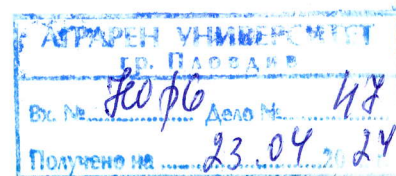


REVIEW



Regarding the competition for the academic position of “Associate Professor” in the scientific specialty “Mechanization and Electrification in Crop Production”, announced in the State Gazette issue 7/23.01.2024.

Candidate in the present competition:

Chief Asst. Prof. Ivan Angelov Mitkov, PhD, from the Department of Mechanization in Agriculture at the Agricultural University – Plovdiv (AU-Plovdiv)

Reviewer:

Prof. eng. BORIS GEORGIEV BORISOV, PhD, from “Angel Kanchev” University of Ruse in the field of higher education: 5.0 Technical Sciences, professional area: 5.13 General Engineering, scientific specialty: Mechanization and electrification in Crop Production, assigned a member of the scientific jury according Order № ПД-16-406/20.03.2024 of the Rector of AU-Plovdiv.

1. General data regarding the candidate`s career and research development.

The present competition was announced in the State Gazette, issue 7/23.01.2024 and on AU website with relation to the needs of the Faculty of Viticulture and Horticulture. The only candidate participating in the competition is Chief Asst. Prof. Ivan Angelov Mitkov, PhD.

Chief Assistant Professor Ivan Angelov Mitkov was born in 1970 in the town of Parvomay. In 1995 he graduated with honors from the Technical University - Gabrovo obtaining a Master's degree as a mechanical engineer majoring in *Technology of Metals and Metalworking Machinery*. He worked in production as a technical assistant and as a production manager in companies in the city of Plovdiv. Since 2014 he has been working as a junior expert and a lecturer in the Agricultural Mechanization Department of AU-Plovdiv. In 2012 he was enrolled as a doctoral student at the University and defended his PhD in the scientific specialty *Mechanization and Electrification of Crop Production*. Since 2018, after a competition, he has been appointed for chief assistant professor at the Faculty of Viticulture and Horticulture, Agricultural Mechanization Department, where he still works. He delivers lectures, laboratory exercises and training practices to undergraduate students, he also supervises graduate students.

The candidate has passed through additional qualification courses, such as: an English language course, a course for computer and office equipment, a course for specific work with machines and equipment.

2. General description of the submitted materials. Implementation of the requirements regarding the occupation of the academic position of “Associate Professor”.

The candidate, Chief Asst. Prof. Ivan Angelov Mitkov, have presented the following scientific production:

2.1. Scientific works and publications in the nomenclature specialty – 31, such as:

- Publications related to the doctoral thesis – 4, which are not subject of discussion.
- Impact Factor publications – 3, with a total IF-0,848.
- Publications in reviewed and referenced scientific journals – 14.
- Publications in non-referenced journals with scientific review – 12.

10 of the publications are in Web of Science journals, and 5 – in Scopus. @ of the journals are indicated with Q4 and IF-0,3, and 1 journal - with Q3 and SJR-0,248.

- Publications in conference collections, delivered reports at international forums – 12.
- Participation with reports in scientific forums – conferences, symposiums, congresses – 17, 12 of which abroad and 5 in Bulgaria.

The candidate's personal participation is evident from the fact that he is an individual author of 7 publications, a first author in 15. 25 of the publications are written in English language.

Taking into account the indicators, the publications are grouped as follows: 10 by indicator B 4, 1– Γ 6, 4 - Γ 7 and 12 - Γ 8.

2.2. A published book based on the defended dissertation work – 1.

2.3. Number of citations – 7 from 5 publications in referenced and indexed journals (3 in Scopus and 4 in Web of Science, 2 of them in journals in Q3 with SJR-0.21 and in Q1 with SJR-1.32, all included in the group of indicators Д 12.

2.4. The candidate has five years standing up to March 2024 including average workload of in-classroom and out-of-classroom activities estimated to 996 hours. 394 of them represent classes on technical disciplines delivered at AU-Plovdiv.

2.5. The candidate has participated in 2 institutional research projects.

2.6. He has supervised 18 successfully defended graduate students.

The candidate can be described as a thorough scientist, researcher and knowledgeable lecturer.

A total number of 27 scientific works are subject to analysis in the present review, which are excluded from the candidate's dissertation work. For the final evaluation of the scientific production 10 scientific publications from group B4, 1 – from group Г6 and 4 – from group Г7 are considered (published in indexed scientific publications in world-renowned databases with scientific information on Scopus and Web of Science), 12 publications - from group Г8 (published in non-referenced journals with scientific review or in edited collective volumes), 2 participations in university research projects. The candidate has also submitted 12 reports presented at international scientific conferences abroad and 5 in Bulgaria. He has one published book based on his dissertation work from group Г6.

As a summary, the candidate for the position of "Associate Professor" meets the minimum national requirements by groups as follows: for group A1 - from 50 to 80.65 points; for group B4 from 100 to 125.57 points; for group Г from 200 to 257.25 tons; for group Д from 50 to 70 points;
In total, for all groups of indicators, the candidate collects 533.47 points with minimum requirements for the academic position of ASSISTANT PROFESSOR at least 400.

3. Main directions in the candidate's research work. Demonstrated skills or qualities for research management (project management, attraction of external financing).

The candidate's research studies are mainly directed in the field of mechanization and automatization of crop production, mechanized technologies in agriculture, agro-machinery construction. The presented publications cover the following main directions:

- *In the field of creating and studying new operational bodies for tilling machinery.*

The construction of a tillage cutter with a horizontal axis of rotation was investigated in terms of the quality of crushing the soil into fractions and mixing them with the ameliorant, according to the agro-technical requirements for the cultivation of a given crop. Two new working bodies combining the kinematics of a tiller with a horizontal axis of rotation and horizontal displacement of the soil by a disc working body have been created and tested in production conditions. Adequate regression models were derived, describing soil fragmentation into fractions creating optimal conditions for growing crops. Publications from groups: B-10; Г-8.3; Г-8.7; Г-8.9.

- *In the field of developments related to agro-robots.*

Research was conducted on the working methodology of a weed control robot. An algorithm for determining the overall dimensions and energy parameters of an agricultural robot was presented, and the agro-technical indicators for its efficiency at work were substantiated. Publications from groups: B-3; B-4; B-6; Г-7.1; Г-7.3.

- *Studies related to the developments of agro machinery construction.*

A constructive layout of a combined seeder for complex grass mixtures is proposed, in order to justify the technical parameters of the seed box. The quality of operation of a machine for breaking walnut fruits was investigated, and the modes of operation with different fractions of the fruits were established. Publications from groups: B-5; B-7; Г-7.2; Г-8.4,8,9,10,11,12.

- *Technological developments related to ultrasound.*

Studies on the effect of ultrasound on vegetable crops at different exposures have been presented. The influence of a biostimulator used in seed treatment by ultrasound was investigated. Publications from groups: B-8; B-9.

- *Technological developments related to heating derived from biomass and renewable energy.*

A comparative analysis of fuel from different types of biomass was carried out in order to justify the construction of an installation for the thermal degradation of biomass. The straw briquetting process has been researched and optimized. An innovative method for applying green energy in the maintenance of internal combustion engines is proposed. The influence of main factors in determining the energy efficiency of a heating module with green energy has been investigated. Possibilities have been established for the use of an HHO generator /for Brownian gas/ as renewable energy for heating buildings. Publications from groups: Г-7.4; Г-8.1; Г-8.2; Г-8.5; Г-8.6.

- *Technological developments related to mechanization of agricultural technologies and mathematical result processing.*

Technical and economical evaluations have been made for mechanized technologies for growing grape varieties, for growing tomatoes, fruits and others. Publications from groups: B-1; B-2.

Basic technological and constructive parameters of new working bodies, new technologies and schemes for optimization of individual processes are substantiated with economic evaluations of their effectiveness, some of which are proposed for use in practice and in the educational process.

Part of the research studies and publications have been financed by three research projects, respectively - 03-13; - 09-17; - 02-20, with the personal participation of Chief Asst. Prof. Ivan Mitkov.

The above shows the candidate's extensive research activity, which characterizes him as a deep-thinking and renowned scientist, researcher and innovator.

4. Evaluation of the candidate's pedagogical preparation and activity. His role in the training of young scientists.

The work of Chief Asst. Prof. Ivan Mitkov with students is characterized by the following:

- For more than 5 years Chief Asst. Prof. Mitkov has conducted and continues to conduct in-classroom and out-of-classroom activities - lectures and seminar classes to undergraduate students in basic disciplines at the Agricultural University-Plovdiv.

- Supervised 18 graduates who successfully defended their diploma theses - in Bachelor's and Master's degrees.
- A book has been published based on a defended dissertation work.

From the above mentioned it can be concluded that Chief Asst. Prof. Ivan Mitkov is a well-established teacher at the University, responds to the specifics of the competition for the scientific specialty "Mechanization and Electrification of Crop Production" and is aware of the problems of the educational process in its specification for the Department of Mechanization in Agriculture.

5. Significance of the obtained results proved with citations, publications in renowned journals, awards, membership in international and national scientific bodies, etc.

5 of the scientific publications in group Д12 of Chief Asst. Prof. Ivan Mitkov have been cited 7 times in scientific works of other authors in scientific journals in Scopus and Web of Science with Q3 and SJR - 0.21 and Q1 with SJR -1.32, as follows: N:N: 1,3,5 once and N: N: 2,4 twice, in Scopus – 3 pieces and in Web of Science - 4 pcs. with a total IF-1,411.

It is evident that the main part of the candidate's scientific works is known to the scientific community, both at home and abroad.

6. Significance of the contributions for science and practice.

According to the submitted information, the candidate's contributions can be evaluated and classified as follows:

Methodological contributions:

1. Research studies have been conducted on the methodology for determining the overall dimensions of an agricultural robot and the agrotechnical indicators for its efficiency at work have been substantiated. Publications from groups: B-3; B-4; B-6; Г-7.1; Г-7.3.

Scientific contributions:

1. Two new working bodies have been created and tested in production conditions, combining the kinematics of a tiller with a horizontal axis of rotation and horizontal displacement of the soil by a disk working body. Adequate regression models have been derived, describing soil fragmentation into fractions creating optimal conditions for growing crops. Publications from groups: B-10; Г-8.3; Г-8.7; Г-8.9.

2. Through the obtained adequate regression models for the granulometric composition of the treated soil and through optimization, the influence of the main parameters (the working speed, the deflection angle of the reflective cover and the frequency of rotation of the tractor's PTO shaft) on the degree of soil fragmentation has been established, which can be useful for practice in presetting the working bodies depending on the specific circumstances (soil type, humidity, predecessors, etc.).

Scientific and applied contributions:

1. The construction of a soil tillage cutter with a horizontal axis of rotation has been studied and substantiated regarding the quality of crushing the soil into fractions and mixing them with the ameliorant, according to the agro-technical requirements for the cultivation of a given crop. Publications from groups: B-10; Г-8.3; Г-8.7; Г-8.9.

2. A comparative analysis of fuel from different types of biomass was carried out in order to justify the construction of an installation for its thermal degradation. The straw briquetting process has been studied and optimized. An innovative method for applying green energy in the maintenance of internal combustion engines is proposed. The influence of main factors in determining the energy efficiency of a heating module with green energy has been explored. Possibilities have been established for the use of an HHO generator /for Brownian gas/ as renewable energy for heating buildings. Publications from groups: Г-7.4; Г-8.1; Г-8.2; Г-8.5; Г-8.6.

Applied contributions:

1. A design layout of a combined seeder for complex grass mixtures is proposed, in order to justify the technical parameters of the seed box. The quality of a machine's operation for breaking walnut fruits was studied, and the modes of operation with different fractions of fruits have been established. Publications from groups: B-5; B-7; Г-7.2; Г-8.4,8,9,10,11,12.

2. Studies on the effect of ultrasound on vegetable crops at different exposures have been presented. The influence of a biostimulator used in seed treatment by ultrasound have been examined. Publications from groups: B-8; B-9.

3. Technical and economic estimations have been made for mechanized technologies for growing grape varieties, for growing tomatoes, fruits and others. Publications from groups: B-1; B-2.

I assess the significance of all contributions as being obtained personally by the candidate Chief Assistant Professor Ivan Angelov Mitkov, Ph.D. I classify them as scientific, scientific-applied and applied, which can be useful for science and practice. I positively assess the fact that the quantitative indicators of the criteria for occupying the academic position of "ASSOCIATE PROFESSOR" have been met with a minimum of 400 points. The candidate is presented with 535.47 points. The citations of some of the candidate's works are presented in 5 scientific journals in Scopus - 3 pieces and in Web of Science - 4 pcs. with a total of IF-1,411, from group Д12 – 7 works, which adds up to 70 points with a minimum of 10 points, which is a good indicator of the candidate's recognition among the scientific circles at home and abroad.

7. Critical notes and recommendations.

- There are no separate protocols for joint publications, what is the reason and is it fair to the other authors?
- In his future scientific work Chief Asst. Prof. Ivan Angelov Mitkov should direct his efforts to independent publications and the implementation of the obtained results in practice, as well as leading teams on various scientific projects.

8. Reviewer`s personal impressions and statement.

I personally know Chief Assistant Professor Ivan Angelov Mitkov and his scientific-academic development for more than 5 years - as a doctoral student in the Agricultural Mechanization Department of AU-Plovdiv, from his participation in scientific conferences, from the defense procedure of his dissertation work, as well as from the bilateral cooperation between the two departments of AU-Plovdiv and Angel Kanchev University of Ruse. The applicant is a highly intelligent and erudite scientist, researcher and lecturer in academic community, practice and life, respected by students and fair to his colleagues. I have been impressed by his constructive approach to problems and solving specific issues, his communicativeness and loyalty, which has had a favorable impact on his teaching, research and applied activities.

CONCLUSION

Based on the submitted documents, materials and the analysis of the candidate's pedagogical, scientific and scientific-applied activities, I believe that Chief Asst. Prof. Eng. Ivan Angelov Mitkov, Ph.D., meets the requirements of the Act on Development of the Academic Staff in the Republic of Bulgaria, the Regulations for its implementation and the Regulations of the Agricultural University of Plovdiv for its application.

My overall assessment is unequivocal and positive - in favor of the candidate. Taking into account the results of his educational, scientific, scientific-applied and pedagogical work, the received scientific, scientific-applied and applied contributions and their significance, I CONSIDER and find it reasonable that he will be useful as a lecturer and researcher for the academic position of "ASSOCIATE PROFESSOR" at the Agricultural University - Plovdiv, and with his experience - for the entire scientific community.

I allow myself to propose to the Honorable Scientific Jury to vote POSITIVELY and to propose to the Faculty Council of the Faculty of Viticulture and Horticulture at AU-Plovdiv to elect Chief Assistant Professor Ivan Angelov Mitkov, Ph.D., for the academic position of "ASSOCIATE PROFESSOR", in professional area 5.13 "General Engineering", scientific specialty *Mechanization and Electrification of Crop Production*.

12.04.2024

Reviewer:

The city of Plovdiv

/Prof. Eng. Boris Borisov, PhD/