



OPINION

regarding a competition for occupying the academic position of "Associate Professor" in the field of higher education 5. Technical Sciences, professional area 5.13 General Engineering, scientific specialty *Mechanization and Electrification of Crop Production* for the needs of the Department of Agricultural Mechanization, the Faculty of Viticulture and Horticulture, Agricultural University Plovdiv (AU-Plovdiv), announced in the State Gazette 7/23.01.2024
Member of the Scientific Jury: Prof. Eng. Georgy Ivanov Valchev, PhD

1. General description of the candidate's scientific and scientific and applied work.

The only candidate for the position of Associate Professor is Assistant Professor Eng. Ivan Angelov Mitkov, PhD. He has submitted all necessary documents (a total of 17) certifying compliance with the minimum national requirements for the academic position of Associate Professor in the professional area 5.13 General Engineering, according to the current Act for Higher Education, the Regulations for the Implementation of the Act on Development of Academic Staff in R Bulgaria, and the Regulations for the Conditions and Procedure for Occupying Academic Positions at the Agricultural University of Plovdiv (AU-Plovdiv). He has presented a diploma for completed higher education (a five-year course of study equivalent to a Master's degree) Series БД-95 No. 0014135 from the Technical University - Gabrovo, specializing in "Metals Technology of Metals and Metalworking Machinery." He has also presented a diploma No. ДР 99 dated from September 15, 2017, awarding the educational and scientific degree of "Doctor" in "Mechanization and Electrification of Crop Production" resulted from a defended dissertation work entitled "Investigation of Biomass Heating Technology for Greenhouses." The scientific publications related to the dissertation work are 4 in total.

For participation in the competition, 14 scientific publications have been submitted in journals that are peer-reviewed and indexed in globally renowned databases, along with 12 publications in non-peer-reviewed journals or edited collective volumes. Additionally, a book based on the dissertation work entitled "Investigation of Biomass Heating Technology for Greenhouses" has been published by Intel Entrance, Sofia, 2023, ISBN: 978-619-7703-25-2. Participation includes oral presentations at world and European congresses, international symposiums (1 oral presentation), and 11 poster presentations. There are also reports presented at scientific forums in Bulgaria, which total number is 5. The distribution of scientific publications according to group indicators is as follows: for indicator B.4 - scientific publications equivalent to (a habilitation work-monograph) - 10 publications; for indicator Г.7 (from Г.5 to Г.11), there are 4 scientific publications in journals that are peer-reviewed and indexed in globally renowned databases, and 12 scientific publications in non-peer-reviewed journals or edited collective volumes.

Assistant Professor Eng. Ivan Angelov Mitkov, PhD, completely meets the minimum national requirements for occupying the academic position of Associate Professor in the professional area "General Engineering," scientific specialty "Mechanization and Automation of Crop Production." Out of the minimum requirements of 400 points by group indicators for occupying the academic position of Associate Professor, the candidate's personal total points are 502.82. The points for indicator A are 50 out of the required 50, for indicator B (B.4) they are 125.57 out of the required 100, for indicator Г (from Г.5 to Г.11) they are 257.25 out of the required 200. The sum of total points for indicator Д is 70 out of the required 50.

2. Evaluation of the candidate's pedagogical training and work.

His teaching and research activities are entirely focused on the professional area of the announced competition. Assistant Professor Eng. Ivan Angelov Mitkov has held the academic position of "Chief Assistant Professor" from October 1, 2018, until now in the Department of Agricultural Mechanization at AU-Plovdiv. Until March 1, 2024, his teaching experience amounts to five years and five months. Certificate No. HO-Φ5-09/23.02.2024, signed by Prof. Yancheva - Rector of the Agricultural University, attests to the candidate's academic workload, including lectures, seminar classes, and extracurricular activities including the academic years from 2018/2019 to 2022/2023. The total number of hours for this period of primary teaching activities as a chief assistant professor is 3433.8 academic hours, averaging 686.76 academic hours per year. Additionally, Certificate No. 6/16.02.2024 confirms the candidate's participation in two research projects:

*Project No. 09-17 on the topic: "Development of a Model for an Energy-Efficient Heating Installation Module" during the period 2017-2019.

*Project No. 02-20 on the topic: "Power Unit for Agro-Robots", executed for a one-year period, with the candidate being the operational project leader.

He has provided academic supervision for 18 graduating students from the Faculty of Viticulture and Horticulture, who have successfully defended their diploma theses.

A Declaration of Originality and Authenticity of the Results and Contributions in Scientific Production has been submitted. The candidate declares that the results and contributions in the presented scientific production are original and have not been borrowed from research and publications in which he did not participate.

I positively evaluate the candidate's pedagogical preparation and work.

3. Main scientific and scientific and applied contributions.

The candidate's scientific publications can be classified into the following directions: research in soil cultivation; developments related to agro-robots; developments related to the design of agricultural machinery; technological developments related to ultrasound; developments related to renewable energy sources; and technological developments in mechanization of technology and mathematical processing of results.

I accept the author's statement regarding the scientific contributions derived from the research, based on the results obtained and indicated in the scientific publications of Assistant Professor Eng. Ivan Angelov Mitkov, presented as equivalent to a habilitation work - a monograph, as well as those publications beyond it. The contributions are defined as scientific and applied.

Scientific and applied contributions in the habilitation work – a monography

*The resistance power of the self-propulsion of the agro-robot has been determined.

*The technical parameters of a seed box for an experimental combined planter - STS-80, developed by us, have been established.

*The influence of ultrasound with a frequency of 43-45 kHz and different exposure durations on the germination of vegetable seeds has been determined.

*The influence of the working fluid for treating seeds with ultrasound at a frequency of 43-45 kHz has been determined.

Scientific and applied contributions in the publications excluding those related to the habilitation work

*Technical and economic options have been designed for predicting expenses in mechanized cultivation of certain crops.

*The cost price of some agricultural products has been determined while adhering to a given mechanized technology.

*Operating modes of a machine for cracking various fractions of nuts have been established.

*A design for thermal decomposition of biomass has been justified.

*It has been established that the HHO generator produces clean and renewable energy based on water compounds. The obtained energy is relatively inexpensive and accessible.

*The use of an energy-efficient module reduces heating expenses for a specific residential building by over 6.2 times when using HHO gas as an energy source compared to a conventional electric boiler. When using an additional energy source - agricultural pellets from waste agricultural products - heating expenses for a residential building decrease by over 2.8 times. Furthermore, the combined use of various energy sources will lead to even greater reduction in these expenses.

4. Significance of the contributions for science and practice

The candidate's scientific publications have become part of the scientific community specializing in the professional field 5.13 General Engineering, both nationally and internationally. They have been presented at scientific conferences with international participation and published in peer-reviewed and indexed databases with scientific information, as well as in non-peer-reviewed journals with scientific reviewing or in edited collective volumes. Publications with an impact factor (IF) have total IF of 0.848. Out of the scientific publications submitted for participation in the competition, a total of 7 citations have been observed, with 5 of them reflected in globally renowned databases with scientific information, as indicated by indicator Д.12.

5. Critical notes and recommendations.

Analysis of the materials submitted for participation in the competition for Associate Professor indicates a lack of significant omissions. Therefore, I believe it is unnecessary to make critical remarks. I would like to make recommendations for the future work of Assistant Professor Eng. Ivan Angelov Mitkov regarding his work as a habilitated university lecturer and researcher. He should actively work under his supervision with the participation of students and doctoral students in scientific research projects in the field 5.13 General Engineering. He should also successfully supervise doctoral students in the scientific specialty *Mechanization and Automation of Crop Production*.

CONCLUSION

Based on the review of the submitted scientific works, their significance, the scientific and applied contributions contained within them, the candidate's pedagogical preparation, and the fulfillment of the minimum requirements for occupying the academic position of Associate Professor according to the Higher Education Act in the Republic of Bulgaria, its implementing Regulations, and the Regulations of the Agricultural University-Plovdiv, I give an overall "POSITIVE" assessment to the candidate.

I propose to the members of the Honorable Scientific Jury to give a positive evaluation to the candidate and recommend the Honorable Academic Council of the Faculty of Viticulture and Horticulture at the Agricultural University - Plovdiv to confer upon Assistant Professor Eng. Ivan Angelov Mitkov, PhD, the academic position of Associate Professor in the field of higher education 5. Technical Sciences, professional area 5.13 General Engineering, scientific specialty *Mechanization and Electrification of Crop Production*.

Date: 10.04.2024
City of Plovdiv

Member of the Scientific Jury:
/Prof. Eng. G. Valchev, PhD/