R E V I E W

by Prof. Georgi Nikolov Krastev, D.Sc.
"Angel Kanchev" University of Ruse

of the materials submitted for participation in the competition
for occupying the academic position associate professor
in the field of higher education - 5. Technical sciences,
professional direction - 5.3 Communication and computer technology,
specialty - "Computer systems, complexes and networks" (Schematic technology, Microprocessor technique)

In the competition for associate professor, announced in the State Gazette, no. 54/25.06.2024 and on the TU - Gabrovo website for the needs of the "Computer systems and technologies" department at the "Electrical Engineering and Electronics" faculty, as a candidate participate, chief assistant prof. Hristo Stefanov Kilifarev, PhD.

1. Brief biographical data

Chief assistant prof. Hristo Stefanov Kilifarev, has acquired the educational degree "master" specialty Computer systems and technology in TU-Gabrovo in 2002. In 2017, he acquired the educational and scientific degree "doctor" in professional direction 5.3. Communication and computer technology, scientific specialty "Computer systems, complexes and networks".

Appointed as an Assistant in 2002, since 2006 he has been a senior assistant, and since 2011 - a chief assistant at TU-Gabrovo, Department of Computer Systems and Technologies. The career of chief assistant prof. Hristo Kilifarev, PhD, is saturated with participation in a number of projects in the field of information and communication technologies.

2. General description of the presented materials

The candidate has submitted for review a total of 33 scientific works, 1 textbook, 1 teaching aid and documents for participation in 7 research projects. All are accepted for reviewing, because they are outside the thesis work for the educational and scientific degree "doctor".

One of the publications is with Impact Factor. At the moment, there are a total of eight citations of scientific works noticed.

For the competition, the candidate submitted 1 textbook on the discipline "Schematic technology", published by "Vasil Aprilov" University Publishing House, Gabrovo. The textbook is intended for students of the "Software and Computer Engineering" specialty. The material covers topics from areas such as: basic concepts and laws in electrical circuits; basics of electrical measurements; logical functions and Boolean algebra; element base and functional

digital devices; combinational logic circuits and sequential circuits; linear and non-linear pulse circuits; transistor switches; analog-to-digital and digital-to-analog converters.

Chief assistant Prof. Hristo Kilifarev, has also presented 1 teaching aid - "Manual for Laboratory Exercises in Microprocessor Technique", published by "Vasil Aprilov" University Publishing House - Gabrovo. The same is aimed at learning and experimenting with Atmel's AVR family of 8-bit microcontrollers. The examples are tested with an ATmega8515 microcontroller. It is intended for students of specialties studying microprocessor and microcontroller technology, as well as embedded systems based on them at a modern level. The manual is structured in ten exercises, each of which includes a theoretical part, instructions to students for preliminary preparation, performance tasks and control questions. Literature for further preparation is also indicated.

3. Reflection of the scientific publications of the candidate in the scientific community (known citations)

The scientific works of chief. assistant prof. Hristo Kilifarev, PhD, are known to the scientific community abroad - eight citations are indicated in the competition documents, all of which are abroad (Scopus, WoS).

4. Overview of content and results in the presented works

Chief assistant prof. Hristo Kilifarev, covers and in certain indicators exceeds the scientometric data according to the minimum requirements of TU-Gabrovo. With a required 15 publications, of which 4 independent, he participated with 33 publications, of which 8 were independent. With the required 5 citations chief assistant prof. Hristo Kilifarev, PhD, has 8.

Content	**Minimum requirements of TU-Gabrovo for holding the academic position of "Associate Professor"**	**Chief Assistant Prof. Hristo Stefanov Kilifarev, PhD**
Total number publications	15	**33**
Independent	4	**8**
With IF (WoS) or with SJR (Scopus)	1	**1**
Number of known citations from other authors	5	**8**
Textbooks published	1	**1**
Teaching aids published	1	**1**
Management of projects and contracts	-	**1**

5. General characteristics of the applicant's activity

5.1. Educational and pedagogical activity

The pedagogical activity of the candidate covers both creation of new ones and participation in established lecture courses and exercises from the curricula for bachelors and masters at TU-Gabrovo.

In recent years chef assistant professor Hristo Kilifarev, PhD, has led lectures on the following disciplines:

- Computer graphics;
- Multimedia systems;
- Programming of embedded systems;
- Computer peripherals;
- Computer graphics systems;
- Modeling and visualization of objects;
- Computer graphics III;
- Web-design and multimedia products;
- Multimedia design and presentation;
- Multimedia systems and Web-design.

He participated in the development of the following curricula:

- Manufacturing Practice I and II;
- Educational practice;
- Computer graphics;
- Multimedia systems;
- Programming of embedded systems;
- Computer peripherals;
- Computer graphics systems;
- Modeling and visualization of objects;
- Computer graphics III;
- Web-design and multimedia products;
- Multimedia design and presentation;
- Multimedia systems and Web-design;
- Microprocessor technology;
- Computer architectures;
- Computer animation;
- Computer games;
- Computer training systems;
- Systems with artificial intelligence;
- Computer oriented control;
- Office equipment and computer systems.

The number of disciplines led by the candidate is significant, which speaks of a good professional training covering many areas of computer technology. From what has been said so

far, I believe that the pedagogical preparation of chief assistant prof. Hristo Kilifarev, PhD, is at a high level, and I rate his teaching and pedagogical activities as successful and fruitful.

5.2. Scientific and scientific-applied activity

Thematically, the presented publications are interdisciplinary in focus and cover various areas of the theory and use of computer systems, computer technologies and methods of creating computer systems.

The classification of scientific publications by publication type is as follows:

	Publication type	**Number from the list of publications**	**Number**
1.	Publications with Impact Factor (WoS)	[B.4.8]	1
2.	Articles in refereed and indexed databases (Scopus)	[B.4.8]	1
3.	Articles in non-refereed publications abroad	[G.8.12]	1
4.	Articles in non-refereed publications in Bulgaria	[G.8.16, G.8.17]	2
5.	Reports in refereed and indexed databases (Scopus)	[B.4.1 – B.4.7, B.4.9, B.4.10, G.7.1]	10
6.	Reports at international conferences abroad	[G.8.13, G.8.14, G.8.22]	3
7.	Reports of international conferences in Bulgaria	[G.8.1, G.8.2, G8.4 –G.8.11, G.8.15, G.8.18 – G.8.21]	15
8.	Reports of national conferences in Bulgaria	[G.8.3]	1

The classification of scientific publications by co-authorship is as follows:

	Type of co-authorship	**Number from the list of publications**	**Number**
1.	Independent publications	[B.4.3 – B.4.4, G.8.4 – G.8.6, G.8.10, G.8.22]	7
2.	Co-authored publications	[B.4.1, B.4.2, B.4.5 – B.4.10, G.7.1, G.8.1 – G.8.3, G.8.7 – G.8.9, G.8.11 – G.8.21]	26

In all joint publications, the contribution of the participants is equal.

Chief assistant prof. Hristo Kilifarev, PhD, was the head of 1 university research project (TU-Gabrovo No. 2004E "Modern methods for quality of food and materials"). He participated in 1 project under the operational program (project BG05M2OP001-1.002-0002-C01

"Digitalization of the Economy in an Environment of Big Data" under the Operational Program "Science and education for intelligent growth") and 5 internal projects for TU-Gabrovo: No. 2304E "Increasing the effectiveness of education through the use of information and communication technologies"; No. 2203E "Development and validation of solutions for effective distance learning using innovative ICT technologies"; No. 2109E "Research and implementation of ICT solutions for effective distance learning"; No. 1907E "Implementation of innovative ICT technologies in education" and No. 1810E "Application of virtualization and cloud technologies in education.

5.3. Implementation activity

The candidate has not submitted official implementation documents, but the subject of some of the publications is related to the taught disciplines, which implies the use of the obtained results in the educational process.

6. Contributions (scientific, scientific-applied, applied)

The scientific, scientific-applied and applied contributions presented by ch. assistant professor Hristo Kilifarev, correspond to the professional direction 5.3 "Communication and computer technology" and are in the following thematic directions:

- Design and development of automated systems;
- A specialized platform for managing video recordings in online learning;
- Non-contact research of mediums, materials and speed;
- Design and development of systems providing local short-term weather forecast based on a microcontroller;
- Optimization of Big Data for e-shops;
- Research in the field of electric cars.

1. Scientific contributions

- A method for remote (non-contact) research and recognition of environments and materials by analyzing the reflected ultrasonic wave has been proposed and implemented. A spectral model based on wavelet transformation was developed [B.4.8, B.4.7, G.8.18];
- A methodology has been developed for non-contact recognition and classification of materials and mediums [B.4.6, B.4.7, B.4.8, G.8.7, G.8.10, G.8.12, G.8.13, G.8.14, G.8.15, G.8.18];
- An approach for recognizing and classifying materials based on artificial neural networks has been created [G.8.15].

2. Scientific-applied contributions

- A method has been developed and experimented for the recognition of explosives - Ammonite, Ammonite B and TNT [B.4.8];
- A method has been developed and experimented for the recognition of metals - aluminum, chrome-nickel steel, brass, cast iron, copper and structural steel [G.8.12];
- A model is proposed for determining the boundary distances of the working area of parallel ultrasonic sensors when the reflected waves from the surface of an object are used for

research purposes. The model can be used to calculate and simulate the optimal distance to the studied object and to correctly place ultrasonic sensors in a measuring device [G.7.1];

- Design and implementation of a specialized device with microcontroller management, which is part of a computer-based measurement system for automated non-contact ultrasonic testing of mediums and materials [B.4.7, B.4.6, G.8.10, G.8.14];
- Designed and created a prototype implementation of an automated system for greenhouse cultivation of mushrooms [B.4.1, B.4.2];
- Designing and prototype implementation of an automated monitoring system for metal fragments in food products [B.4.3, B.4.4];
- An approach has been developed to measure the speed of movement of objects using a microwave radar module RCWL-0516, designed for presence detection [G.8.1, G.8.2].

3. Applied Contributions

- A controller has been developed for controlling an ultrasonic measuring head [B4.6, B.4.7, G8.14, G8.18];
- A PC-based system has been developed for remote recognition, characterization and classification of substances, materials and states of mediums in real time [B.4.7];
- A method was created to determine the hardness of materials, especially metals, Rockwell hardnesses - HRc=34, HRc=36, HRc=40, HRc=46 and HRc=50 [G8.13];
- A weather prediction algorithm is proposed. An autonomous device operating according to this algorithm has been developed [B.4.9, B.4.10, G.8.20, G.8.21];
- A specialized system has been developed for managing video recordings in online education [B.4.5];
- A home-use processed meat dryer has been developed based on an Arduino microcontroller with cyclic action in a closed chamber, with control of reduced temperature and relative humidity of the air through a Peltier element, as well as underpressure in the chamber with a vacuum pump, with a local graphic LCD with touch function, with the possibility to set control parameters and different conditions for the end of the drying program [G.8.6];
- A controller for measuring wind speed and direction has been developed with a four-arm ultrasonic anemometer based on an Arduino platform and ultrasonic modules for distance measurement [G.8.4];
- A MATLAB model has been developed for the simulation study of an electromechanical brake connected to one of the phases of an asynchronous electric motor [G.8.9].

7. Evaluation of the personal contribution of the candidate

The significance of the contributions in the candidate's scientific works is indisputable, taking into account the topicality of the subject, the dissemination of research results among the scientific community and their wide application in practice.

8. Critical notes and recommendations

I have no comments on the presented documents and scientific works. I think the contributions can be summarized.

9. Personal impressions

I have no immediate personal impressions of the appearances of chief assistant professor Hristo Kilifarev, PhD, outside the competition.

10. Conclusion:

Bearing in mind the above, I propose Chief Assistant Professor Hristo Stefanov Kilifarev, PhD, to be elected as an "associate professor" in the field of higher education - 5. Technical sciences, professional direction - 5.3 Communication and computer technology, specialty - "Computer systems, complexes and networks" (Schematic technology, Microprocessor technique).

6 Nov 2024

Reviewer: /signature/
/ Prof. Georgi Krastev, D.Sc. /