



**NATIONAL CENTER FOR
EDUCATIONAL QUALITY
ENHANCEMENT**

Accreditation Expert Draft Group Report on Higher Education Programme

**Doctor's degree educational programme
"Mathematics"
LEPL - Akaki Tsereteli State University**

Evaluation Date : October 31

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Tbilisi

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Information about a Higher Education Institution ¹

Name of Institution Indicating its Organizational Legal Form	LEPL - Akaki Tsereteli State University
Identification Code of Institution	212693049
Type of the Institution	University

Expert Panel Members

Chair (Name, Surname, HEI/Organisation, Country)	Malte Braack, Kiel University, Gemany
Member (Name, Surname, HEI/Organisation, Country)	Diana Mtchedlishvili, Caucasus University, Georgia
Member (Name, Surname, HEI/Organisation, Country)	Giorgi Dalakishvili, Ilia State University, Georgia
Member (Name, Surname, HEI/Organisation, Country)	Giga Khositashvili, Ilia State University, Georgia
Member (Name, Surname, HEI/Organisation, Country)	Davit Kakiashvili, Grigol Robakidze University, Georgia

¹ In the case of joint education programme: Please indicate the HEIs that carry out the programme. The indication of an identification code and type of institution is not obligatory if a HEI is recognised in accordance with the legislation of a foreign country.

I. Information on the education programme

Name of Higher Education Programme (in Georgian)	მათემატიკა
Name of Higher Education Programme (in English)	Mathematics
Level of Higher Education	Doctoral studies (3 rd level)
Qualification to be Awarded ²	PhD in Mathematics
Name and Code of the Detailed Field	Mathematics, 0541
Indication of the right to provide the teaching of subject/subjects/group of subjects of the relevant cycle of the general education ³	
Language of Instruction	Georgian
Number of ECTS credits	45 credits
Programme Status (Accredited/ Non-accredited/ Conditionally accredited/new/International accreditation) Indicating Relevant Decision (number, date)	New
Additional requirements for the programme admission (in the case of an art-creative and/or sports educational programme, passing a creative tour/internal competition, or in the case of another programme, specific requirements for admission to the programme/implementation of the programme)	

² In case of implementing a joint higher education programme with a higher education institution recognized in accordance with the legislation of a foreign country, if the title of the qualification to be awarded differs, it shall be indicated separately for each institution.

³ In case of Integrated Bachelor's-Master's Teacher Training Educational Programme and Teacher Training Educational Programme

II. Accreditation Report Executive Summary

▪ General Information on Education Programme⁴

The PhD program builds upon the foundations of two prior programs. The preceding programs, active from 2012 to 2019, were more specialized, focusing on 'Theory of Functions' and 'Differential Equations.' In contrast, the present PhD program offers a broader scope, encompassing these previous areas alongside an additional focus on 'Algebra-Geometry.' Students enrolled in this PhD program are required to complete modules totaling 45 ECTS in both mathematical and general subjects. The largest part of the program is dedicated to the mathematical research work. These modules comprise general lectures on modern learning methods and specialized mathematical lectures. The essence of this program revolves around the dissertation, which serves as the pivotal research project. The final grade hinges upon the outcome and quality of the dissertation.

▪ Overview of the Accreditation Site Visit

The site visit afforded the expert panel an initial overview of the facilities, encompassing the library, seminar rooms, lecture halls, offices, and computer facilities. The observed infrastructure and equipment are deemed to meet adequate standards, ensuring that PhD students enrolled in this program have access to suitable resources essential for completing their dissertations. The interviews revealed that this PhD program benefits from passionate colleagues and an ambitious university management, both committed to extending their full support within the limitations of available human and financial resources. This commitment ensures that students receive the necessary assistance and financial backing to the best of the institution's capabilities.

• Brief Overview of Education Programme Compliance with the Standards

The program is in largest parts in accordance with the Standards. In some parts, an adjustment is necessary for obtaining a fully satisfactory study program. The issues are mainly related to the rigidity of the course program, the lack of transparency for obtaining the grade in the verbal assessment and the final grade, the minimum competencies for enrollment, and the lack of necessary mathematical literature in the libraries.

Standards complying with the requirements: 1.1, 1.2, 1.3, 1.5, 2.1, 2.3, 3.1, 4.1, 4.2, 4.3, 4.5, 5.1, 5.2

Standards substantially complying with the requirements: 2.2, 3.2, 4.4, 5.3.

Standards partially complying with the requirements: 1.4, and 2.4

Recommendations

- The strict imposition of compulsory courses is not suitable for doctoral candidates with their individual thesis topics and contradicts academic freedom. Therefore, mandatory courses should be replaced by elective courses, allowing each doctoral candidate to tailor their curriculum to align with their specific research project. Supervisors can provide guidance in selecting these electives.

⁴ When providing general information related to the programme, it is appropriate to also present the quantitative data analysis of the educational programme.

- The department should provide additional opportunities for academic exchange between students and scholars / scientists from related fields. This could be achieved, for instance, through a continuous guest program featuring regular guest lectures, the establishment of dedicated online seminars, or the increased utilization of existing online seminars in Georgia or other countries.
 - Supervisors should provide personalized guidance to students in designing individualized lecture plans at the initiation of their PhD projects.
 - To ensure students possess the essential foundational knowledge for conducting research, it is recommended for the university to reassess the minimum competency rate set for the study component courses.
 - Make the assessment system for the research component clear to outline a one-time assessment and provide periodic formative assessment while the doctoral student works on the dissertation.
 - The weighting of both examination components (dissertation and oral defense) in determining the overall grade must not depend on the specific dissertation but should be uniformly regulated and transparent for examiners and students alike. To achieve this, the faculty's regulations for doctoral studies must establish a consistent weighting of both examination components (dissertation and oral defense) in calculating the final grade.
 - Clarify the process by which the dissertation committee determines the final verbal assessment.
 - University/faculty library must be provided by all the basic literature indicated in the syllabus of the subjects defined by the program, either in book form or in electronic form.
 - The students should be given the opportunity to evaluate their supervisors anonymously. In the case that an anonymous evaluation is infeasible (e.g. if the relation supervisor : students is too small), the faculty should give the possibility to carry out evaluations in an aggregated manner.
- **Suggestions for Programme Development**
- An incorporation of lectures on Numerical Mathematics, expanded Statistics, Stochastics, and/or Financial Mathematics into the curriculum would widen the career opportunities of the graduates.
 - It is suggested to strengthen international cooperation.
 - The faculty is encouraged to expand its collection of foundational mathematical textbooks and research materials (e.g., lecture notes), extending beyond the essential course literature, to support and facilitate independent research activities.
 - The accessibility of the data bases, as Web of Science, should be checked and potential outages should be monitored.
 - The department should identify new employers apart of the educational sector to enhance and diversify the possibilities of employments.
- **Brief Overview of the Best Practices (if applicable)⁵**
- The catalogue of module descriptions is very carefully crafted and detailed.

⁵ A practice that is exceptionally effective and that can serve as a benchmark or example for other educational programme/programmes.

▪ **Information on Sharing or Not Sharing the Argumentative Position of the HEI**

The expert panel received the answers of the HEI which includes feedback on the recommendations made in the draft report. After examining the arguments the panels agrees as follows:

- Recommendation on Standard 1.4: The HEI declared that the strict imposition of compulsory courses will be relaxed and elective courses will be implemented. The expert panel accepts this action and shares this argumentative position of the HEI. This recommendation is still listed in this report to ensure the announced changes in the program.
- Recommendation on Standard 2.2: The HEI agrees with this recommendation and alludes the present possibilities for scientific exchange of the PhD students. The expert panel appreciates these possibilities. However, such possibilities for scientific interaction should be gradually increased in the future. This recommendation is still listed in the report to support the positive development of the program. The argumentation in the report is slightly extended and recognizes the present possibilities of scientific exchange in the HEI.
- Recommendation on Standard 2.4 (1): The HEI agrees with this recommendation and is considering possibilities to resolve this issue. This recommendation is still listed in the report.
- Recommendation on Standard 2.4 (2): It seems that this recommendation was not clearly enough formulated. We reformulated this recommendation.
- Recommendation on Standard 2.4 (3), (4): The answer of the HEI does not address these two recommendations. They are still listed in the report.
- Recommendation on Standard 3.2: The HEI agrees with this recommendation and announce to resolve this issue as indicated in Standard 1.4. The expert panel accepts this action and shares this argumentative position of the HEI. This recommendation is still listed in this report to ensure the announced changes in the program.
- Recommendation on Standard 4.4: The HEI agrees with this recommendation and announced to resolve this issue. The principal textbooks and monographs are now supposed to be available in the university library. The expert panel accepts this action. This recommendation is still listed in this report but is considered to be resolved when the availability of the books is approved.
- Recommendation on Standard 5.3: The HEI states that evaluation of PhD supervisors is regularly conducted by the Quality Assurance Service. This recommendation is still listed in this report but is considered to be resolved if the announced evaluations are really conducted.

▪ **In case of re-accreditation, it is important to provide a brief overview of the achievements and/or the progress (if applicable)**

III. Compliance of the Programme with Accreditation Standards

1. Educational Programme Objectives, Learning Outcomes and their Compliance with the Programme

A programme has clearly established objectives and learning outcomes, which are logically connected to each other. Programme objectives are consistent with the mission, objectives and strategic plan of the HEI. Programme learning outcomes are assessed on a regular basis to improve the programme. The content and consistent structure of the programme ensure the achievement of the set goals and expected learning outcomes.

1.1 Programme Objectives

Programme objectives consider the specificity of the field of study, level and educational programme, and define the set of knowledge, skills and competences a programme aims to develop in graduate students. They also illustrate the contribution of the programme to the development of the field and society.

Summary and Analysis of the Education Programme's Compliance with the Requirements of the Component of the Standard

According to the Institute's Statement of Educational Objectives, this program is designed to encompass scientific research, the generation of new knowledge, and the development of various research-related skills, such as analytical thinking and presentational skills, in specific areas of Mathematics. The program focuses on training PhD students to enhance their proficiency in these areas. These objectives are aligned with the evolution of the scientific discipline of Mathematics.

The program aligns with Akaki Tsereteli State University's mission and strategic plan, which focus on offering high-quality education and research, fostering student development, and producing professionals and leaders. The university recognizes its societal responsibility and actively contributes to the city and region's development by offering lifelong education programs, generating new knowledge, and providing various services.

The program's objectives are met through core courses and extracurricular activities, which include staff and student involvement in scientific forums and exchange programs, as well as professional partnerships with schools and other educational institutions. Students actively participate in university events related to learning and employment, which, in turn, contribute to regional development.

As outlined in the program description, successful PhD students are expected to substantially contribute to refereed journals. This is the primary means through which the program actively fosters the advancement of the academic field and benefits society. These objectives are both realistic and attainable, offering enrolled students the opportunity to make significant scientific contributions and enhance their international recognition. Site visit discussions have revealed that the academic staff involved in the program fully endorse these objectives.

Evidences/Indicators

- Program description,
- University's mission statement,
- Self-Evaluation Report (SER), and
- the interviews.

Recommendations:

Suggestions for the Programme Development

Evaluation

Component	Complies with requirements	Substantially complies with requirements	Partially complies with requirements	Does not comply with requirements
1.1 Programme Objectives	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1.2 Programme Learning Outcomes

- The learning outcomes of the programme are logically related to the programme objectives and the specifics of the study field.
- Programme learning outcomes describe knowledge, skills, and/or the responsibility and autonomy that students gain upon completion of the programme.

Summary and Analysis of the Education Programme's Compliance with the Requirements of the Component of the Standard

The aspired learning outcomes are divided into mathematical research skills and teaching skills. Both are important for the relevant labor market of the graduates. Whereas the research skills are fundamental for graduates remaining in the academic sector, the teaching skills are also important for employments in schools. Regarding the teaching skills, the HEI has a focus on modern teaching method which are taught in a specific lecture, practical exercises and two seminars.

The research skills are trained by mathematical lectures on specific topics which contain state-of-the-art knowledge in topics from the areas of Analysis or Algebra/Geometry, depending on the particular choices of the student. However, students with a PhD thesis in Analysis have not the possibility to get credits for courses in Algebra/Geometry, or vice-versa. Moreover, students with a PhD thesis in Analysis (Theory of Functions) do not get credits for lectures in Differential Equations, or vice-versa (see 1.4 for further details).

Evidences/Indicators

- Program description,
- Self-Evaluation Report (SER),
- Study plans, and
- the interviews.

Recommendations:

Suggestions for Programme Development

Evaluation

Component	Complies with requirements	Substantially complies with requirements	Partially complies with requirements	Does not comply with requirements
1.2 Programme Learning Outcomes	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1.3 Evaluation Mechanism of the Programme Learning Outcomes

- Evaluation mechanisms of the programme learning outcomes are defined; the programme learning outcomes evaluation cycle consists of defining, collecting and analyzing data necessary to measure learning outcomes;
- Programme learning outcomes assessment results are utilized for the improvement of the programme.

Summary and Analysis of the Education Programme's Compliance with the Requirements of the Component of the Standard

The development of this program leverages the foundation of previous PhD programs in Mathematics. It encompasses lectures in mathematical theory related to each individual PhD topic, modern teaching methodology sessions, and diverse seminars. However, the core emphasis lies in conducting independent research. Assessment of learning outcomes occurs primarily through oral exams following each course and seminar presentations. The culmination of the program involves earning the degree through the submission and defense of the thesis.

The program's framework allows for considerable autonomy in conducting individual research and fostering new knowledge. Tailored supervision and collaboration within small working groups cater to individual needs, ensuring flexibility within the program structure.

The expert panel agrees that these outcomes align with standard expectations for a Mathematics PhD, meeting the demands of the academic job market.

The faculty administration regularly conducts analyses to monitor student performance. The program outlines its learning outcomes, addressing the necessary knowledge, skills, and competencies for a Mathematics PhD. An internal group, along with program personnel, examines student success in meeting learning outcomes. They pinpoint where most students struggle, revisiting the curriculum and related courses. Amendments are proposed, like adjusting prerequisites, content, or teaching methods. Finally, a report consolidates assessment results, analyses, and program improvements. Various surveys, including labor market and employment analyses, are generated by the faculty administration and shared with the faculty dean and program leaders.

Evidences/Indicators

- Program description,
- Self-Evaluation Report (SER),
- Study plans, and
- the interviews.

Recommendations:

Suggestions for the Programme Development

Evaluation

Component	Complies with requirements	Substantially complies with requirements	Partially complies with requirements	Does not comply with requirements
1.3 Evaluation Mechanism of the Programme Learning Outcomes	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1.4. Structure and Content of Education Programme

- The Programme is designed according to HEI's methodology for planning, designing and developing of education programmes.
- The Programme structure is consistent and logical. The content and structure of the programme ensure the achievement of programme learning outcomes. The qualification to be granted is consistent with the content and learning outcomes of the programme.

Summary and Analysis of the Education Programme's Compliance with the Requirements of the Component of the Standard

This PhD program represents the evolution of two previous PhD programs in Mathematics. The Department of Mathematics started such programs in 2012. However, during the course of those earlier programs, only three students were enrolled, and of those, two successfully graduated, earning their doctoral degrees, and one is going to finish in the near future. With the introduction of this new PhD program, the university anticipates a higher enrollment rate, particularly from the broader Kutaisi regional area. For this, it is important that the program is genuinely attractive to many graduates from mathematical master's programs. This is challenging in the sense that individual workgroups are relatively small, making it more difficult to achieve a diversity of scientific exchange. Additionally, larger cohorts of PhD students may enhance the attractiveness of the program, as it facilitates more seamless scientific and social exchanges.

Certainly, to enhance the competitiveness of Mathematics graduates and accommodate the limited academic labor market in Georgia, a significant curriculum improvement involves reconsidering the rigid structure of compulsory mathematical courses. To enhance the appeal of this PhD program, the faculty should consider easing the requirement for compulsory courses and introducing the option to attend elective courses. An effective measure would be to open the entire range of available mathematical courses within this program to all PhD students, irrespective of their specific research topic. At the outset of the PhD project, supervisors could collaborate with students to identify suitable courses aligned with their research interests. This approach offers greater academic freedom and allows for tailored curricula that specifically cater to the diverse needs of topics covering multiple research areas within the program.

By implementing this strategy, students gain the flexibility to select courses that best complement their research focus, fostering a more customized and enriched learning experience. It not only broadens their mathematical knowledge but also aligns more seamlessly with the interdisciplinary nature of research that spans multiple areas within Mathematics. Ultimately, this initiative enhances the overall competitiveness and adaptability of Mathematics graduates in the academic landscape.

Typically, a PhD program in Mathematics leads more towards research and academia. As a result, the focus of this PhD program is mainly oriented for the academic job market and for the demands in the educational sector. Beyond this, the non-academic job market is rarely addressed.

Absolutely, incorporating lectures on Numerical Mathematics, expanded Statistics, Stochastics, and Financial Mathematics would significantly benefit graduates by aligning their skill set with the demands of various professional sectors. These adjustments not only enhance their competitiveness but also broaden their scope in comparison to individuals with business-related degrees. Numerical Mathematics courses would bolster their problem-solving abilities, while expanded Statistics and Stochastics lectures would deepen their analytical skills, crucial across industries like finance, insurance, and telecommunications. Additionally, exposure to Financial Mathematics would equip them with specialized knowledge, highly sought-after in sectors such as finance and consultancy.

By integrating these courses into the program, graduates would possess a more versatile and robust skill set, enabling them to navigate a wider spectrum of career opportunities. This adaptation ensures that Mathematics graduates are not only competitive in academic fields but also well-prepared to excel in diverse professional arenas, enhancing their overall appeal to prospective employers.

Evidences/Indicators

- Program description,
- Self-Evaluation Report (SER),
- Study plans, and
- the interviews.

Recommendations:

- The strict imposition of compulsory courses is not suitable for doctoral candidates with their individual thesis topics and contradicts academic freedom. Therefore, mandatory courses should be replaced by elective courses, allowing each doctoral candidate to tailor their curriculum to align with their specific research project. Supervisors can provide guidance in selecting these electives.

Suggestions for the programme development

- An incorporation of lectures on Numerical Mathematics, expanded Statistics, Stochastics, and/or Financial Mathematics into the curriculum would widen the career opportunities of the graduates.

Evaluation

Component	Complies with requirements	Substantially complies with requirements	Partially complies with requirements	Does not comply with requirements
1.4 Structure and Content of Educational Programme	<input type="checkbox"/>	<input type="checkbox"/>	X	<input type="checkbox"/>

1.5. Academic Course/Subject

➤ The content of the academic course / subject and the number of credits ensure the achievement of the learning outcomes defined by this course / subject.

- The content and the learning outcomes of the academic course/subject of the main field of study ensure the achievement of the learning outcomes of the programme.
- The study materials indicated in the syllabus ensure the achievement of the learning outcomes of the programme.

Summary and Analysis of the Education Programme's Compliance with the Requirements of the Component of the Standard

The general courses in the program cover theoretical knowledge, research methods, practical skills, problem-solving abilities, and the development of continuous learning habits and teaching skills, collectively encompassing the program's learning outcomes. The content of the mathematical courses is mostly on graduate level. The structure of mathematical courses in this PhD program is purposefully designed to directly support and advance students in their individual research endeavors. The module descriptions catalogue is meticulously crafted, providing comprehensive and detailed descriptions for each module within. The number of allocated ECTS credits is comprehensible and realistically specified.

The required readings and educational materials outlined in the syllabi are directly aligned with the specific learning objectives of the course or subject, thereby guaranteeing the fulfillment of broader program learning objectives. These designated materials not only correspond to the academic requirements within the field of study but also serve as instrumental tools to meet the intended educational outcomes. The listed literature in the syllabi incorporate the most recent and most relevant research findings from pertinent fields of mathematical research.

Evidences/Indicators

- Program description,
- Self-Evaluation Report (SER),
- Syllabi,
- Study plans, and
- the interviews.

Recommendations:

Suggestions for the programme development

Evaluation

Component	Complies with requirements	Substantially complies with requirements	Partially complies with requirements	Does not comply with requirements
1.5. Academic Course/Subject	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Compliance of the Programme with the Standard

1. Educational programme objectives, and their compliance with the programme	Complies with requirements	<input type="checkbox"/>
	Substantially complies with requirements	X
	Partially complies with requirements	<input type="checkbox"/>
	Does not comply with requirements	<input type="checkbox"/>

2. Methodology and Organisation of Teaching, Adequacy of Evaluation of Programme Mastering

Prerequisites for admission to the programme, teaching-learning methods and student assessment consider the specificity of the study field, level requirements, student needs, and ensure the achievement of the objectives and expected learning outcomes of the programme.

2.1 Programme Admission Preconditions

The HEI has relevant, transparent, fair, public and accessible programme admission preconditions and procedures that ensure the engagement of individuals with relevant knowledge and skills in the programme to achieve learning outcomes.

Summary and Analysis of the Education Programme's Compliance with the Requirements of the Component of the Standard

The admission prerequisites for the educational program align with current Georgian legal requirements, ensuring transparency and compliance. As outlined in the self-evaluation report, upon accreditation, the program's detailed description will be readily accessible on ATSU's official website, www.atsu.edu.ge. Moreover, the university's educational program catalog will be regularly updated with pertinent information, readily available online.

Furthermore, the university's rector will issue a normative directive detailing the admission criteria and procedures for the program. This directive will be promptly uploaded to the website, ensuring accessibility and clarity. To disseminate information widely, social media platforms will be utilized, enabling prospective candidates to stay informed about the program's admission requirements. Additionally, informational sessions will be conducted, providing interested individuals with opportunities to gain further insights.

The PhD program's admission criteria are meticulously designed to ensure that candidates possess the requisite knowledge, skills, and ethical values. Below are the essential prerequisites for admission to the PhD program:

- Possession of a Master's Academic degree or an equivalent diploma, specializing in mathematics or a related field.
- Evaluation of candidates with a master's degree in a related specialty for admission to the doctoral program, decided by the commission established within the Department of Mathematics.
- Submission of a letter of recommendation from academic circles within the field, addressed to the admissions committee for doctoral studies.
- Presentation of abstracts or published scientific works aligned with the research area.
- Successful completion of the Mathematics entrance examination.
- Demonstration of a B2 level of proficiency in English through certification or by passing the relevant examination.
- Submission of a document confirming proficiency in the Georgian language for candidates seeking to pursue a program taught in Georgian, if Georgian is not their native language.

The precise criteria and guidelines governing the doctoral studies at Akaki Tsereteli State University are outlined in the resolution titled "On determining the basic principles of doctoral studies at Akaki Tsereteli State University," specifically detailed in the Academic Council Resolution №2 (12/13) dated September 5, 2012, with subsequent amendments reflected in the Academic Council Resolution №79(19/20) dated

August 10, 2020. This document can be accessed via the following link: [Doctoral Studies Guideline Document](http://www.atsu.edu/ge/ganxadebebi/doctorantura.pdf).

In cases where candidates receive equal scores during evaluation, the following factors are taken into account to differentiate among them: assessment of their master's thesis, the scope of published works, and active participation in scientific conferences. These criteria serve as additional measures to distinguish candidates in a competitive setting.

Evidences/Indicators

- Doctoral educational programme of “Mathematics”;
- Resolution of the Academic Council №32 (20/21), 21.05.2021 - on defining the basic principles of doctoral studies at Akaki Tsereteli State University Regulation for doctoral studies;
- Resolution of the Academic Council 67 (22/23) 23.07.2022 - the procedure for obtaining, suspending, terminating, restoring, mobility, qualification, and recognition of the received education, in case of changing/cancelling the educational program, the mechanisms for providing the students of the relevant program with further education;
- ATSU’s website www.atsu.edu.ge;
- Self-evaluation report;
- Interview results.

Recommendations:

Suggestions for the programme development

Evaluation

Component	Complies with requirements	Substantially complies with requirements	Partially complies with requirements	Does not comply with requirements
2.1 Programme Admission Preconditions	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2.2. The Development of Practical, Scientific/Research/Creative/Performing and Transferable Skills

Programme ensures the development of students' practical, scientific/research/creative/performing and transferable skills and/or their involvement in research projects, in accordance with the programme learning outcomes.

Summary and Analysis of the Education Programme's Compliance with the Requirements of the Component of the Standard

The doctoral program is designed to equip students with practical research skills rooted in the latest advancements in the field, encompassing contemporary scientific theories, methodologies, and essential techniques essential for conducting research. These foundational components are integral to both the educational and research facets of the program. Complementing theoretical knowledge, seminars and module courses are structured to foster the development of practical research capabilities among doctoral candidates.

Central to the program is the research component, which centers around addressing specific scientific problems through investigation and the application of resultant discoveries. This facet is instrumental in

honing students' abilities to effectively apply both theoretical understanding and practical expertise in the pursuit of scientific inquiry. Ultimately, the program aims to cultivate adeptness in the application of theoretical knowledge to real-world scientific research practices.

PhD students are actively encouraged to contribute to the planning and development of research initiatives within the faculty, playing integral roles in formulating research projects. Moreover, they are encouraged to present their scientific findings at both national and international conferences, showcasing the outcomes of their research endeavors.

Beyond the administrative bodies like the rectorate, dean's office, or program delivery group, there exists a strong commitment from the faculty, administrative staff, and program execution group to actively support doctoral candidates. This support extends to facilitating their engagement in regional research projects and international exchange programs, fostering a rich and diverse learning experience.

Furthermore, PhD students are encouraged to participate in a range of extracurricular activities organized by the university and faculty. These activities encompass diverse spheres, including research initiatives, creative projects, and educational endeavors, providing students with opportunities to broaden their horizons beyond the formal academic curriculum.

At least one student is required to actively engage in a university internal grant project, fostering practical involvement in research initiatives. Funding was allocated to support a student's participation in a field-specific scientific conference held in Batumi, enabling them to contribute to the academic discourse and expand their professional network. Additionally, students are encouraged to take part in departmental presentations, presenting their scientific reports and exchanging insights with peers and faculty members.

The selection of scientific supervisors takes into account the research interests of students, ensuring alignment and mutual interest in the chosen area of study. Verification and confirmation of the appropriate competence of scientific supervisors are integral steps in this process, ensuring their capability to guide and mentor students effectively in their research pursuits.

Students are offered a valuable chance for scientific growth through engagement in seminars at the Mathematical Institute, discussions with some scientific guests, and participation in international grant projects. Despite these opportunities, the department's small research groups limit the scope of scientific exchange. Consequently, it's crucial for the department to actively seek and capitalize on any available means to enrich and expand these opportunities for student scientific exchange.

Evidences/Indicators

- Educational program;
- Scientific topics and reports of the faculty and departments;
- Students participation statistics in scientific-research activities;
- Self-evaluation report;
- Interview results.

Recommendations:

- The department should provide additional opportunities for academic exchange between students and scholars / scientists from related fields. This could be achieved, for instance, through a

continuous guest program featuring regular guest lectures, the establishment of dedicated online seminars, or the increased utilization of existing online seminars in Georgia or other countries.

Suggestions for the programme development

Evaluation

Component	Complies with requirements	Substantially complies with requirements	Partially complies with requirements	Does not comply with requirements
2.2.The Development of practical, scientific/research/creative/performing and transferable skills	<input type="checkbox"/>	X	<input type="checkbox"/>	<input type="checkbox"/>

2.3. Teaching and Learning Methods

The programme is implemented by use student-oriented teaching and learning methods. Teaching and learning methods correspond to the level of education, course/subject content, learning outcomes, and ensure their achievement.

Summary and Analysis of the Education Programme's Compliance with the Requirements of the Component of the Standard

The teaching and learning methodologies employed within the PhD program are purposefully selected to align with the program's overarching goals, specifically tailored to achieve the intended learning outcomes. These methodologies are thoughtfully outlined in the curriculum and syllabi, ensuring a cohesive approach geared towards fulfilling the program's educational objectives.

A strategic consideration of the content and desired learning outcomes of each individual course informs the deliberate choice and application of teaching and learning methodologies. This approach ensures that the methodologies employed are well-suited to facilitate the comprehension and attainment of specific course objectives, thereby optimizing the learning experience for students.

Interactive methodologies such as discussions, debates, case studies, induction-deduction, analysis and synthesis, explanatory approaches, and action-oriented learning play pivotal roles, tailored to the specific content of the taught courses. Additionally, verbal and written methods, coupled with in-depth exploration of scholarly books and scientific articles, are integral to the learning process. Demonstrative techniques further complement the teaching strategies employed.

Doctoral students are encouraged to utilize recommended core literature alongside supplementary resources, engaging in independent work that aligns with and fulfills the program's learning objectives. Central to the curriculum are seminars, teaching practice sessions, and colloquiums, which serve as fundamental components essential to the holistic learning experience.

The doctoral seminar, an integral component mandated by the program, serves as a platform to delve into contemporary research challenges within the field, addressing current and pertinent issues. Topics for these seminars are carefully selected, drawing from the subject matter of the doctoral thesis and the curriculum's course content. The seminar aims to foster the development of novel research methodologies and analytical approaches. Its objectives include in-depth discussions on the chosen topic, comprehensive understanding of underlying problematic issues, and the cultivation of the autonomy to make informed decisions regarding potential problem-solving approaches.

Notably, it's imperative that the doctoral dissertation remains distinct from the seminar paper, ensuring that no elements from the seminar topic are incorporated into the dissertation content. This separation maintains the integrity and uniqueness of the doctoral research conducted by the student.

The colloquium represents a vital segment encompassing both the dissertation and the research components. During the colloquium, the doctoral candidate introduces and presents the research findings pertinent to the dissertation topic. The successful completion of the colloquium is a prerequisite for the public defense of the dissertation, highlighting the importance of this academic forum in validating and showcasing the culmination of the candidate's research efforts.

Evidences/Indicators

- Doctoral educational program in “Mathematics”;
- Course syllabi;
- Resolution of the Academic Council №32 (20/21), 21.05.2021 - on defining the basic principles of doctoral studies at Akaki Tsereteli State University;
- Self-evaluation report;
- Interview results.

Recommendations:

Suggestions for the programme development

Evaluation

Component	Complies with requirements	Substantially complies with requirements	Partially complies with requirements	Does not comply with requirements
2.3. Teaching and learning methods	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2.4. Student Evaluation

Student evaluation is conducted in accordance with the established procedures. It is transparent, reliable and complies with existing legislation.

Summary and Analysis of the Education Programme's Compliance with the Requirements of the Component of the Standard

The syllabi of individual courses meticulously outline the assessment methodologies, criteria, and rubrics used to evaluate students, ensuring alignment with the learning objectives of each program component. These methods are consistently applied across all program facets to ascertain the attainment of specified learning outcomes. Assessments of students' achievements adhere to guidelines established by ATSU and the directives laid out in Order #3 issued by the Ministry of Education and Science of Georgia.

The evaluation of student performance within the study component follows a 100-point system mandated by Georgian law. Assessment methodologies such as written tests, seminars, essays, presentations, and

activities are employed, tailored to the specific nature of each course and aligned with the program's learning objectives. However, the minimum competency rates set for Midterm evaluations at 20 points out of 60 and 16 points for the Final exam out of 40, as defined in the study component of the educational program, might not adequately reflect the rigor expected at the PhD level. It's imperative for the university to reconsider and potentially adjust these minimal competency rates for study component courses, given that they serve as the foundation upon which students develop their research capabilities at the doctoral level.

It was revealed during interviews that student presentations at seminars and colloquiums are subjected to a binary positive or negative assessment, resembling a formative evaluation. This assessment aims to identify areas of improvement and highlight aspects requiring further development. However, discrepancies emerged concerning the structure and evaluation of the research component, particularly between the one-time assessment and ongoing formative assessment. This lack of clarity raises concerns regarding compliance with Ministry Order №3, which sets standards for evaluating the research component.

The absence of explicit mention of formative assessment in the program or dissertation regulations is notable, especially considering the significance of regular formative assessment during a PhD candidate's thesis work. Additionally, a phrase referencing Paragraph 17 of Article 4 in Ministry Order №3 doesn't align with the current version of the Order.

To address these discrepancies, it's crucial to clarify the assessment system for the research component. This should encompass both a one-time assessment and the provision for regular, formative assessments throughout a doctoral student's dissertation work. Establishing a comprehensive evaluation framework that adheres to Ministry Order №3 while integrating ongoing formative assessments would ensure a more robust and transparent evaluation process for doctoral candidates.

While the evaluation of the dissertation aligns with the stipulations outlined in Ministry Order №3, there exists a notable absence of a defined grading scale for the verbal assessment. This lack of a clear grading scale raises concerns regarding the methodology employed by the dissertation committee to determine the final verbal assessment. A standardized grading scale for the verbal assessment would provide transparency and clarity regarding the criteria and benchmarks used by the dissertation committee. This scale would serve as a guiding framework, enabling a more structured and consistent approach to evaluating dissertations, in adherence to Ministry Order №3 requirements. Establishing a clear grading scale for the verbal assessment is crucial to ensure fairness and objectivity in the evaluation process for doctoral dissertations.

The dissertation defense adheres meticulously to the Higher Education Institution's (HEI) established procedures for dissertation evaluation and defense. The defense commission plays an integral role during the defense, overseeing the assessment process. This evaluation includes the participation of both local and external evaluators, ensuring a comprehensive and impartial review. Notably, the dissertation defense is conducted as a public event, providing transparency and allowing broader academic engagement.

Students are thoroughly acquainted with the prerequisites for maintaining an academic style within their dissertations well in advance. These requirements, outlining the expected academic standards, are factored into the assessment process, ensuring that the evaluation of their work aligns with these predefined criteria.

While the program culminates in the evaluation of the thesis and the PhD defense, there's an absence of defined guidelines on how these two components contribute to the final grade. To enhance transparency, the program should articulate and communicate a clear procedure for obtaining the final degree. Specifically, establishing a reasonable weighting system for both components and making this weighting transparent would offer greater clarity to students and evaluators alike.

Evidences/Indicators

- Doctoral educational program in “Mathematics”;
- Syllabi;
- Resolution of the Academic Council №6 (22/23), 16.09.2022 - on the approval of the student evaluation system at Akaki Tsereteli State University (amendment of the Resolution of the Academic Council of September 15, 2017, №5 (17/18));
- Resolution of the Academic Council №32 (20/21), 21.05.2021 - on determining the basic principles of doctoral studies at Akaki Tsereteli State University;
- The samples of dissertation assessment;
- Self-evaluation report;
- Interview results.

Recommendations:

- To ensure students possess the essential foundational knowledge for conducting research, it is recommended for the university to reassess the minimum competency rate set for the study component courses.
- Make the assessment system for the research component clear to outline a one-time assessment and provide periodic formative assessment while the doctoral student works on the dissertation.
- The weighting of both examination components (dissertation and oral defense) in determining the overall grade must not depend on the specific dissertation but should be uniformly regulated and transparent for examiners and students alike. To achieve this, the faculty's regulations for doctoral studies must establish a consistent weighting of both examination components (dissertation and oral defense) in calculating the final grade.
- Clarify the process by which the dissertation committee determines the final verbal assessment.

Suggestions for the programme development

Evaluation

Component	Complies with requirements	Substantially complies with requirements	Partially complies with requirements	Does not comply with requirements
2.4. Student evaluation	<input type="checkbox"/>	<input type="checkbox"/>	X	<input type="checkbox"/>

Compliance with the programme standards

2. Methodology and Organisation of Teaching, Adequacy of Evaluation of Programme Mastering	Complies with requirements	<input type="checkbox"/>
	Substantially complies with requirements	<input checked="" type="checkbox"/>
	Partly complies with requirements	<input type="checkbox"/>
	Does not comply with requirements	<input type="checkbox"/>

3. Student Achievements, Individual Work with Them

The programme ensures the creation of a student-centered environment by providing students with relevant services; promotes maximum student awareness, implements a variety of activities and facilitates student involvement in local and/or international projects; proper quality of scientific guidance is provided for master's and doctoral students.

3.1 Student Consulting and Support Services

Students receive consultation and support regarding the planning of learning process, improvement of academic achievement, and career development from the people involved in the programme and/or structural units of the HEI. A student has an opportunity to have a diverse learning process and receive relevant information and recommendations from those involved in the programme.

Summary and Analysis of the Education Programme's Compliance with the Requirements of the Component of the Standard

At Akaki Tsereteli State University, students benefit from comprehensive consultations and support in planning their learning process. The institution has established regulations governing the acquisition, suspension, and termination of student status, as well as student mobility and education recognition during study periods. Resolution No. 32(20/21) outlines fundamental principles for doctoral studies, which comprises the procedure for choosing the educational program and individual components of the program, and the mechanism of ensuring further mobility of the doctoral student of the relevant program in case of changing or canceling the educational program. Students actively engage in planning their educational and research components through individual plans, involving faculty administration, quality assurance services, and academic staff.

The program offers students opportunities to engage in local and international projects and conferences, showcasing various international collaborations such as conferences, scientific visits to foreign universities, and hosting foreign professors. Notably, the faculty maintains fruitful partnerships with universities in Poland, the Czech Republic, and Rennes, involving joint seminars and master classes. To foster students' involvement in international projects, conferences, and research fellowships, and to further develop and enhance the PhD program, the Expert Panel recommends supporting and stimulating international cooperation.

Additionally, doctoral students can access internal faculty research grants with professorial involvement. Moreover, they receive monetary rewards for publishing articles in journals listed in Scopus or Web of Science listed journals, supporting young researchers. The faculty actively fosters students' career development, boasting a high employment rate for graduates within the institution and receiving commendations from employers for the graduates' high qualifications and continued studies at ATSU.

Alumni play an active role in the program's self-evaluation, influencing program development by introducing algebraic direction based on their initiative. They engage with the university, participating in program development events and surveys, showcasing a collaborative approach to enhancing the program.

Evidences/Indicators

- Interviews during site visit with different stakeholders;
- Self-Evaluation Report on Accreditation of Higher Education Program;
- Syllabi of learning courses of educational program;
- Webpage of the University <https://www.atsu.edu.ge/ge/home>
- Resolution No. 32(20/21) on determining the basic principles of doctoral studies at Akaki Tsereteli State University;
- PHD Student satisfaction survey report;
- Memorandums with foreign universities;
- Provision of Exact and Natural Sciences faculty;

Recommendations:

Suggestions for Programme Development

- It is suggested to strengthen international cooperation.

Evaluation

Component	Complies with requirements	Substantially complies with requirements	Partially complies with requirements	Does not comply with requirements
3.1 Student Consulting and Support Services	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3.2. Master's and Doctoral Student Supervision

- A scientific supervisor provides proper support to master's and doctoral students to perform the scientific-research component successfully.
- Within master's and doctoral programmes, ration of students and supervisors enables to perform scientific supervision properly.

Summary and Analysis of the Education Programme's Compliance with the Requirements of the Component of the Standard

Akaki Tsereteli State University has developed regulatory documents outlining the roles and responsibilities of MA/Doctoral student supervisors and co-supervisors, along with protocols for their appointment, modification, and overseeing the supervision process. The scientific supervisor for a doctoral thesis can be an academic staff member (professor, associate professor) from Akaki Tsereteli State University or another accredited institution, an emeritus professor, or an invited doctorate holder with substantiated research experience in mathematics, validated through their degree and publications. Their expertise should align with the doctoral student's dissertation topic, complemented by substantial experience in implementing the planned research.

The educational program ensures highly qualified specialists supervise PhD students, substantiated by institutional data (CVs/publications/works). According to university regulations, doctoral research topics align with individual student interests, allowing for corresponding supervisor selection, even inviting external supervisors. The program also accommodates changing the research topic title and supervisor.

Both PhD students and alumni expressed contentment with their supervisors, frequently engaging in consultations covering research methodology, scientific paper writing, and dissertation guidance.

As mentioned above in part 1.4, the compulsory courses should be replaced by elective courses which are tailored to the individual PhD project. For guidance at the commencement of the PhD project, supervisors and students should collaboratively select pertinent courses that align with their research interests. This method provides more academic flexibility, enabling customized curricula tailored to encompass various research areas within the program.

The scientific supervisor actively engages in overseeing the pedagogical practice, offering guidance and assistance during the doctoral student's involvement in teaching practices. This component is specifically designed to foster the development of crucial skills essential for the student's future teaching endeavors.

Supervisors dedicate at least one hour per week to consulting with PhD students. As outlined in Resolution No. 32(20/21), the scientific supervisor collaborates with the doctoral student to create an individual plan, including research objectives, a brief dissertation description, educational and research schedules, endorsed by a signed agreement among the university, doctoral candidate, and supervisor within two months of enrollment. This agreement delineates respective obligations and rights, with the individual plan forming a part of this contract. A professor can oversee a maximum of three PhD students simultaneously.

Moreover, the institution provided a 2018 PhD Student satisfaction survey report incorporating assessments of cooperation with scientific supervisors. The Quality Assurance Office plans to evaluate the supervisor and co-supervisor activities using questionnaires.

Data related to the supervision of master's/ doctoral students	
Quantity of master/PhD theses	
Number of master's/doctoral students	
Ratio	

Evidences/Indicators

- Interviews during site visit with different stakeholders;
- Self-Evaluation Report on Accreditation of Higher Education Program;
- Syllabi of learning courses of educational program;
- Webpage of the University <https://www.atsu.edu.ge/ge/home>
- Resolution No. 32(20/21) on determining the basic principles of doctoral studies at Akaki Tsereteli State University;
- PHD Student satisfaction survey report;
- Individual quantitative indicators.

Recommendations:

- Supervisors should provide personalized guidance to students in designing individualized study plans at the initiation of their PhD projects.

Suggestions for the programme development

Evaluation

Please, evaluate the compliance of the programme with the component

Component	Complies with requirements	Substantially complies with requirements	Partially complies with requirements	Does not comply with requirements
3.2. Master's and Doctoral Students Supervision	<input type="checkbox"/>	X	<input type="checkbox"/>	<input type="checkbox"/>

Compliance with the programme standards

3. Students Achievements, Individual Work with them	Complies with requirements	X
	Substantially complies with requirements	<input type="checkbox"/>
	Partly complies with requirements	<input type="checkbox"/>
	Does not comply with requirements	<input type="checkbox"/>

4. Providing Teaching Resources

Human, material, information and financial resources of educational programme ensure sustainable, stable, efficient and effective functioning of the programme and the achievement of the defined objectives.

4.1 Human Resources

- Programme staff consists of qualified persons, who have necessary competences in order to help students to achieve the programme learning outcomes.
- The number and workload of programme academic/scientific and invited staff ensures the sustainable running of the educational process and also, proper execution of their research/creative/performance activities and other assigned duties. Quantitative indicators related to academic/scientific/invited staff ensure programme sustainability.
- The Head of the Programme possesses necessary knowledge and experience required for programme elaboration, and also the appropriate competences in the field of study of the programme. He/she is personally involved in programme implementation.
- Programme students are provided with an adequate number of administrative and support staff of appropriate competence.

Summary and Analysis of the Education Programme's Compliance with the Requirements of the Component of the Standard

Based on the self-evaluation report of the educational program, employee CVs, attached documentation, and information obtained through direct meetings and interviews with higher education institution staff, it has been established that the individuals overseeing the master's program are engaged in accordance with the relevant legislation and internal regulations of the institution. The program involves a total of 13 personnel, including 11 affiliated academics (3 affiliated professors and 8 affiliated associate professors). Importantly, the qualifications of both academic and visiting staff align seamlessly with their qualification requirements, functions, and applicable legislation. The well-balanced composition of

academic and visiting staff (11 academic and 2 visiting) contributes significantly to the program's sustainability.

The participating personnel possess commendable competence, substantiated by their pedagogical experience, publications in international scientific journals, contributions to books/manuals, engagement in scientific grant projects, and active participation in local and international conferences.

The head of the program, equipped with the requisite experience and a robust portfolio of scientific works, plays a pivotal role in the development and execution of the program. His direct involvement ensures a hands-on approach to program enhancement.

Furthermore, the university ensures that students enrolled in the program receive support from an adequate number of administrative and support staff with the requisite qualifications. This comprehensive approach contributes to the overall success and effectiveness of the program.

Number of the staff involved in the programme (including academic, scientific, and invited staff)	Number of Programme Staff	Including the staff with sectoral expertise⁶	Including the staff holding PhD degree in the sectoral direction⁷	Among them, the affiliated staff
Total number of academic staff	13	13	13	11
- Professor	3	3	3	3
- Associate Professor	8	8	8	8
- Assistant-Professor	0	0	0	0
- Assistant	0	0	0	0
Visiting Staff	2	2	2	–
Scientific Staff	0	0	0	–

Evidences/Indicators

- Self evaluation report,
- CV of academic and visiting staff,
- staff labor contracts,
- provisions of Doctoral Studies of the University,
- rights and duties of the program manager and administrative staff,
- regulations of the Faculty of Exact and Natural Sciences,
- interview results.

Recommendations:

Suggestions for Programme Development

Evaluation

Component	Complies with requirements	Substantially complies with	Partially complies with requirements	Does not comply with requirements
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⁶ Staff implementing the relevant components of the main field of study

⁷ Staff with relevant doctoral degrees implementing the components of the main field of study

	requirements			
4.1 Human Resources	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4.2 Qualification of Supervisors of Master's and Doctoral Students

The Master's and Doctoral students have qualified supervisor/supervisors and, if necessary, co-supervisor/co-supervisors who have relevant scientific-research experience in the field of research.

Summary and Analysis of the Education Programme's Compliance with the Requirements of the Component of the Standard

The academic staff responsible for the implementation of the new doctoral program is eligible to serve as scientific supervisors for doctoral students. This includes 2 academic doctors who hold the position of professors, along with 7 academic doctors serving as associate professors. Additionally, there is 1 visiting professor with a Doctorate in physics-mathematical sciences, and another visiting professor who is an academic doctor. After a thorough examination of the academic CVs and publication records of these researchers, it is evident that the qualifications of the supervisors, collectively, can be deemed as proficient. Their extensive academic backgrounds and notable publication records contribute to a wealth of expertise and knowledge, reinforcing their capacity to effectively guide and mentor doctoral students in the program.

The selection of research topics aligns with the scientific expertise of the academic staff leading the program, addressing contemporary scientific issues. Furthermore, the interests of doctoral students and the preferences of partner universities will be considered when finalizing the choice of research topics. This approach ensures a well-rounded and collaborative framework for doctoral research within the program.

Number of supervisors of Master's/Doctoral theses	Thesis supervisors	Including the supervisors holding PhD degree in the sectoral direction	Among them, the affiliated staff
Number of supervisors of Master's/Doctoral thesis	11	11	9
- Professor	2	2	2
- Associate Professor	7	7	7
- Assistant-Professor	0	0	0
Visiting personnel	2	2	–
Scientific Staff	0	0	–

Evidences/Indicators

- Self-evaluation report,
- interview with academic staff
- Personal files of supervisors and co-supervisors (of MA and PhD students)
- Documents confirming the implemented studies

- Supervisors publication list

Recommendations:

Suggestions for the programme development

Evaluation

Please, evaluate the compliance of the programme with the component

Component	Complies with requirements	Substantially complies with requirements	Partially complies with requirements	Does not comply with requirements
4.2 Qualification of Supervisors of Master's and Doctoral Students	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4.3 Professional Development of Academic, Scientific and Invited Staff

- The HEI conducts the evaluation of programme staff and analyses evaluation results on a regular basis.
- The HEI fosters professional development of the academic, scientific and invited staff. Moreover, it fosters their scientific and research work.

Summary and Analysis of the Education Programme's Compliance with the Requirements of the Component of the Standard

The university employs a systematic approach to assess the academic staff engaged in the program. This evaluation encompasses a comprehensive survey gauging students' satisfaction with each program subject and their respective lecturers. The outcomes of these evaluations serve as a foundation for the continuous professional development of academic, scientific, and visiting staff members. The university demonstrates a commitment to fostering the growth of its personnel by actively supporting their involvement in scientific and research projects, encouraging participation in conferences, and providing financial assistance for conference-related travel expenses. In addition, the university endeavors to stimulate the scientific activity of academic staff, exemplified by a monetary award for co-author students upon the publication of articles in high-rated journals. Moreover, an internal grant system is in place to further support research initiatives.

Confirmation of the significance attributed to evaluation results in staff motivation is evident in the examination of staff CVs and interviews with university administration and program stakeholders. This underscores the university's dedication to leveraging evaluation outcomes as a tool for staff development and motivation.

Evidences/Indicators

- Self-Evaluation Report;
- Interview with program managers;
- Interview with the academic staff implementing the program;
- Interview with the quality control team;

- Interview with students and graduates of a similar program;
- Interview with the university administration.

Recommendations:

Suggestions for the programme development

Evaluation

Component	Complies with requirements	Substantially complies with requirements	Partially complies with requirements	Does not comply with requirements
4.3 Professional development of academic, scientific and invited staff	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4.4. Material Resources

Programme is provided by necessary infrastructure, information resources relevant to the field of study and technical equipment required for achieving programme learning outcomes.

Summary and Analysis of the Education Programme's Compliance with the Requirements of the Component of the Standard

During the site visit, the expert team explored the university's facilities, noting recent renovations in classrooms, including upgraded computer equipment. The university boasts various accessible labs, accessible to both students and faculty members enrolled in this program. The library's reading halls are well-organized, featuring sections designated for both individual and group work. Access to academic databases enhances the library's resources, with the university currently subscribed to nearly 10 databases, including Science Direct and Scopus, which are particularly beneficial for students in this study program. The university's material and technical infrastructure stands ready to support the program's implementation.

Regrettably, our team was unable to locate all the necessary literature during the site visit. Essential materials specified in the syllabus for program-defined subjects were not found, whether in physical or electronic form. It is noteworthy, however, that by the visit's conclusion, books were added to the electronic library (<https://elibrary.atsu.edu.ge/lms/>). Despite this, during interviews with students, it was evident that the attendant students had diligently sought and accessed the required literature outlined in the syllabus.

It is crucial to highlight that the database mentioned on library webpage, Web of Science, was unavailable at the university at the day of site visit of the expert team. This information is essential for a comprehensive understanding of the available resources and potential areas for improvement. Efforts to address this gap in the library's resources could significantly enhance the program's academic support infrastructure. Furthermore, the Higher Education Institution (HEI) should explore effective strategies to substantially enhance the assortment of mathematical textbooks within the realms of the PhD program, specifically focusing on areas such as Analysis, Algebra, and Geometry.

Evidences/Indicators

- Self-Evaluation Report;
- Interview with program managers;
- Interview with the academic staff implementing the program;
- Interview with the head of the library;
- visual inspection of the material and technical base,
- University library webpage <https://elibrary.atsu.edu.ge/lms/>

Recommendations:

- University/faculty library must be provided by all the basic literature indicated in the syllabus of the subjects defined by the program, either in printed or electronic form.

Suggestions for the programme development

- The faculty is encouraged to expand its collection of foundational mathematical textbooks and research materials (e.g., lecture notes), extending beyond the essential course literature, to support and facilitate independent research activities.
- The accessibility of the data bases, as Web of Science, should be checked and potential outages should be monitored.

Evaluation

Component	Complies with requirements	Substantially complies with requirements	Partially complies with requirements	Does not comply with requirements
4.4 Material Resources	<input type="checkbox"/>	X	<input type="checkbox"/>	<input type="checkbox"/>

4.5 Programme/Faculty/School Budget and Programme Financial Sustainability

The allocation of financial resources stipulated in the programme/faculty/school budget is economically feasible and corresponds to the programme needs.

Summary and Analysis of the Education Programme's Compliance with the Requirements of the Component of the Standard

As outlined by university management, a pivotal element of the university's mission involves advancing fundamental sciences, with a particular emphasis on prioritizing the implementation of the doctoral program in mathematics. This commitment extends beyond mere execution to actively promoting the program, affirming its sustained funding.

The university's budget meticulously accounts for the financial intricacies of the doctoral program in mathematics. Specifically, the budget includes income earmarked for the program (15,320 GEL) and covers essential expenses for its successful execution. These expenses comprise salaries for academic

staff (7,020 GEL), administration and support staff (3,000 GEL), utility and taxes (2,100 GEL), infrastructure (1,000 GEL), and miscellaneous costs such as events, training, materials, supplies, and other essentials (2,200 GEL), totaling 15,320 GEL.

While the budget does not explicitly incorporate scientific or research-related expenses, such as scientific trips, publication of academic staff's research studies, research projects, scientific literature, and related costs, the university actively supports these endeavors. Financial assistance is provided for student and academic staff participation in scientific conferences, with the university covering associated travel expenses. The encouragement of research work is evident through internal grants and a student award program, recognizing outstanding articles published by students in top-rated journals.

Considering the comprehensive financial support outlined above, we are confident that the program's sustainable financing is secure. The university's commitment to fostering scientific exploration, coupled with its proactive funding initiatives, ensures the continued success and growth of the doctoral program in mathematics.

Evidences/Indicators

- Self-evaluation report;
- Interview with the head of the program;
- Interview with students and graduates;
- Interview with the staff involved in the program;
- Program budget;
- Interview with the university administration.

Recommendations:

Suggestions for the programme development

Evaluation

Component	Complies with requirements	Substantially complies with requirements	Partially complies with requirements	Does not comply with requirements
4.5. Programme/ Faculty/School Budget and Programme Financial Sustainability	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Compliance with the programme standard

4. Providing Teaching Resources	Complies with requirements	X
	Substantially complies with requirements	<input type="checkbox"/>
	Partly complies with requirements	<input type="checkbox"/>
	Does not comply with requirements	<input type="checkbox"/>

5. Teaching Quality Enhancement Opportunities

In order to enhance teaching quality, programme utilises internal and external quality assurance services and also, periodically conducts programme monitoring and programme review. Relevant data is collected, analysed and utilized for informed decision making and programme development.

5.1 Internal Quality Evaluation

Programme staff collaborates with internal quality assurance department(s)/staff available at the HEI when planning the process of programme quality assurance, developing assessment instruments, and implementing assessment process. Programme staff utilizes quality assurance results for programme improvement.

Summary and Analysis of the Education Programme's Compliance with the Requirements of the Component of the Standard

Based on the submitted documents, it was established that this educational program employs standard approaches for internal quality assurance, following a structured "Plan, Implement, Evaluate, Develop" cycle. This comprehensive process encompasses staff evaluations, analysis of student survey forms, internal quality assessment, and a SWOT analysis of the program. The results obtained from these evaluations inform recommendations submitted by the internal quality assurance office to the program heads and the university governing body, guiding subsequent interventions.

The Programs Self-Evaluation teams, consisting of both academic and administrative staff from various faculty levels and structural units providing university services, actively engage in the program's implementation and development. Roles within the teams are allocated based on individual competencies. Notably, students and alumni are integral participants in the self-evaluation process, reflecting a holistic approach.

Despite the program's operational span from 2011 to 2021, SWOT analyses and internal monitoring were consistently conducted following university procedures. In 2019, an internal quality assurance assessment was carried out by colleagues from different faculties. While the Self-Evaluation Report (SER) documents these processes, the expert team evaluates the program as if it were new. During interviews, the team focused on understanding the communication between teaching staff and the QA team for program development. The majority of academic staff expressed agreement with the recommendations provided by the QA office.

The institution boasts a Learning Management System (LMS), with academic staff well-versed in the tools and mechanisms supporting technology-enhanced learning. Consequently, the program is prepared to deliver courses online when necessary. The QA team affirmed the existence of regulations that support and monitor online learning initiatives. This reflects the program's adaptability and commitment to ensuring a quality learning experience through various modalities.

Evidences/Indicators

- Self-evaluation report
- The mechanisms of Internal Quality Assurance
- The methodology of Planning and Implementing the Education Program
- The survey forms created by the quality assurance team
- The outcomes of the interviews
- University web-page

Recommendations:

Suggestions for the programme development

Evaluation

Component	Complies with requirements	Substantially complies with requirements	Partially complies with requirements	Does not comply with requirements
5.1 Internal quality evaluation	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5.2 External Quality Evaluation

Programme utilises the results of external quality assurance on a regular basis.

Summary and Analysis of the Education Programme's Compliance with the Requirements of the Component of the Standard

Upon the site visit, it was discerned that the university strategically engages in two pivotal dimensions for the external quality evaluation of the specified study program. Firstly, there is a concerted effort to address recommendations stemming from the program's accreditation process. During interviews, academic staff revealed their ongoing commitment to addressing recommendations dating back to 2012, pertinent to two distinct PhD programs now integrated into the current program. These recommendations spanned improvements to study courses and the broadening of the employer network.

The second facet of external quality assurance involves the inclusion of external reviewers in the assessment process. As outlined in the self-evaluation report, the study program underwent scrutiny by a local research institute (at Ivane Javakhishvili Tbilisi State University) and an international reviewer from the Technical University of Brno (Czech Republic). The overall feedback from these reviewers was positive, emphasizing the utility of the program's content and supporting its ongoing development. Noteworthy recommendations pertained to prerequisites, course timelines, potential employment opportunities for alumni, among other aspects. The Head of the Program confirmed that all recommendations were duly considered during the program's design phase.

During interviews, emphasis was placed on viewing employer feedback and the achievements of alumni as integral components of the external quality assessment for the program. This approach underscores a holistic evaluation strategy that incorporates real-world outcomes and perspectives to continually enhance the program's effectiveness.

Evidences/Indicators

- The Self-evaluation reports
- The mechanisms of external Quality Assurance
- The external reviews of the given program (local and international)
- Interview outcomes
- University web-page

Recommendations:

Suggestions for the programme development

Evaluation

Component	Complies with requirements	Substantially complies with requirements	Partially complies with requirements	Does not comply with requirements
5.2. External Quality Evaluation	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5.3 Programme Monitoring and Periodic Review

Programme monitoring and periodic evaluation is conducted with the involvement of academic, scientific, invited, administrative, supporting staff, students, graduates, employers and other stakeholders through systematic data collection, study and analysis. Evaluation results are applied for the programme improvement.

Summary and Analysis of the Education Programme's Compliance with the Requirements of the Component of the Standard

Based on the submitted documentation, the program undergoes meticulous monitoring and periodic evaluation, adhering to the established rules and procedures of the university. This inclusive process engages academic and administrative staff, students, graduates, and employers alike. Through collaborative meetings, the identified needs are deliberated within the program self-evaluation group, subsequently brought before the faculty council. If adjustments are warranted, they undergo an assessment by the academic council for final approval.

The expert team expressed a keen interest in comprehending how all stakeholders are integrated into this multifaceted process. Students and graduates primarily contribute their input through questionnaires distributed via email, covering specific study courses and university services. During the site visit both students and professors confirmed that there is no practice to evaluate PhD supervisors. Notably, the evaluation of supervisors is currently under development, with the institution actively working on a form for future implementation. While the expert team cannot presently assess its effectiveness, the expert panel recommends anonymous evaluations by students to gather valuable insights for ongoing program development.

Employer feedback during interviews acknowledged that the program adequately addresses regional needs. The university maintains an ongoing dialogue with employers from the educational sector, seeking to understand their requirements through personal interviews. While the expert panel affirmed the university's strong collaboration with employers, they propose diversifying the pool of employers involved in the program beyond secondary schools.

The university upholds the practice of collegial evaluation (peer-assessment). Specifically, at the onset of each semester, the quality assurance office of the faculty and the Head of the Program collaborate to compile a list of academic staff whose lectures should be attended. In response to the expert panel's query about comparisons of the program to other international or national programs, it was clarified and documented that the university had compared the PhD program with a few programs from developed countries.

Evidences/Indicators

- Self-evaluation report
- The mechanisms of Internal Quality Assurance

- The methodology of Planning and Implementing the Education Program
- The survey forms created by the quality assurance team
- The outcomes of the interviews
- University web-page

Recommendations:

- The students should be given the opportunity to evaluate their supervisors anonymously. In the case that an anonymous evaluation is infeasible (e.g. if the relation supervisor : students is too small), the faculty should give the possibility to carry out evaluations in an aggregated manner.

Suggestions for the programme development

- The department should identify new employers apart of the educational sector to enhance and diversify the possibilities of employments.

Evaluation

Component	Complies with requirements	Substantially complies with requirements	Partially complies with requirements	Does not comply with requirements
5.3. Programme monitoring and periodic review	<input type="checkbox"/>	X	<input type="checkbox"/>	<input type="checkbox"/>

Compliance with the programme standards

5. Teaching Quality Enhancement Opportunities	Complies with requirements	X
	Substantially complies with requirements	<input type="checkbox"/>
	Partially complies with requirements	<input type="checkbox"/>
	Does not comply with requirements	<input type="checkbox"/>

Attached documentation (if applicable):

Name of the Higher Education Institution:

Name of Higher Education Programme, Level:

Compliance with the Programme Standards

Evaluation Standards	Complies with requirements	Substantially complies with requirements	Partially complies with requirements	Does not comply with requirements
1. Education Programme Objectives, Learning Outcomes and their Compliance with the Programme	<input type="checkbox"/>	X	<input type="checkbox"/>	<input type="checkbox"/>

2. Teaching Methodology and Organisation, Adequacy Evaluation of Programme Mastering	<input type="checkbox"/>	X	<input type="checkbox"/>	<input type="checkbox"/>
3. Student Achievements, Individual Work with them	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Providing Teaching Resources	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Teaching Quality Enhancement Opportunities	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Signatures:

Chair of Accreditation Expert Panel

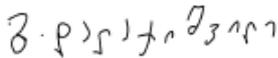


Malte Braack

Accreditation Expert Panel Members



Diana Mtchedlishvili



Giorgi Dalakishvili



Giga Khositashvili



Davit Kakiashvili