

REVIEW

by Eng. Dimitar Mihaylov Tokmakov, Ph.D

Professor at the ECIT department, Faculty of Physics and Technology,

University of Plovdiv "Paisii Hilendarski"

Of the materials submitted to the competition for the academic position of professor

at University of Plovdiv „ Paisii Hilendarski“

by: field of higher education: *5 Technical sciences*

Professional field: 5.1. Mechanical engineering

(Engineering automation and automated design systems)

In the competition for the academic position "professor" announced in the State Gazette, no. 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. Dr. Slavi Yassenov Lyubomirov from Plovdiv University "Paisii Hilendarski".

1. General description of the presented materials

By Order No. RD-21-385 of 16.02.2024 of the Rector of Plovdiv University "Paisii Hilendarski" (PU) I have been appointed as a member of the scientific jury of the competition for the academic position "Professor" in PU in the field of higher education 5. *Technical sciences*, 5.1. Mechanical Engineering (Automation of Engineering Work and Automated Design Systems), announced for the needs of the Department of Mechanical Engineering and Transport at the Faculty of Physics and Technology in the same university.

For participation in the announced competition, a single candidate submitted documents:

Prof. Dr. Slavi Yassenov Lyubomirov from Plovdiv University "Paisii Hilendarski".

The submitted by Assoc. Prof. Slavi Yassenov Lyubomirov set of materials on paper is in accordance with the Regulations for the Development of the Academic Staff of University of Plovdiv , and includes the following documents: application form to the Rector for admission to the competition; CV in European format; copy of the diploma of higher education with the Master's degree; copy of the diploma of the PhD degree; a copy of the certificate for the academic position "Associate Professor"; a list of scientific works; scientific works (copies of publications); a statement of compliance with the minimum national requirements; a statement of originality and authenticity of the attached documents; annotations of the materials under Art. 76. of the PRASPU (in Bulgarian and English); self-assessment of contributions; list of citations; document for work

experience; documents for academic work; documents for research activity; documents for participation in research projects and other documents such as certificates, etc.

The candidate Assoc. Prof. Dr. Slavi Yasenov Lyubomirov has submitted 93 scientific papers, 1 monograph, 1 book, 7 textbooks, teaching textbook, and a list of 14 research papers.

1 habilitation work - monograph, 52 scientific works which are outside the dissertation and are taken into account in the final evaluation, 1 textbook, 1 lab textbook and participation in 14 research projects are accepted for review.

Not reviewed from the list; the dissertation for the PhD degree, 7 scientific works on the dissertation, textbooks and teaching books - 5 pieces, 1 book based on a defended dissertation for the degree of PhD and 33 scientific works for the academic position of Associate Professor. The distribution of the scientific works under the relevant headings, at home and abroad, is as follows 25 are presented abroad and 27 are presented at home. A list of 41 noted citations beyond those used for the position of Associate Professor is presented.

2. Brief biographical details of the applicant

Assoc. Prof. Dr. Slavi Lyubomirov was born in 1970. Since 1999 he obtained a Master of Science Degree in Computer Systems Engineering with specialization in Information Technology, from Technical University of Sofia - Plovdiv Branch. In 2013 he defended his dissertation thesis on "Research of hardware and software for digital relay protection" and obtained PhD degree in the scientific specialty 5.2. Electronics, Electrical Engineering and Automation from the Technical University - Sofia. He started his professional activity in 2002 as an assistant professor at the Technical College - Smolyan at Plovdiv University "Paisii Hilendarski".

From 2015 until now, he holds an academic position "Associate Professor" at Plovdiv University "Paisii Hilendarski" in: field of higher education 5. Technical sciences, professional field 5.3. Communication and computer engineering.

The professional biography of Assoc. Prof. Dr. Slavi Yasenov Lyubomirov gives me grounds to conclude that the candidate has high educational and professional potential for research and teaching.

3. General description of the applicant's activities

In the last four academic years (2019-2023), the applicant has an average teaching load of 816.5 academic hours per year. He lectures on the courses "Application Programming for Mobile Devices", "Computer Architectures", "Web-based Systems" , "JAVA Programming" , "Data Communication and Computer Communications", "Electric Vehicles", "Design of Embedded Microcomputer Systems with Microcontrollers" , "Graphical User Interface Design - C#" , "Computer Networks" , "Hybrid Cars and Electric Vehicles", "Information Security", "Operating Systems" and "Electronic Systems in the Vehicle". For most of the lecture and practical courses, the candidate has developed corresponding e-courses in the DIPSEIL learning environment.

From the materials submitted for participation in the competition for the academic position "Professor" of Assoc. Prof. Dr. Slavi Lyubomirov it 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 one textbook and one lab textbook. The 10 project-based electronic courses developed by him are used for the training of students at the Faculty of Physics and Technology of University of Plovdiv "Paisii Hilendarski".

Assoc. Prof. Dr. Slavi Lyubomirov has provided a report on work with students and PhD students, which shows that he has students with defended 26 diploma theses and he has done 27 thesis reviews. There are 38 publications with the participation of students and PhD students.

He is scientific supervisor of four PhD students, two of whom have successfully defended. This is proof of his undeniable teaching qualifications and high professional qualities.

Assoc. Prof. Dr. Slavi Lyubomirov presents one habilitation thesis - a monograph, which is devoted to the current topic of digital tools and automated design systems in mechanical engineering. The monographic work has a volume of 218 pages.

The distribution of the scientific papers by relevant headings, in the country and abroad, is as follows: 11 scientific publications in publications that are refereed and indexed in world-known databases of scientific information Web of Science and Scopus from group D7.1. to D7.11.

Forty-one scientific publications in non-refereed peer-reviewed journals or in edited collective volumes were submitted.

The candidate's submitted scientific works do not overlap his/her participation in other procedures.

The 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 proceedings of international scientific conferences abroad - 19 issues; reports in proceedings of international scientific conferences in Bulgaria - 16 issues; papers in proceedings of national scientific conferences, sessions and seminars - 5 issues; papers in proceedings of universities - 6 issues; by language in which they were written; in English - 41 issues, in Bulgarian - 11 issues; by number of co-authors; with one co-author - 7 issues; with two co-authors - 20 issues; with three or more co-authors - 25 issues).

Based on the presented scientific publications by Assoc. Prof. Dr. Lyubomirov, it can be summarized that the main scientific contributions are:

1. The structural optimization of a rod in a 1-cylinder in-line thermal engine was investigated. An ANSYS finite element analysis program is used and an optimal solution for the geometric shape of a reel is presented [D7.10].

2. Electronic systems have been developed to improve the harmful emissions of automobiles. Implemented and tested experimental methodology for researching 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].

3. A microprocessor smart device has been developed to measure current, voltage, electrical energy, power, power factor and phase angle. The measurement of current and voltage is carried out using a current and voltage sensor, converting them into analog voltage signals, which are fed to an Arduino Nano series microprocessor [D8.33].

4. Design, simulation, construction and research of a 28.8 kW photovoltaic system. The parameters of the photovoltaic plant were investigated. An analysis of the simulation data from the project was performed with the actual measured and obtained data [G7.4] and [G7.6].

5. A state-of-the-art real-time air quality monitoring IoT system tailored for smart cities has been developed and tested. Key system components include a single-chip microcontroller, air pollution sensors capable of measuring NO₂, CO, PM₁, PM₁₀ and PM_{2.5} levels, as well as Long-Range (LoRa) and GSM modems. To ensure a stable power supply, photovoltaics and a battery are integrated into the system [G7.7]

The candidate has formulated eight scientific and applied contributions and five applied contributions to multidisciplinary fields of modern science and technology that I consider significant.

The candidate has submitted a list of noticed citations - 41 pcs, apart from those used for the occupation of the academic position of Associate Professor. From the presented reference of citations, it is noticeable that 21 citations are from foreign authors. The information on citations in scientific publications, referenced and indexed in the world-famous scientific information databases 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 in the last 4 years. The remaining 14 citations are in peer-reviewed collective volumes and non-refereed peer-reviewed journals.

Three of the citations are in journals with high impact factor.

In the specified number of citations, there are no self-citations, which is a good certificate.

The comparison between the table "Minimum national requirements" for the procedure for occupying the academic position "professor" in professional field 5.1 and the table presented by the candidate Assoc. Prof. Dr. Eng. Slavi Lyubomirov (8. Reference for the minimum national requirements - Appendix 1) shows that the quantitative indicators of the criteria for occupying the academic position "professor" have been met according to all indicators of the minimum national requirements.

An application has been submitted by the patent office of the Republic of Bulgaria for the registration of a utility model: "System for purifying water in a swimming pool", for which application decision No. 4664 has been issued for registration of a utility model with authors Rumén Popov and Slavi Lyubomirov.

Assoc. Prof. Lyubomirov has presented a list of nine national and two international scientific and educational projects in which he is a member of the scientific team. Three national scientific projects of which the candidate was the leader are also presented.

Assoc. Prof. Lyubomirov has been a member of the Union of Scientists in Bulgaria, Smolyan branch since 2006, and since 2020 is the chairperson of SUB-Smolyan. The candidate has been a reviewer of reports and articles in scientific conferences and journals visible in the world-famous databases of scientific information - Scopus and Web of Science.

4. Evaluation of the candidate's personal contribution

Nearly 40% of the scientific works submitted for participation in the competition (articles in periodicals and reports from conferences) are the result of the candidate's work with the doctoral students supervised by him, which undoubtedly confirms that the presented results were achieved entirely with the participation of Assoc. Prof. Lyubomirov. Regarding the rest of the publications, given their subject matter and the candidate's leading position in the author's collective, as well as

the presented monograph, I also consider it the candidate's personal work. I believe that the personal contribution of Associate Professor Dr. Slavi Lyubomirov in the publications presented to the scientific community is indisputable and essential.

5. Critical remarks and recommendations

In the materials presented for participation in the competition, accuracy in the layout and precision in the speech is noticeable, which speak of high motivation and aspiration for self-improvement. I noticed only some small omissions (for example, the numbering of Project No. IT22 - FTF-001 was omitted), which I consider rather to be technical inaccuracies that do not diminish the significance of the achieved results. In the future, I recommend that the candidate continue his active research work with students and doctoral students, as well as publish articles in prestigious scientific journals with a high impact factor.

6. Personal impressions

I have known associate professor Dr. Slavi Lyubomirov for more than 15 years from our joint work as educators in various scientific disciplines at Technical College - Smolyan at University of Plovdiv "Paisii Hilendarski" and later as a colleague at FTF baza Smolyan.

My general impressions from his appearances at scientific forums are that he is very qualified as a professor and scientist with good research potential.

My personal impressions of his work are that he shows exceptional responsibility towards his work and colleagues. His purposeful work to support the development of young scientists and the improvement of communication and computer technologies to implement the concepts of sustainability and ecological stability ("Green thinking") show a high commitment to the problems of modern society, which I believe every teacher should to be sympathetic.

CONCLUSION

The documents and materials presented by Assoc.Prof. Dr. Slavi Yassenov Lyubomirov meet all the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria (ZRASRB), the Regulations for the Implementation of ZRASRB and the relevant Regulations of University of Plovdiv "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 degree, and not used in the competition for the academic position "associate professor". The candidate's works contain original scientific and scientific-applied contributions that have received international recognition. His theoretical developments have practical applicability, and some of them are directly oriented to the educational process. The scientific and teaching qualifications of Assoc. Prof. Dr. Eng. Slavi Lyubomirov meet the requirements of the competition. After getting acquainted with the materials and scientific works presented in the competition, analyzing their significance and the scientific, scientific-applied and applied contributions contained in them, I find it reasonable to give my positive assessment and recommend the Scientific Jury to prepare a report-proposal to the faculty

council of the Faculty of Physics and Technology at Plovdiv University "Paisii Hilendarski" for the election of Assoc. Prof. Dr. Slavi Yasenov Lyubomirov to the academic position of "Professor" at University of Plovdiv "Paisii Hilendarski" in: field of higher education 5. Technical sciences, professional field: 5.1. Mechanical Engineering (Automation of engineering work and automated design systems).

13.03.2024

Reviewer:.....

/prof. Dimitar Tokmakov, Ph.D/