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	Assist. prof.	PhD	Tsvetelina	Georgieva	Foteva	UCTM
№	academic position	scientific degree	name	middle name	last name	workplace

Scientific area:

5.	Technical sciences
code	name

Professional area:

5.11.	Biotechnologies
code	name

Scientific specialty:

Technology of biologically active substances

The competition has been announced:

96	17.11.2023	Biotechnology	Chemical and Systems Engineering
in SG issue	date	for the needs of the Department	Faculty

The review was written by:

Professor	PhD	Penka	Angelova	Moncheva	Biological Faculty, SU “St. Cl. Ohridski“(retired)
academic position	scientific degree	name	middle name	last name	workplace

1. Review for the candidate:

Assist. prof.	PhD	Tsvetelina	Georgieva	Foteva
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 candidate in the competition for the academic position "associate professor" in scientific area 5.1. Technical sciences, professional area 5.11. Biotechnologies, scientific specialty "Technology of biologically active substances" has submitted a very well-formed set of documents, which fully correspond to the requirements, according to the Regulations for the acquisition of scientific degrees and holding academic positions at UCTM.

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.
Assist. prof. Dr. Foteva has a total of **40 scientific publications**, **3 of which** are related to her dissertation work for the acquisition of the ONS "doctor". To participate in the current contest, she submitted a total of **37 publications**. **Twenty-nine (29)** of these scientific works have been published in journals that are referenced and indexed in world-renowned databases of scientific information (**Scopus** and **Web of Science**). The remaining **8 papers** were published in non-refereed peer-reviewed journals. In Scopus, Dr. Foteva is reflected with the following scientometric indicators: **30 scientific works**, **h-index 7** and **206 citations**. The distribution of the scientific articles depending on the quartile of the journals in which they were published is as follows: **5 - Q1**, **2 - Q2**, **19 - Q3** and **2 - Q4**. The **total impact rank (SJR)** of the journals in which Dr. Foteva's scientific papers are published is **11.351**, and the **total impact factor (IF)** is **13.573**. From the publishing journals, I would indicate *Molecules* **(IF- 3.56),** *Carbohydrate Polymers* **(IF-3.479)**, *Materials Science & Engineering* **(IF- 2.686).** The analysis of the scientific production of Assist. prof. Dr. Tsvetelina Foteva, presented for participation in the competition for the academic position "associate professor", shows that she fully meets and even exceeds the minimum national requirements for the scientific field 5. Technical sciences, defined in the Regulations for the Implementation of the Law on development of the academic staff in the Republic of Bulgaria, as well as the additional determined in the Regulations for the Acquisition of Scientific Degrees and the Occupancy of Academic Positions in UCTM by groups of indicators as follows: **Indicator 1** – Docroral thesis (2016) for the award of the educational and scientific degree "Doctor" "Antimicrobial hybrid materials based on cellulose derivatives with incorporated silver nanoparticles" - **50 points** (*50 points required*) .

Indicator 4 - Habilitation work - scientific publications (**not less than 10**) in journals that are referenced and indexed in world-renowned databases of scientific information. **10 scientific publications are presented** - **100.4 points** (*100 points required*) (*appendix 6g*)

Indicator 7 - Scientific publications in journals that are referenced and indexed in world-renowned databases of scientific information. **19 scientific publications** are presented - **181.03** points (*appendix 6*a)
Indicator 8 - Articles and reports published in non-refereed peer-reviewed journals or published in edited collective volumes. **8 scientific publications** are presented - **32.7 points** (*appendix 6a*)

Total number of points according to indicators 7 and 8 = 213.73 points (*200 points required*)

Indicator 12 - Citations or reviews in/of scientific publications, referenced and indexed in world-renowned databases of scientific information or in monographs and collective volumes. For participation in the competition, **10 citations of one publication are submitted - 100 points** (*appendix 6b*) A review prepared by Dr. Foteva of an article published in the International *Journal of Chemical Engineering* (Hindawi), 2023 (Q2) - **10 points** (*appendix 6v*)

Total points for Indicator 12 - 110 points

According to the requirements of UCTM, authorship/co-authorship of at least **one teaching aid** is also required for holding the academic position of "associate professor" (**Indicator 24**).
Dr. Foteva is the co-author of an electronic practical training course in Microbiology (*appendix 6j*)

Indicator 24 – **10 points**

The total number of points from all the indicators required to occupy the academic position "associate professor" according to the minimum national requirements and those of UCTM is **434.13 points** (400 points required)

Dr. Foteva has **48 participations** in scientific forums - national and international with poster presentations.
Assist. prof. Dr. Foteva participated in the team of **19 scientific projects**: **4 projects** financed by the Scientific Research Fund at the Ministry of Education and Culture (participant); **1 project** financed by the operational program "Development of human resources" 2007-2013 (participant); **2 projects** financed by the Operational Program "Science and Education for Smart Growth" (participant); **12 projects** financed by the "Scientific Research" Fund of UCTM, **5 of which as** a leader and **7 as a** member of the team.

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.
Dr. Foteva's scientific research is focused on the following **3 scientific directions**: 1) Antimicrobial activity of polymeric materials containing metal ions; 2). Biocompatibility and cytotoxicity of hybrid materials; 3) Synthesis, characterization, analysis, and activity of biomolecules for the purpose of their application in medicine, pharmacy and diagnostics. I believe that scientific research **is actual** considering: - The interest in the incorporation of metal nanoparticles into various hybrid polymer matrices with a view to stabilizing the nanostructures and obtaining materials combining the properties of the hybrid and the nanoparticles, making them potential candidates for application in both *in vitro* and *in vivo* biomedical research and in biotechnology - The formation of resistant substances with pronounced antimicrobial activity when incorporating metal nanoparticles into hybrid materials, which could be used as an alternative in the treatment of diseases caused by highly pathogenic microorganisms possessing drug resistance, which is extremely widespread and a threat to public health; as drug carriers; imaging diagnostics; implantology, etc. - The need for the created hybrid polymer matrices, with metal nanoparticles included in them, to possess the property of "biocompatibility", i.e. to be implanted in the body without inducing a cellular response in order to achieve an optimal effect of their application - The role of antimicrobial peptides with antitumor activity in targeted therapy in cancer diseases and the interest of researchers in these peptides in order to improve their pharmacokinetics and pharmacodynamics and their use for the delivery of pharmacophore molecules to certain cells and tissues. Research in the scientific fields in which Dr. Foteva's research activity is focused is also conducted by other Bulgarian and foreign researchers. Dr. Foteva's research related to the synthesis of new hybrid materials with included metal nanoparticles, as well as their characterization, could be considered **innovative**.

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.
The reading of Dr. Foteva's publications, the scientometric indicators of the journals in which they are published are convincing evidence that the candidate **knows in detail the achievements** of other authors in the scientific directions in which her research is directed. The results of all her publications are discussed in the light of what has been achieved so far on the specific issues. Proof of the above is the used modern literary sources, which she refers to in her publications, as well as the formulation of the research goals, tasks for their realization, conclusions and contributions.

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.
I would define the research that has been conducted as **theoretical-applied**, which is confirmed by the objectives of the research, the methods used and the results obtained.

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.
The goals of the conducted research are **realistic** and correspond to the scientific directions of Dr. Foteva, which she has defined in the presented report on the contributions, the proof of which is the achieved results of their implementation. In summary, the objectives could be formulated as follows: - Synthesizing new hybrid materials with the inclusion of metal nanoparticles in order to enhance their antimicrobial properties - Study of the biocompatibility and cytotoxicity of the newly synthesized hybrid materials with a view to the applicability of these materials in various fields - Synthesis and characterization of biomolecules by a set of properties with a view to application in medicine, pharmacy and diagnostics The goals are of scientific and applied interest and their realization through the implementation of specific tasks is related to the synthesis of new hybrid materials, with various metal nanoparticles included in them and the characterization of the structure and a number of their properties, which reveal their potential application in biomedicine, biotechnology and others. The well-chosen methods for conducting the research contribute to the achievement of the goals in order to obtain reliable and adequate results.

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.
A wide and varied set of modern methods was used in the studies with the participation of Dr. Foteva, which were appropriately chosen. This has enabled the research objectives to be realized. The methods could be grouped as follows: **Analytical methods** The following classical and modern analytical methods were used to synthesize and characterize the properties of hybrid materials: - Sol-gel method for the synthesis of materials - Microscopic (atomic force microscopy (AFM), transmission electron microscopy (TEM), scanning electron microscopy (SEM)] - Spectroscopic methods (infrared spectroscopy, Fourier transform infrared spectroscopy, UV-Vis spectroscopy, mass spectrometry) - Other analytical methods (XRD analysis, DTA, TG-(DTG, HPLC/DAD, photocatalytic tests) **Biological/Microbiological** - cultivation methods - for cultivation of the used test microorganisms in determining the antimicrobial action of the studied materials - agar-diffusion methods for determining antimicrobial action - methods for *in vitro* cytotoxicity determination of synthesized materials - methods for *in vitro* determination of antiproliferative activity of materials - methods for *in vitro* determination of anticancer potential of synthesized materials, by using a panel of tumor cell lines

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.
Dr. Foteva's research with the obtained results contains scientific and applied contributions, and most of them represent a basis for ongoing research, both in a scientific and applied aspect. The contributions relate to all three areas of her scientific research activity. In a summary form, I will present those that I consider the most important. **1. Antimicrobial activity of polymeric materials containing metal ions**

- Three types of inorganic-organic hybrid materials based on silicon dioxide, hydroxypropyl cellulose, hydroxypropyl methylcellulose and carboxymethyl cellulose with included silver nanoparticles were obtained, whose structure and surface morphology was characterized by appropriate methods.
- The antimicrobial properties of the above-mentioned hybrid materials against pro- and eukaryotic microorganisms have been investigated and proven, and a dose-dependent effect in relation to the amount of silver nanoparticles has been proven. The obtained results are a good basis for the use of these materials in biomedicine.
- Based on a developed simple, fast and cost-effective method, spherical silver nanoparticles were synthesized by chemical reduction, which were incorporated into porous collagen structures. Their bactericidal properties were evaluated, showing their potential effect for medical application.
- Hybrid materials containing zinc nanoparticles as antimicrobial agents were synthesized and their morphology and antimicrobial properties against reference strains of bacteria (Gram-positive and Gram-negative) and microscopic fungi were studied.
- Hybrid materials based on SiO_2, HPC and copper ions have been synthesized and structurally characterized. Their antimicrobial potential against Gram-positive, Gram-negative bacteria and yeasts has been proven, and a dose-dependent effect has been established for copper cations. Copper cations have been found to induce morphological dimorphism in *Candida* (switching from a mycelial to a non-pathogenic yeast form).
- Good antibacterial properties of nanocomposite materials with the participation of SiO_2, ZnO, TiO_2 and reduced graphene oxide (RGO) have been proven, which reveal their potential for application in a number of areas.
- Lignocellulosic waste materials produced after enzymatic hydrolysis of plant raw biomass doped with silver have been found to have a high antibacterial effect in aqueous solutions and have the potential to be used for the production of antibacterial products.
- Based on the modification of wood with alkali-activated hydrolyzed lignin, Cu_2S and maleic anhydride and the study of resistance to Gram-negative bacteria, the possibility of this method for its conservation is shown.

2. Biocompatibility and cytotoxicity of hybrid materials.

- Preliminary results were obtained on the biocompatibility of synthesized hybrid materials containing silver nanoparticles by determining their cytotoxicity, as well as materials containing SiO_2/cellulose and copper from different sources. It was found that the antimicrobial activity (for the Ag-nanoparticle-containing materials) and cytotoxicity depended on the concentration of the silver or copper nanoparticles and that the carboxymethylcellulose-based materials would have medical applications after further research, and those containing Cu-nanoparticles could be further investigated with a view to their application as a novel or adjuvant cancer therapy.
- The anti-adhesion ability of SiO_2/HPC/Ag and SiO_2/HPMC/Ag hybrid materials in biofilm formation by *P. aeruginosa* PAO1 and clinical isolates of the species due to bactericidal action of all three hybrid materials was studied and proven. A dependence of the bactericidal effect on the concentration of silver nanoparticles was established. The obtained results reveal the potential of these materials for application in tissue engineering, dentistry, etc., where cell adhesion is undesirable.
- Results were obtained for the antimicrobial properties of a series of synthesized SiO_2/HPC hybrid materials containing zinc.
- The biocompatibility and antifungal properties of hybrid materials containing SiO_2/pectin and silver, which make them a potential candidate material for *in vivo* implants, have been investigated.

3. Synthesis, characterization, analysis and study of the activity of biomolecules for the purpose of their application in medicine, pharmacy and diagnostics.

- The anticancer potential of new bioconjugates of monofluorinated analogues of BIM-23052 containing a second pharmacophore naphthalimide, caffeic acid or the tripeptide Arg-Gly-Asp was studied against a panel of tumor cell lines, including human mammary, carcinoma cell lines MCF-7, MDA -MB-231, as well as BALB 3T3 and MCF-10A cell lines, evaluating their activity and bioselectivity.
- Shortened analogues of antimicrobial peptide (KLAKLAK)2-NH2- containing the unnatural amino acids β-Ala and nor-Leu, as well as their conjugates containing 1,8-naphthalimide and caffeic acid

were synthesized and their antimicrobial properties, antiproliferative effect and cytotoxicity were determined.
- Liquid chromatographic methods with UV detection were developed and validated for the determination of six prohibited active substances in nutritional supplements, as well as 13 substances with a steroid structure in nutritional supplements for sports.
- A confirmatory GC/MS method has been developed that can also be used in screening to determine the presence or absence of 17 substances with a steroid structure in nutritional supplements for sports.

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	**X**
B) The candidate has at least an equal participation in most of the submitted papers	7 points	
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 documentation presented by the candidate in the competition for the academic position of "associate professor", there is no separation protocol showing Dr. Foteva's participation in the implementation of the research contained in the presented scientific publications. However, from the report prepared by her for the fulfillment of the minimum requirements, it can be seen that for each of her publications points have been marked, which correspond to her equal participation in all the works presented. All scientific works are collective, except for one of which she is the sole author. She is the lead author of 13 of the works, and in 5 of them she holds the 2nd position. The preparation of the documentation, especially in the part of the presentation of the scientific contributions from the research shows that she is a direct participant in the overall development and writing of the scientific works, of on the basis of which she formulated the contributions well. All this confirms her equal participation and contribution to the conclusion of the experimental work and the achieved results presented in the scientific works.

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	**X**
B) The candidate has sufficient pedagogical activity at the university. The textbooks issued satisfy the requirements of the Regulations.	6 points	
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 candidate in the competition for the academic position "associate professor" has **effective and sufficient teaching activity**, thus satisfying the minimum requirements of UCTM for this position. For **the past 3 years**, Dr. Foteva has been giving lectures on **5 academic disciplines** (165 hours in total) in various specialties at the EQD "Bachelor", as follows: - Technical microbiology (in German) – **30 h.** - Biochemistry and biological foundations (in German) – **30 h.** - Biochemical productions (in German) – **15 h**. - Industrial biotechnology (full-time/part-time study) - **30/15 hours respectively** - Industrial biotechnologies (in English for Erasmus students) - **30 h.** - Microbiology Part I (correspondence study) – **15 h**. In addition, it provides **exercises** in the following **8 disciplines**: - Microbiology I and II part – x **30 hours**, respectively - Biochemistry – **60 h.** - Cell biology – **30 h.** - Biochemistry and biological foundations (in German) – **15 h**. - Technical microbiology (in German) – **15 h**. - Biochemical productions (in German) – **30 h.** I must point out her very good foreign language training, which allows her to participate in the teaching process in a foreign language (German and English), which I highly appreciate. The co-authored textbook provides students with modern knowledge and methodical skills. Assist. prof. Foteva was the **supervisor** of **14 graduates**: **11** in the EQD "Bachelor" and **3** in the EQD "Master". She has been a scientific **consultant** to **7 graduates** - 4 in the EQD "Bachelor" and 3 in the EQD "Master". The wide range of taught disciplines, her excellent language training, the many specializations at universities abroad are an important prerequisite for me to consider that her work with students is also at a **high professional level**.

1.11. Critical notes:

A) Lack of critical notes	8 points	**X**
B) Critical notes of a technical nature	7 points	
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 have no critical notes.

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	**X**
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
My assessment of the overall academic activity of the candidate in the competition for the academic position "associate professor", Assist. Prof. Dr. Tsvetelina Georgieva Foteva, is entirely positive and high (94 points in total). The submitted documents are in accordance with the requirements of the Regulations for the Application of the Law on the Development of the Academic Staff in the Republic of Bulgaria and the Regulations of UCTM. A sufficient number of scientific works have been submitted, which cover and even exceed the national minimum requirements, as well as the additional ones of UCTM, for holding this academic position. The candidate's research contains both scientific and applied contributions. The works with the participation of Assist. Prof. Foteva have received recognition from the international scientific community through the noted citations. I highly appreciate the candidate's participation in an impressive number of scientific projects. Her pedagogical activity is characterized by teaching a wide range of academic disciplines in Bulgarian and foreign languages, which I also appreciate very highly. Under her scientific supervision, a large number of students have successfully defended their diploma theses. Dr. Foteva specialized in a number of foreign universities, where she increased her qualification in the specialty of the announced competition, which is a prerequisite for high quality of her research and teaching activity. In conclusion, I think that Assoc. Prof. Tsvetelina Foteva is a well-established university researcher and teacher, possessing all the qualities to hold the academic position of "associate professor". Based on everything stated above, I allow myself to recommend to the respected Scientific Jury, formed by Order No. P- OX / 04.01.2024 of the Rector of UCTM, as well as to the members of the Faculty council of the Faculty of Chemical and System engineering to vote positively for the occupation of the academic position "Associate professor" in professional field 5.11. Biotechnologies and Scientific specialty Technology of biologically active substances from Assist. prof. Dr. Tsvetelina Georgieva Foteva.

20.02.2024	The review was written by:	
date	**Prof. Penka Angelova Moncheva**	signature