



REVIEW

By Prof. Kosta Andreev Garov, PhD

University of Plovdiv "Paisii Hilendarski"

of the scientific works submitted for participation in the competition for occupying the academic position of "Professor" for the needs of Nikola Vaptsarov Naval Academy, announced in the State Gazette issue 91 of 19.11.2019 in area in higher education: 1. Educational sciences of professional field 1.3 Pedagogy of Education in Mathematics and Informatics, scientific specialty "Geometry", Academic subjects "Mathematics – Part I", "Mathematics – Part II", and "Mathematics – Part III", of the candidate Assoc. Prof. Veselin Nenkov Nenkov, PhD

This review was written based on order № JIC - 5 of 15.01.2020 issued by the Head of Nikola Yonkov Vaptsarov Naval Academy (NVNA). By this order I was appointed as a member of the Scientific Jury for electing a *professor* for the competition announced in the State Gazette issue 91 of 19.11.2019 in area of higher education: 1. Educational Sciences, professional field 1.3 Pedagogy of Education in Mathematics and Informatics, scientific specialty "Geometry", Academic subjects "Mathematics – Part I", "Mathematics – Part II", and "Mathematics – Part III" for the needs of the Mathematics and Physics Department at the Faculty of Engineering at NVNA. At the first meeting of the Scientific Jury I was appointed to prepare a review for the competition in accordance with Minutes № 1 of 13.02.2020. The review was written in compliance with Art. 29 (1) of the Law on the Development of Academic Staff in the Republic of Bulgaria (LDASRB), Art. 60 (1) of the Regulations for the Application of the Act for the Development of the Academic Staff in the Republic of Bulgaria (RAADASRB) and the Law on the Development of the Academic Staff (LDAS) of Nikola Yonkov Vaptsarov Naval Academy NVNA.

To participate in the competition, documents have been submitted by only one candidate – Assoc. Prof. Veselin Nenkov Nenkov, PhD. As a member of the Scientific Jury, I received all the documents submitted by the candidate for participation in the competition both in electronic format and on paper and I concluded that they are in accordance with the Law on the Development of the Academic Staff (LDAS) of Nikola Yonkov Vaptsarov Naval Academy NVNA. The documents are **precisely prepared and systematized**, which allows a real assessment of the results achieved by the candidate. As a reviewer, I have carried out a thorough verification and **determined the accuracy** of the filed **administrative documents and scientific publications**.

1. Scientific works of the candidate accepted for evaluation and review

Associate Professor Veselin Nenkov has presented an impressive list of 280 titles, of which he is the author or co-author. His works range from monographs and scientific articles in journals, to solutions and comments on competition assignments in journals. It is noteworthy that over 80% of the publications are in the Scientific-methodical journal "Mathematics and Informatics" and in the Journal for high school students "Mathematics plus".

To participate in this competition for occupying the academic position of "Professor", Veselin Nenkov has presented **25** scientific papers: **1** monograph, **18** scientific articles and **6** textbooks. A detailed examination shows that they were not used to acquire the academic position of "Associate Professor" and the educational and scientific degree of "Doctor". The submitted papers meet the requirements and **are accepted** by the reviewer when preparing the review.

Of the scientific papers submitted for review, **14** were published in journals indexed in the **Web of Science** database, and **4** were in non-refereed scientific peer-reviewed journals. The monograph "Enhancing Mathematical Competences with Dynamic Geometry" has a total volume of 316 pp. and includes topics in the field of mathematics and mathematics education, for the development of which modern ICT has been used. The textbooks submitted for review can be found in the library database COBISS. (bg.cobiss.net).

The candidate has participated in the implementation of four national scientific or educational projects.

2. General characteristics of the candidate's theoretical and applied research activities

The main scientific areas and scientific fields, in which the candidate Veselin Nenkov works, are: "Methodology of Teaching Mathematics", "Use of Information and Communication Technologies in Education", and "Preparation of Outstanding Students for Successful Participation in Olympiads and Competitions in Mathematics". The main thing that characterizes the candidate in his work in these fields is that he manifests himself as a researcher, educator, and a promoter of mathematics, successfully combining these qualities.

Proof of the above-mentioned characteristics of Assoc. Prof. Veselin Nenkov, PhD is that he fulfills the **minimum** national requirements for occupying the academic position of "Professor", set out in the Regulations for the Application of the Act for the Development of the Academic Staff in the Republic of Bulgaria.

The following table shows the **minimum** points required by groups of indicators, as well as the **actual** number of points, with which the candidate participates in the competition in area of higher education: 1. Educational sciences, professional field: 1.3. Pedagogy of education in..., scientific specialty: Methodology

of Teaching Mathematics and Informatics. The reference statement by indicators from Group D, submitted by the candidate, contains **275** points, but the reviewer recognizes **260 points** because article number 1 is duplicated with article number 4 so **15** points are reduced. From the reference provided by the candidate it is not clear what the role of the described book in item 2 is, which is written by another author.

Group of indicators	A	B	C	D	E	F	Total number of points
Minimum number of points for a professor	50	–	100	200	100	100	550
Actual number of points of the candidate	50	–	100	260	160	116,4	686,4

It can be seen that Assoc. Prof. Veselin Nenkov, PhD, with his 686.4 points not only covers but also exceeds the national minimum requirements for occupying the academic position of "professor" in the professional field 1.3. Pedagogy of Education in Mathematics and Informatics.

3. Evaluation of the pedagogical preparation and activity of the candidate

Veselin Nenkov has a solid background in the area of mathematics and informatics. He graduated from the Faculty of Mathematics and Informatics at the University of Plovdiv "Paisii Hilendarski" in 1989 majoring in Mathematics and Informatics. In this way he obtained his Master's degree in Mathematics and Informatics. His professional career began in the same year as a teacher of mathematics at Vasil Levski Primary school in the village of Cherni Osam. Veselin Nenkov's pedagogical activity as a teacher continued until the middle of 1995. Immediately after that he enrolled at the Technical College – Lovech, where he worked until the middle of 2017. He consecutively held the following academic positions: Assistant, Senior Assistant, Chief Assistant, and Associate Professor.

In 2011, Veselin Nenkov acquired the educational and scientific degree "Doctor" in the doctoral program of Methodology of Teaching Mathematics, successfully defending a dissertation on the topic "Formation of Research Skills in Mathematics Using Information Technology". In 2013 he habilitated as an Associate Professor in geometry at the Technical University of Gabrovo. Since 2018 to the present Veselin Nenkov has been Associate Professor of mathematics at Nikola Vaptsarov Naval Academy in Varna. It can be seen that the candidate's pedagogical activity is quite long – over 30 years. His teaching commitment is mainly in the field of mathematics and information technology.

Veselin Nenkov provides scientific guidance to outstanding students at school and university for successful participation in competitions and conferences in

mathematics. They have been awarded prizes for their scientific work in Bulgaria and abroad.

My assessment of the educational and pedagogical activity of Assoc. Prof. Veselin Nenchev, PhD is **high**. In his pedagogical work, he successfully applies the latest developments in information and communication technology and uses modern teaching methods and techniques.

4. Basic scientific and applied scientific contributions

The main scientific and applied scientific contributions of the candidate are in the scientific field of the competition "Methodology of Teaching Mathematics and Informatics". After a thorough analysis of Veselin Nenkov's works, the reviewer **acknowledges** the following major contributions of the candidate.

A. Scientific contributions

1. Successful use of information technology to create and prove mathematical statements

It is well known that in the science of mathematics people work with statements that are proved on the basis of properly chosen axioms and definitions. Today, computer programs and technologies are being actively used to formulate and prove various mathematical hypotheses. In this area Veselin Nenkov successfully uses the interactive and dynamic computer program The Geometer's Sketchpad (GSP). Statements and images have been explored in terms of the capabilities of the GSP environment as a heuristic means of rediscovery and generalization by analogy. New mathematical statements have been discovered in the GSP environment, which have been proved by geometric and analytical means.

2. Proving new mathematical statements

By means of geometric and analytical means, a variety of statements have been proved from the geometry of the triangle, quadrilateral, different curves, etc.

3. Development of generalizations in elementary geometry

A number of **concepts** have been summarized in the geometry of the triangle and other figures. Also, numerous **theorems** in the geometry of the triangle have also been outlined.

4. Development of methodologies for testing and proving geometric statements

Methodologies have been successfully developed to test and prove geometric statements by applying barycentric coordinates and using complex numbers.

5. Detecting dependencies between areas of cross sections and walls in some polyhedrons

General dependencies between areas of cross sections and walls in some polyhedrons – prisms and pyramids, have been found. The results have been obtained not only by means of elementary mathematics, but also by the use of elements of analytical geometry, such as a vector product.

6. Development of the theory of linear programming for areas enclosed by curves and surfaces of the second degree

A method has been described for finding of maximums and minimums of target linear functions in areas enclosed by surfaces of the second degree.

7. Determination of the geometric locations of the roots of the derivatives of some types of polynomials

A geometric relationship is shown between polynomials with roots at three collinear points and the roots of their respective derivatives by means of a set of ellipses generated by the roots of the polynomial.

B. Applied scientific contributions

One of the applied scientific contributions of Veselin Nenkov is his participation in the development of three textbooks describing solutions to problems in the European Kangaroo competition for students at school. Methodological solutions to the problems are proposed, which allow one to trace the path from guessing to receiving the correct answers to the problems. This makes the textbooks very valuable both in preparing students for successful participation in the competition as well as in other similar competitions, including international ones. These textbooks are also very useful for teachers who prepare students for Olympiads and mathematics competitions. The textbook also includes appropriately selected and developed additional teaching materials, covering some basic mathematical topics for the respective student level.

V. Nenkov also participated in the creation of two textbooks with geometric content, which contribute to mastering key mathematical competences and developing students' creative thinking. He has participated in developing a methodological guide for teachers, including topics for extracurricular work in mathematics.

Other applied scientific contributions of the works of Assoc. Prof. Nenkov, PhD may also be mentioned:

- Creating tools for isogonal, isotomic, and other correspondences in the GSP environment.
- Developing a methodology for searching and finding generalizations in geometry.
- A general idea has been developed for establishing dependencies between the radii of tangent circles in the plane of a triangle, etc.

5. Importance of the contributions to science and practice

Veselin Nenkov has made a real contribution to the development of the methodology of teaching mathematics in the Bulgarian school. The results of the research work of Assoc. Prof. Nenkov are reflected in the specialized scientific literature – he has submitted a list of more than **300** noted citations of his publications. The reviewer recognizes **160** points for citations of the candidate's work described in the Minimum Requirements Report. I believe that the candidate's

scientific contributions are his own merit. Veselin Nenkov **has respected the rules of scientific ethics** – he has not published the same manuscript in different places and has not used the “**copy-paste**” technique. I have no doubts about any **plagiarism** committed in his publications submitted for review.

6. Personal impressions, critical notes and recommendations

My personal impressions of Veselin Nenkov are very good. I have known the candidate for the position of professor for more than 10 years. I was a reviewer of his dissertation thesis and am familiar with his scientific work in detail. Assoc. Prof. V. Nenkov is a respected teacher, scientist with high professionalism, and a reliable colleague. My recommendations for his future research work are to continue contributing elements to the methodology of teaching mathematics with the help of modern information and communication technologies and with greater confidence to show the results obtained to the scientific community in **our country and abroad**.

My **assessment** of the pedagogical and applied scientific activity of Assoc. Prof. Veselin Nenkov Nenkov, PhD is **high**. He has made a real contribution to the development of the methodology of teaching mathematics. Veselin Nenkov meets the requirements of the the Law on the Development of Academic Staff in the Republic of Bulgaria (LDASRB), the Regulations for the implementation of the LDASRB, and the Law on the Development of the Academic Staff (LDAS) of Nikola Yonkov Vaptsarov Naval Academy NVNA for occupying the academic position of "Professor".

All of the above is sufficient reason to give a **positive conclusion** for the election of Associate Professor Veselin Nenkov Nenkov, PhD for the academic position of "**Professor**" at Nikola Vaptsarov Naval Academy NVNA in the scientific specialty **Methodology of Teaching Mathematics and Informatics**, in professional field 1.3 Pedagogy of Education in, area of higher education: 1. Educational sciences.

I recommend that the highly respectable Scientific Jury, designated for the announced competition, propose to the Honorable Faculty Council of the Faculty of Engineering at Nikola Vaptsarov Naval Academy **to elect** Associate Professor Veselin Nenkov Nenkov, PhD for **the academic position of “Professor”**.

20.03.2020

Plovdiv

Reviewer:.....

Prof. Kosta Andreev Garov, PhD