OPINION

on the materials submitted for participation in a competition for **„Professor“** in the field 5. **Technical Sciences**, Professional field **5.13. General engineering**, scientific specialty **Applied mechanics** in the discipline **Mechanics**

In the competition for professor, published in the State Gazette, issue. 101 of December 27, 2019 and on the site of the University of Forestry (UF) with procedure code WWI-P-1119-28 for the needs of the Department of 'Mathematics and physics' at the Faculty of 'Forest industry'(FFI), as a candidate participates Assoc. Prof. Eng. Georgi Yordanov Vukov, Ph.D., Faculty of 'Forest industry', Department of „Mathematics and physics“.

Prepared the opinion: Youlin Nikolov Tepeliev, Ph.D., Professor in the Professional Field 5.7. Architecture, Civil Engineering and Geodesy, from the University of Forestry

1. Brief biographical data for the candidate

Assoc. Prof. Eng. Georgi Yordanov Vukov was born on January 29, 1960. From 1980 to 1985, he studied at the Technical University – Sofia, majoring in Industrial Heat Engineering and graduated as an engineer. Shortly thereafter (1986 – 1987) he specialized in Applied Mathematics at the Institute of Applied Mathematics of the Technical University of Sofia and acquired the qualification of Mathematical Engineer, ISCED level 6 in the national classification. From 1985 to 1988 he worked at the Technical University - Sofia as an engineer-technologist in connection with the development of equipment for the teaching process. From 1988 to 1991, he was a full-time doctoral student (then a graduate student) at the Department of Mechanics and in 1996 he defended his doctoral thesis on the subject "Dynamic loads of bearing bearings on machines with cardan shafts". From 1992 to 1998 he worked as a teacher at the Professional High School of Hairdressing and Cosmetics "Princess Evdokia" – Sofia. In 1999 he became an Assistant Professor at the University of Forestry, since 2000 – Head Assistant Professor and since 2002 up to now – Associate Professor, currently in the Department of Mathematics and Physics at the Faculty of 'Forest industry'.

2. Correspondence of the submitted documents and materials of the applicant according to the Rules of the Development of academic staff at the University of Forestry.

The documents and materials submitted by the applicant are in full compliance with the requirements of the Academic Staff Development Regulations at the University of Forestry

3. Assessment of the candidate's educational and pedagogical activities (work with students and PhD students)

From 2009 to 2019 Assoc. Prof. Eng. Georgi Yordanov Vukov leads lectures and exercises in Mechanics with students in the specialty Engineering Design (ED), 1st year, full-time education (FTE). From 2014 to 2019 he leads lectures and exercises in "Theoretical Mechanics" with students in the specialty "Technology of wood and furniture" (TWF), I course, full-time and part-time education (PTE). Conducts lectures and exercises in "Metal Science" of the students in the specialty TWF, I course, FTE and PTE, respectively in the

periods 2009 – 2017 and 2009 – 2016 (2015 for the exercises). From 2016 to 2019 he conducts lectures and exercises on "Materials resistance" of the 2nd year students, majoring in TWF, FTE and PTE. With regard to the Master's degree, Assoc. Prof. Vukov leads lectures and exercises in "Technical diagnostics" of students in the specialty TWF, 1st year, FTE in the period 2012 – 2014.

During the current academic year, he conducts lectures and exercises in "Mechanics", "Theoretical Mechanics" and "Materials resistance" of the students from the mentioned two majors.

According to the current syllabus, Assoc. Prof. Vukov has prepared the curricula for the bachelor's degree by:

- "Mechanics" – specialty "Engineering Design", 1st year, full-time education;
- "Theoretical Mechanics" – specialty "Technology of wood and furniture", I course, full-time and part-time training;
- "Materials resistance" – specialty "Technology of wood and furniture", II year, full-time and part-time training.

For the master's degree, Assoc. Prof. Vukov has prepared the syllabus in the discipline "Technical diagnostics".

Assoc. Prof. Eng. Georgi Yordanov Vukov was a scientific consultant to Mag. G. Kovachev in the development and successful defense of a dissertation for the acquisition of the educational and scientific degree "Doctor" on the topic "Dynamics of the cutting mechanism of a milling machine with a lower arrangement of the spindle", headed by Assoc. Prof. Vasil Vlasev, Ph.D., Department Woodworking Machines, Faculty of 'Forest industry' – Sofia, 2015. COBISS.BG-ID-1281227236. Currently, Dr. G. Kovachev is Assistant Professor in the same department.

4. Assessment of candidate's scientific, scientific-applied and publishing activities

General description of the presented materials

Candidate Assoc. Prof. Eng. Georgi Yordanov Vukov participated in the competition with:

- Monographs – **1** number (s);
- Textbooks – **6** number (s);
- Learning materials – **1** number (s);
- Books –… number (s);
- Publications – **74** number (s).
- Projects – **10** numbers (s).

4.1 Participation in scientific, scientific-applied and educational projects

Assoc. Prof. Georgi Vukov was the leader of two scientific projects:

- Contract №40 / 13.04.2009 on the topic "Investigation of the torsional vibrations in the mechanical gear of a class of wind generators", funded by the UF for a duration of three years (2009 – 2011);
- Contract FFI-2018-S-4 / 19.03.2018 entitled "Study of the main factors giving rise to vibrations and noise during operation of woodworking machines", funded by the Experimental Forestry Enterprise (EFE) 'Yundola'.

He has worked as a participant in the teams of eight other projects:

- Contract №46 / 13.04.2009 on the topic "Automated circular device for horizontal band saw" headed by Prof. Sl. Sokolovsky funded by the UF;
- Contract №22 / 2016 on the topic "Modeling and experimental study of the processes of longitudinal milling of solid wood", headed by Assoc. Prof. G. Gochev, funded by the UF;
- Contract on the theme "Mechanical-mathematical and Computer Modeling of the Geometry and Motion of Real Mechanical Systems of Bodies" under the supervision of Prof. Kolyo Minkov Petrov, DSc, funded by the Bulgarian Academy of Sciences (BAS);
- Contract on "Mechanical - mathematical and Computer Modeling of Real Machines, Mechanisms and Automats as Connected Systems of Solid Bodies" under the supervision of Prof. DSc Kolyo Minkov Petrov, funded by BAS;
- Contract on the theme "Investigation of the processes underlying the mechanical behavior of solid-state systems, oriented towards their analysis and synthesis" headed by Assoc. Prof. Dr. Valentin Ivanov Abadjiev, funded by BAS;
- Contract on the topic "Modeling and Investigation of the Interaction of Body Systems" headed by of Assoc. Prof. Evtim Venets Zahariev, funded by BAS;
- Contract on "Mechanics, Modeling and Control of Solid and Elastic Body Systems" headed by Prof. Dr. Evtim Venets Zahariev, financed by BAS;
- Contract on the topic "Dynamics of Mechatronic Systems" under the leadership of Prof. Dr. Evtim Venets Zahariev, funded by BAS.

4.2 Characterization of published scientific results

Total number of publications – 75:

Monographs – **1**;

Books published – **0**;

Publications in scientific journals:

- publications in journals with impact factor – **0**;
- in foreign refereed – **9** (SCOPUS, Web of Science) + **7** (Other databases);
- in Bulgarian refereed - **0** (SCOPUS, Web of Science) + **16** (Other databases);
- in non-refereed – **17**;

Publications in collections of scientific forums:

- national – **11**;
- international – **14**.

By importance

- In impact factor journals – **0**;
- Plenary reports – **0**;
- Invited reports – **0**.

Place of publication:

- Articles in foreign journals – **13**;
- Reports in proceedings of international scientific forums – **20**;
- Articles in national journals – **30**;
- Papers in proceedings of national scientific conferences, sessions and seminars – **11**;
- Reports in scientific papers of universities and institutes – **0**;

Language of the publications:

- In Bulgarian – **26**;

- In English – **48**.

Number of co-authors:

- Independent – **13**;
- With one co-author – **29**;
- With two co-authors – **15**;
- With three co-authors – **8**;
- With four co-authors – **9**.

Place in collective publications:

- First – **29**;
- Second place – **28**;
- Third place – **4**;
- Next – **0**.

Except the aforementioned publications, additional 5 are presented, which are not included in Annexes 1 and 2, i.e. they do not carry points for the competition because they are in editions without ISSN and ISBN or they are not in the list of the National Centre for Information and Documentation (NCID).

4.3 Reflection of Candidate's Scientific Publications in Literature (known citations)

Total number of citations in Annexes 1 and 2 – 63:

By type of citations:

- Citations in journals with impact factor – **13** (D12-1 - D12-13);
- Citations in refereed journals (SCOPUS, Web of Science) – 4 (D12-14 - D12-17);
- Citations in journals refereed in other databases – **8** (D14-1 - D14-3; D14-7 - D14-10, D14-17);
- Citations in non-refereed journals and conference proceedings – **38**.

Except the aforementioned citations, additionally some other are presented which are not included in Annexes 1 and 2, i.e. they do not carry points for the competition because they are in editions without ISSN or ISBN.

4.4 Contributions to the candidate's work (scientific, scientific-applied, applied)

I accept without objection the scientific, scientifically applied and applied contributions to the applicant's works presented in the relevant reference. I think they are very well formulated and grouped.

I. The scientific contributions of Assoc. Prof. Georgi Vukov are mainly in the construction of a methodology for vibration diagnostics and monitoring of technical equipment in the forest industry (developed in a systematic series of original views, understandings and concrete developments), which is presented in the monograph [B-3] . Another original scientific contribution is the proposed new, deductive way of deriving the second part of Hooke's generalized law, as well as of the dependences on deformations in different directions [G8-64].

II. Scientific and applied contributions are related to: clarification of theoretical issues; construction of dynamic (mechanical-mathematical) models; analysis of the results obtained from numerical and real-time experimental studies; substantiated conclusions and recommendations for the practical operation of the tested technical equipment. Contributions can be grouped in the following directions:

1. Dynamics, strength and reliability of machinery in the forestry industry

Six projects (E 18-1 - E 18-6) were presented, as well as 54 scientific works, incl. in refereed journals (Web of Science or SCOPUS) – 6, and in other databases – 20. The works are cited in 29 papers - including 3 in refereed journals (Web of Science or SCOPUS) and 3 in other databases.

2. Dynamics and vibration of wind turbine and vehicle drive units

Three projects (E 20-1, E 18-7, E 18-8) were presented, as well as 18 scientific works, incl. in refereed journals (Web of Science or SCOPUS) – 3, and in other databases – 4. The papers are cited in 29 papers – including 13 with impact factor, 1 in a refereed journal (SCOPUS) and 5 in other databases.

3. Technical diagnostics

One monograph has been presented and 10 scientific papers have been published. The works are cited in 12 papers, including 1 in a refereed by Web of Science journal.

5. Assessment of the applicant's personal candidate

The monograph submitted by the applicant is a stand-alone. Out of the 74 entries submitted for the competition, 13 are standalone, with one co-author being 29, with two co-authors – 15, with three co-authors – 8 and with four co-authors – 9. The candidate is first in 29 publications, second in 28 and thirdly, in 4. The publications reflect complex scientific and applied research, which, for understandable reasons, is usually done by a team. In this regard, due to lack of accurate information, I accept that the applicant has an equal participation with the other co-authors in the common developments.

6. Critical remarks

There are no critical remarks on the substance and recommendations for the candidate's work that would influence the results and conclusions in the publications.

7. Personal impressions

I know the candidate personally, but I have no immediate impressions.

8. Conclusion

In connection with the above, I propose Assoc. Prof. Eng. Georgi Yordanov Vukov, Ph.D. to be elected as a „Professor" in the discipline „Mechanics" in the Professional field 5.13. General engineering, scientific specialty „Applied mechanics".

Prepared the opinion:

Opinion delivered on: 27.04.2020