REER REVIEW

on Competition procedure for the position of "Associate Professor" in the field 1.3. professional field 3.1. Methodology of teaching mathematics Announced by Sofia University St. Kliment Ohridski, Faculty of Mathematics and Informatics in the State Gazette, issue 87/19.10.2021 and on the Sofia University St. Kliment Ohridski web page

By Assoc. Prof. Yulian Tsankov Tsankov, Sofia University St. Kliment Ohridski, Faculty of Mathematics and Informatics, in his capacity of Scientific Jury Member following Order # RD 38-592/10.12.2021 of the Rector of Sofia University "St. Kliment Ohridski"

For participation in this competition applied only one candidate: **Chief Assistant Professor PhD Irina Zdravkova Voutova** (Department of Education in Mathematics and Informatics, Faculty of Mathematics and Informatics – Sofia University "St. Kliment Ohridski").

I. GENERAL DESCRIPTION OF THE DOCUMENTS PRESENTED FOR THE COPMPETION

1. Description of the application

Documents presented at the competition by **Chief Assistant Professor PhD Irina Zdravkova Voutova**, **meet the requirements** of the Law for Development of the Academics in the Republic of Bulgaria, Bylaws for implementation of the Law for Development of the Academics in the Republic of Bulgaria and at Sofia University St. Kliment Ohridski.

For participation in the competition, Chief Assistant Professor PhD Irina Zdravkova Voutova has presented 19 publications.

2. Data for Applicant

Chief Assistant Professor PhD Irina Voutova graduated in 1998 with a Master's Degree in „Mathematics and informatics" from the Faculty of Mathematics and Informatics of Sofia University "St. Kliment Ohridski".

She graduated in 2000 with a Master's Degree in Business Administration from Faculty of Economics and Business Administration.

She graduated in 2000 with a Master's Degree in Economics and Management from Erasmus University, Rotterdam, Faculty of Economic Science, The Netherlands.

In 2014 she defended his PhD thesis.

From 2005 until now, he has been a **Chief Assistant Professor** in the department of Education in Mathematics and Informaticsin the Faculty of Mathematics and Informatics of Sofia University "St. Kliment Ohridski ".

In the period 2017-2019 she has scientific specializations in University of Belgrade, Belgrade, Republic of Serbia and University of Joensuu, Joensuu, Finland.

In the period 2009 - 2019 **Irina Voutova** participates in 11 Scientific projects.

3. General characteristic of the scientific works and achievements of the applicant

The papers with which Chief Assistant Professor PhD Irina Voutova applies are related to the mathematical preparation of students-future teachers and to the educational work of mathematics teachers.

The scientific contributions of the works submitted for the competition are in the field of theory and practice of mathematics education and in particular the teaching of geometry, entertaining mathematics, primary school mathematics and history of mathematics.

Numerical indicators: According to the Sofia University regulations and the regulations for the Law application on the minimal national criteria for occupation of the academic post "Associate Professor", the required indicators and the indicators for the applicant Irina Voutova are provided in the TABLE below. It is evident that these criteria are satisfied:

Group	А	В	Г	Д
Applicant's points	50	100	254.53	100
Minimum points required	50	100	200	50

a) The submitted publications are in full compliance with the minimal national requirements under Art. 2B (2) and (3) of ZRASRB, as well as with the additional requirements of SU for the academic position "Professor" in the professional field of this competition;

b) None of the submitted publications have been submitted in a preceding procedure for acquiring a scientific title or an academic position;

c) There is no lawful evidence for plagiarism in the submitted publications.

4. Characteristic and evaluation of the teaching activities of the applicant

Chief Assistant Professor PhD Irina Voutova led an exercise at the Department of Education in Mathematics and Informatics and at the Department of`Geometry of FMI in the disciplines: Analytical Geometry , Geometry, Linear Algebra and Analytical Geometry. Part of the subject are taught for some specialties from the Faculty of Physics and for almost all specialties in Faculty of Mathematics and Informatics and in all forms of training – bachelor, master, postgraduate qualification. Regardless of the specialty or form of study taught by Chief Assistant Professor PhD Irina Voutova has always been sought after and respected by her students , due to the way of presenting the content but also for the correctness and accuracy of her assessments..

5. Analysis of the scientific achievements of the applicant in the works presented on the competition

The vector-algebraic apparatus is used very proficiently in the presented papers.

The first use of this apparatus is for solving mathematical problems. The papers contain examples of usage of the vector apparatus for solving mathematical problems and for proving mathematical statements [Г7.6.], (shown in the derivation of the volume of the octahedron) , there are also many more examples in the monography [Г4.1].

The vector-algebraic apparatus allows for abstraction and extension of many types of problems from the planimetrics into space and even more broadly in space with high dimensionc. The opportunity to apply it as a heusteric approach for enchancing the geometric knowledge is described in detail by Irina Voutova in [В.3], [Г.8.1], [Г.8.2] .

As an extension to the line of thought triangle-tetrahedron in two dimensional and three dimensional space respectively the paper introduces new concept “elementary dot configuration” (the algebraic topology of this concept corresponds to that of a simplex). Another concept that is introduced is “invariant of elementary dot configuration” expanding the concept of a face in the context of a triangle and volume in the context of a tetrahedron.

The geometric idea of Yakov Isidorovich Perelman for solving Poisson’s problem of liquid overflow is expanded without explicit usage of the vector apparatus and by only using the means of elementary geometry(mostly axis symmetry). The problem is reduced to the movement of ray of light on the sides of the rhomboid mesh which reflects from the reflective sides of the mesh. In addition cases that have no solution are considered. [Г.7.2] , [Г.6.1].

For primary school mathematics the paper describes an experience of expanding on a somewhat short solutions for some problems. New more effective approach is introduced – mathematical map. The goal is not necessarily the new solution to be shorter but it serves as a logical model of the problem and technical model for its solution. This is achieved through schematically representation of the structure of the problem – operations, relations and the order of their introduction set in text of the mathematical problem. New concept is introduced "arithmetical node" [Г.6.4.].

In the papers presented for the competition by Irina Voutova special attention is paid to the heuristic method in the teaching of mathematics. The monography [В 3.1.] introduced as main habilitation work for the competition displays excellent knowledge of the works of Bulgarian scientists like prof. Grozdev, prof. Tonov, prof. Milushev and others. General heuristic scheme is proposed for the formulation of new statements (hypotheses) in mathematics courses. Vector-algebraic apparatus is used for the demonstration of the methods.

The study of the history of mathematics more specifically of byzantine mathematics described here [Г.7.5] that influences the development of mathematics in our lands a thousand years ago makes a very pleasant impression. A conclusion is made that the proposed theory of the decline of the hellenic mathematics development made by the well-known mathematics historian van der Waerden is not accurate.

Taking into account the independent works of Chief Assistant Professor PhD Irina Voutova I think in all joint works her participation is equal to the other co-authors.

6. Critical Remarks and Recommendations

I have no significant critical remarks towards the candidate and the presented documents. I recommend the candidate to focus on conducting specialized elective courses in the scientific fields in which he works.

7. Personal Impressions

I have known Irina Zdravkova Voutova personally since he was a student at FMI. He was one of the strongest students on the course. Irina has very broad culture and knowledge in all areas of mathematics. My impressions of Irina Voutova as a teacher and colleague are extremely positive.

8. Conclusion on the application

Having become acquainted with the materials and the scientific works submitted in the competition and on the basis of the analysis of their significance and the scientific and applied contributions contained there. **I confirm that the scientific achievements meet the requirements** of the ZRASRB, the PPZRASRB and the corresponding Regulations of Sofia University "St. Kliment Ohridski" for the occupation by the candidate of the academic position "Associate Professor" in the scientific field and professional direction of the competition. In particular, the applicant meets the minimum national requirements in the professional field and no plagiarism was found in the scientific works submitted at the competition.

I give a **positive assessment** of the application of **Chief Assistant Professor PhD Irina Voutova** for the academic position of "Associate Professor" in the professional field 3.1. Methodology of teaching mathematics in the competition announced for the needs of Sofia University "St. Kliment Ohridski ", Faculty of Mathematics and Informatics.

II. GENERAL CONCLUSION

Based on the above, **I recommend** the scientific jury to propose to the body of Faculty of Mathematics and Informatics at Sofia University "St. Kliment Ohridski", competent on the election on this procedure, **to elect Chief Assistant Professor PhD Irina Zdravkova Voutova to occupy the academic post "Associate Professor"** in the professional field 3.1. Methodology of teaching mathematics.

04.02.2022 Prepared by:

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