Appendix 12c

REVIEW
to occupy the academic position:

"Professor"	
"Associate Professor"	**X**
	one of the academic positions indicated shall be marked with the sign "X"

Candidates to occupy the position:

1	**Assistant professor**	**Dr. Eng.**	**Temenuzhka**	**Hristova**	**Radoykova**	**University of Chemical Technology and Metallurgy (UCTM), Department of Analytical Chemistry**
№	academic position	scientific degree	name	middle name	last name	workplace

Scientific area:

4	**Natural Sciences, Mathematics and Informatics**
code	name

Professional area:

4.2.	**Chemical sciences**
code	name

Scientific specialty:

4.2. Chemical Sciences (Analytical Chemistry)

The competition has been announced:

64	**05.08.2025**	**Analytical Chemistry**	**Faculty of chemical technology**
in SG issue	date	for the needs of the Department	Faculty

The review was written by:

Prof.	**Dr. Eng.**	**Stela**	**Ivanova**	**Georgieva-Kiskinova**	**UCTM**
academic position	scientific degree	name	middle name	last name	workplace

1. Review for the candidate:

Assistant professor	**Dr. Eng.**	**Temenuzhka**	**Hristova**	**Radoykova**
academic position	scientific degree	name	middle name	last name

1.1. Completion of the provided documents:

A) The competition documents are in full compliance with the Regulations	3 points	**X**
B) The documents are complete but do not fully comply with the requirements of the Regulations	2 points	
C) The documents are not completed in accordance with the requirements of the Regulations	0 points	
		one of the answers given is marked with the sign "X"

Missing documents and violated requirements must be described if response C is marked.
The presented documentation is prepared precisely and contains a full set of materials - a curriculum vitae, a list of scientific publications on indicators 4 and 7, a reference for citations, a summary of the main results and contributions, as well as a list of teaching aids. The arrangement of the documents is clear and allows for easy orientation in the content. In the presentation of scientific publications, impact factors, impact ranks and quartiles (Q1–Q4) of the journals are cited, which provides transparency and the possibility of verifying bibliometric indicators. In the main works, doi numbers are also indicated, which facilitates tracking in international databases. The documents are in accordance with the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria, the Regulations for the Implementation of the Law and the internal rules of UCTM. No shortages or procedural inconsistencies are detected. The publications included in the dissertation for the acquisition of the educational and scientific degree "Doctor" are not taken into account in the assessment for associate professor. In conclusion, the set of documents is complete, tidy and suitable for an objective assessment of the candidacy for “Associate Professor” of assist. prof. dr. eng. T. Radoikova.

1.2. Meeting the minimum requirements under the Regulations:

A) The candidate meets the minimum requirements	20 points	**X**
B) The candidate doesn’t meet the minimum requirements	0 points	
		one of the answers given is marked with the sign "X"

It must be filled in if answer B is marked. The publication activity of the candidate is analyzed. The response of the results achieved (quoted) is analyzed.
The presented materials show that the candidate fulfills in full the minimum requirements for occupying the academic position of "Associate Professor" according to the regulatory documents. To participate in the competition, T. Radoykova presented 28 scientific publications, of which 23 are in journals with impact factor or impact rank, as well as 3 publications from conferences indexed in WoS/Scopus. 58 citations based on Scopus data and h-index 9 are indicated, which exceeds the national indicators in the 4.2 "Chemical Sciences" strands. The publications are evenly distributed over time and include papers from the last three years (2023–2025), indicating constant research activity. Educational and methodological contributions are also presented – co-authorship of a university textbook – as well as participation in projects under the NIS, NSF and NRRP in the capacity of a manager or contractor. In summary, I could conclude that the applicant meets and exceeds the minimum national and intra-university requirements for the position of “Associate Professor”, and the evidence presented is sufficient and reliable for a positive assessment.

1.3. Relevance of scientific and / or applied research:

A) The research is relevant. Part of the research is pioneering (no results are known on the topic by other authors)	7 points	
B) Research is relevant. Results from other authors are known for each of the topics and / or applications studied.	5 points	**X**
C) Most of the research is relevant, but also some results are presented that have no scientific and / or applied value	3 points	
D) The smaller part of the research is relevant	2 points	
E) Research is not relevant	0 points	
		one of the answers given is marked with the sign "X"

The evaluation of the relevance of the research must be substantiated.
The scientific topics of the candidate are in accordance with the current directions of modern analytical chemistry. Research on lignin, biochar, industrial slag and flying ash is significant in the context of the circular economy and sustainable technologies. The applied instrumental methods – GC–MS, FT–IR, ICP/AAS, UV–Vis and thermal analysis – are appropriate and validated in the analysis of complex matrices. The international literature on these topics is extensive, but the candidate's contribution is expressed in the adaptation of methodologies to specific Bulgarian materials and conditions, as well as in the systematization of dependencies between composition and functional properties. The relevance of the research is confirmed by publications from recent years (2023–2025) published in refereed and indexed journals. At the moment, however, the candidate does not submit publications in quartile journals (Q1) that would position the results at a higher international level. In this sense, the research is up-to-date and well inscribed in modern trends, but cannot be defined as pioneering.

1.4. Knowledge of the problems subject of research:

A) The candidate knows in detail the achievements of other authors on the researched topics and/or applications	6 points	**X**
B) The candidate is partially familiar with the achieved results on the researched topics and / or applications	4 points	
C) The candidate has no prior knowledge of the status of the researched problems	0 points	
		one of the answers given is marked with the sign "X"

The evaluation must be substantiated if answer C is marked.
A review of the publications shows that the candidate knows the topic and previous developments in the field well enough. The works reveal a good knowledge of the scientific results achieved in the international literature on the problems of lignin depolymerization, isolation of phenolic compounds and the application of instrumental methods for the study of natural and industrial materials. The

approach to the choice of analytical techniques is justified and consistent with the physico-chemical nature of the matrices and the goals of the specific experiments. The publications apply adequate argumentation and logical interpretation of the results, seeking comparison with literature data and discussing possible mechanisms of interaction. A consistent logic is traced between the goals, the methods used and the conclusions, which indicates a good knowledge of the topic. In individual cases, the discussion of the metrological characteristics of methods – e.g. detection limits, reproducibility and uncertainty estimation could be expanded, which would add additional analytical precision. Overall, however, the candidate demonstrates solid knowledge and analytical thinking, typical for an independent researcher with accumulated experience in the field of analytical chemistry.

1.5. Type of research:

A) Theoretical	4 points	
B) Applied	4 points	
C) Theoretical with application elements	4 points	**X**
D) It does not correspond to the level specified in the Act for the Development of the Academic Staff in the Republic of Bulgaria and the Regulations	0 points	
		one of the answers given is marked with the sign "X"

The level of research must be substantiated if answer D is marked.
The presented research combines mainly theoretical analysis with a pronounced applied orientation. In some of them, the authors, in particular Dr. T. Radoykova, develop and adapt analytical methodologies for the study of natural and industrial materials (Appendix 4c, publications No. 3, 4, 5, 9, 10, 12, 18), and in others they seek their practical application in assessing the composition, structure and functional properties. The approach is mainly experimental, but it is based on a solid theoretical foundation. The theoretical side of the scientific developments is expressed in the tracing of the dependencies between the chemical composition and the functional behavior of the studied systems (Appendix 4c, publications No. 6, 8, 11, 14). The application aspect is primarily related to the possibilities for the recovery of biomass and industrial waste (Annex 4c, Publ. Nos. 13–20, 25). Some publications also consider potential technological applications of the analyzed materials – for example, as antioxidants, sorbents or components of geopolymer systems (Appendix 4c, Publications No. 6, 10, 12, 18, 19, 20, 28). The studies are logically arranged, the results are consistent and well supported by experimental data. In the future, it would be useful to pay greater attention to mathematical modelling and quantitative description of processes (Appendix 4c, Publ. Nos. 9, 14, 18), which would further strengthen the link between theory and practice. In general, the candidate's works are distinguished by a balanced character – a clear methodological basis, convincing results and real practical significance, which fully correspond to the profile of the competition.

1.6. Objectives of the research:

A) Realistic and of scientific and / or applied interest	8 points	**X**
B) Realistic, but not of scientific and / or applied interest	4 points	
C) Unattainable (unrealistic)	0 points	
		one of the answers given

		is marked with the sign "X"

Objectives must be specified. The type of the set objectives must be justified.
In the scientific activity of the candidate, presented under the competition, it can be seen that the objectives of the research are clearly formulated and consistently fulfilled in the individual publications. They are aimed at the identification and quantification of low molecular weight phenolic compounds and other bioactive components, as well as at the structural characterization of natural and industrial materials (Appendix 4c, publications No. 3, 4, 6, 9, 10, 12, 18). Some of the papers look for dependencies between chemical composition and functional properties – for example, antioxidant activity and sorption capacity (Appendix 4c, Nos. 6, 8, 11, 14, 19, 20). The objectives are realistic and consistent with current trends in analytical chemistry and environmental analysis. The applied instrumental methods – GC–MS, FT–IR, UV–Vis and AAS – are suitable for achieving the assigned tasks and provide the necessary sensitivity and reliability of the results (Appendix 4c, No. 3, 5, 7, 9, 12, 15). The publications trace a logical connection between the goals set, the methods used and the conclusions drawn, which gives the impression of purposefulness and consistency in the scientific work. Some of the papers demonstrate the implementation of the objectives in the context of sustainable resource utilization and environmentally oriented technologies (Appendix 4c, No. 13–20), which gives the research relevance and practical orientation. In general, the formulated objectives are justified, feasible and correspond to the profile of the competition.

1.7. Methods of research:

A) Adequate to research and set scientific objectives and /or applications	8 points	**X**
B) Partially appropriate, enabling part of the scientific objectives and / or applications to be achieved	4 points	
C) Inappropriate methods	0 points	
		one of the answers given is marked with the sign "X"

Methods must be specified. The type of methods used is justified.
In the presented papers, well-combined and complementary analytical techniques applied to matrices of different nature are found – GC–MS/GC–FID, FT–IR, UV–Vis/fluorimetry, ICP/AAS and thermoanalytical methods (Appendix 4c, Publ. No. 3, 5, 7, 9, 12, 15, 16). The candidate demonstrates in-depth knowledge of good laboratory practices by approaching precise sample preparation – extractions, purification and concentration of analyzes, described in detail in Appendix 4c, publications No. 4, 6, 8, 11 and 13. In the research, there is consistency and evolution in approaches – striving to optimize analytical parameters, introduce standard samples and improve calibration procedures (Appendix 4c, publications No. 2, 9, 14). In some papers (Appendix 4c, Publications Nos. 5, 10, 18) the candidate examines the limits of precision and stability of the methods, while in others the mutual confirmation of the results through cross-verification between spectroscopic and chromatographic methods is used (Appendix 4c, Publications Nos. 7, 9, 12, 15), which gives additional reliability to the data obtained. In summary, the methodological approach in the works of Dr. T. Radoykova is modern and purposeful. The selection and combination of techniques are made with an understanding of the specifics of each matrix and with analytical clarity.

1.8. Candidate research contributions:

A) With lasting scientific and / or applied response, they form the basis for new research and applications	20 points	
B) They are of significant scientific and / or applied interest, complete and / or summarize previous research	16 points	**X**
C) They are of scientific and / or applied interest	12 points	
D) Lack of significant contributions	8 points	
E) Lack of contributions	0 points	
		one of the answers given is marked with the sign "X"

Contributions must be specified. The type of results achieved must be justified.
The applicant has made a clear contribution to the analytical characterization of complex natural and industrial matrices, as well as to the development of methodologies for the identification of low molecular weight phenolic compounds with antioxidant activity (Appendix 4c, publications Nos. 1–6, 25). Research on biomass, slags, fly ash and other by-products of industrial processes (Annex 4c, Publications 13-20) has a clear application value for the recovery of waste resources and the development of environmentally sustainable technologies. The integration of functional tests – antioxidant activity, sorption capacity, biological activity – with chemical and structural analysis is significant (Appendix 4c, publ. No. 8–12, 18–20), which gives the works a multidisciplinary and practical-applied character. Among the most significant achievements stands out the development and implementation of complex instrumental approaches for identification and quantitative analysis – GC–MS, FT–IR, UV–Vis and AAS (Appendix 4c, Publ. No. 3, 4, 6, 9, 10, 12, 18). Particular attention should be paid to the results related to the transformation of waste lignocellulosic materials into useful products – phenolic antioxidants, sorbents and biocoke (Appendix 4c, Publ. No. 5, 6, 8, 19, 20, 28). These studies not only reveal the potential of biomass as a source of chemical raw materials, but also outline opportunities for a circular economy in the chemical industry. The candidate demonstrates the ability to apply instrumental methods not formally, but with a deeper understanding of their sensitivity and limitations. Her publications show a consistent search for relationships between chemical structure, functionality, and behavior of systems. This is evident in the studies on lignin and derived materials (Appendix 4c, publications No. 1, 2, 4, 6, 25), where relationships between the structural features and the antioxidant activity of the products are formulated. Also noteworthy are the papers devoted to the analysis of industrial waste and slag (Appendix 4c, Publication No. 13–17), in which, through a combination of ICP–OES, XRD and FTIR new possibilities for the synthesis of catalysts and geopolymer materials have been revealed. This research expands the application of analytical chemistry in areas such as sustainable development and green technologies. In conclusion, Dr. Radoykova's contributions are substantial, consistent and emphatically analytical. With this, the candidate presents a fully completed scientific and methodological profile, corresponding to the academic position of "Associate Professor".

1.9. Participation of the candidate in the achievement of the presented results:

A) The candidate has at least an equal participation in the submitted papers	8 points	
B) The candidate has at least an equal participation in most of the submitted papers	7 points	**X**
C) The candidate has a secondary participation in most of the submitted papers	4 points	

D) The candidate participation is unnoticeable	0 points	
		one of the answers given is marked with the sign "X"

Critical notes must be provided if one of the items C or D is marked.
In the majority of works – approximately 71% – Dr. Radoykova is the first or second author, which clearly shows her leading participation in the formulation of the idea, experimental design and analysis of the results. Her participation in research teams on NIS, NSF and NRRP projects, including as a leader and contractor, complements the idea of an active and responsible scientific position. Her work shows the ability to effectively cooperate with colleagues from the department as well as with external partners, which is a prerequisite for the development of sustainable scientific directions. My general impression is of purposeful and active participation in every stage of the research process, which fully corresponds to the requirements for independence and competence when applying for the academic position of "Associate Professor".

1.10. Pedagogical activity:

A) The candidate has effective and sufficient pedagogical activity at the university. The textbooks issued are modern and useful (they meet the requirements of the Regulations). The work with undergraduate and doctoral students is at a high professional level.	8 points	
B) The candidate has sufficient pedagogical activity at the university. The textbooks issued satisfy the requirements of the Regulations.	6 points	**X**
C) The pedagogical activity and / or textbooks issued are insufficient (do not meet the requirements of the Regulations)	0 points	
		one of the answers given is marked with the sign "X"

Critical notes must be provided if one of the items B or C is marked.
The average annual teaching workload of the candidate, exceeding 350 hours, clearly shows a high commitment to the learning process and a responsible attitude towards the student audience. The exercises and lectures conducted in major disciplines such as "Instrumental Methods in Analytical Chemistry" and "Analytical Chemistry" are fully consistent with the profile of the competition. Dr. Radoykova participated as a co-author of a university textbook, which is a clear indicator of pedagogical responsibility and willingness to share the experience gained. In addition, its active guidance and counseling of graduates enriches the teaching profile with a valuable practical component and supports the development of young specialists. In the future, it would be useful for the candidate to expand their participation in the leadership of doctoral students and to develop new training courses, for example in the field of chimetry and validation of analytical methods – topics with great potential for integrating theory and practice. In summary, the pedagogical activity of Dr. Radoykova is stable, systematic and fully complies with the requirements for the academic position of Associate Professor.

1.11. Critical notes:

A) Lack of critical notes	8 points	
B) Critical notes of a technical nature	7 points	**X**
C) Critical notes that would partially improve the results achieved in a small part of the research	5 points	
D) Critical notes that would partially improve the results achieved in most of the research	3 points	
E) Significant critical notes	0 points	
		one of the answers given is marked with the sign "X"

Critical notes must be provided if one of the answers C, D or E is marked.
I do not have critical remarks to the candidate, but rather I have formed some recommendations, which Assist. Prof. T. Radoykova, if desired, can take into account in the formation of future scientific projects and the upgrade of what has already been achieved. First of all, the distribution of publications by quartile levels shows a predominance of papers in Q3–Q4 journals. These are robust, established journals, but the potential of the research suggests that some of the future results could be directed to higher-quartile Q1/Q2 journals, where publication would provide wider international visibility. Secondly, there is a tendency towards cooperation with colleagues from similar departments and institutes, but the role of Dr. Radoykova as a corresponding author is still limited. It would be useful to strengthen its participation in international partnerships, for example under Horizon Europe and COST Actions programs, which would ensure a more visible integration from a Bulgarian side. Finally, it would be valuable for the candidate to expand his expertise to the areas of inorganic analytics and ecotoxicology, which logically complement his profile and will strengthen the interdisciplinarity of his scientific activity. These areas are in line with European trends in the assessment of the impact of industrial pollutants and sustainable resource management. In summary, Dr. Radoykova has the necessary scientific experience to turn these recommendations into the basis for future achievements of even higher international value.

1.12. Conclusion

A) The evaluation of the candidate's activity is **POSITIVE**	This evaluation is assigned to a total number of at least 65 points	88 points
B) The evaluation of the candidate's activity is **NEGATIVE**	This evaluation is assigned to a total number below 65 points	
		one of the answers given is marked with the sign "X"

To be filled in if requested by the reviewer
After a careful analysis of the presented materials, scientific publications, educational and methodological activities and the overall professional path of Assist. Prof. Dr. Eng. Temenuzhka Hristova Radoykova, I believe that the candidate fully meets the requirements for occupying the academic position of "Associate Professor" in the professional field 4.2. Chemical Sciences (Analytical Chemistry). The presented scientific results show the sustainability of scientific interest, consistency in the development of analytical competencies and the ability to combine instrumental methods with an applied approach to real systems. The candidate's desire to work in sync with the

current topics of modern analytical chemistry - green technologies, waste resource recovery and development of materials with new functional properties is impressive. Based on all the above, I give a positive assessment (88 points) and propose to the scientific jury to award to Assist. Prof. Dr. Eng. Temenuzhka Hristova Radoykova the academic position of Associate Professor in the professional field 4.2. Chemical Sciences (Analytical Chemistry).

01.12.2025	The review was written by:	**Prof. Stela Georgieva**
date		signature