Appendix 12a

REVIEW

of dissertation for the acquisition of:

educational and scientific degree " **doctor** "	X
scientific degree **"Doctor of Science"**	
	the true is indicated by the sign "X"

Author of the dissertation:

	MSc, Eng.	Monika	Yanulova	Petrunova	45 Primary School "K. Velichkov" - Sofia
academic position	scientific degree	name	middle name	last name	workplace

Topic of the dissertation:

Interactive systems for training and testing

Scientific area:

4	Natural sciences, mathematics, and computer science
code	name

Professional area:

4.6	Informatics and Computer Sciences (Informatics)
code	name

Scientific specialty:

Informatics

The review was written by:

Prof.	Dr.	Rumen	Ivanov	Trifonov	TU-Sofia
academic position	scientific degree	name	middle name	last name	workplace

1. Completion of the provided documents:

A) The dissertation and the competition documents are in full compliance with the Regulations.	4 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 standards must be described if response C is marked.

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.
Eng. M. Petrunova has presented three publications that meet indicators 7.1 and 7.2 of the Minimum requirements for professional field 4.6 Informatics and Computer Science (Informatics) of the Regulations for the Acquisition of Scientific Degrees and Holding Academic Positions at the Technical University of Bulgaria. Her first publication was printed in the proceedings of the International Conference Automatics and Informatics (ICAI 2021), Varna. The conference is referenced in the scientific database IEEE Xplore and according to indicator 7.2 and the publication is evaluated with 18 points. The next publication was printed in the Journal of Chemical Technology and Metallurgy, volume 60, issue 6, in 2025. The journal has an SJR Q3 factor and according to indicator 7.1 the publication is evaluated with 45 points. Her last publication was printed in the proceedings of the International Conference Automatics and Informatics (ICAI 2025), Varna and is evaluated with 18 points. The sum of the points of the doctoral student is 81 and exceeds more than twice the 30 points set in the minimum requirements. The publications are directly related to the dissertation work. In them, M.Eng. Monika Petrunova is the first co-author, and the other co-authors are the scientific and supervisors (Prof. A. Atanasov and Prof. D. Pilev).

3. The relevance of the topic of the dissertation:

A) The topic is relevant and new (there are no known results on the topic by other authors)	8 points	
B) The topic is relevant and results from other authors are known	6 points	X
C) The topic is not relevant, but results from other authors are known	2 points	
D) The topic is not relevant and no results from other authors are known	1 point	
E) The topic does not correspond to the level of dissertation	0 points	
		one of the answers given is marked with the sign "X"

The evaluation of the relevance of the dissertation must be substantiated
The digitalization of education and the mass application of online learning require reliable assessment methods that are both objective, flexible and applicable across platforms. The dissertation analyzes real difficulties of teachers and institutions in the conditions of a rapidly changing technological environment. It offers standardized, scientifically based and practically applicable solutions that improve the quality of e-learning and assessment. In the context of a growing need for automation and analytics in education, these results have high practical and strategic significance.

4. Knowledge of the problems, subject of research in the dissertation:

A) The doctoral student knows in detail the achievements of other authors on the topic of the dissertation	8 points	X
B) The doctoral student is partially familiar with the achieved results on the topic of the dissertation	4 points	
C) The doctoral student has no prior knowledge of the status of the problems in the dissertation	0 points	
		one of the answers given is marked with the sign "X"

The evaluation must be substantiated if answer C is marked.

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 of dissertation	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.

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	3 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 objectives of the dissertation are: • Comparative analysis of existing online testing platforms and their comparison with the regulatory framework for knowledge assessment in Bulgaria. • Conducting a scientific study to identify the most used online testing platforms and establishing the methods preferred by teachers and students for testing knowledge. • Developing and implementing innovative models for automated conversion of the obtained points (percentages) into grades, tailored to the specific requirements of users. • Deriving a methodology for automatic analysis of typical errors (knowledge deficits), which aims to significantly facilitate teaching activities when preparing analyses for input and output levels. These objectives cover the full cycle of a study: from theoretical analysis of the software and legal framework, through empirical research of user attitudes, to practical development of innovative automation tools. They are oriented towards creating a scientific and applied methodology that technologically optimizes the assessment and analysis of knowledge in Bulgarian schools.

7.Methods of research:

A) Adequate to research and set objectives	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.
The methodology of the dissertation combines theoretical, empirical and applied approaches for a comprehensive study of the processes of online student assessment. Comparative and content analysis were used to compare the technical capabilities of the software platforms with the Bulgarian regulatory framework (Regulation No. 11) and international standards. The empirical part includes a series of questionnaire surveys among hundreds of students and teachers, whose data were processed using statistical methods to identify real needs. Through mathematical modeling and programming (Python, JavaScript and Excel), author's algorithms for automated conversion of points into grades and diagnosis of knowledge deficits were developed. The practical value of the developed methods was proven through testing in a real learning environment and subsequent analysis of user satisfaction.

8. Contributions of the dissertation:

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 contributions of MSc. Eng. Monika Petrunova are of a scientific-applied and applied nature. The scientific-applied contributions are related to: • Systematization of modern platforms for online learning and electronic assessment, and through empirical data the key requirements of teachers for their functionality and pedagogical effectiveness have been derived. • Identification of the main pedagogical, technical and organizational difficulties in the implementation of e-learning, which allows for the formulation of criteria for assessing the effectiveness of digital platforms. • An in-depth analysis of different assessment systems (point, percentage, numerical, letter) has been carried out, consistent with the Bulgarian regulatory framework and international standards such as ECTS. • Formulas and scales for converting points into grades have been compared, which supports more objective and theoretically grounded assessment. • A universal methodology for analytical interpretation of test results has been developed, independent of the platform, number of questions or educational stage, oriented towards the diagnosis of learning deficits. Among the applied contributions, I would like to point out the following: • Functional solutions have been proposed to increase the efficiency of distance learning, including mechanisms for tracking attendance, visual contact, collaborative work and pedagogical control. • Algorithms, scripts and formulas for automated analysis of test results have been developed, which overcome the limitations of existing platforms and accelerate pedagogical analysis. • A unified mechanism for automatic calculation and transformation of results into grades has been created, applicable both in electronic systems and with manually processed data. • A method for automatic identification of problematic questions through analysis of zero and low scores has been introduced, supporting the diagnosis of weaknesses in learning. • The adaptability of the developed analytical framework in various educational contexts has been demonstrated - from elementary school to university, in entrance, ongoing and final assessment.

9. Evaluation of the compliance of the dissertation summary with the dissertation:

A) Full compliance	4 points	X
B) Compliance of the main parts	2 points	
C) Lack of compliance of the main parts	0 points	
		one of the answers given is marked with the sign "X"

The evaluation must be substantiated if answer C is marked.
The abstract (dissertation summary) is 35 pages long and corresponds to the content of the dissertation. It has been prepared in accordance with the requirements of the Regulations for the Acquisition of Scientific Degrees and Holding Academic Positions at the UCTM.

10. Participation of the doctoral student in the achievement of the results of the dissertation:

A) The doctoral student has at least an equal participation	8 points	X
B) The doctoral student has secondary participation	5 points	
C) The participation of the doctoral student 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 B or C is marked.

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	4 points	
D) 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 or D is marked.
Page number 135 in the dissertation is blank.

12. Conclusion

A) The evaluation of the dissertation is **POSITIVE**	This evaluation is assigned to a total number of at least 65 points	(93 points) X
B) The evaluation of the dissertation 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 at the request of the reviewer
My assessment of the content of the dissertation and the contributions of MSc. Eng. Monika Yanulova Petrunova is positive. The PhD student has carried out significant research work in terms of volume and content, which is also evident from her total point asset of 93 points. The dissertation fully meets the requirements of the Law on the Development of the Academic Staff of the Republic of Bulgaria, the Regulations for its implementation and the Regulations for the Acquisition of Scientific Degrees and Holding of Academic Positions at the UCTM. The above gives me reason to recommend to the Honorable Scientific Jury to award Eng. Monika Yanulova Petrunova the educational and scientific degree "Doctor" in professional field 4.6 Informatics and Computer Sciences, scientific specialty "Informatics".

16. 04. 2026	The review was written by: **Prof. Dr. Eng. Rumen Trifonov**	
date		signature