

## OPINION

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concerning materials submitted for participation in competition for awarding the academic position of “Associate professor”  
in the area of higher education - 5. Technical Sciences,  
in professional field 5.1. Mechanical engineering,  
scientific major “Technology of textile materials”

In the competition for associate professor, announced in the State Gazette, issue 55/27.06.2023 and on the official website of TU-Gabrovo for the needs of the department of “Industrial Design and Textile Engineering” at the Faculty of Mechanical and Precision Engineering, participate Senior Assistant Borislav Tsonev Stoyanov, PhD – Technical University of Gabrovo as single candidate.

### **1. Overview of content and results in the submitted works**

The submitted works for participation in the competition include 1 monograph (B.3) on the topic "Laser marking of textile materials", 10 scientific publications in publications that are referenced and indexed in world-renowned databases (Web of Science and/or Scopus) with scientific information (Г.7), 37 scientific publications in non-refereed peer-reviewed journals or in edited collective volumes (Г.8), 3 independent textbooks: "Testing of textile materials", "Machines and Processes in Spinning" and "Computer 3D modeling", all of University Publishing House "Vasil Aprilov", Gabrovo. The papers from Г.7 are co-authored, and in one of them the candidate is the first author [Г.7.1], and in those from Г.8, 10 are independent, and in 24 the candidate is the first author.

Scientific works are systematized in six thematic areas.

The publications in the first thematic area "Laser marking of textile materials" are devoted to the analysis of laser engraving technologies [Г.8.34], as a tool for creating fashion design, and in paper [Г.8.35] a microscopic analysis of cotton fabrics treated with a laser, examining the bleaching effects.

The second thematic area "Electron-beam processing" presents the results of generalized studies on structural changes and changes in the mechanical characteristics of compounds of dissimilar materials by means of electron-beam processing [Г.7.2], [Г.7.3], [Г.7.4], [Г.7.6], [Г.8.37].

Publications in the third thematic area "Technology of textile materials" are related to studies of the influence of geometrical parameters on the dynamics of winding of conical windings of ring spinning machines [Г.8.20], of the conditions during formation of the winding body [Г.8.27], on the influence of preliminary preparation on fabric properties [Г.8.29], on the rate of moisture diffusion in terry fabrics depending on the time of treatment with different softeners [Г.8.30] and on other characteristics such as tensile strength, elongation at break and etc.

In a group of publications [Г.7.1, Г.8.13, Г.8.14, Г.8.15, Г.8.16, Г.8.17, Г.8.22, Г.8.25, Г.8.26] from the fourth thematic area "Machines and equipment for light industry", a device for winding yarn bodies with intersecting axes was analyzed and tensile forces in threads during winding were experimentally determined [Г.7.1 and Г.8.15]. In the other publications, the physical indicators of the yarns were investigated with consideration of the tensions during winding [Г.8.13], the magnitude of the signals received at the output of strain gauges, when loaded with reference weights, was measured [Г.8.16], analyzed the vibration loads [Г.8.17], a kinematic analysis of a coil mechanism of a ring spinning machine [Г.8.21] was carried out, different approaches to the construction of the initial winding of a modernized spinning machine

[Г.8.28] were analyzed under different laws of movement of the mechanism for winding conical coils [Г.8.31].

In the publications of the fifth thematic area "Theory of Mechanisms, Machines and Automatic Lines" based on spatial finite elements, a parametric model of links of a circular chain was developed taking into account the contact area between the chain links, the operation of the chain links when entering into mesh was analyzed with a chain wheel, taking into account the friction coefficients in which the mutual operation of the gear is improved [Г.8.5], the degree of influence and the dynamic loads that occurred [Г.8.7 and Г.8.8] were considered.

In the last thematic area "Electromechanics", the candidate has included five publications. In work [Г.8.9], the kinematics of a device for introducing 3D objects into a computing environment is defined, a design model of a device for 3D scanning is selected [Г.8.18], a block diagram for controlling the scanning device is developed [Г.8.19 ], a PLC software module was analyzed for controlling electromechanical systems for the realization of a cam-like law of motion [Г.8.23], a mathematical model was created to control the processes of winding and unwinding of tape material [Г.8.24].

I believe that the works presented for participation in the competition are in topical areas relevant to science and practice, and the candidate uses modern methods and means to solve the problems and achieve the relevant goals.

## **2. General description of candidate's activity**

### **2.1. Teaching and pedagogical activity (work with students and doctoral students)**

I assess the candidate's pedagogical training and his work as a teacher as corresponding to the level of the requested academic position on the basis of the following:

- Conducts lectures and laboratory exercises in the disciplines "Textile materials science", "Testing of Textile Materials", "Machines and processes in spinning", "Modern spinning methods", "Computer 3D modeling", "Modelling and Prototyping", "Computer Tools for Graphic Design", "Computer-interior Design", " Office and Retail Design" and "Individual Design Research", included in the curricula of specialties in the Faculty of Mechanical and Precision Engineering - full-time and part-time studies for the educational qualification degree "bachelor" and " master's degree".

Both his good theoretical and linguistic preparation and the accumulated rich practical experience as a designer and manager of industrial projects in "AMK Drive and Control" Ltd., Gabrovo, contribute to the high level of delivering lectures to students.

- He developed the curricula for the disciplines "Textile Materials Science", "Testing of Textile Materials", "Machines and Processes in Spinning", "Modern Spinning Methods", "Computer 3D Modeling", "Modelling and Prototyping", "Computer Tools for Graphic Design" and "Computer-Interior Design" for the specialty "Technology of Textile Materials".

- To ensure the educational process, he has published 2 textbooks, 1 book and 1 study aid.
- Actively participates in the renewal of the information and material base in the laboratories of the department and the faculty, which are used in the educational and research process.

### **2.2. Scientific and scientific-applied activity**

To participate in the competition, the candidate submitted 1 monograph, 47 scientific publications (journal articles and conference reports), of which 10 are in refereed and indexed editions (2 have an "impact factor" of 2.351 and 3.236, respectively, and the rest are with SJR in the SCOPUS database), which is an important proof of the high level of the candidate's scientific work. Of the 47 publications (articles and reports), 10 are independent and the rest co-authored, in 25 of which the candidate is the first author. 34 reports in scientific conferences are in Bulgarian, and the rest in English. He is the author of 2 textbooks, 1 book and 1 teaching aid. I

want to note the systematicity and methodical planning with which the candidate's publication activity is organized. This shows sustainability in terms of scientific development, commitment and serious interests in the field of the competition's subject matter.

The publications do not repeat the articles and reports on the acquisition of the PhD attached to the tender documentation.

In the list of citations for participation in the competition, 6 items are presented in scientific publications, referenced and indexed in world-famous databases with scientific information, and 9 items in non-refereed journals with scientific review. All this convincingly shows that the candidate's works are known to the scientific community at home and abroad.

The candidate has participated in 4 scientific and educational projects, 3 of which he was the leader of. Assistant Professor Borislav Stoyanov, PhD, has 5 useful models registered in the Patent Office - BG3214-U1, BG3503-U1, BG3564-U1, BG4048-U1 and BG4070-U1, and it should be emphasized that he is the first place in the team of inventors.

A summary of the minimum national requirements by groups of indicators for the academic position "associate professor" in the area of higher education - 5. Technical Sciences, in professional field 5.1. Machine engineering, and the evidence presented by the applicant is shown in the table:

Indicators	Minimum national requirements for the occupation of "Associate Professor"	Declared points by groups of indicators by the candidate
A	50	50
Б	-	-
B	100	100
Г	200	511,72
Д	50	83
E	-	31

The analysis of the data shows that the requirements of ZRASRB and PPZRAS have been exceeded in all groups of indicators. The minimum requirements of the Regulations for acquiring scientific degrees and occupying academic positions at Technical University - Gabrovo have also been fulfilled.

### **2.3. Implementation activity**

From the official notes presented, it is clear that the candidate has participated in a number of industrial projects in the following companies - "KARDENA-TEX" Ltd, YANTRA JSC, "AMK DRIVE AND CONTROL" Ltd and "ADTECH" Ltd, which is indisputable proof of his active implementation activity.

### **3. Contributions (Scientific, Scientific and applied, Applied). Significance of contributions to science and practice.**

I accept and positively evaluate the scientific-applied and applied contributions of the candidate, indicated in the statement of contributions prepared by him, but it is necessary to systematize, edit and summarize them. Contributions correspond to the professional direction and scientific specialty of the announced competition "Technology of textile materials".

I believe that the scientific and applied contributions contained in the candidate's works are relevant and significant for the development and enrichment of scientific research in the thematic areas in which he works. The works presented are of undeniable importance for practice with the necessary degree of applicability, as well as in the field of training through the presented

three independent teaching aids. Contributions can be attributed to the groups proving by new means of essential new aspects of already existing scientific fields, problems, theories, hypotheses; creating new classifications, methods, constructions, technologies and obtaining facts.

#### **4. Assessment of the personal contribution of the candidate**

The candidate's personal participation can be judged by the number of independent publications - 10, as in other 25 publications he is the first author, of a total of 47 publications presented in the competition. This gives me reason to say that the contributions are the personal work of the candidate or with his leading role.

#### **Critical remarks and recommendations**

I do not have any significant remarks to challenge the main scientific and applied contributions in the presented works of Assistant Professor Borislav Tsonev Stoyanov, Ph.D.

I recommend the candidate to concentrate his research activity in fewer thematic areas and to activate the work on prestigious national and international projects, including as a supervisor.

#### **Personal Impressions**

I do not know the candidate personally, but from the presented scientific works and precisely designed documents for participation in the competition, I believe that he is a responsible, highly qualified scientist and teacher. He enjoys authority among his colleagues at the university and specialists at home and abroad.

#### **5. Conclusion:**

**Based on my familiarity with the competition materials, my positive evaluations of the candidate's research, implementation and pedagogical activities, the relevance and significance of the achieved scientific and applied contributions, I offer assistant professor Borislav Tsonev Stoyanov, Ph.D., to be elected as an "associate professor", in the field of higher education - Technical sciences, professional field - Mechanical engineering, specialty - Technology of textile materials.**

Date: 30.10.2023

Jury member: /signature/  
/prof. Eng. Ivo Malakov, DSc/