

## STATE

in a competition for the academic position of "Associate Professor" at

**Professional field:** 5.1 Mechanical engineering

**Specialty:** Technology of mechanical engineering

Announced in SG: no. № 67 / 28.07.2020

**Candidate:** Dr. Eng. Tanya Georgieva Avramova

**Member of the scientific jury:** Prof. Dr. Eng. Dimcho Stoilkov Chakarski

### 1. General characteristics of the research and applied research activity of the candidate

For participation in the competition are presented 1 habilitation thesis (monograph), 24 scientific publications, 3 textbooks, 2 registered utility models and 8 scientific publications in connection with the dissertation.

The presented scientific publications (in international scientific journals and conferences in Bulgaria and abroad) and teaching aids are shown in detail in Annex № 6. They are distributed as follows:

- [A] - Habilitation work (Monograph) - 1 piece; • [B] - Scientific papers - 24; • [B] - Textbooks - 3 pcs .; • [D] - Registered utility models - 2 pcs .; • [D] - Publications in connection with the dissertation - 8 pcs. The distribution of the scientific works of the candidate in the competition for the academic position of associate professor is as follows: • Independent author is in 10 works [(B8); (B9); (B10); (B14); (B15); (B16); (B18); (B19); (B20); (B21)];
- The first author is in 6 works [(B3); (B4); (B7); (B11); (B15); (B17)];
- Second author in 6 works [(B1); (B2); (B5); (B6); (B13); (B24)];
- Third author is in 1 work [(B22)];
- The fourth author is in 1 work [(B23)].

He has a separate monographic work entitled "Finishing operations by sliding friction when machining holes" - (A1). The monograph is 108 pages long and was published by Color Print Publishing House - Varna in 2019, with ISBN 978-954-760-490-2 and was reviewed by Assoc. Prof. Dr. Dimitar Nedelchev.

Dr. Eng. Tanya Avramova fully meets the minimum national requirements for all groups of indicators for AD "Associate Professor". The total number of points according to the minimum requirements is 430, and the candidate has 1031.34 points. The excess is about 2.4 times. The information on the implementation of the scientometric indicators for the participant in the competition, Dr. Eng. Tanya Avramova, can be summarized by criteria as follows:

Group of indicators	Contents	Minimum requirements for acquisition of AD "Associate Professor"	Number of points of the candidate
A	Indicator 1	50	50
B	Indicator 2	—	-
C	Indicator 3 or 4	100	100
D	Sum of indicators from 5 to 11	200	378,34
E		50	66

	Sum of indicators from 12 to 15		
<b>F</b>	Sum of indicators from 16 to 28	—	130
<b>G</b>	Indicator 29	30	307
Total	Indicators 1 to 29	<b>430</b>	<b>1031,34</b>

The candidate also shows significant research and development activity. As can be seen from the attached list, the applicant in the period 2012 - 2019 has participated in 5 research projects and 2 educational projects funded by two operational programs from. He is the leader of 2 scientific projects for the period 2018 - 2019, as one of the managed projects was awarded a diploma for a project of the Faculty of Mechanical Engineering of TU-Varna. The scientific-applied activity is realized in the company "Si Pro" EOOD - Varna. Two PPD tools have been implemented (for which there are two useful models registered. With them the openings of hydraulic cylinders have been processed in production conditions.

## **2. Assessment of the pedagogical preparation and activity of the candidate The candidate for associate professor has significant teaching and teaching activity.**

She has lectured and laboratory exercises in the following subjects: • Manufacturing Technologies; • Production technologies; • Technological equipment; • Assembly technology; • Computer aided design of metal cutting tools; • And other Conducts classes in English. Under the leadership of Dr. Avramova, 40 graduates defended. ERASMUS students were also trained in the academic year 2016-2017. Dr. Avramova has developed a number of curricula.

## **3. Main scientific and applied contributions**

### **Scientific contributions)**

- Analytical dependences for determining the forces acting on the guide-smoothing elements of a smoothing tool are derived, which allow determining their location in space and the design of such tools (B4);
- A methodology for calculating the change in chip thickness in counter and passing milling has been developed, based on theoretical dependences (B13).

### **Scientific and applied contributions**

There are many scientifically applied contributions (over 20), the most typical of which are:

- Equations describing the trajectory of the relative working motion of a point from the cutting edge of the tool during milling are derived, on the basis of which a computer simulation model for studying the change of the rear angle for different diameters of available points in machining concave and convex rotary surfaces (B1, B2);
- An approach has been developed to determine the safety factors and strength conditions of combined instruments for sequential impact, which takes into account the stress concentrators (B3);
- A construction of an adjustable tool for smoothing the surfaces of cylindrical holes with three deforming elements, working in conditions of sliding friction (B4, B5); • And other. The scientifically applied contribution is proving with new means of essential new sides of already existing scientific fields, problems, as well as creation of new classifications, methods, constructions, technologies; obtaining confirmatory facts.

### **Applied contributions**

There are 10 applied contributions, the most characteristic of which are:

- A dynamometric tool for experimental research has been created, the results of which serve to find an optimal design variant of a scraping tool with guide-smoothing elements (B6);
- A combined tool for scraping and surface plastic deformation with radial feed (B7) is designed and manufactured;
- The experimental setup for determining the chip breaking element and for studying the change of the chip shortening coefficient (B11);
- And other.

#### **Methodical contributions**

- The candidate for associate professor has a number of methodological contributions, which I highly appreciate. The presented one textbook (B2) and two teaching aids (B1) and (B3) are essential for the quality of the learning process.
- The textbook and teaching aids are on the topic of the competition, are peer-reviewed and have positive reviews.

29 citations of works are presented, distributed as follows:

- In Scopus - (B13);
- In peer-reviewed scientific journals [(B1), (B2), (B3), (B4), (B5) - cited 2 times, (B6) - cited 2 times, (B7) - cited 4 times, (B8) - cited 2 times, (B9) - cited 2 times, (B10) - cited 2 times, (B13) - cited 2 times, (B15) - cited 2 times, (B16) - cited 3 times, (B17), (B24) - cited 2 times, (D6)].

#### **4. Significance of contributions to science and practice**

I appreciate that there are significant scientific, applied and applied contributions. They enrich the theory and engineering practice in the field of the announced competition in "Technology of Mechanical Engineering".

The citations mentioned above speak of the recognition of the candidate by the scientific circles at home and abroad.

They are fully complied with, as the quantitative indicators of the criteria for holding the academic position of "Associate Professor" are exceeded.

#### **5. Critical remarks and recommendations In the works of the candidate**

I did not find omissions of a fundamental nature - such as literary ignorance, wrong statements, incorrect methodology, incomplete analysis or incorrect summary of the results. There are comments of a secondary nature, which should be accepted as recommendations for the future work of the candidate. For example: Not every publication clearly distinguishes the scientifically applied contributions, which are generally given in the conclusions.

#### **CONCLUSION**

***Based on the in-depth acquaintance with the presented scientific works, their significance for science and engineering, sufficient scientific, scientific-applied and applied contributions have been received. Based on the above, I convincingly suggest to the scientific jury to evaluate positively the materials presented in the competition and proposed to the faculty scientific committee to choose Dr. Tanya Georgieva Avramova to hold the academic position of "Associate Professor" in the professional field 5.1 Mechanical Engineering in "Mechanical Engineering Technology"***

Date: 21.10.2020.

JURY MEMBER:

(Prof. Dr. Eng. Dimcho Chakarski)