent to it publications in specialized scientific issues which should not be the same as these used for the acquirement of the scientific and

educational degree of PhD. Chief Assistant PhD Neda Chehlarova has presented a monographic work on the topic: "Additive Technologies in Education", 184 pages, DIPKU Publishing House, Thracian University, 2025. The monograph was reviewed by Prof. Dr. Ivan Chavdarov and Assoc. Prof. Dr. Daniela Kozhuharova.

In accordance with article 26 of LDASRB, beside the monography, the candidate submitted an information of conformance with the minimal requirements of BAN, as well as information about the original scientific contributions with the necessary proof, created after the defense of the PhD thesis. To this group belong his scientific publications and educational handbooks.

The information submitted for the competition is summarized in Table 1.

Table 1: Fulfillment of Minimum Requirements for the Academic Position of Associate Professor

Group of indicators	Content	Requirements for assoc. professor	Done by the candidate
А	Thesis for ESD PhD	50	50
Б	Thesis for SD Doctor of science"	-	-
В	Habilitation work - monography	100	100
Г	Scientific publications in referred journals – 5 Scientific publications in non-referred journals with scientific reviewing – 8	200	216,7
Д	Citations - 7	50	70
Е	Educational handbooks	-	-
Ж	Tuition hours	-	-
З	Scientific publications with IF	-	-
Summary		400	436,7

Based on the data provided by the candidate in Table 1, I assume that the number of works accepted for review is 14 separate publications. This includes the monograph. The submitted scientific publications, monographic work and citations have not been used in previous procedures for acquiring the educational and scientific degree "Doctor of Philosophy", which the candidate confirms with an attached Declaration of Originality.

It is also important for the analysis of the scientific papers in the competition where the papers were published. It is noteworthy that 5 of the submitted papers have found a place in refereed publications in Scopus and Web of Science.

The competition materials include a bibliographic reference of 7 citations of the candidate's works, all of which are in works referenced in global databases. After my research in Scopus and Web of Science, I found the availability of both more publications and more citations.

Considering the place of publication, it can be concluded that it is a scientific production of acceptable level and certain thematic priority in professional field 5.2. and especially in the scientific specialty: at the competition: "Elements and devices of automation and computing technology".

The candidate also took part in two national research projects

3. General characteristic of the scientific research and applied research activity of the candidate

3.1. Thematic classification and content analysis of the scientific production

The candidate classifies his works according to their thematic focus in the following groups:

1. Analysis of additive manufacturing as a tool for strategic and scientific planning - 3 / B3, G8-4, G8-6/
2. Didactic resources with 3D printed materials for working with people with visual impairments - 5 / B3, G7-2, G7-3, G8-7, G8-8/
3. Scenarios for integrated STEAM classes using additive technologies and training of teachers for their implementation in school education – 4 / B3, G7-1, G7-4, G8-5/
4. 3D modeling of educational resources to support formal and informal education – 5, / B3, G7-5, G8-1, G8-2, G8-3/

First group: *Analysis of additive manufacturing as a tool for strategic and scientific planning.*

A terminological analysis of publications from scientific databases related to technological progress and the transformation of production processes through additive technologies was carried out, depending on the different materials and the operating principles of the technical devices that serve these processes.

Second group:*Didactic resources with 3D printed materials for working with people with visual impairments*

Tasks for counting various geometric figures related to 3D printing are presented. Scenarios have been developed that support the development of mathematical competence and spatial thinking in learners. Research has been conducted with adults, students, and people with visual impairments that confirm expectations about common errors in detecting patterns in counting different shapes and bodies, as well as in dividing shapes by side length and type.

Third group: *Scenarios for integrated STEAM classes using additive technologies and training of teachers for their implementation in school education*

Tasks for counting various geometric figures related to 3D printing are presented. Scenarios have been developed that support the development of mathematical competence and spatial thinking in learners. Research has been conducted with adults, students and people with visual impairments, which confirm expectations regarding common errors in detecting patterns in counting various figures and bodies, as well as in dividing figures according to the length of the sides and by type.

Fourth group: *3D modeling of educational resources to support formal and informal education*

Methods for creating models of geometric bodies, percentages and fractions in software environments are described, as well as main disadvantages associated with 3D printing of volumetric models using a 3D printer. Recommendations are proposed for optimizing the process of creating 3D models by using available tools or adding additional buttons and sliders in specific software products.

3.2. Characteristic of the applicant as a scientist and researcher

Senior Assoc. PhD Neda Chehlarova knows very well the scientific field she is focused on – additive technologies in modern production processes and their application in education. She has knowledge and experience in various software environments. She applies her knowledge in creating scenarios with a 3D pen and 3D printed materials for school education, introducing innovative ideas into her research.

I can make some recommendations regarding the presented scientific production. The materials presented by the candidate lack data on the implementation of scientific research in the form of patents and utility models. The implementation of scientific ideas would have a truly serious weight in the development of the candidate as a leading specialist.

4. Main scientific and applied scientific contributions

I accept the contributions defined by the candidate. Having familiarized myself with the content of the materials presented to me for review, I take the liberty of classifying the contributions as follows:

A. SCIENTIFIC CONTRIBUTIONS

As scientific contributions, I would point out the following:

- In-depth bibliometric review and analysis of research in the field of additive technologies, as well as trends in their development;
- A terminologically defined review of publications from scientific databases on technological development and transformation of production processes through additive technologies has been made, analyzing the different types of materials and principles of operation of technical devices that support these processes;

- Different economic spheres in which 3D printing is used are analyzed - architecture, robotics, design, etc. The review includes best practices, 3D printer models used, business solutions, and more.
- A division into four main categories is proposed: formula, technique, skill and habit, which cover different types of mental activities when performing new or regularly repeated actions in people's daily lives. - An innovative approach to forming behavior based on the emergence and satisfaction of needs that arise from the actions of the individual or other people. In this context, the individual experiences "losses" or "benefits" as a result of his actions.

Б SCIENTIFIC AND APPLIED CONTRIBUTIONS

- The results of the application of additive technologies, in particular 3D printers and 3D pens, in creative workshops with students, teachers and educational experts are presented.
- Scenarios for integrated STEAM classes using additive technologies and their implementation in school education are given, as well as guidelines for the development of future such activities;
- Scenarios for creating original works using a 3D pen and auxiliary 3D printed models for robotic systems are proposed;
- Research has been conducted with people with visual impairments, confirming expectations regarding: frequently made mistakes, finding rationality when counting different figures and bodies, ways to record intermediate results, separating figures according to side length and by type.

5. Significance of contributions to science and practice

The significance of the contributions is related to their scientific and scientifically applied nature. In the documents I did not notice information about the implementation of the results in practice. I would like to recommend this as a direction in the future activities of the candidate. For the most part, the developments in the materials submitted for the competition advocate an innovative scientific approach to the solution.

The quantitative indicators of the criteria for occupying the academic position "ASSOCIATE PROFESSOR", adopted by the Bulgarian Academy of Sciences, have been met. The candidate has submitted a published monographic work, which does not repeat the one submitted for the acquisition of the educational and scientific degree "Doctor of Philosophy". The materials meet all quantitative indicators contained in the "Regulations on the conditions and procedure for occupying academic positions" at the Bulgarian Academy of Sciences, regarding occupying the academic position of ASSOCIATE PROFESSOR.

The monograph is an independent work, and most of the publications are co-authored. There are data on 7 citations in the submitted materials. After checking Scopus and Web of Science, I noticed more. These data are convincing that the

contributions made in the candidate's scientific work are predominantly his personal work.

I did not find any data on plagiarism.

6. Critical remarks and recommendations

I have no critical remarks. At certain places of the present opinion I made some recommendations, mainly about the implementation of the results. These recommendations are constructive. I am looking forward to hearing the opinion of the candidate on the issues marked during his presentation.

7. Personalimpressions

I personally know the applicant scarcely. My good impression of him is formed mainly on the basis of the documents presented by him. Thus, I form my opinion of the candidate as a proficient engineer and experienced lecturer. The recommendations made within the present opinion are part of the impressions based on the document presented and my assessment after acquainting with and analyzing his scientific production.

CONCLUSION

In order to justify my conclusion, I will allow myself to make the following generalizations. The candidate:

- is well aware of the current state of science in the competitive field;
- has a sufficient volume of scientific production with scientific and applied scientific contributions, corresponding to the requirements for the academic position;
- has good scientific and applied achievements in the scientific specialty with significance for practice.

Based on the presented scientific works, the assessment of their significance and the scientific and applied contributions contained in them, I find it reasonable to give a positive comprehensive assessment. I give my positive opinion to Senior Assistant Professor Dr. Neda Venelinova Chehlarova to occupy the academic position of "ASSOCIATE PROFESSOR" in Professional Direction 5.2 Electrical Engineering, Electronics and Automation, scientific specialty - "Elements and Devices of Automation and Computing" ("Application of Additive Technologies in Education").

Burgas Signature

12.09.2025 /Assoc. Prof. Neli Simeonova/