

## **REVIEW**

**from D.Sc. Engineer Georgi Atanasov Mishev - professor**

of the materials submitted for participation in the competition  
to occupy the academic position of "associate professor"

**Paisii Hilendarski University of Plovdiv**

by: field of higher education 5. Technical sciences

professional direction 5.1 Mechanical engineering (Automation of engineering work and automated design systems)

In the competition for "associate professor", announced in the State Gazette, no. 32 of 09.04.2024 and on the website of Plovdiv University "Paisiy Hilendarski" for the needs of the Department of "Mechanical Engineering and Transport" at the Faculty of Physics and Technology, as a candidate, ch. assistant Dr. Eng. Emil Georgiev Velev from the Department of "Mechanical Engineering and Transport" at the same faculty.

### **1. General presentation of the received materials**

#### **Subject:**

By order No. PRD-21-1415 of 07.08. 2024 of the Rector of Plovdiv University "Paisiy Hilendarski" (PU) I have been appointed as a member of the scientific jury of competition for the academic position of "associate professor" at the PU by field of higher education 5. Technical sciences, professional direction 5.1 Mechanical Engineering (Automation of engineering work and systems for automated design), announced for the needs of the Department of Mechanical Engineering and Transport at the Faculty of Physics and Technology.

He has submitted documents for participation in the announced competition Ch. assistant Dr. Eng. Emil Georgiev Velev from the Department of "Mechanical Engineering and Transport" at the same faculty.

Presented by Dr. Eng. Emil Georgiev Velev. a set of materials on paper is in accordance with the Regulations for the Development of the Academic Staff of the PU, and includes the following documents:

1. application for admission to the competition;
2. resume;
3. a higher education diploma with an acquired educational and qualification degree "master" with an application;

4. diploma for educational and scientific degree "doctor";
5. list of scientific works;
6. list of citations;
7. certificate of compliance with minimum national and additional faculty requirements;
8. annotations of the materials under Art. 65. from PRASPU;
9. self-assessment of contributions;
10. declaration of originality and authenticity of the attached documents;
11. certificate of work experience;
12. documents for academic work;
13. documents for research work;
14. Other documents

The candidate. Eng. Emil Velev has attached a total of 24 scientific works, 1 monograph and a list of 2 research papers list developments. Accepts for review 21 scientific papers that are not the dissertation and 2 research projects. 3 research papers on the dissertation are not reviewed, but are taken into account in the final evaluation. The distribution of scientific works by relevant headings, in the country and abroad, is as follows: abroad – 2 nos. and in the country – 19 items. Documents (in the form of official notes) for participation and implemented developments in 2 research projects were also presented. I have no comments on the submitted documents.

## **2. Brief biographical data of the applicant**

Dr. Emil Velev was born on May 14, 1964. He received his secondary education at a French college in Tunis. He completed his higher education at TU Sofia, Plovdiv branch with two master's degrees: "Technology of mechanical engineering and metal cutting machines" and "Computer systems and technologies". In 2015, he successfully defended his dissertation and obtained the scientific and educational degree "doctor". Since 2016, Dr. Velev has been an assistant and chief assistant in the Department of Mechanical Engineering and Transport at the Faculty of Physics and Technology, headquartered in Smolyan. For most of his career, Dr. Velev worked in machine-building companies as a designer of tooling and a programmer and adjuster of CNC machines. At the University, he gives lectures and conducts exercises in the main disciplines for the majors "Mechanical engineering and technology" and "Automotive technology". His professional, pedagogical and scientific experience make him one of the leading teachers in the Department of "Mechanical Engineering and Transport" and fully coincides with the announced competition for associate professor.

## **3. General characteristics of the applicant's activity**

### ***Assessment of educational and pedagogical activity***

Ch. Emil Velev, assistant professor, gives lectures in 4 disciplines: Processing of metals by plastic deformation; Programming and setting of metal cutting machines with digital program control; Automation of engineering production and Heat treatment of metals. Conducts laboratory exercises in 10 disciplines.

Under his leadership, 7 students defended their theses: 4 in the bachelor's degree and 3 in the master's degree. He is an active participant in the international project No. BG05M2OP001-2.016-0026. During the academic year 2022/23, he supervised 12 master's students on a 3-month course at the University of Craiova - Romania.

He was the leader of a student project "Design, analysis and fabrication of CNC router rotary table realizing the fourth and fifth axis", which increased the capabilities of the existing router.

This short reference shows a good relationship between teacher and students.

In the presented materials from Ch. assistant professor Dr. Emil Velev does not have study materials (written textbook, manual for laboratory exercises, notes) to be used by the students.

### ***Evaluation of the candidate's scientific and scientific-applied activity***

The candidate. Eng. Emil Veleveh as attached a total of 24 scientific works, 1 monograph and a list of 2 research papers list developments. Three of these scientific papers were used in the defense of the doctoral dissertation and are not subject to peer review. Publications can be classified according to the following characteristics:

- Articles - 10 pcs.; reports – 11 pcs.;
- Articles in publications with an impact factor - 3 items;
- By place of publication: in refereed international journals – 3 copies; articles in national magazines - 7 items; reports in proceedings of international scientific conferences in Bulgaria - 6 nos.; reports in proceedings of national scientific conferences - 5 pcs.;
- According to the language in which they were written: in Bulgarian - 12 items; in other languages – 9 pcs.;
- By number of authors: independent - 10; with one co-author - 1 piece; with two co-authors - 1 item; with three or more co-authors - 9 nos.

The monograph "Production of metal parts using additive technologies" I do not review, as I have reviewed it for publication. I would like to point out that this is the first book published in Bulgaria that deals with the latest technologies for the production of metal parts - 3D printing. It

indicates the origin and development of 3D printing to the present day and the author's results of research into the process.

### **Author Contributions:**

From the theoretical and experimental research carried out by Dr. Emil Velev, the following main scientific and applied contributions can be formulated:

#### ***a) Scientific contributions***

1. Method for the construction of a gerotor hydromachine are proposed, determining the dimensions of the rollers, improving the technical parameters of a hydromotor, by changing the profile of the gerotor pair, as well as deciphering the gerotor gear pair [G 8.2].

#### ***b) Scientific and applied contributions***

1. Method for the construction of a gerotor hydromachine are proposed, determining the dimensions of the rollers, improving the technical parameters of a hydromotor, by changing the profile of the gerotor pair, as well as deciphering the gerotor gear pair [G 8.1], and [G 8.3];
2. The processes of cavitation in hydromotors have been clarified by using computer simulation [G 8.13];
3. New types of gear pairs for gerotor hydromotors are proposed, as well as a methodology for their generation [G 8.1], [G 8.2];
4. Methods have been proposed to reduce the impact of plastic parts, by using such extracted from sustainable extracted materials [G 8.4], [G 8.5];

#### ***c) Applied Contributions***

1. Methods for the use of different types of plastic with the same tool are proposed by using the SolidWorks finite element analysis program [G 8.7], as well as the influence of the inlet diameter on the injection molding process [G 8.12.];
2. A practical method for restoring a gerotor pump used in car hydraulic boosters is proposed [G 8.14];
3. The advantages of additive manufacturing in mechanical engineering have been confirmed, as well as its advantages over conventional manufacturing of details [G 8.6].

Bearing in mind that 10 of the presented publications are independent, there is no separation protocol of the collective publications, i.e. participation is equal, I believe that the contributions are the personal work of Dr. Emil Velev.

The candidate's scientific works have been cited in 20 scientific publications as follows:

- in journals with an impact factor – 4 items;
- national conferences with international participation - 4 pcs.;
- in international conferences abroad – 3 pcs.;
- in books and monographs – 7 items;
- in national conferences – 2 pcs.

All citations are after a defended doctoral dissertation, 3 of them are from a member of the working group. Citations are extensive and positive.

All the candidate's contributions are in significant areas of science and practice - additive technologies, modern constructions, increasing the operational resource of facilities. Dr. Eng. Emil Velev is a recognized specialist among the scientific circles at home and abroad in the field of additive technologies, programming and setting up CNC machines, CAD/CAM systems, etc.

All this gives me reason to claim that all the quantitative indicators of the criteria for occupying the academic position of "associate professor" have been met.

#### ***Implementation activity***

A service note for participation in 2 research projects is presented. No data on implemented developments.

### **5. Evaluation of the candidate's personal contribution**

Dr. Eng. Emil Velev participated in the competition with 21 scientific works and one monograph. By number of authors: independent - 10; with one co-author - 1 piece; with two co-authors - 1 item; with three or more co-authors - 9 nos. Since no split protocol of the general publications is presented, I assume that the participation of all participants is equal.

The contributions noted in the review are: 7 nos. from independent publications; 1 pc. with one co-author and 3 nos. with two co-authors.

All this gives me reason to consider that the personal contribution in the publications and the personal merit in the formulated contributions of Dr. E. Velev is indisputable.

### **6. Critical remarks and recommendations**

I have the following critical remarks about the candidate:

1. The designations of the list of scientific works and the list of abstracts of the works do not match, and this makes it difficult to review them;
2. The list of citations is not complete:
  - Position 10 is not indicated where it is cited;

- It is not indicated where the articles with position 12, 13, 14 and 15 were published, in which the publication with position 11 is cited;
- 3. The obtained result is not visible in some of the articles - D8.4, D8.6, etc.;
- 4. Contributions are not research, computer simulation, but obtained results.

I have the following recommendation: as soon as possible, Dr. Velev should prepare and issue a paper textbook and a Manual for laboratory exercises in MM with CNC.

## **7. Personal impressions**

I have known Mr. Emil Velev since I was a student at TU Sofia, Plovdiv branch. Even then, he showed a great interest in the innovations in mechanical engineering. He started his career as a tool builder, then specialized in programming and setting up CNC machine tools.

As a teacher in the Faculty of Physics and Technology - an external unit in Smolyan - he enjoys the respect of his colleagues and students. Able to work in a team. Everyone appreciates him as a very great professional.

## **CONCLUSION**

The documents and materials presented by chap. assistant professor Emil Georgiev Velev, PhD, meets all the requirements of the Law on the Development of the Academic Staff of the Republic of Bulgaria (LADAPB), the Regulations for the Implementation of the LADAPB and the relevant Regulations of the PU "Paisii Hilendarski"

The candidate in the competition has submitted a sufficient number of scientific works published after the materials used in the defense of the Educational Science Degree "Doctor". The candidate's work includes original scientific-applied and applied contributions that have received national and international recognition, some of which have been published in journals and scientific collections issued by academic publishing houses. The candidate's theoretical and experimental developments have practical applicability. Some of them are also oriented towards the learning process. The scientific and teaching qualifications of Dr. Emil Velev are at a very high level and there is no doubt.

The results achieved by Dr. Emil Velev in his research and teaching activities fully correspond to the minimum national and university requirements.

After getting acquainted with the materials and scientific works presented in the competition, analyzing their significance and the scientific-applied and applied contributions contained in them, I find it reasonable to give my positive assessment and to recommend the Scientific Jury to prepare a

report-proposal to the Faculty Council of The Faculty of Physics and Technology for the election of Dr. Eng. Emil Georgiev Velev to the academic position of "associate professor" at PU "Paisii Hilendarski" in: field of higher education 5. Technical sciences, professional direction 5.1 Mechanical Engineering (Automation of engineering work and automated design systems).

19.08. 2024

Reviewer: .....

(prof. D.Sc Eng. Georgi Mishev)