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ШУМЕНСКИ УНИВЕРСИТЕТ
"ЕПИСКОП КОНСТАНТИН ПРЕСЛАВСКИ"
50 ГОДИНИ ЗАЕДНО ПИШЕМ ИСТОРИЯТА

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**SHUMEN UNIVERSITY**
**"BISHOP KONSTANTIN PRESLAVSKI"**

# REVIEW

**by Prof. Dr. Ing. Sabin Ivanov Ivanov,**
by ShU "Bishop Konstantin Preslavski"
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on a competition for the academic position "Professor" in the field of higher education: 5. Technical sciences, professional direction 5.7. Architecture, Construction and Geodesy, (Photogrametry and Remote Methods) in the Department of Geodesy, Faculty of Technical Sciences of The University of Shumen "Bishop Konstantin Preslavski", announced in SG, issue 41/03.06.2022

**Candidate:** Associate Professor Dr. Eng. Kiril Filipov Yanchev

**Reason:** Order No RD-16-174/31.08.2022 of the Rector of the Shumen University "Bishop Konstantin Preslavski".

## 1. Biographical data

Associate Professor Dr. Eng. Kiril Filipov Yanchev received his first master's degree in "Geodesy" from ShU "Bishop Konstantin Preslavski" in 2013 and a second master's degree in "Todor Kableshkov" University of Health in Sofia in 2015. In 2017 he defended his dissertation on the acquisition of the ESD "Doctor" in professional direction 5.7. Architecture, construction and geodesy. From 2019 to 31.08.2020 he was "Chief Assistant" in the Department of Geodesy at ShU „Bishop Konstantin Preslavski". From 01.12.2020 he holds the academic position "Associate Professor" in the same department.

## 2. Pedagogical training and activity of the applicant

### 2.1. Auditors and outside audience classes – development of lecture courses, innovations in teaching methodology, provision of activities in a practical environment outside the higher school or scientific organization

From the submitted reference under Art.61 of the RILDASRB for additional indicators for participation in the competition, guided subjects are "Geoinformatics III Part", "Design of GIS", "Vertical Planning Part I and II", "Applied Geodesy I and II Part", "Study of geodynamic phenomena with geodetic methods", "Urban movement and street design", "Regulations", "Before the thesis".

Associate Professor Dr. Eng. Kiril Filipov Yanchev has participated in the preparation of curricula in his disciplines.

## 3. General characteristics of the applicant's scientific-research and scientific-applied activities

### 3.1. Textbooks and teaching tools

According to the announced competition for "professor" has presented 4 textbooks as follows:

– Photogrametry and remote methods I part;
– Photogrametry and remote methods II part;
– Digital processing of images I part;
–Digital processing of images II part.

**3.2. Publications**

I accept the monograph of Assoc. Prof. Dr. Eng. Kiril Filipov Yanchev entitled "Laser scanning – achievable precision in the field of photogrametry, remote sensing and geodesy" on the basis of the accepted science requirements for taking up an academic position "professor". The monograph work examines the evolution of ideas on the subject and methods of modern measurements carried out using ground laser systems. Problems in the measurement of meteorological parameters affecting the accuracy of the results of observations obtained by methods of terrestrial and satellite scanning systems shall be discussed. Attention is paid to the different types of laser systems and photogrametric principles of work, including their design, measurement and mathematical modeling of the results.

According to the announced competition for "Professor" the candidate participates with 14 publications, of which 8 are co-authored and 6 are independent. The subject area of publications fully covers the professional direction 5.7. Architecture, construction and geodesy.

**3.3. Citations**

The submitted report lists 34 citations of the candidate's work.

**3.4. Participation in projects**

From the documents submitted, the applicant participated:

– 2019 in an internal project of ShU: Project № RD-08-95/01.02.2019 – "Research of the effectiveness of GNSS technologies in RTK mode, together with mobile GIS, for the needs of the cadastre";

– 2020 in an internal project of ShU: Project № RD-08-82/27.01.2020 – "Study the application of remote methods and technologies in the mapping of spatial objects";

– 2021 in an internal project of ShU: Project № RD-08-128/04.02.2021 – "Laboratory for testing of topologies and communications";

– 2021 in national project – Project BG05M2OP001-2.016-0010 – "Modernization, digitization and internationalization of the training in the professional field "Architecture, Construction and Geodesy" at the University of Mining and Geology "St. Ivan Rilski".

**3.5. Scientific contributions to the competition**

Associate Professor Dr. Eng. Kiril Filipov Yanchev, according to the author's report, has defined his contributions in one direction:

**I. Development of the theory and technology of remote methods for collecting geospatial data.**

The available publications in the field of laser scanning are characterized by fragmentation and lack of completeness of studies that do not meet the requirements for a systematic approach and do not have common theoretical and technological foundations. A significant part of the publications related to laser scanners are devoted to the practical experience of their application. The publications present the shooting objects, the type of products received, the laser scanner models used and the software used to process the results of the scan. Thus, a systematic solution to the problem of bringing the speed and accuracy of photogrametry technological operations to the requirements of different sectors of the country's economy is presented by developing the theory and technology of remote methods of geospatial data collection.

In this regard, the scientific contributions of the proposed works under the competition are presented:

- mathematically and experimentally justified are the basic principles of ground laser scanning, on the basis of which the ways of improving the accuracy of measurements with ground laser scanners are theoretically proven and studied. These principles make it possible to take into account the influence of the metrological properties of objects, which significantly improves the quality of raw data from laser scanners;

- A theory of photogrametric processing of data from laser scanning based on the use of the package method for leveling the scanner's passages has been developed, which allows to increase the accuracy of determining the elements for external orientation to 35% compared to other methods;

- A theoretical and methodological justification of ground laser research processes has been developed, which is the basis of universal technology for its production, determination of parameters of research and tolerances for monitoring the accuracy of the ground laser observation processes, as well as assessing the accuracy of the finished product;

- A universal method for checking ground laser scanners has been developed, which allows the implementation of metrological certification of all types of phase and pulse ground laser systems;

- A theoretical and methodological justification of the ground laser testing process has been developed, which is based on universal technology for work in progress, determined by the test parameters and the observation tolerances for accuracy of the ground-based process distortion, laser monitoring and accuracy assessment of the finished product..

**1.1. Publications with scientific contributions in this field:**

- Monograph - Kiril Yanchev "Laser scanning – achievable precision in the field of photogrammetry, remote sensing and geodesy", university publishing house "Bishop Konstantin Preslavski", Shumen, 2022, ISBN 978-619-201-573-2. Pp. 175;
- № II.2. Kirilova K., Yanchev K. 2020 "Satellite gradiometry – an excellent addition to the general dynamic method of cosmic geodesy". Yearbook of ShU "Bishop Konstantin Preslavski" Technical Sciences. Volume X E, Shumen, University Publishing House "Bishop Konstantin Preslavski", ISSN: 1311-834X, pp. 153-159;
- № II.3. Kirilova K., Yanchev K. 2020 "Gradiometric measurements with gradiometer on board". Yearbook of ShU "Bishop Konstantin Preslavski" Technical Sciences. Volume X E, Shumen, University Publishing House "Bishop Konstantin Preslavski", ISSN: 1311-834X, pp. 159-163;
- № II.4. Yanchev K., Kirilova K. 2020 "Assessment of the possibility of practical use of unmanned aerial system in three-dimensional modeling of terrain on the ground". Scientific Conference with International Participation MATTEH 2020, Compendium of Scientific Papers, Vol. 2, Shumen, ISSN: 1314-3921, pp. 247-254;
- № II.5. Kirilova K., Yanchev K. 2020 "Redefining the capabilities of the unmanned aerial system for the needs of the cadastre". Scientific Conference with international participation MATTEH 2020. Compendium of Scientific Papers, Vol. 2, Shumen, ISSN: 1314-3921, pp. 255-261;
- № II.6. Yanchev, K. 2021 "Applications of geographic information systems in forecasting the conditions of aerospace research". Shumen: University Publishing House "Bishop

Konstantin Preslavski", Yearbook of ShU "Bishop Konstantin Preslavski" Technical Sciences. Volume XI E, 2021, pp. 35-40, ISSN: 1311-834X;

- № II.9. Kiril F. Yanchev 2022 "Opportunities for creating basic geodetic networks using laser scanning". Scientific Conference with international participation MATTEH 2022. Compendium of Scientific Papers, Vol. 2, Shumen, ISSN: 1314-3921, pp. 219-222;
- № II.11. Kiril F. Yanchev, Krasimira K. Kirilova 2022 "Ground Laser Scan". Scientific Conference with international participation MATTEH 2022. Compendium of Scientific Papers, Vol. 2, Shumen, ISSN: 1314-3921, pp. 226-230;
- № II.12. Kiril Yanchev "The influence of air density on received laser signals", Journal scientific and applied research, licensed at EBSCO , USA. Volume 20, 2022, ISSN: 1314–6289, pp. 20–24;
- № II.13. Kiril Yanchev "The influence of turbolity on laser signals", Journal scientific and applied research, licensed at EBSCO , USA. Volume 20, 2022, ISSN: 1314–6289, pp. 25–27;
- № II.14. Kiril Yanchev "Error in determining the permanent correction of the measured distance by a ground laser scanner", Journal scientific and applied research, licensed at EBSCO , USA. Volume 20, 2022, ISSN: 1314–6289, pp. 28–32.

**4. Conclusions**

4.1. The applicant Assoc. Prof. Dr. Eng. Kiril Filipov Yanchev fully fulfills the requirements of the LDASRB, the RILDASRB and the Rules of Development of Academic Staff in ShU and covers the minimum national requirements for the holding of academic positions as follows::

A: Required 50 points – achieved 50 points

V: Required 100 points – achieved 100 points

G: Required 200 points – achieved 200 points

D: Required 100 points – achieved 102 points

E: Required 150 points – achieved 160 points

4.2. There is no statutory plagiarism in the scientific papers of the applicant.

4.3. I recognise the contributions submitted by the applicant.

**5. Critical notes and recommendations**

My critical remarks are not of a meaningful nature. I recommend that the applicant direct his audience activity in referenced and indexed scientific publications with impact factor in order to promote the results of his research activities and to increase his participation in research projects in the fields of professional direction 5.7. Architecture, construction and geodesy.

**6. Conclusion**

In summary of the fore, I declare that with the presented scientific production and the educational and teaching activity carried out, the candidate for the academic position "Professor" Assoc. Prof. Dr. Eng. Kiril Filipov Yanchev satisfies the mandatory conditions of the LDASRB, the RILDASRB and the requirements for holding academic positions in the ShU "Bishop Konstantin Preslavski", as well as the content of the ucometric assessments. With a responsibility, I find it reasonable to suggest that the candidate, Assoc. Prof. Dr. Eng. Kiril Filipov Yanchev to take the academic position "Professor" in the Field of Higher Education: 5. Technical Sciences, Professional Direction 5.7. Architecture, construction and geodesy, (Photogrametry and remote methods) in the Department of Geodesy, Faculty of Technical Sciences of The University of Shumen "Bishop Konstantin Preslavski".

13.10.2022

Reviewer:.....

(Prof. Dr Eng. Sabin Ivanov)