

## REVIEW

**By Dr. Eng. Nevena Stoyanova Mileva - Professor at the University of Plovdiv**

**"Paisii Hilendarski"**

of the materials submitted for participation in a competition  
to occupy the academic position "**Professor**"  
**at Plovdiv University "Paisii Hilendarski"**

by: field of higher education 5. Technical sciences professional field 5.1. Mechanical engineering  
(Automation of engineering labor and systems for automated design)

In the competition for "professor", announced in the State Gazette, issue 96 of 17.11.2023 and on the website of Plovdiv University "Paisii Hilendarski" for the needs of the Department of Mechanical Engineering and Transport at the Faculty of Physics and Technology, as a candidate participated Assoc. Prof. Slavi Yasenov Lyubomirov from Plovdiv University "Paisii Hilendarski"

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

By Order No RD-21-385 of 16.02.2024 of the Rector of Plovdiv University "Paisii Hilendarski" (PU) I was appointed a member of the scientific jury of a competition for the academic position of "**professor**" in the University of Plovdiv in the field of higher education 5. Technical sciences, professional field 5.1. Mechanical engineering (Automation of engineering labor and systems for automated design), **declared for the needs of** Department of Mechanical Engineering and Transport at the Faculty of Physics and Technology.

For participation in the announced competition are submitted documents from **a single candidate:**

Ass. Prof. Dr. Slavi Yasenov Lyubomirov from Plovdiv University "Paisii Hilendarski".

The set of paper materials presented by Assoc. Prof. Dr. Slavi Yasenov Lyubomirov **is** in accordance with the Rules for the Development of the Academic Staff of Plovdiv University and includes the following documents: application form to the Rector for admission to the competition; CV by European format; copy of a higher education diploma with acquired educational and qualification degree "Master"; copy of diploma for educational and scientific degree "Doctor"; copy of a certificate of academic position "Associate Professor"; a list of scientific works; scientific works (copies of publications); a reference to compliance with the minimum national requirements; a declaration of originality and authenticity of the attached documents; annotations of the materials under art. 76. of PRASPU (in Bulgarian and English); self-assessment of contributions; list of citations; a document of work experience; documents for educational work; research documents;

documents for participation in research projects and other documents such as certificates; certificates, etc.

Prof. Dr. Slavi Yassenov Lyubomirov has applied a total of 93 scientific papers, 1 monograph, 1 book, 7 textbooks and teaching aids and a list of 14 research developments. 1 habilitation work – monograph, 52 scientific papers that are outside the dissertation and are reported in the final assessment, 1 textbook, 1 teaching tool and participation in 14 research projects are accepted for review. Not reviewed from the list; dissertation for acquiring the scientific and educational degree – PhD, 7 scientific papers on the dissertation, textbooks and teaching aids - 5 pieces, 1 book on the basis of a defended dissertation for the award of educational and scientific degree "Doctor" and 33 scientific papers for the academic position of Associate Professor. The distribution of scientific works under relevant headings, in the country and abroad, is as follows 25 are presented abroad and 27 are represented in the country. A list of 41 noticed citations outside those used for the academic position of associate professor is presented. Documents (in the form of official notes) for a published patent or utility model application are also presented. It has a registered utility model with reg. №4664.

## **2. Short biographical details of the candidate**

Ass. Dr. Slavi Lyubomirov was born in 1970. Since 1999 he has been a Master of Engineer in "Computer Systems" with a specialization in "Information Technologies" from the Technical University of Sofia - Plovdiv Branch. In 2013 he defended a dissertation on "Research of apparatus and software tools for digital relay defenses" and acquired the educational and scientific degree "Doctor" in scientific specialty 5.2. Electronics, Electrical Engineering and Automation from the Technical University – Sofia. He started his work in 2002 as an assistant at the Technical College of Smolyan at Plovdiv University "Paisii Hilendarski".

Since 2015. until now he holds the academic position of Associate Professor at Plovdiv University "Paisii Hilendarski".

The professional biography of Assoc. Dr. Slavi Yassenov Lyubomirov gives me reason to believe that he has serious scientific and teaching experience in the field of the competition.

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

### *Evaluation of educational and pedagogical activity*

From the materials submitted for participation in a competition for occupying the academic position "professor" of Assoc. Dr. Slavi Lyubomirov is evident that he has published 1 habilitation work – a monograph "Digital Tools and Systems for Automated Design in Mechanical Engineering". He is the author of 1 textbook and one teaching tool. The 10 project-based e-courses developed by

him are used for the training of students at the Faculty of Physics and Technology of Plovdiv University "Paisii Hilendarski".

Ass. Dr. Slavi Lyubomirov actively participates in the development and updating of curricula for a number of specialties from the Faculty of Physics and Technology for the Bachelor's and Master's Degree and the Doctor's National Assembly. He is a coordinator of several curricula for specialties from the faculty.

Since 2015 he has participated in working teams that have produced the documentation on program accreditations, internal and external audits at the Faculty of Physics and Technology.

Ass. Dr. Slavi Lyubomirov has provided a reference for work with undergraduates and PhD students, which shows that he has defended 26 graduates and 27 reviews of thesis. There are 38 publications with the participation of undergraduates and PhD students. He is a supervisor of 4 doctoral students.

This is proof of his undeniable teaching qualifications and high professional qualities.

*Evaluation of the scientific and applied activities of the applicant*

Ass. Dr. Slavi Lyubomirov presents 1 habilitation work – a monograph, which is dedicated to the current topic of digital tools and systems for automated design in mechanical engineering. Emphasis is placed on the main theoretical and practical engineering activities for automated design. The scientific paper presents the modern aspects of automated design systems. The practical possibilities of CAD/CAM systems in the development of parts with complex geometric shape using specialized software are discussed. The monographic work has a volume of 218 pages.

The distribution of scientific works by relevant rubrics, in the country and abroad, is as follows: 11 scientific publications in editions that are referenced and indexed in world-famous databases of scientific information and are published in Web of Science and Scopus. of group D7.1. to G7.11. 41 scientific publications are presented in non-refereed journals with scientific review or in edited collective volumes.

The submitted scientific works of the applicant do not overlap his/her participation in other procedures.

Publications can be classified by type (articles – 6 issues; reports – 46 issues); awarded publications – 1 issue, by place of publication (articles in refereed international journals – 6 issues, reports in works at international scientific conferences abroad – 19 issues; reports in works at international scientific conferences in Bulgaria – 16 issues; reports in works at national scientific conferences, sessions and seminars – 5 pieces; reports in scientific papers of universities – 6 pieces; by the language in which they are written; in English – 41 issues, in Bulgarian – 11 issues; by number

of co-authors; with one co-author – 7 copies; with two co-authors – 20 copies; with three or more co-authors – 25 copies).

*Contributions (scientific, scientific-applied, applied) and citations*

Based on the presented scientific publications by Assoc. Dr. Slavi Lyubomirov, it can be reasonably summarized that the main contributions are: scientific, applied and applied. In the monograph work, research has been done on precision sensors and actuators, which are closely oriented and used in industrial automation. Studies are presented on: photoraster converter, rotary magnetic coders, DC electric drive with step input interface and power unit operating in current source mode with relay regulator, the dynamics of a coordinate table with numerical program control. In the fourth chapter a methodology for automated design of fixtures under the conditions of CAD environments is presented. The product "connecting rod" is designed using CAD/CAM software SolidWorks 2019, and the approaches in 3D modeling of the workpiece are presented. The product "connecting rod" is designed using CAD/CAM software SolidWorks 2019, and the approaches to the modeling of the workpiece are presented. In a final chapter of the monograph, material testing of 3D printed prototypes has been performed to provide both industrial and academic communities with foundations for improving mechanical and digital design in the context of additive manufacturing .

The contributions formulated by publications in refereed editions, list D7 can be summarized as follows:

*Scientific contributions*

1. Electronic systems have been developed to improve the harmful emissions of cars. Implemented and tested experimental methodology to study various engine malfunctions to prove their effect on harmful emissions from the car [G8.15], [G8.16], [G8.24], [G8.26], [G8.27] and [G8.29], etc.

*Scientific and applied contributions*

1. Design, print, scan and study the properties of materials for additive manufacturing in 3D printing [G8.39]. The research focuses on molten deposition modeling (FDM) for the production of prototypes. A comprehensive analysis of scanning techniques [G7.8], [G7.9], [G7.11] and [G8.4] was performed, a 3D virtualized three-dimensional object from an existing building was generated through the Blender software, which was successfully interfaced with virtual reality tools [G8.38]. Implementation of 3D printing in the automotive industry through the process of design and manufacture of a functional part of the vehicle [G8.37], etc.

*Applied contributions*

1. The principles and capabilities of Controllino PLC as a means of control and management of automated processes as well as prototypes for industrial purposes are explored [G8.10].
2. A practical approach to restoring a gerrotor pump used in hydraulic car amplifiers has been developed and illustrated. A methodology for recovering a gerrotor pump of automotive hydraulic amplifiers is presented [G8.35].
3. A methodology for automated design of devices in CAD environments used in the training of students from mechanical engineering specialties is presented, prototypes of the models using 3D printer Creat Bot PEEK – 300 [G8.40] and [G8.41] are created, etc.

The candidate has submitted a list of noted citations – 41 pieces, beyond those used for the academic position of associate professor. From the presented reference of the citations it is noticeable that 21 quotes are from foreign authors. The information about citations in scientific publications, referenced and indexed in world-famous databases of scientific information Web of Science and Scopus by year is as follows: for 2020 5 citations; for 2021, 12 citations; for 2022 8 citations and for 2023 2 citations. A total of 27 citations in Web of Science and Scopus over the past 4 years. The remaining 14 citations are in collective volumes with scientific review and in unrefereed journals with scientific review. Three quotes with the Impact Factor.

In the specified number of quotes, there are no auto quotes, which is a good testimonial.

The comparison between the table "Minimum national requirements" for opening a procedure for occupying the academic position of "professor" in professional fields and the table presented by the candidate Assoc. Dr. Ing. Slavi Lyubomirov (8. Reference for the minimum national requirements – Annex 1) confirms that the presented table fully meets the minimum national requirements. This statement of satisfied minimum national requirements is presented with evidence in the documents of this competition. The quantitative indicators of the criteria for occupying the academic position "professor" in all indicators of the minimum national requirements are met.

#### *Implementation*

An application has been submitted by the Patent Office of the Republic of Bulgaria for utility model registration. Ass. Dr. Slavi Lyubomirov put into practice a number of results from his scientific work in the construction of the laboratory base of the Faculty of Physics and Technology.

#### **4. Assessment of the applicant's personal contribution**

I believe that the personal contribution of Assoc. Dr. Slavi Lyubomirov in the publications presented to the scientific community is indisputable and substantial. I believe that to a large extent the contributions formulated by the candidate and the results obtained are his personal merit. I am

convinced that the scientific, scientific, applied and applied contributions in the works of the candidate fully meet the requirements for occupying the academic position of "professor".

No distributive protocol has been presented, but there is no reason to doubt the active participation of Assoc. Dr. Slavi Lyubomirov in the publications presented by him.

### **5. Critical remarks and recommendations**

The candidate's performance in the competition is convincing, but I also have some insignificant remarks and recommendations that do not reduce the importance of the results obtained.

I would recommend to the candidate:

- more precisely to derive and systematize and summarize the candidate's contributions;
- to devote more efforts to summarizing and publishing their research results in independent publications in journals with a high impact factor;
- To try for the real application in industry and business at the undoubtedly high level of the presented developments.

### **6. Personal impressions**

I know Doc. Dr. Slavi Lyubomirov approximately since 2014. Responsibly approaches his teaching activities, constantly updates the content of the teaching material in the disciplines he teaches. He actively participates in the program accreditations of several professional fields from the Faculty of Physics and Technology.

My general impressions of his appearances at scientific forums, collegiate conversations and discussions on educational and scientific issues are excellent as a lecturer and scientist. I believe that he is an excellent teacher with good research potential.

### **CONCLUSION**

The documents and materials presented by Assoc. Prof. Dr. Slavi Yasenov Lyubomirov meet all the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria (RASRB), the Regulations for the Implementation of the Law on the Implementation of the Law on Combating Organized Crime "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 PhD and scientific papers for the academic position of Associate Professor. In the works of the candidate there are original scientific and applied contributions that have received international recognition as a representative part of them have been published in journals and scientific collections issued by international academic publishers. His theoretical works have practical applicability, some of which are directly oriented towards the

teaching work. The scientific and teaching qualification of Assoc. Prof. Dr. Slavi Lyubomirov cannot be questioned.

The results achieved by Assoc. Prof. Dr. Slavi Yassenov Lyubomirov in the academic and research activities **fully** comply with the minimum national and additional requirements of the Faculty of Physics and Technology, adopted in connection with the Rules of the University for the Application of the Law on Educational Research.

After familiarization with the materials and scientific works presented in the competition, analysis of their significance and contained in them scientific, scientific-applied and applied contributions, I find it reasonable to give my **positive** assessment and recommend to the Scientific Jury to prepare a report-proposal to the Faculty of Physics and Technology at Plovdiv University "Paisii Hilendarski" for the selection of Assoc. Prof. Dr. Slavi Yassenov Lyubomirov to the academic position "Professor" at Plovdiv University "Paisiy" Hilendarski" by: field of higher education 5. Technical sciences, professional field 5.1. Mechanical engineering (Automation of engineering labor and systems for automated design).

5 April 2024

Reviewer:.....

*(Prof. Dr. Ing. Nevena Mileva)*