

## REVIEW

by Assoc. Prof. Emil Hristov Doichev, PhD  
at the Faculty of Mathematics and Informatics  
of Plovdiv University “Paisii Hilendarski”  
on the materials submitted for participation in the competition  
for the academic position of “Associate Professor”  
at Plovdiv University “Paisii Hilendarski”  
in the field of higher education: *4. Natural Sciences, Mathematics, and Informatics*,  
professional field: *4.6. Informatics and Computer Science (Informatics – Databases)*

In the competition for the position of “Associate Professor,” announced in the State Gazette, issue 98 of 19.11.2024, and on the website of Plovdiv University “Paisii Hilendarski,” for the needs of the Department of “Computer Systems” at the Faculty of Mathematics and Informatics, the applicant is Chief Assistant Professor Dr. Georgi Nikolov Cholakov from the Department of “Computer Systems,” Faculty of Mathematics and Informatics.

### 1. General Overview of the Submitted Materials

By Order No. RD-22-77 of 17.01.2025, issued by the Rector of Plovdiv University “Paisii Hilendarski” (PU), I have been appointed as a member of the scientific jury for the competition for the academic position of “**Associate Professor**” at PU in the field of higher education 4. Natural Sciences, Mathematics, and Informatics, professional field 4.6. Informatics and Computer Science (Informatics – Databases), **announced for the needs of the Department of “Computer Systems”** at the Faculty of Mathematics and Informatics (FMI). By decision of the scientific jury during a meeting held on 23-24.01.2025, I was assigned to participate in the jury’s work by preparing a review of the submitted materials.

Only one candidate has submitted documents for participation in the announced competition: Chief Assistant Professor Dr. Georgi Nikolov Cholakov from the Department of “Computer Systems,” Faculty of Mathematics and Informatics at Plovdiv University “Paisii Hilendarski.”

The set of materials submitted by Chief Assistant Professor Georgi Cholakov in electronic format complies with the Regulations for the Development of the Academic Staff at PU and includes the following documents:

- A standard application to the Rector for admission to the competition;
- A curriculum vitae in European format;
- A diploma for higher education with a “Master’s” degree;

- A diploma for the educational and scientific degree “Doctor”;
- A list of scientific works submitted for the competition;
- A list of all scientific publications;
- Copies of the scientific works submitted for the competition;
- A list of citations;
- A report on compliance with the minimum national and additional faculty requirements;
- Abstracts of the scientific works in Bulgarian and English;
- A self-assessment of contributions in Bulgarian and English;
- A declaration of originality and authenticity of the submitted documents;
- A certificate of professional experience;
- Documents related to teaching activities;
- Documents related to research activities.

The candidate, Chief Assistant Professor Georgi Cholakov, has submitted a total of 11 scientific papers, 1 monograph, 1 book based on his dissertation, and 1 textbook on databases for participation in the competition. A list of registered citations and a complete list of his scientific publications have also been provided. For review, 11 scientific papers and 1 monograph that are not part of the dissertation are accepted. Additionally, the final assessment considers the textbook, research activities on projects, and the candidate’s pedagogical engagement. The published book related to the dissertation is not subject to review and is not included in the author’s self-assessment of contributions. The distribution of the scientific papers is as follows: 5 articles published in journals (3 in English and 2 in Bulgarian) and 6 papers in English presented at international scientific conferences. Additionally, documents (reports) have been provided to certify participation in research projects, teaching activities both within and outside of regular coursework, as well as work with students and graduates.

The submitted documents and scientific works of the candidate fully meet the requirements for admission to the competition for the academic position of “Associate Professor,” as defined in the Law for the Development of the Academic Staff in the Republic of Bulgaria and the Additional Requirements of FMI in accordance with Article 65 (3) of the Regulations for the Development of the Academic Staff at PU.

## **2. Brief Biographical Data of the Candidate**

Chief Assistant Professor Dr. Georgi Cholakov graduated in 1999 with a Master’s degree in Mathematics, earning the professional qualification of “Mathematician and Computer Scientist” from the Faculty of Mathematics and Informatics at Plovdiv University “Paisii Hilendarski.” In 2013, he successfully defended his dissertation on “Hybrid Architecture for Building a Distributed E-Learning Center (DeLC)”, obtaining the educational and scientific

degree “Doctor” in professional field 4.6. Informatics and Computer Science, doctoral program Informatics.

Between 1999 and 2023, he gained substantial professional experience as a software developer and technical project lead in Bulgarian companies specializing in high-tech solutions. Since 2005, he has held an academic position at Plovdiv University “Paisii Hilendarski”, progressively advancing through the ranks of Assistant, Senior Assistant, and Chief Assistant Professor. He teaches courses primarily focused on databases and Java programming, combining theoretical knowledge with practical applications.

According to the submitted documents, Chief Assistant Professor Georgi Cholakov has a total professional and teaching experience of 19 years and 7 months, of which 13 years and 9 months have been in the position of Chief Assistant Professor. His professional and academic activities demonstrate a high level of expertise in information and software technologies, as well as significant teaching and research experience, meeting the criteria for the academic position of Associate Professor.

### **3. General Characteristics of the Candidate’s Activities**

#### *3.1 Teaching Activities of the Candidate*

Chief Assistant Professor Dr. Georgi Cholakov is actively engaged in teaching the mandatory “Databases” course in the Department of Computer Systems at the Faculty of Mathematics and Informatics (FMI). His annual teaching workload includes 180 hours of lectures and 500 hours of practical exercises. This course is an essential part of the curriculum for the Software Engineering, Software Technologies and Design, Informatics, and Business Information Technologies programs, offered in both full-time and part-time study formats. In addition to undergraduate courses, he also teaches specialized master’s programs, including: Databases (15 hours), Java Practicum (30 hours), Programming for Oracle with PL/SQL (30 hours). As part of his teaching activities, he actively contributes to the development and modernization of these courses.

Beyond his direct teaching responsibilities, Dr. Cholakov supervises coursework and theses, provides student consultations, participates in scientific seminars, serves on state exam committees, and evaluates diploma projects. Additionally, he has been twice elected as a member of the Faculty Accreditation Committee. According to the submitted report on teaching and extracurricular activities, he consistently meets and exceeds the established academic requirements.

As part of the competition, he has presented the textbook “Databases”, co-authored with Chief Assistant Professor Dr. Magdalena Veselinova. The book, published by Plovdiv University “Paisii Hilendarski” in 2019, consists of 133 pages and covers the fundamental principles and tools for working with relational databases. The material is presented systematically and accessibly, incorporating illustrations, practical examples, and exercises to facilitate understanding and mastery of database concepts. The textbook is aligned with the curricula of Software Engineering, Software Technologies and Design, Informatics, and Business Information Technologies, making it highly relevant to the theme of the competition.

In addition to developing teaching materials, Dr. Cholakov has extensive experience in supervising and mentoring graduate students. According to the submitted student supervision report, he has successfully guided over 30 diploma students and has provided more than 20 thesis reviews. This demonstrates his continuous commitment to student education and his active contribution to their academic and professional development.

### *3.2 Research and Applied Scientific Activities of the Candidate*

Chief Assistant Professor Dr. Georgi Cholakov has submitted 11 scientific papers for participation in the competition, published between 2020 and 2024. These publications do not overlap with those used for obtaining his PhD degree or the academic position of Chief Assistant Professor. Two of the works are single-authored, while the remaining nine are co-authored. Among the submitted publications, 10 have been published in peer-reviewed and indexed journals, included in the WoS and/or Scopus databases. Three of these publications have an Impact Factor (IF) according to WoS, categorized in Q3 and Q4 quartiles, while one has an SJR ranking in Scopus. Additionally, the candidate has submitted a single-authored monograph in Bulgarian, published by Plovdiv University Press in 2024, consisting of 113 pages.

The contributions of Dr. Georgi Cholakov’s research have both scientific and applied significance, categorized into three main areas:

- ***Databases [2, 4, 5, 6, 7, 8, 9, 13]***. His research on databases focuses on the use and optimization of different database types in projects, including relational, document-oriented, and ontological models. His main contribution is in the design of databases, structuring, processing, and storage of data, as well as the analysis of accumulated information. In particular, the submitted works examine the development of a system for crawling web pages and extracting language models used in artificial intelligence. In these studies, the author proposes solutions for structuring and storing data, as well

as a strategy for handling dynamic changes in data through the combined use of relational and document databases. Another significant contribution of the author is the in-depth analysis of data from automated assessment systems integrated into DeLC. Based on these analyses, important trends in student learning are identified, including preferences for NoSQL databases and difficulties in mastering theoretical concepts. These results have been used to update teaching materials, including the development of a new textbook. In addition, the author contributes to the creation and processing of ontologies in various fields such as software engineering, smart agriculture, and cultural and historical heritage, demonstrating competence in the application of semantic technologies and knowledge bases.

- ***Agent-Oriented Architectures [1, 3, 11, 12].*** Another significant focus of the author's research is the development of intelligent software agents within the Distributed E-Learning Center (DeLC). His monograph, as well as his dissertation, are dedicated to this topic. His main contribution in this field is the enhancement of agent functionalities through integration with large language models such as ChatGPT, which improves the quality of automated assessment and the detection of academic misconduct. Specifically, the developments include the Agent Evaluator, responsible for assessing responses to test questions, where integration with language models enhances grading accuracy, and the Agent FraudDetector, which analyzes whether student responses have been copied from the internet by using knowledge bases and similarity detection models. The author has made a significant contribution to the development, maintenance, and optimization of these agents, as well as to the analysis of their effectiveness before and after the implementation of new technologies. An additional contribution is the experimental application of the Agent Evaluator in a non-standard environment, where it functions as a search engine in a personal blog. The results of this experiment demonstrate the versatility of the developed model, opening opportunities for its application beyond the educational domain.
- ***E-Learning [1, 3, 4, 5, 10, 12].*** A significant part of the author's research is related to improving e-learning processes through the integration of intelligent assessment systems, personalized learning, and the analysis of learning data. His monograph summarizes developments in the field of e-learning, presents the extended architecture of DeLC, and justifies changes and improvements to the system based on analyzed data. The author examines the impact of large language models on e-learning and their integration with agents in DeLC. Among the notable developments is a software assistant for personalized learning, which stores and analyzes students' progress and

suggests adapted learning materials and tests based on their individual needs. The author has contributed to the analysis of requirements, modeling of student profiles, and the integration of the agent into the DeLC system.

The scientific contributions of Chief Assistant Professor Dr. Georgi Cholakov are distinguished by their significant practical application in the fields of databases, intelligent agents, and e-learning. They include the development of effective software solutions, the analysis of learning processes, and the implementation of new technologies, making them valuable both for the scientific community and for their practical application in education and the technology sector.

Chief Assistant Professor Dr. Georgi Cholakov has submitted a list of 18 citations of his scientific works, 11 of which are in prestigious journals indexed in databases such as WoS and/or Scopus. Of these citations, 13 refer to the works submitted in the competition. They are part of publications by both Bulgarian and foreign authors, citing significant scientific results from the candidate's research. This indicates that his studies generate interest and receive recognition both nationally and internationally.

According to the submitted research activity reports, Chief Assistant Professor Dr. Georgi Cholakov has participated in 5 research projects, of which 2 are international and 3 are funded by the Ministry of Education and Science. Additionally, he has delivered 5 presentations at scientific forums with international participation.

Overall, the candidate's research and applied activities demonstrate a consistent interest in scientific research, in-depth knowledge, and practically significant results. His work encompasses databases and knowledge bases, intelligent software components utilizing artificial intelligence, as well as the application of these technologies in e-learning and student supervision.

Regarding quantitative indicators, the submitted reports confirm that the candidate meets and exceeds both the minimum national requirements and the additional criteria of FMI for obtaining the academic title of Associate Professor.

#### **4. Evaluation of the Candidate's Personal Contribution**

I have observed the professional growth of Chief Assistant Professor Dr. Georgi Cholakov for over 30 years, as we were fellow students, and later through our collaborative work at FMI. I hold his professionalism, deep knowledge, and responsible approach to teaching and research in high regard.

My review of the competition materials and his scientific works, along with my personal observations of his work, give me complete confidence that the declared scientific and applied contributions are his own. I have no evidence of plagiarism in the submitted works.

## 5. Critical Remarks and Recommendations

I have no substantive remarks regarding the candidate's scientific works and the results presented in them. I highly appreciate the achieved scientific and applied research outcomes and recommend that Chief Assistant Professor Dr. Georgi Cholakov continue his work in this field while encouraging the participation of young researchers and doctoral students in his future projects.

## CONCLUSION

The documents and materials submitted by Chief Assistant Professor Dr. Georgi Cholakov comply with all the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria, its implementing regulations, and the relevant regulations of Plovdiv University "Paisii Hilendarski".

After reviewing the materials and scientific works submitted for the competition, analysing their significance and the scientific and applied contributions contained therein, I give my **positive** evaluation and recommend that the Scientific Jury prepare a report-proposal to the Faculty Council of the Faculty of Mathematics and Informatics for the appointment of **Chief Assistant Professor Dr. Georgi Cholakov** to the academic position of "**Associate Professor**" at Plovdiv University "Paisii Hilendarski", in the field of higher education: 4. Natural Sciences, Mathematics, and Informatics, professional field: 4.6. Informatics and Computer Science (Informatics – Databases).

24.02.2025

Reviewer: .....

/Assoc. Prof. Emil Doychev/