

REVIEW

by Dr. Slavi Yasenov Lyubomirov, Associate Professor at Plovdiv University " Paisii Hilendarski "

of the materials submitted for participation in the competition
for the academic position of '**professor**'
at Plovdiv University "Paisii Hilendarski"

by field of higher education 5. Technical sciences
professional field 5.2. Electrical engineering, electronics and automation

Scientific degree "Automated systems for information processing and management"

In the competition for 'Professor', which was announced in the Government Newspaper issue number 40 on 14.05 .2021 as well as on the website of the Plovdiv University "Paisii Hilendarski" for the needs of the Physics and Technology Faculty Department "EKIT ", as a candidate involved Assoc. Prof. Dr. Rumen Kostadinov Popov from Plovdiv University "Paisii Hilendarski".

1. General presentation of the received materials

By order № P33- 4298 on 10.08. 2021 of the Rector of the University of Plovdiv "Paisii Hilendarski" (PU) I was appointed as a member of the scientific jury of the competition for the academic position '**professor**' at the University of Plovdiv "Paisii Hilendarski" in the field of higher education 5. Technical sciences , professional field 5.2 Electrical Engineering, Electronics and Automation, scientific specialty (Automated systems for information processing and control) **announced for the needs of the** Department "EKIT" at the Faculty of Physics and Technology.

One single candidate Assoc. Prof. Rumen Popov Kostadinov, Plovdiv University "of Plovdiv" took part in the announced competition and submitted his documents.

The paper materials presented by Assoc. Prof. Dr. Rumen Kostadinov Popov are in accordance with the Regulations for development of the academic staff of the University of Plovdiv, and include the following documents: application to the Rector; autobiography; copies of diplomas for master's degree, educational and scientific degree "doctor" and two diplomas for academic position "associate professor", list of scientific papers, annotations and copies of scientific papers in refereed and non- refereed editions, all peer-reviewed; reference for compliance with the minimum national and additional faculty requirements, author's reference for scientific contributions; declaration for originality and authenticity of the materials, annotations of the materials under art. 76. from PRASPU including self-assessment of the contributions; document for work experience, documents for academic work, documents for research activity and other documents such as certificates, certificates, etc.

The candidate Assoc. Prof. Rumen Kostadinov Popov has included 34 scientific papers, 1 published book based on the dissertation for awarding the academic degree "Doctor" , one university book and 3 textbooks. 3 textbooks and 9 research projects, as well as 34 scientific papers are accepted for review, which are outside the dissertation and are reported in the final evaluation. The distribution of scientific papers by relevant sections, in Bulgaria and abroad, is the following: 10 scientific publications that are referenced and indexed in world-famous databases of scientific information and published in Web of Science and Scopus , equivalent to a monograph. It can be seen that they all have the Impact Factor from group B4.1. to B4.10. Ten scientific publications are presented in issues that are referenced and indexed in world-famous databases with scientific information from group D, which are published in Web of Science and Scopus, five of which are with Impact Factor. Also, 14 scientific papers and publications in non- peer-reviewed journals with scientific review or in edited collective volumes were provided.

2. Brief biographical information about the candidate

Assoc. Prof. Dr. Rumen Kostadinov Popov was born in 1964. He completed his secondary education in the technical school of electrical engineering of Plovdiv in 1982. In 1990 he graduated with a master's degree from Tula university, located in Tula – Russia, and specialized in "automatic control system", where he qualified as electrical engineer in automatic control systems. From 1991 to 2011 he worked at the Plovdiv branch of the Technical University - Sofia, as a teacher in various disciplines in the field of robotics, electromechanical, electrical engineering, automation and design (including three subjects in English). He acquired the educational and scientific degree "Doctor" in 2008 from the University of Ruse "Angel Kanchev" in "Reconstruction and modernization of existing systems for power supply backup of agricultural holdings." From 2011 to March 2015 he was an associate professor at the Plovdiv branch of the Technical University – Sofia. In 2012-2013 he held the academic position of associate professor at the European Polytechnic University - Pernik. Since 2015 he has been a professor at Plovdiv University "Paisii Hilendarski".

The professional biography of Assoc. Prof. Dr. Rumen Kostadinov Popov gives me reason to believe that he has serious scientific and teaching experience in the field of the competition.

3. General characteristics of the candidate's activity

Assessment of educational and pedagogical activity

From the materials submitted by Assoc. Prof. Dr. Rumen Popov for participation in the competition for the academic position 'Professor', it is evident that there is a published book based on a defended dissertation for the award of educational and scientific degree "Doctor" - Systems for control of diesel electric units. He is the author of the following teaching materials: "Programmable

Logic Controllers - Guide for Programming Controllers Zelio Logic", "Signals and Systems", Academic Publishing House of IIIT-Plovdiv, "Sensors and Actuators" and a manual in English". Solar Radiation Measurement - Guide on Solar Radiation Energy and Lighting Calculations.

The video exercises developed by him on "Sensors and actuators" are used for the training of students at the Faculty of Physics and Technology of "Paisii Hilendarski" University of Plovdiv.

From the provided reference for classroom and extracurricular activity it can be seen that it conducts lecture courses on a number of disciplines, some of which are: General Electrical Engineering, Electrical Engineering 2, Computer Simulation, Power System Automation, Signals and Systems, Electronic Circuitry, Sensors and Executors mechanisms, programmable controllers, etc.

Assoc. Prof. Dr. Rumen Popov actively participates in the development and updating of curricula for a number of subjects in the Faculty of Physics and Technology for Bachelor's and Master's degrees as well as Doctor's degree.

In the last 3 years Assoc. Rumen Popov has 11 defended graduated students, 5 reviews and 18 publications involving undergraduate and master students.

This is a proof of his indisputable teaching qualification and highly professional qualities.

Evaluation of the scientific and scientific-applied activity of the candidate

The scientific and scientific-applied activity of the candidate is aimed at the theoretical basis, methods and means for research of the properties and operational characteristics of heat energy accumulators, analysis of results from experimental and simulation researches of different types of heat energy storage systems. The presented publications by Group B4 indicators, which include 10 publications, equivalent to a monograph, referenced and indexed in the world-famous databases with scientific information (Web of Science and Scopus). All publications are with Impact Factor and have many citations.

The publications presented in group D are characterized by research of thermal characteristics, development of methods and algorithms for identification and analysis of heat storage systems. Most of the publications in this group have been published in Web of Science and Scopus.

The publications can be classified by language: 31 English publications, 3 Bulgarian publications; as well as by number of co-authors: 3 publications with one co-author; 8 publications with two co-authors and 23 publications with three or more co-authors.

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

Based on the scientific publications of Assoc. Prof. Rumen Popov, reasonably it can be concluded that the main contributions are: scientific, scientific-applied and applied.

Scientific contributions

1. Three paraffin MPFS E53, E46 and ECP are thermo-physically characterized. There has been a Raman structural study to determine the aliphatic character, where sample of paraffin E53 is in the range of 1500 to 1700 cm⁻¹ [B4.1] (above 48 observed cited 7 years);
2. A first-of-its-kind large-scale and systematic comparison between field and laboratory tests to determine the thermal characteristics of ground heat exchangers and between different approaches to laboratory tests [B4.5] (over 35 observed citations in 3 years);
3. Mathematical modeling and 3-D numerical simulation studies to predict the thermal behavior of the thermal batteries with paraffins [V4.2, B4.3] (6 seen citations);
4. A new hybrid approach and method for measuring the efficiency of vertical ground heat exchangers (VZT) and the surrounding underground thermal properties [B4.6] was selected (5 cited notes);
5. New original set of virtual instruments (mid LabVIEW™) has been developed and tested, which allows online or offline calculations of the uncertainty of measurements and testing of statistical hypotheses [V4.7] (5 spotted quoted for 1 year)
6. 3D mathematical model of the process of conducting a test to determine the thermal characteristics with the possibility of estimating the temperature field around the drilling. [B4.10] (3 citations noted).

Scientific and applied contributions

1. The main analytical and numerical models and methods related to the thermal behavior of shallow geothermal energy accumulators PGEA [B4.9] are presented (3 noted citations).
2. A small hybrid installation containing daily and seasonal accumulators and supporting five different operating modes with an emphasis on charging a drilling heat exchanger (VZT) was studied. A methodology has been developed to determine the energy efficiency of the different regimes [B4.8] (11 citations observed in 1 year);
3. Experimental 7-day testing for determining the thermal characteristics of the soil in the region Plovdiv [V4.6, V4.8 V4.10].

Applied contributions

1. Detailed overview of different types of heat storage systems concentrated on underground heat accumulators and MPFS accumulators [B4.4.] (10 cited notes).
2. The construction of a latent heat accumulator with the use of paraffins E53, E46 and EC [B4.1], [B4.2, B4.3] has been developed and studied.
3. Small hybrid installation containing daily and seasonal batteries and supporting five different modes of operation has been developed, built and put into operation. The emphasis is put on charging a drilling heat exchanger (VZT), heating mode with ground-connected heat pump and subsequent natural relaxation [B4.8].

Citations

The significance of the presented scientific publications is confirmed by the over 120 perceived citations in scientific journals referenced and indexed in world databases of scientific information (indicator C.4) and a number of citations in unreferred journals with scientific review. This shows that the results of the scientific production of Assoc. Prof. Dr. Rumen Popov have become available to the scientific community worldwide.

Implementation activity

A certificate was presented that Assoc. Prof. Dr. Rumen Popov applied in practice a number of results from his scientific work in the construction of the laboratory base of the Department of ECIT and the Faculty of Physics and Technology.

The quantitative indicators of the criteria for holding the academic position of "professor" in all indicators of the minimum national requirements are met.

4. Assessment of the personal contribution of the candidate

From the presented scientific works it can be seen that in five of the candidate's publications he is the first author, and in another 7 he is in the second place, which is why I believe that the contributions and results formulated by Assoc. Prof. Rumen Popov are largely personal merit.

I believe that the personal contribution of Assoc. Prof. Dr. Rumen Popov in the publications presented to the scientific community is indisputable and significant. I am convinced that the scientific, scientific-applied and applied contributions in the works of the candidate meet the requirements for holding the academic position of "professor" fully.

No distribution protocol has been presented, but there is no reason to doubt the active participation of Assoc. Prof. Rumen Popov in the mentioned publications.

5. Critical remarks and recommendations

I have no critical remarks on the submitted documents and scientific papers.

6. Personal impressions

I have known Assoc. Prof. Dr. Rumen Kostadinov Popov since around 2000s. He approaches his teaching activity responsibly, updates the content of the teaching material in the disciplines he teaches constantly. He participates actively in the program accreditations of the professional fields 5.2. Electrical engineering, electronics and automation and 5.3. Communication and computer equipment.

My general impressions of his participation at scientific forums, collegial talks and discussions on academic and scientific issues both as a teacher and scientist are excellent. I think he is an excellent teacher with great research potential.

CONCLUSION

The documents and materials submitted by Assoc. Prof. Dr. Rumen Kostadinov Popov meet all the requirements of the Academic Staff Development Act in the Republic of Bulgaria (RASRB), the Regulations for implementation of the RASRB and the relevant Regulations of PU "Paisii Hilendarski".

The candidate in the competition has submitted a sufficient number of scientific papers published after the materials used in the defense of ONS 'Doctor'. In the works of the candidate there are original scientific, scientific-applied and applied contributions, which have received international recognition and most of them are published in journals and scientific journals published by international academic publishers. His theoretical developments have practical applicability, as some of them are directly aimed at the educational work and tested in the educational process. The scientific and teaching qualification of Assoc. Prof. Dr. Rumen Kostadinov Popov is undoubted.

The results achieved by Assoc. Prof. Dr. Rumen Kostadinov Popov in teaching and research comply fully with the specific requirements of the Faculty of Physics and Technology, adopted in connection with the Regulations of the University of Plovdiv for the implementation of ZRASRB.

After getting acquainted with the materials and scientific papers presented in the competition, analysing their significance and the scientific, scientific-applied and applied contributions contained in them, I find it reasonable to give my positive assessment and recommend to the Scientific Jury to prepare a report-proposal to the Faculty Council of the Faculty of Physics and Technology for the election of Assoc. Prof. Dr. Rumen Kostadinov Popov for the academic position of 'Professor' at the University of Plovdiv "Paisii Hilendarski" in professional field 5.2 Electrical engineering, electronics and automation, (Automated systems for information processing and control).

27.09.2021r.

Reviewer:

Assoc. Prof. Dr. Slavi Lyubomirov