

**OPINION**  
**on the competition for the academic position „Professor“**

<b>Area of higher education:</b>	4.0 Natural sciences, mathematics and computer science
<b>Professional field:</b>	4.6. Informatics and Computer Science (Informatics)
<b>Announced in:</b>	State Gazette, issue 99 of 20/11/2020
<b>Candidate:</b>	<b>Assoc. Prof. PhD Elena Petrova Somova</b>
<b>Reviewer:</b>	<b>Prof. D.Sc. George Totkov</b>

**1. Background and CV of the applicant**

The review was prepared on the basis of Order No. P 33-74/12.01.2021 г. of the Rector of Plovdiv university "P. Hilendarskii", Prof. Dr. Rumen Mladenov, which approves the Scientific Jury for the open procedure for occupying an academic position of „Professor” in the area of higher education 4.0 Natural sciences, mathematics and computer science, professional field 4.6 Informatics and Computer Science in SG, issue 99 of 20.11.2020.

For the participation in the competition for the academic position of „Professor“, only Assos. Prof. Elena Somova Ph.D. submitted documents.

Assoc. Prof. El. Somova was born in 1972. In 1995 she graduated with a Master's degree in Mathematics, specialty Informatics from Plovdiv University. In 2003 she defended her PhD thesis in the field of the competition on „Tool system for designing, creating and maintaining virtual learning environments”.

Since 1996 she has been an assistant professor at the Faculty of Mathematics and Informatics at Plovdiv University (FMI), and since 2007 – „Associate Professor”.

**2. General description of the submitted materials**

Assoc. Prof. El. Somova has presented the required documents and materials on paper and electronic media.

From the Report for fulfilment of the national minimum requirements and the List of scientific production it is evident that Assoc. Prof. El. Somova participates in the competition with 5 monographies in the field, 39 publications and one textbook. From the presented publications, 16 are in English, 29 are in Bulgarian, and do not repeat those presented for the acquisition of the educational and scientific degree PhD and those for the acquisition of the academic position „Associate Professor”.

**3. General characteristics of the research and pedagogical activity of the candidate**

Assoc. Prof. El. Somova works in the Department of Computer Science, where she has been an assistant professor since 1999. Since 2003 she has held the academic position of „Associated Professor” and from 2012 she has been the Head of the Department.

Assoc. Prof. El. Somova is a lecturer in Master's and Bachelor's programmes at FMI, Faculty of Philology and Faculty of Physics and Technology (FFT) at Plovdiv University. In most of the disciplines she is the leading lecturer. Associated Professor El. Somova has been a lecturer in disciplines such as Logical and functional programming, Programming, Algorithms and data structures, Object-oriented programming, Web programming, Programming languages, Introduction to computer science, Modeling and management of business processes, Object-oriented programming in C#, Information technologies in education, Design of e-learning content, Modern information technologies in education, etc. In the academic year 2014-2015 she is a lecturer and designer of electronic learning content in disciplines of master programme „E-learning” (distance form of education) at FFT.

From the presented General list of publications, it is evident that Assoc. Prof. El. Somova is an author or co-author of 75 publications, from which 5 monographies, 63 papers and 5 textbooks (from which 3 for distance learning in Bulgarian and English), 2 electronic textbooks and a thesis for the award of educational and scientific degree PhD.

Assoc. Prof. El. Somova has participated in 20 (twenty) projects – 10 (ten) international and 10 (ten) national – all in the field of competition. She has participated as head/coordinator and member of teams in CEEPUS and Erasmus+ (resp. from 2007 and 2017).

#### 4. Main contributions

Assoc. Prof. El. Somova conducts research in thematic areas such as Technologies, models and systems for e-learning, Models and systems for gamification of education, Mobile learning technologies, and Automated generation of metadata for digital documents and artifacts.

Her main contributions in these areas can be summarized as follows:

- **derived approaches for:**
  - use of elements and techniques of e-games in an e-learning environment;
  - support of interactive learning activities in an independent mobile environment;
  - invariant teaching of programming, regardless of the programming language;
  - automatic generation of various test items;
  - interoperability of specific information systems with generally accepted standards;
  - protection of NoSQL databases by encryption and configuration of services, etc.;
- **created models for:**
  - gamification of e-learning based on game elements, techniques and actions from e-games;
  - tracking of interactive learning activities in different educational environments, based on the xAPI standard;
  - e-courses based on information and test units and links between them;
- **proposed methodologies for:**
  - creation of game-driven e-courses in any subject area;
  - gamification in face-to-face training supported by a cloud environment;
  - joint and project-based e-learning based on controlled engagement of students, etc.;
- **classifications made of:**
  - the main invariants (template algorithms) in programming training;
  - the game types, suitable for mobile realization in the teaching of mathematics in the primary school;
  - the main types of accumulative test questions;
- **realized prototypes of software tools and performed experiments for:**
  - gamification of a training e-course with the inclusion of specific game elements;
  - transforming an e-course into an interactive e-book in EPUB format;
  - training in programming based on invariants and Bloom's taxonomy;
  - administration of bachelor's / master's theses and elective courses;
  - extraction of metadata from photo files;
  - 3D-modeling and virtualization of cultural and historical objects, etc.

Of the 39 scientific publications submitted for the competition (11 of which are indexed in world-renowned databases with scientific information Web of Science, SCOPUS, ACM and / or IEEE Xplore), Associated Professor El. Somova is an independent author of one publications, with one co-author – 13 publications, with 2 - 18 publications, and with more than 3 – 7 publications. I accept (due to lack of separation protocols) that her contribution is equivalent to that of the other co-authors.

For the enclosed scientific works of Assoc. Prof. El. Somova there is no data and evidence of plagiarism, as well this is declared by the candidate. On this basis, the candidate has achieved 50 points by indicator A. of the minimum national requirements for professional field 4.6. Computer Science and Informatics, 162 points (at a minimum of 100) by Indicator B, 279 points (at a minimum of 200) by Indicator Γ, 200 points (at a minimum of 100) and 1209,88 points (at a minimum of 100) by indicator E.

125 citations of the attached scientific papers are presented, of which 24 in journals, which are referenced and indexed in world-famous databases with scientific information.

The analysis of the above data shows that publications are cited by researchers in the field. This predetermines the significance of the above contributions. Given the scientific value of the publications,

their international and national publicity, and the significant number of citations abroad, it can be concluded that the scientific works of Assoc. Prof. El. Somova meet the requirements of the Academic Staff Development Act of Republic of Bulgaria (ASDARB) to acquire an academic position „Professor“.

## **5. Critical remarks and recommendations**

Regarding the teaching activity of the candidate, more intensive activity is expected in the work with students, and especially with graduates in the field (in the materials for the competition there is no data for defended graduates with scientific supervisor Assoc. Prof. El. Somova). There are data for 2 defended PhD students with research supervisor Assoc. Prof. Somova.

Associated Professor El. Somova has also presented a general list of her scientific publications (from 1996 to date), which contains 75 works. The candidate is not an independent author of group Г6 publications. The latter gives grounds for a recommendation – to focus on independent and in-depth research in the field.

## **6. The personal impressions and opinion of the reviewer**

I have direct personal impressions of the candidate for the academic position of "professor" in various capacities – as a research supervisor (on her PhD thesis), former head of Dept. Computer Science, head of research projects in which she has participated over the years, and co-author of some of the publications. On this basis, I have reason to briefly define Assoc. Prof. El. Somova as a responsible lecturer and researcher, understanding and friendly colleague.

I confirm that the data on the significance and representativeness of the scientific achievements and results presented by the Assoc. Prof. El. Somova (in the form of points for individual indicators listed above), exceed the minimum national requirements – a prerequisite for holding the academic position of "Professor" in the professional field 4.6. Informatics and Computer Science.

## **7. Conclusion**

After getting acquainted with the materials and scientific works presented in the competition and based on the analysis of their significance and the scientific and applied contributions contained in them, I confirm that the scientific achievements meet the requirements of ASDARB, the Regulations of its application, the Regulations for the conditions and the procedure for acquiring scientific degrees and for holding academic positions at the University of Plovdiv and the Specific Requirements of the FMI.

Assoc. Prof. El. Somova satisfies the minimum national requirements in the professional field and no plagiarism has been established in the scientific papers submitted at the competition.

After getting acquainted with the materials and scientific papers presented in the competition, analysis of their significance and the scientific, scientific-applied and applied contributions contained in them, I find it reasonable to give my positive assessment of the applicant and recommend the Scientific Jury to propose to the Scientific Council of FMI to elect Associated Professor Elena Somova to the academic position of „Professor“ in the area of higher education 4. Natural Sciences, Mathematics and Informatics, professional field 4.6. Informatics and Computer Science.

8.3.2021 г.

Reviewer:

(Prof. D.Sc. G. Totkov)