

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	PhD	Ekaterina	Stoianova	Serafimova	UCTM
№	academic position	scientific degree	name	middle name	last name	workplace

Scientific area:

5	Technical sciences
code	name

Professional area:

5.13.	General engineering
code	name

Scientific specialty:

Systems and devices for environmental protection
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The competition has been announced:

27	02.04.2021	Engineering ecology	Chemical and systematic engineering
in SG issue	date	for the needs of the Department	Faculty

The review was written by:

Professor	PhD	Christina	Georgieva	Vassileva	IMC-BAS
academic position	scientific degree	name	middle name	last name	workplace

1. Review for the candidate:

assistant professor	PhD	Ekaterina	Stoianova	Serafimova
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.

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.

E. Serafimova covers, and for some indicators significantly exceeds, the minimum requirements for the acquisition of the academic position "Associated Professor" in the scientific area "Technical sciences" (according to Appendix 23 of the Regulations for implementation of the Law on the development of the academic staff in the Republic of Bulgaria for Technical sciences). **The total points** gained by the candidate for participation in the competition are **837,54** (minimum required 400 points), distributed as follows:

- *Indicator 1* (defended PhD dissertation) - **50** points (minimum required 50 points);
- *Indicator 4* (*Group B – habilitation work*). Under this indicator, the candidate has included 10 publications of totally 42 publications presented for the competition. Eight of these publications have impact-factor as three of them are published in a well-known international journal (Journal of Thermal Analysis and Calorimetry) - **200** points (minimum required 100 points).
- *Indicators from 5 to 11* (*Group G – publication activity*). Included are 31 publications as 1 of them is published in a journal referred and indexed in the world data-bases (Indicator 7), and 30 articles are published in non-referred journals with scientific reviews or in edited volumes of national and international conferences (Indicator 8) - **251.54** points (minimum required 200 points).
- *Indicators from 12 to 15* (citations and reviews). Presented are totally 31 citations of 2 publications, (correctly listed by the candidate in Appendix 65) and 1 review of a scientific work (Appendix 6B) - - **296** points (minimum required 50 points).
- *Indicators from 16 to the end*. The candidate presents one University textbook published (Indicator 23), where she is the only author (Appendix 6ж) - **40** points.

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	
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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 activity of the candidate is related to utilization of different types of wasted biomass (from agricultural sector, manufacturing industry, animal wastes, sludge of municipal and industrial wastewaters) and biomass ash. The subjects of the studies are of special interest nowadays and active scientific work has been performed on the worldwide scale in relation to a number of policies in the field of the environmental protection, namely: effective use of the resources; management and prevention of the wastes and circular economy; prevention of the climate change; waters preservation and management; air pollution, etc. Publications from other authors in Bulgaria and abroad are known for the topics studied by E. Serafimova, and some of these publications are cited adequately and correctly by the candidate in her scientific work.

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 candidate knows well the results of other authors on the topics studied taking in consideration the up-to-date research tasks studied by the candidate.

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 candidate's investigations are markedly of applied type; however new data of theoretical scientific importance about the subjects and processes studied are achieved.

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 aims of candidate's research are realistic and some of them are already implemented at different degree. **The objectives of scientific interest** include: elucidation of chemical and mineral composition, thermal characteristics, structural and phase transformations in organic and inorganic agricultural wastes and their mixtures; acquisition of new data about relationships between conditions of physicochemical treatment of the mixtures and the degree of their modification; mechanism, kinetic parameters and relations of solid-phase reactions; innovative utilization of biomass wastes for new soil amendments; new data on the strength characteristics and thermal behavior of new composite materials made of ceramic wastes from the construction industry; elucidation of the influence of climate change on the deforestation in Bulgaria; clarification of the health risk to the population from exposure to different contaminants (radon, benzene, toluene, ethylbenzene and xylenes) in buildings. **The objectives of applied interest are:** development of valuable products (biologically active carbon; soil amendments) for increasing the organic carbon in the soils and improving their structure and composition through mixing various acids treated wastes in different ratios; possibility for decreasing soil contamination from mineral fertilizers through their partial substitution with soil amendments, compost and biologically active carbon; utilization of biodegradable agricultural and municipal wastes; decreasing maturing time of chicken litter from poultry farms; etc.

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"
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Methods must be specified. The type of methods used is justified.

The methods of research used are adequate to the scientific objectives. A complex of methods is used for identification (XRD, ICP, ICP-OES, FTIR, SEM, TG-DTG-DTA/DSC) of chemical and mineral composition, structural and phase transitions, thermal characteristics, etc. of the initial waste resources and their mixtures. Mechanical tribo- and thermochemical methods are also applied for remodeling of the waste products.

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	
C) They are of scientific and / or applied interest	12 points	X
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.

Contributions of scientific interest:

1. A new economically profitable method for production of biologically active carbon through mixing of different waste products and their acids treatment is proposed.
2. The optimal ratios for mixing the different types of organic and inorganic waste products are established in order to produce effective soil amendments.
3. New data are gained on the physicochemical treatment of biodegradable agricultural wastes and their detail characterization. The conditions and techniques for minimizing and elimination of the harmful emissions from the wastes are established.
4. Decreasing of maturing time of chicken litter from poultry farms is achieved.

Contributions of applied interest:

1. An approach for decreasing soil contamination caused by mineral fertilizers and increasing soil humidity is proposed. It includes partial substitution of mineral fertilizers with new soil amendments, compost and biologically active carbon.
2. Utilization of biodegradable agricultural wastes for increasing soil fertility and content of soil carbon is achieved.
3. Effective technologies and systems for carbonization of waste biomass are proposed in order to produce energy and soil amendments, and in this way, to overcome the consequences of climate change.
4. Some of the proposed methods for processing of chicken litter are implemented in a poultry farm in the town of Kyustendil.

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	
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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.

E. Serafimova is the first author of 26 publications (62% of all 42 articles presented for the competition), second author – 7 publications (17%) and third or subsequent author - 9 publications (21%). This is an evidence that the candidate has an equal participation in most of the submitted papers. The leading role of K. Serafimova is clearly seen in studies related to characterization of chicken litter from poultry farms, wastes from paper industry and waste sludge from wastewater treatment plants, as well as to mechanical tests of their acid treated mixtures with biomass ash in order to produce biologically active carbon or soil amendments, including for recultivation of damaged terrains. The candidate also has substantial contribution to the investigations related to: deforestation and forests recovery using bio-wastes in Bulgaria; the possibilities for home composting of organic wastes; the concept for application of “green roof” during urban construction; assessment of the health risk to the population from exposure to radon and harmful volatile organic compounds in buildings (for example, schools).

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.

1.11. Critical notes:

A) Lack of critical notes	8 points	
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	X
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.
My recommendation to E. Serafimova is to publish more actively her scientific results in well-known international journals with high impact factor because this would improve greatly the quality of her investigations in the future.

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 (84 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
The analysis of the documents submitted by Assistant Professor PhD Ekaterina Serafimova for participation in the competition, shows that the level of her scientific and teaching activity, as well as her science-metric indicators, correspond to the requirements of the normative documents for taking up the academic position „Associated Professor“ at UCTM. The research topic of E. Serafimova is fully in line with the topics studied in the Department “Engineering ecology” at Faculty “Chemical and systematic engineering” for whose needs the competition was announced.
On the basis of the above considerations, I convincingly propose to the honorable members of the scientific jury to recommend Assistant Professor PhD Ekaterina Serafimova to be given the academic position “Associated Professor” in the professional field 5.12. “General engineering” for the needs of Faculty “Chemical and systematic engineering” at UCTM.

July 02, 2021	The review was written by:	
date	Prof PhD Christina Vassileva	signature