

REVIEW

on competition for occupation of the academic position of "associate professor" in professional field 5.2. Electrical Engineering, Electronics and Automation, major - "Elements and Devices of Automation and Computer Engineering" (discipline "Digital Circuit Engineering" and "Impulse and Digital Devices"), State newspaper. pcs. 58 of 23.07.2019 with sole candidate Senior Lecturer Ph.D. Engineer Goran Danailov Goranov.

Reviewer: Academician Chavdar Roumenin, Institute of Robotics at the Bulgarian Academy of Sciences

1. Phenomenology

G. Goranov was born in 1975 in Vratsa. In 1994 he graduated from the Vocational School of Mechanical and Electrical Engineering, majoring in Industrial Electronics. In 1999 he acquired the Master's Degree Program in TU-Gabrovo in Communication Technics and Technology. In the period from 2001 to 2003 he is a PhD student in the specialty "Elements and Devices of Automation and Computer Engineering" at the Department of Electronics at the Technical University of Gabrovo, and since 2003 is an assistant with a leading discipline "Digital Circuit Engineering". In 2007, he acquired the Ph.D. "Doctor". He has twice held the post of deputy Head of Department in 2011-2015 and 2018-2020. From 2007 to 2019, the applicant was a consultant to external organizations as a system administrator for the Municipality of Dryanovo, Complex for social services for elderly Dryanovo, and Multiprofile Hospital for Active Treatment „AktaMedica“ - Sevlievo, and consultant - computer and network security at Regional Hospice Ltd. - Gabrovo, etc.

Senior Lecturer PhD G. Goranov is the only candidate in this competition for the academic position of Assistant Professor.

He has participated in 47 scientific papers, 11 of which are equivalent to monograph work and indexed in the world-famous Scopus and Web of Science databases, and 36 other publications - all outside his dissertation.

I can categorize posts in the following format:

- articles in peer-reviewed scientific journals and yearbooks - 16 (12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27)
- articles in international conference proceedings in Bulgaria - 9 (28, 29, 30, 31, 32, 33, 35, 36, 38).

Of the applicant's works, 6 are independent (12, 14, 16, 18, 21, 27), 21 are with one co-author (1, 2, 6, 7, 8, 10, 15, 19, 20, 25, 28, 30, 32, 34, 35, 37, 38, 41, 43, 44, 46) and 20 with more than two co-authors (3 - 5, 9, 11, 13, 17, 22-24, 26, 29, 31, 33, 36, 39, 40, 42, 45, 47). In 17 of the works (4, 8, 11, 15, 20, 25, 28, 31, 32, 34 - 38, 43, 44, 46) G. Goranov is in first place.

In the documents, Mr. Goranov provided a reference for a total of 17 citations.

My conclusion is that the candidate fully complies with the minimum national requirements for an Associate Professor, in accordance with the law. G. Goranov Ph.D. has defended his dissertation on the theme: "Development and research of a control system for transistor converters with electrotechnical purpose". The number of lectures delivered over the last three years, according to the documents, is 406 hours. The average classroom teaching time is 476

hours. In the Table I have summarized the scientometric evidence proving that the candidate meets the minimum national requirements for an associate professor.

GROUP OF INDICATORS	NUMBER OF POINTS FOR ASSOCIATE PROFESSOR	SENIOR LECTURER GORAN GORANOV
A	50 p.	50 p.
B	-	-
C	100 p.	270 p.
D	200 p.	263 p.
E	50 p.	83 p.
F	-	-

Senior Lecturer Goranov has participated in 8 scientific projects at the NSF of TU-Gabrovo, one international and one at the National Science Foundation, as follows:

- 2013 Agreement No E 1301 "Resonant inverter control system for non-contact electric vehicle charging station".
- 2014 Agreement No. E 1403 "Information gathering and processing system for improving the energy efficiency of industrial electronic devices"
- 2015 Agreement No. E 1504 "Development and testing of control systems for asynchronous three-phase and stepped motors".
- 2016 Agreement No. 1606E. "Data exchange via WiFi module for industrial contactless power transmission systems"
- 2017 Agreement No. 1708E "Traffic Management, Monitoring and Control via Intelligent Contactless Power Modules and Galvanically Separated Communication Environment".
- 2018 Agreement No. 1806E "WEB-based street lighting control with contactless power supply and transmission"

Professor Nikolay Madjarov was the head of the above projects.

Agreement No. 1906E "Methods and means of the conversion of an internal combustion engine into an electric motorcycle"

Head of the contract: Senior Lecturer - G. Goranov. He has also participated in the teams of the following external projects:

- 2014 Agreement No. 03 / 07/04 2014 Contract for the design, design, and construction of an autonomous PLC-based ignition control system. Head – Senior Lecturer Goran Goranov.
- Project BG05M2OP001-1.002 “Construction and Development of the Competence Center“Quantum Communication, Intelligent Security Systems, and Risk Management”(Quasar)”, the total budget of the project is 13 500 000 BGN. In this CCP partner is TU-Gabrovo.
- H 07/6 of 08/28/16 Federal Research Institute “New Non-Destructive Method for Surveying the Surface of Semiconductor Structures” 2016, the Project budget is 120 000, for 2016 - 30 000 BGN. According to the documents, with the assistance of the applicant, funds were provided by

leading companies and in TU-Gabrovo a laboratory № 2314 was established on “Design of microprocessor devices.

3. General characteristics of the applicant's research and applied activities, contributions and results

The presented papers systematize the research and results in the field of digital control systems for industrial converters, computer and microprocessor control, measurement and monitoring systems:

Contributions and results in publications replacing monograph work:

- A module architecture of defined Web services for task management based on G-Lite Grid environment is proposed. A web-based application has been developed - a register of available virtual organizations in the European Network Infrastructure (EGI) and VOMS certificates with advanced functionality. An architecture for monitoring the performance of HPC applications has been developed and tested [1, 2, 22].
- It was realized digital method “All-Digital PLL” was implemented by the synthesis of combinational circuits, registers and counters for control of transistor resonant converters. The structure is made up of logical elements only and is applied to control technological processes in circuits of a half-bridge resonant inverter. Problems such as system stability and phase noise reduction accompanying digital frequency synthesis methods have been solved [4,14].
- A control system based on the ATmega 128 microcontroller and a computer with an operating system for measuring and calculating the area of leather has been implemented. It shows twice the performance of the KNL processor compared to the Ivy Bridge-EP processor. The problem of applying a mathematical apparatus for calculating an area of arbitrary shape is solved by applying an original approach by capturing moving skins with a camera. The development was implemented in the production of Leder Trading Ltd., Gabrovo [5, 6].
- The infrared thermography method is applied to examine the wear of cutting discs. Theoretical and experimental models have been proposed to reflect the relationship between the wear of the cutting disc, the temperature of the cut-off part and the temperature of the disc [7 - 9].
- An original approach has been developed for the implementation of a microcontroller system for battery charge management for a solar system based on a specialized microprocessor measuring system using galvanic sensors. A prototype two-collector magnetotransistor has been proposed and a comparative analysis of its results has been done with its computer modeling [10,11].

Contributions and results in publications outside of the corresponding monograph work:

- A methodology has been developed to calculate the parameters of a digital circuit for controlling resonant inverters and subsequently obtain a maximum frequency scanning range. A cycle by cycle method has been proposed for controlling a thermostat by applying temperature feedback, reducing losses in the heating element [14, 35].
- The process of controlling a three-phase electric motor through mathematical analysis of MATLAB is scientifically substantiated. Control of a three-phase CPLD-based electric motor has been developed, built as a "fuel pump" in a gas injection bottle operating in liquid phase. [22,24].
- A digital module for dual-line matrix display control and digital driver for I2C communication, as well as EEPROM read / write, have been developed. The possibility of using only CPLD in

the control process has been proven by digitally synthesizing a logic circuit model for the HDB3 precoder in the NRZ code [19, 38,44, 45].

- It was realized a data processing and management system based on Fuzzy Controller implemented. The system has been developed to create new software models applicable to high-power conversion and energy transfer systems, including Peltier element processes [7,25,28,31].
- An approach has been proposed and implemented to programmatically configure a microcomputer to measure and operate as a web server via Apache and MySQL with applicability in medicine, energy and measurement systems [3, 26, 37,39,40].
- A web-based system for working time planning and process evaluation, called "360-degree feedback", has been developed and implemented. IP cameras for remote visual control of technological processes for biogas production in real time have been implemented [36, 46, 15, 27, 33].
- A model of two-collector magnetotransistor compatible with PSpice-based simulators has been created. On the basis of this electro-magnetic element are realized: contactless magnetic field device with applicability for DC measurement, electronic leveling and electronic water meter with leakage protection and contactless reading of flow values. A variant for temperature compensation of Hall sensors has been proposed [13, 16, 21, 23, 29, 30, 47].

I appreciate the contributions and results of G. Goranov Ph.D. as proving with new means of substantially new countries in existing scientific problems and receiving numerous confirmatory facts in the field of digital control systems for industrial converters, computer and microprocessor control systems, sensors, measurement and monitoring of processes.

4. Assessment of the candidate's pedagogical activity

Senior Lecturer G. Goranov is an established lecturer at the Technical University of Gabrovo. He has 16 years of teaching experience at TU-Gabrovo. According to the submitted information on the hours of the hours spent in the TU-Gabrovo for the last 3 years, the applicant spent an average of 476 hours in the disciplines as follows:

1. "Digital Circuitry" for "Electronics" with a course of 45 hours lectures and 30 hours. lab. exercises for regular form of training; 23h. lectures and 15h. lab. exercises for part-time training.
2. "Impulse and digital devices" for the specialty "Electronics" with a course of study: 30 hours of lectures and 30 hours. lab. exercises for regular form of training; 15h. lectures and 15h. lab. exercises for part-time training.
3. "Programmable Logic Controllers" for the specialty "Electronics" with a course of study of lectures and 30 hours. lab. exercises for regular form of training; 15h. lectures and 15h. lab. exercises for part-time training.
4. "Computer Systems and Applications" for the specialty "Electronics" with a course of study: 30 hours of lectures and 30 hours. lab. exercises for regular form of training; 15h. lectures and 15h. lab. exercises for part-time training.

and a Master's degree in Electronics in the discipline

1. "Design of microprocessor devices" for specialty "Electronics" with hours: 30 hours of lectures and 30 hours. lab. exercises for regular form of training; 15h. lectures and 15h. lab. exercises for part-time training.

Senior Lecturer G. Goranov has been the head of 21 graduates who successfully defended and has been the reviewer of 21 diploma papers for the last 3 years. For the UNITEX-2017 conference of TU-Gabrovo, the applicant has made 10 reviews and 2 reviews for the Electronics - ET 2019 Sozopol conference at TU-Sofia, which is indexed in SCOPUS. He is the author of two textbooks and two textbooks as follows:

1. Goran Goranov, Siemens Programmable Logic Controllers - S5, S7, Ex-Press Publishing House Gabrovo 2012, ISBN 978-954-490-300-8
2. Goran Goranov, Peter Tomchev, Laboratory Exercise Manual discipline Impulse and Digital Devices Ex-Press Publishing House Gabrovo 2014, ISBN 978-954-490-444-9
3. Goran Goranov, Iskren Kandov, Laboratory exercises manual in the discipline Digital Circuitry, Publishing House "Ex-Press" Gabrovo 2015, ISBN 978-954-490-481-4
4. Goran Goranov, Digital Circuitry, TU-Gabrovo Publishing House 2016, ISBN 978 - 954 - 683 - 554 – 3

The above data give me reason to rate the applicant's pedagogical preparation and activity as very good.

From this factology it becomes clear that Senior Lecturer G. Goranov strongly adheres to the minimum requirements of the TU-Gabrovo Regulations:

- Scientific Papers 47 for requirements of 20
- Individual publications 6 if required for 4
- Quotations 17 when required for 5
- Published textbooks 4 if required for 2
- Manager of 2 projects, requires one.

5. The importance of contributions to science and practice

An evaluation of the candidate in the scientific competition is the citation given in his documents a list of 17 citations is presented, 6 of which are in indexed editions. The applicant has implemented developments in manufacturing and humanitarian firms, as reported in three publications at international indexed conferences and journals. This leads me to conclude that the applicant is an established researcher, publishing his results in well-known scientific journals and collections in the field of competition with technological transfer of scientific achievements in practice.

6. Critical notes and recommendations

In the applicant's writings, I did not find significant gaps that would compromise the analysis and the conclusions. I believe that the contributions can be summarized. My reading of what Mr. Goranov has achieved concludes that his research contains sufficient elements to maintain intellectual / industrial property through patent applications and / or utility models, which is my main recommendation to him.

7. General considerations

I have no compatible posts with the candidate. I am not a related person within the meaning of paragraph 1, item 5 of the Supplementary Provisions of the Law. The submitted works, quotations and participation in projects comply with the requirements of the LPRAP and its

regulations for acquiring the academic position of "Associate Professor". I also declare that I have no mutual financial relations for a possible conflict of interest or trade in influence. There is no evidence of plagiarism in the competition materials.

CONCLUSION

I commend the research and pedagogical activity of Ch. Assistant Professor Eng. Goran Goranov, who fully matches the requirements for the profession of the academic position "Associate Professor". Important scientific facts and results have been obtained. **I positively propose to the Honorable Jury and the Academic Council of TU-Gabrovo Ch. Assistant Professor Eng. Goran Danailov Goranov to employ the academic position of Associate Professor** in the professional field 5.2. Electrical engineering, electronics, and automation majoring in "Elements and Devices of Automation and Computer Engineering".

11/25/2019

Reviewer: /signature/

/Acad. Chavdar Roumenin/