

# OPINION

by **Assoc. Prof. Eng. Daniela Antonova Shehova, PhD,**  
**University of Plovdiv „Paisii Hilendarski”**

on the materials submitted for the a Competition

for the academic position of **Associate Professor**

at Plovdiv University “Paisii Hilendarski”

in the field of higher education: 5. Technical sciences

Professional field: 5.1 Mechanical engineering;

Scientific specialty: Automation of engineering work and systems for automated design

In the competition for "Associate Professor", announced in the State Gazette, issue 32 of 9 th April 2024 and on the website of the University of Plovdiv "Paisii Hilendarski", for the needs of the "Mechanical Engineering and Transport" Department at the Faculty of Physics and Technology, as a candidate participates **Ch. Assistant Professor Eng. Emil Georgiev Velev**, from the Faculty of Physics and Technology of Plovdiv University "Paisii Hilendarski" has applied..

## **1. General overview of the procedure and the candidate**

By order No. PD-21-1415 of 08.07.2024. of the Rector of the Plovdiv University "Paisii Hilendarski" (PU) I was appointed as a member of the scientific jury of a competition for the academic position of "**Associate professor**" in PU in the field of higher education 5. **Technical sciences**, professional field **5.1. Mechanical engineering**, scientific specialty **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.

Those presented by Ch. Assistant Professor Emil Georgiev Velev, Ph.D., documents and materials on paper and electronic media are in accordance with the Regulations for the Development of the Academic Staff of Plovdiv University "Paisiy Hilendarski".

Ch. Emil Georgiev Velev, assistant professor, Ph.D., graduated from 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 defended his doctoral dissertation on the topic "Development and research of new cycloidal gear pairs for gerotor hydromotors" for the acquisition of the National Academy of Sciences "Doctor". Dr. Eng. Emil Velev started working as an assistant in 2016 at the Paisii Hilendarski Polytechnic, Faculty of Physics and Technology, Department of Mechanical Engineering and Transport. Dr. Eng. Emil Velev is a specialist in the field of product design, tooling and mechanical engineering training methodology.

I know Ch. Assistant Professor Emil Velev, Ph.D., since he joined the Faculty of Physics and Technology in 2016. My personal impressions of our joint work show that he is a respected teacher, an excellent professional, a good colleague with teamwork skills.

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

For participation in the competition for the academic position "Associate Professor", the candidate ch. Assistant Professor Emil Velev, Ph.D. Eng., presented a monographic work, two scientific research works and 21 scientific publications outside of the dissertation, of which 3 are referenced and indexed in world-renowned scientific information databases (Scopus) and 18 scientific publications in non-refereed peer-reviewed journals or in edited collective volumes.

The presented independent monographic work "Production of metal parts using additive technologies" has a volume of 189 pages. It was published by FastPrintBooks publishing house in 2024 with ISBN 978-619-236-514-1 and was reviewed by Prof. Eng. Georgi Atanasov Mishev and Assoc. Prof. Eng. Velko Rupetsov. 71 literary sources are cited, of which 4 are scientific works of Ch. Assistant Dr. Emil Velev. The presented scientific work meets the basic requirements for a monograph. The content corresponds to the theme of the contest.

The scientific publications presented in the competition can be classified as follows: 12 in Bulgarian and 9 in English; in international scientific conferences abroad - 2 copies; in international conferences in Bulgaria – 9 issues, of which 1 issue in Bulgarian Chemical Communications c SJR (2021)=0.0.17 and IF (2021)= 0.359; in national conferences in Bulgaria – 10 issues.

The candidate's independent scientific publications are 10, and 11 of the publications are with two or more co-authors.

The candidate in the competition covers the minimum required points by groups of indicators for the academic position "docent" (in groups D and D exceeds the minimum national requirements): defended dissertation on the topic: "Development and research of new cycloid gear pairs for gerotor hydromotors" (indicator A - 50 items); monograph "Manufacturing of metal parts using additive technologies". (indicator B -100 points); 24 citations (group of indicators D - 79 items, by author's reference), of which 4 citations in scientific publications, referenced and indexed in world-famous databases with scientific information, 7 citations in monographs and collective volumes with scientific review and 9 citations in non-refereed peer-reviewed journals.

Ch. Emil Velev, assistant professor, participated in 2 national research projects. He has implemented outgoing mobility at the Technical University of Craiova, Romania in the period from September - December 2023 under the project BG05M2OP001-2.016-0026 AKADEKOS for the purpose of scientific research and teaching.

With regard to the educational and pedagogical activity ch. assistant professor Emil Velev has experience as a teacher for more than 8 years in the specialties "Mechanical Engineering and Technologies" and "Automotive Technology" at the Faculty of Physics and Technology of the PU "Paisiy Hilendarski". It is clear from the presented references for academic work that he participated in the development and updating of the curricula of the above-mentioned specialties for the Bachelor's and Master's degrees. Ch. assistant professor Dr. Velev leads lectures and exercises on specialized disciplines in the same majors for OCS "Bachelor" and OCS "Master". In his extra-audit activity ch. assistant professor Emil Velev, Ph.D., has successfully defended 7 graduate students and reviewed 6 theses.

Formulated contributions by the candidate in the presented works are of a scientific, scientific-applied and applied nature.

- **Scientific contributions:**Methods for constructing a roller hydromachine have been developed, 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 [D 8.1], [D 8.2] and [D 8.3]; The possibilities of reducing the impact of plastic parts by using such extracted from sustainable extracted materials have been studied [D 8.4], [D 8.5]; The processes of cavitation in hydromotors were studied by using computer simulation [D 8.13].

- **Scientific and applied contributions:**New types of gear pairs for gerotor hydromotors have been proposed, as well as a methodology for their generation [D 8.1], [D 8.2].

- **Applied Contributions:**The possibility of using different types of plastic with the same tool was investigated. SolidWorks finite element analysis program is used [D 8.7], as well as the influence of the inlet diameter on the injection molding process [D 8.12.]; A practical approach to rebuilding a

gerotor pump used in automotive power amplifiers is developed and illustrated. A methodology for restoring the gerotor pump of automotive hydraulic boosters is presented [D 8.14]; The advantages of additive manufacturing in mechanical engineering are shown, as well as its advantages over conventional manufacturing of details [D 8.6].

The analysis of the scientific production of ch. Assistant Professor Emil Velev gives me reason to believe that the authenticity of the contributions is unquestionable and that they are definitely his personal work. The candidate's personal contribution is clearly expressed. The scientific, scientific and applied contributions in the works of Ch. Assistant Professor Emil Velev, Ph.D., are sufficient to meet the requirements for holding the academic position of "Associate professor".

### 3. Critical remarks and recommendations

I have no serious remarks and recommendations to the presented materials. I only note the following:

- the candidate could refine the wording of the contributions in the submitted works;
- I would recommend the candidate to devote more time to publishing and summarizing his research results in serious international journals and publishing houses;
- no official documents have been submitted for the candidate's participation in scientific research projects;
- some posts lack motivation, purpose, tasks, contributions.

### CONCLUSION

The documents and materials presented by **Chief Assistant Professor Eng. Emil Georgiev Velev, Ph.D.**, meets all the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria (LDASRB), the Regulations for the Implementation of the LDASRB and the respective Regulations of Plovdiv University Paisii Hilendarski.

After my acquaintance with the presented materials and scientific works and the contributions contained in them - scientific, scientific-applied and applied, I find it reasonable to give my **positive opinion** and to recommend the Scientific Jury to prepare a report-proposal to the Faculty Council of the Physics and Technology faculty for the election of **Chief Assistant Professor Eng. Emil Georgiev Velev, Ph.D.**, in the academic position of "**Associate professor**" at PU "Paisii Hilendarski" in: field of higher education **5. Technical sciences**, Professional field 5.1. Mechanical engineering, and the scientific specialty „Automation of engineering work and systems for automated design”.

August 26 th, 2024

The opinion was prepared by: .....

(Assoc. Prof. Eng. Daniela Shehova, PhD)