

## OPINION

**by Prof. Dr. Eng. Nikolay Dimitrov Madzharov, Technical University - Gabrovo of the materials submitted for participation in a competition for the academic position "Associate Professor " in the field of higher education - 5. Technical sciences, professional direction - 5.2. Electrical engineering, electronics and automation, specialty - "Power supply and electrical equipment" (Lighting and installation technology).**

In the competition for „Associate professor“, announced in the State Gazette, no. 54 of 25.06.2024 and on the TU-Gabrovo website for the needs of dep. "Mechanical engineering, computer systems and electrical engineering" at TC Lovech, as a candidate participated assistant professor Dr. Milko Todorov Yovchev.

### **1. Overview of the content and results in the presented works**

The scientific works presented for the competition can be summarized in the following scientific and applied fields:

- Three-dimensional computer modeling and optimization of optical systems of LED illuminators - [B.4.1], [B.4.2], [B.4.3], [B.4.6], [B.4.7], [B.4.9], [D.7.2], [D.7.3], [D.8.18], [D.8.19];
- Study of color characteristics of illuminators - [B.4.4], [B.4.8], [D.7.5], [D.8.5], [D.8.7], [D.8.8], [D.8.9], [D.8.13], [D.7.20];
- Increasing the energy efficiency of indoor and street lighting systems - [D.8.1], [D.8.3], [D.8.4], [D.8.6], [D.8.10], [D.8.12], [D.8.16];
- Electrotechnical characteristics and temperature distribution of LED illuminators [B.4.5], [D.7.1], [D.8.17];
- Laboratory bench for measuring transmission and reflection coefficients of materials for visible, infrared and ultraviolet light [D.8.11] and investigation of the reflection coefficient of 75 steel samples with different marking step and laser marking frequency [D.7.4];
- Study of modes of operation of autonomous photovoltaic power supply of street LED lighting [D.8.2]; specialized measuring device for volt-ampere characteristics of photovoltaic modules [D.8.15]; study and analysis of the development of photovoltaic electricity in Bulgaria over a 10-year period [D.8.14];
- Development of a planar transformer for a flyback converter [B.4.10].

The scientific works that assistant professor Dr. Milko Todorov Yovchev, submits for participation in the competition for "Associate Professor" by groups of indicators, according to the minimum requirements, the following:

1.1. Dissertation work for the award of the educational and scientific degree "Doctor". Indicator A from the minimum national requirements, where the candidate collects 50 points, with a required minimum of 50 points.

1.2. Scientific publications

- Habilitation work – 10 scientific publications in publications that are referenced and indexed in world-famous databases with scientific information [B1 – B10]. This work is related to Indicator B4, where with the publications presented, the candidate collects a total of 182 points with a required minimum of 100 points.

- Scientific publications in publications that are referenced and indexed in world-renowned databases with scientific information [D7.1 – D7.5]. According to the national requirements, they refer to indicator G7, where the candidate scores 103.33 points.

- Scientific publications in non-refereed peer-reviewed journals or in edited collective volumes [D8.1 – D8.20]. According to the national requirements, they refer to indicator D8, where the candidate scores 188.02 points.

In total, according to indicator D, the candidate scores 291.35, with a minimum score of 200.

- A list of citations is presented, where 3 articles have been cited a total of 10 times in scientific publications, referenced and indexed in world-renowned scientific information databases or in monographs and collective volumes. According to indicator D of the minimum national requirements, the candidate collects a total of 100 points with a required minimum of 50 points. From the reference in Scopus it can be seen that assistant professor Dr. Milko Todorov Yovchev has 15 articles and 22 citations, as a result of which he has a Hirsch index of 3.

The processing of the data from the presented scientific works and their general characteristics shows that assistant professor Dr. Milko Todorov Yovchev fully meets the minimum national requirements for holding the academic position "Associate Professor" for the field of "Technical Sciences" in higher education, laid down in Art. 2b of ZRASRB, art. 60, paragraph 3 of the PPZRASRB and Art. 1, para. 2 of PPNSZAD in TU-Gabrovo.

## **2. General characteristics of the applicant's activity**

### ***2.1. Educational and pedagogical activity***

Assistant professor Dr. Milko Todorov Yovchev was appointed as an assistant in the department of "Electrical supply and electrical equipment" at TU-Gabrovo in 2011. He has led lectures, seminars and laboratory exercises in 4 disciplines for "Bachelor" degree and 1 "Master" degree for full-time and correspondence form of education. He participated in the development of 2 study programs for the specialty "Electricity and electrical equipment" - "Master" degree and three study programs for "Doctor" degree, professional direction - "Electrical Engineering, Electronics and Automation"

For the competition, he participated with 1 textbook (co-authored with assoc. prof. Tsankov) and two teaching aids (co-authored with assoc. prof. Tsankov), all of which were reviewed. The language and style in them is precise and clear.

Assistant professor Dr. Milko Todorov Yovchev participated in the construction of a scientific research laboratory "Ecological, energy-saving and electromagnetically compatible lighting, LED, and RES components and technologies" at the Competence Center "Intelligent Mechatronic, Eco- and Energy-Saving Systems and Technologies".

The candidate has good language skills. He speaks English at a basic and independent level, which allows him to follow current publications in his scientific field and to contact colleagues from abroad.

### ***2.2. Scientific and scientific-applied activity***

Assistant Professor Dr. Milko Todorov Yovchev participated in 2 projects under operational programs, 2 international research projects and one university research project, of which he was the leader.

For the period 2012 - 2024, he presented his scientific developments at 23 conferences, and in 2022 he received an award for "Best Report" at the UNITECH 2022 conference.

He is a member of the National Lighting Committee in Bulgaria (NKO - Bulgaria) (member of the management board) and the Chamber of Engineers in Investment Design (KIIP) – a designer with limited designer's legal capacity, Certificate No. 20029.

### ***2.3. Implementation activity***

A large part of the presented projects, on which the candidate worked, are of an applied nature and are directly related to the educational process. The main part of these developments are

presented in the publications for participation in the competition. They are successfully used in the form of educational stands in the disciplines "Lighting and installation technology", "Lighting equipment design", "Power supply", "Industrial power supply systems", "Optimization and management in power supply systems".

### **3. Contributions. Significance of contributions to science and practice**

The contributions on the materials of assistant professor Dr. Milko Todorov Yovchev, I believe that they are scientific and applied. The scientific-applied contributions are related to the development of new methodologies, software algorithms and tools for studying new effects and achieving better characteristics and parameters of optical systems of illuminators.

#### **Scientific and applied contributions can include:**

1. A methodology for iterative three-dimensional computer modeling and photometric analysis of illuminators with different purposes is proposed.
2. An analytical dependence of the effectiveness of the dangerous blue light emission in the visible spectrum of lamps and illuminators is defined.
3. Models of secondary optical lenses for street LED lights and of reflectors and diffusers for LED lights for indoor lighting have been created.
4. Iterative optimization of optical systems of LED illuminators for indoor and street lighting was performed.

#### **Applied Contributions:**

1. Losses in optical systems of illuminators with different purposes were studied.
2. The influence of various factors on the color characteristics and photobiological safety of lamps and illuminators was investigated.
3. Digital graphic models of the existing lighting systems in populated areas were developed.
4. Energy-saving measures are proposed on the basis of variant optimization lighting engineering calculations and evaluation of the electrical efficiency of the proposed technical solutions for the reconstruction of the lighting systems.

### **4. Evaluation of the candidate's personal contribution**

I consider that the contributions are the personal business of the candidate. Proof of this is the 35 publications presented for the competition, 4 of which are independent and 7 publications in which the candidate is in first place.

The personal contribution of assistant professor Dr. Milko Todorov Yovchev in the educational activity is also serious and successful, since a large part of the scientific and applied activity is related to the educational process. In general, all necessary requirements and indicators are fulfilled 1.56 times, taking into account the minimum national requirements of the current law and regulations.

### **5. Critical notes and recommendations**

I have no critical comments on the materials presented by the candidate, but I have the following more substantial recommendations:

1. To publish the more significant results in scientific journals with an impact factor and prestigious international forums.
2. To deepen the work on the citation of the candidate's scientific output.
3. Interesting applied developments are presented and I recommend seeking protection with intellectual property documents.
4. To devote more time to the implementation in real business of his scientific and research results.

The recommendations aim at a better future creative expression and do not detract from the research activity carried out by assistant professor Dr. Milko Todorov Yovchev.

## **6. Personal impressions**

I know assistant professor Dr. Milko Todorov Yovchev as a colleague who has been working in the Department of "Electrical Supply and Electrical Equipment" of TU Gabrovo since 2011 and is a member of Assoc. Prof. Tsankov's team. He is distinguished by independence, diligence, initiative and collegiality. As a responsible researcher, he strives for comprehensiveness and accuracy of research, its design and publication. The impression created by the materials presented for the competition is also very good.

## **7. Conclusion**

**Bearing in mind the above, I propose assistant professor Dr. Milko Todorov Yovchev to be elected "ASSOCIATE PROFESSOR" in the field of higher education 5. Technical sciences, professional direction 5.2. Electrical engineering, electronics and automation, specialty - "Power supply and electrical equipment" (Lighting and installation technology).**

**31.10.2024**

Jury member:                    /signature/  
/ Prof. Dr. Eng. Nikolay Dimitrov Madzharov /