REVIEW

for the competition for the academic position of **"Professor"**
in the field of higher education **6. "Agricultural Sciences and Veterinary Medicine"**, professional field **6.1. "Crop Production"**,specialty **"Soil Science"**,for the needs of the **Department of Crop Production**, Faculty of Machine Technology, **Technical University of Varna**, announced in the *State Gazette*, Issue No. 60/25.07.2025,with candidate **Assoc. Prof. Dr. Pavlina Naskova Atanasova**

Reviewer: Prof. Dr. Veneta Naydenova Krasteva-Penkova,
Institute of Soil Science, Agrotechnologies and Plant Protection "Nikola Pushkarov" – Sofia, scientific specialty "Soil Science," professional field "Crop Production,"
appointed as a member of the Academic Jury by Order No. 613/24.09.2025
of the Rector of the Technical University of Varna.

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1. General information and biographical data

Assoc. Prof. Dr. Pavlina Naskova Atanasova is the sole candidate for the academic position of "Professor" in the field of higher education 6. "Agrarian Sciences and Veterinary Medicine", professional direction 6.1. "Plant Production", scientific specialty "Soil Science", for the needs of the Department of "Plant Production", Faculty of Agriculture, Technical University of Varna. She received her secondary education at the Natural Sciences and Mathematics High School in Varna (in the period 1990-1995). From 2004 to 2012, she worked at the State Forestry Enterprise in Varna, where she was engaged in forest ecosystem protection, forest pathology, and the planning and organization of forestry and logging activities. Since 2012, she has been employed at the Technical University of Varna. In 2016, she defended her PhD dissertation titled *"Management of Heavy Metal Pollution in Natural, Agro- and Urban Ecosystems"* and was appointed as an Assistant Professor. In 2018, she was promoted to Associate Professor in the professional field "Crop Production," scientific specialty "Soil Science." Between 2019 and 2022, she served as Director of the Directorate "International Relations and Foreign Students." She currently holds the position of **Vice-Rector for Administrative and Economic Affairs** (2023–2027 term) and lectures at the Faculty of Machine Technology, Department of Crop Production.

2.General description of the materials presented

The candidate has submitted a list of 30 scientific publications, 2 books, 1 textbook and 2 manuals for laboratory exercises. All materials are in the field of soil science and the processes occurring in soils. I accept for review 30 scientific papers and 2 books that are on the list and do not repeat those submitted for the acquisition of the ONS "doctor" and for holding previous academic positions.

Assoc. Prof. Atanasova is a participant in 1 project funded by the "Scientific Research Fund"; 2 projects under the OP "Human Resources Development" 1 project under the OP "Science and Education for Smart Growth"; 1 project "From Higher Education to Employment" and 2 international projects - funded by INTERREG. 14 citations in scientific publications referenced and indexed in world-renowned databases and 11 citations in monographs and collective volumes with scientific review are presented.

Assoc. Prof. Atanasova has trained two doctoral students who have defended their doctoral dissertations and has two more enrolled who are in the process of training. Information is presented on her participation in the development of scientific and applied tasks at the High-Tech Park-TU-Varna; a report on implemented mobilities under the ERASMUS+ program, a list of graduates whom she has supervised and who have successfully graduated; a report on the participation of students in a student scientific session under the supervision of Assoc. Prof. Atanasova. In addition, it should be noted that a report on academic employment for the last three years, the disciplines in which she conducts training and the number of lecture hours is presented.
All the evidence is presented in a very detailed and clear manner. It is well organized and facilitates the work of the reviewer. From the review of the information presented, I can state with deep confidence that the candidate fully meets the minimum national requirements for holding the academic position of "professor".

3. General characteristics of the candidate's research and applied scientific activities.

In the competition for "Professor" Assoc. Prof. Dr. Pavlina Atanasova participated with a total output of 32 works, grouped as follows:
- 1 monograph on the topic "Modeling the dynamics of organic matter and heavy metals in the soil";
- 1 book based on a defended dissertation for the award of the educational and scientific degree "Doctor" on the topic "Management of heavy metal pollution of natural, agro and urban ecosystems";
- 1 textbook - Soil science, soil pollution and purification technologies (not peer-reviewed);
- 1 manual for laboratory exercises in microbiology (not peer-reviewed);
- 1 manual for laboratory exercises for microbiological control of chemical pollution of plant production and the environment (not peer-reviewed)
- Publications in scientific journals referenced and indexed in world-renowned databases with scientific information - 22 issues, (2 issues are in print);
Articles and reports published in non-refereed journals with scientific review or published in edited collective volumes - 8 issues;
Most of the presented papers have been published in scientific journals and series. The majority of the publications are in English, indexed in Scopus; WoS/CABI; Elsevier Bibliographic Databases, and all have ISBN/ISSN. In 94% of the 30 reviewed papers, Assoc. Prof. Atanasova is the first or lead author (in 2 issues she is an independent author; in 13 issues she is the first author; in 15 issues she is the second author), in the remaining 2 issues she is the third and subsequent author. The results by groups of indicators of the candidate are presented in the table below:

Below is a summary of the candidate’s results by indicator groups:

№	Group of Indicators	Points (based on candidate’s documentation)
1	Group A – Minimum 50 points	50
2	Group B – Minimum 100 points	100
3	Group C – Minimum 200 points	329.85
4	Group D – Minimum 100 points	315
5	Group E – Minimum 100 points	220
Total		**1014.85**

The total number of points for the indicators for group "B.3" is 100 points. i.e. the minimum requirements are met; scientific publications under items D6, D7, D8 exceed the minimum requirement of 200 points by 65%; with 129 points, citations in scientific publications under items D13 and D14 exceed the minimum requirements of 100 points by 215%.

In group E, 220 points were scored for supervising successfully defended doctoral students, for participating in projects at various scientific organizations, for publishing textbooks and manuals for exercises in the specialties that the candidate leads at TU. Adding 50 points for indicator A1, the candidate has a total of 1014.85 points. The minimum requirements for occupying the scientific position "Professor" are 550 points, i.e. the minimum requirements for occupying this position are exceeded by 85%.

The scientific activity of Assoc. Prof. Atanasova covers the field of "Soil Science". From the review of the presented works and developments, it is evident that she has very well studied the main processes occurring in the soil, soil formation, agrochemical processes, soil microbiology, etc. Atanasova also shows good scientific preparation in the field of mathematical modeling, which she applies when predicting the development of certain processes in soils (such as migration of heavy metals in soils or determining the activity of microbiological activity).

The candidate also works in other areas (agrochemistry, allelopathy, sludge decontamination, etc.), interesting issues for modern soil science that are very relevant at this time, when significant damage to land is observed as a result of human activity.

In the presented monograph on the topic: "Modeling the dynamics of organic substances and heavy metals in the soil" the author describes in an accessible way for the reader, the basics of mathematical modeling as the main cognitive method of complex natural systems. The possibilities and methods for imitation modeling are presented in detail. As a result of its application, a working model for studying the dynamics of organic substances and heavy metals in the depth of soil horizons has been created.

The experimental results obtained for the distribution of heavy metal content, the abundance of micro and mesofauna and the climatic indicators of the soil are an objective basis for the creation and testing of local models for the recognition, assessment and prediction of the states of soil ecosystems. The proposed algorithms are of an adaptive type and can, after conducting an initial training, be improved both in breadth (number of factors and criteria) and in depth (number of horizons and accuracy).

In the book “Management of heavy metal pollution of natural, agro and urban ecosystems” a general model for the management of heavy metal pollution of natural, agro and urban ecosystems has been developed. The use of mathematical modeling is of great importance in solving problems related to environmental protection. In the presented book the dissertation work has been developed with additional models related to the determination of soil moisture and soil microflora. The bibliography has also been enriched by including additional modern scientific sources.

Part of the scientific research is related to the study of the effect of fertilization methods on the productivity and quality of winter wheat. It has been established that the combined application of soil fertilization and foliar feeding during the spring vegetation is most favorable for the formation of maximum productivity and high protein content in wheat.; the leading role of macronutrients as a yield factor is confirmed. (G7.1; ; G7.6; G 7.9; G 7.14; G.15).

The antimicrobial activity of plant extracts from basil and thyme against Escherichia coli and their application as additives for decontamination and deodorization of compost mixtures was studied. It was found that essential oil crops increase the microbiological and enzymatic activity of soils. The antibacterial activity of plant extracts from different parts of lavender with different solvents was studied to determine variants to be used as microbial additives for enrichment with beneficial microflora, for decontamination and deodorization of composts contaminated with *Escherichia coli*.

Experiments were conducted with the organic cultivation of coriander and mint, and soil microbiological and agrochemical indicators were monitored in relation to antimicrobial activity against *E. coli*. A statistical analysis of large arrays of heterogeneous experimental data was performed in order to compile models for studying the antibacterial properties of essential oil crops in relation to obtaining plant extracts to combat pathogenic microflora. Different types of rhizosphere microorganisms and their functions in the agrobiological outpost were described. (G 7.2; G 7.3; G 7.5; G 7.8;G.11;G.12; G.18;G.19)

Some of the publications are related to the study and description of composting processes and the composition of the microflora in them, the benefits and risks of introducing sludge into the soil and their impact on the soil microflora are analyzed. In a separate work, a review of the toxic properties of cadmium and its sources both in nature and as a result of human activity is made. The migration of cadmium in the soil and its transfer along the plant-animal-human chain are monitored. The dependence between the concentration of the lime solution and the amount of microorganisms in sludge from treatment plants is studied. The results obtained show a strong correlation between the studied quantities. (G 7.4; G 7.10; G 7.13; G.17).

The influence of allelochemicals on the germination of cucumber and tomato seeds was studied by testing plant extracts (decoction, tincture, oil filtrate, medicinal wine and vinegar) obtained from essential oil plants: coriander, mint, oregano and basil, from which filtrates were obtained. (G.16; G.20).

The presented scientific works of Assoc. Prof. Atanasova have a specific focus, with a clearly defined profile related to soils damaged by human activity - contaminated with heavy metals, sediments and composts. The studies are aimed at preserving and improving soil microbiological activity, and various methods are proposed in this direction. The publications are written in a good scientific style, with clearly formulated goals, good methodological presentation and accurate and scientific interpretation of the results.

4. Assessment of the candidate's pedagogical training and activities

The teaching activity of Assoc. Prof. Atanasova fully corresponds to the scientific specialty and the discipline of the competition. Over the past three years, she has been giving lectures and conducting classes in the disciplines "Soil Science", "General Microbiology", "Chemical Pollutants and Control Methods", "Ecological Safety of Plant Production", "Botany", "Ecology". My overall assessment of this type of activity is very good.

5. Major scientific and applied scientific contributions.

I accept the contributions presented by the candidate, as they are supported by the publications with which she participated in the competition. I believe that the leading role of the candidate is indisputable and they are the result of the in-depth research that she has conducted, both independently and in a team. The contributions can be attributed to the following main groups:

Scientific contributions:

1. An imitation model of the movement of organic matter and heavy metals in soils of characteristic areas and conditions has been developed by applying mathematical methods. (B.3, G.6)
2. A general model for the management of heavy metal aerosol pollution in natural agro- and urban ecosystems has been developed. The new model created combines experimental methods for direct measurement of the content of the studied indicator (lead, cadmium, etc.) with probabilistic statistical approaches for pattern recognition in a general model for the assessment and prediction of open or closed ecosystems. (B.3, G.6.)

3. A comprehensive approach and toolkit have been developed for the assessment, prediction and management of various processes in ecosystems and agriculture (B.3, G.6, G.7.1, G.7.7, G.8.1, G.8.6.)
4. A comprehensive approach, general model and technologies have been developed for the production of extract solutions with different raw materials, technological and production conditions*(G.7.2, G.7.3, G.7.11, G.7.12, G.7.16., G.7.18, G.7.19, G.7.20).*
5. A model for digitalization in agriculture has been developed, representing a platform of experiments, agro and bio analyses, software for statistical processing, hypothesis testing, recognition and prediction of the state of soil ecosystems. (B.3, G.6, G.7.1, G.7.5, G.7.7, G.8.1.)

B. Scientific and applied contributions

B′. Scientific and applied contributions realized in the monograph submitted for participation in the competition and in the book based on the defended dissertation:
1. Developed and implemented models for the distribution of the amount of heavy metals in soil horizons and depending on the distance to the source of pollution.
2. Experimental assessment of the distribution of factors determining dynamics across horizons.
3.Methodology and criteria for assessing the factors influencing the abundance of soil microflora through dispersion, correlation and regression analysis.
Determination and prediction of soil microbiological activity through statistical algorithms for recognition by indirect signs. (B.3)

B ′′. Scientific and applied contributions

1. The effect of different types of fertilization on the productivity and quality of wheat and corn has been studied. Models for productivity and quality of plant production have been developed, using the potential of soil microorganisms and analysis of certain biological mechanisms (G.7.1, G.7.5, G.7.6, G.7.8, G.7.9, G.7.14, G.7.15, G.8.2, G.7.21, G.7.22, E.22.1)
2. Local models for obtaining extracts from essential oil crops have been developed and implemented for their application for decontamination and deodorization of compost mixtures and their use in medical applications. An analysis of the method of treatment, processing and use of sludge from sewage treatment plants in agriculture has been made (G.7.2, G.7.3, G.7.5, G.7.11, G.7.12, G.8.1., G.7.18, G.7.19,)
3. The allelopathic effect of extracts from essential oil crops on plant processes in vegetable crops has been studied. (G.7.16, G.7.20)
4. An assessment has been made and management recommended in relation to the ecological risk of fires, soil contamination with heavy metals and causing ecological disasters (B.3, G.6, G.7.13, G.7.17, G.8.5, G.8.6, G.8.8)
5. Use of modern technologies in agriculture and environmental protection (G.8.3, G.8.4, G.8.7)

B. Applied contributions

1. As a result of the presented theoretical and conducted experimental and systematic studies, local models have been compiled as parts of a future model for assessing soil fertility under specific conditions. The structure of the models (or parts of them) are described in a large part of the scientific works and are summarized in the monograph (pp. 115-117). (B.3, G.6)
2. Databases of experimental agrochemical and microbiological analyses, and databases of recognition of the state of agro- and urbogenic soils depending on the distance from the source of

pollution at different depths, have been obtained, which can be used in electronic form or on paper. (B.3, G.6)

G. Educational and methodological contributions

1. Presentation of basic knowledge of soil science; causes and methods for preventing environmental problems, such as soil pollution and technologies for their purification. (E.22.1).

2. Systematization and adaptation of specialized microbiological knowledge in an accessible form, consistent with the curricula and the level of students in the respective specialty. Development of structured topics and practical classes that meet the modern requirements for microbiology training in agricultural and biological specialties. Selection of a rich and updated illustrative base (diagrams, tables, images) that visualize complex microbiological processes and support their understanding by students. (E 23.1, E.23.2)

6. Significance of contributions to science and practice.

The scientific and applied scientific contributions presented by Assoc. Prof. Atanasova are significant. The created model for predicting the dynamics of organic matter and heavy metals in the soil can be applied in practice, especially in areas with heavy metal pollution. This method involves saving resources and facilitates the taking of multiple samples from the study areas. Very applicable in practice are the studies with essential oil crops and the study of their antibacterial properties.

7.Critical notes and recommendations.

I have no critical remarks about Assoc. Prof. Atanasova. I would recommend that in the future she continue to work on the application of mathematical models in the field of soil science and soil microbiology. To expand her research to other sites (the lands around the Trakia highway and the areas around roads with intensive traffic).

8. Personal impressions and opinion of the reviewer.

I do not know Assoc. Prof. Atanasova personally, but from the materials presented it is clear to me that she is a scientist with an established scientific profile in the field of the competition and an established lecturer. She has put in a lot of work, which deserves to be positively evaluated.

CONCLUSION

Based on the thorough review of the submitted scientific works, their significance, and the scientific, applied, and practical contributions they contain,I find it fully justified to propose that **Assoc. Prof. Dr. Pavlina Naskova Atanasova** be awarded the academic position of **Professor** in the field of higher education **6. "Agricultural Sciences and Veterinary Medicine"**, professional field **6.1. "Crop Production"**, specialty **"Soil Science"**, for the needs of the **Department of Crop Production**, Faculty of Machine Technology, **Technical University of Varna**.

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