ASIIN Seal

Accreditation Report

Bachelor's Degree Programmes
Biology
Chemistry

Master's Degree Programmes
Methodology of Teaching Exact and Natural Sciences (Biology)
Methodology of Teaching Exact and Natural Sciences (Chemistry)

Provided by
Tashkent State Pedagogical University named after Nizami, Uzbekistan

Version: 06 December 2024

Table of Content

A About the Accreditation Process

Name of the degree programme (in original language)	(Official) English translation of the name	Labels applied for [1]	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC)[2]
Biologiya	Bachelor Biology	ASIIN		10
Kimyo	Bachelor Chemistry	ASIIN		09
Aniq va tabiiy fanlarni o‘qitish metodikasi (Biologiya)	Master Methodology of Teaching Exact and Natural Sciences (Biology)	ASIIN		10
Aniq va tabiiy fanlarni o‘qitish metodikasi (Kimyo)	Master Methodology of Teaching Exact and Natural Sciences (Chemistry)	ASIIN		09
Date of the contract: 17.04.2024 **Submission of the final version of the self-assessment report:** 25.06.2024 **Date of the audit:** 13.08. – 15.08.2024				
Expert panel: Ass. Prof. Dr. Farrukh Erkinov, Tashkent Institute of Chemical-Technology Prof. Dr. Carmen Genning, Ostfalia University of Applied Sciences Prof. Dr. Vlada Urlacher, Heinrich-Heine University Duesseldorf Dr. Thomas Steinbrecher, Bildungswerk Nordostchemie, Berlin Khadisha Kadirova, National University of Uzbekistan, student				
Representative of the ASIIN headquarter: Rainer Arnold				

[1] ASIIN Seal for degree programmes;
[2] TC: Technical Committee for the following subject areas: TC 10 – Life Sciences; TC 13 – Physics;

Responsible decision-making committee: ASIIN Accreditation Commission	
Criteria used: European Standards and Guidelines as of 15.05.2015 ASIIN General Criteria as of 23.03.2023 Subject-Specific Criteria of Technical Committee 09 – Chemistry as of 29.03.2019 Subject-Specific Criteria of Technical Committee 10 – Life Sciences as of 28.06.2019	

B Characteristics of the Degree Programmes

a) Name	Final degree (original)	b) Areas of Specialization	c) Corresponding level of the EQF[3]	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Bachelor Biology	O‘qituvchi Biologiya / Bachelor of Education in Biology	-	6	Full time	No	8 semesters	240 ECTS points	Once a year (September), 2021
Master Methodology of Teaching Exact and Natural Sciences (Biology)	O‘qituvchi, tadqiqotchi Biologiya / Master of Education in Biology	-	7	Full time	No	4 semesters	120 ECTS points	Once a year (September), 2021
Bachelor Chemistry	O‘qituvchi Kimyo / Bachelor of Education in Chemistry	-	6	Full time	No	8 semesters	240 ECTS points	Once a year (September), 2021
Master Methodology of Teaching Exact and Natural Sciences (Chemistry)	O‘qituvchi, tadqiqotchi Kimyo / Master of Education in Chemistry	-	7	Full time	No	4 semesters	120 ECTS points s	Once a year (September), 2021

[3] EQF = The European Qualifications Framework for lifelong learning

For the four degree programme under review, Tashkent State Pedagogical University (TSPU) has presented the following profile in the Self-Assessment Report:

“The educational programmes should serve to form and develop professional and personal competencies of graduates. Personal competencies include responsibility, self-development and learning ability, communicative, cognitive and social competencies, teamwork, and independent decision-making skills in non-standard settings.”

The chemistry programmes “focus on training teachers in chemistry for the continuing education system, management staff for educational institutions, and bachelors and masters in laboratory areas.”

The biology programmes “focus on training teachers in biology for the continuing education system, management staff for educational institutions, and bachelors and masters in laboratory areas.”

The Bachelor’s degree programmes are designed for training chemistry and biology teachers for secondary schools, while the Master’s degree programmes have the goal to train chemistry and biology teachers for higher education.

For the Bachelor’s degree programme Biology, TSPU has published the following profile on its webpage:

“A radical reform of the quality of biology education, the introduction of an innovative system of teaching biological sciences in secondary schools, educational institutions with textbooks, modern laboratories and other educational equipment in accordance with international standards is urgent to provide and attract qualified teachers-trainers in biological education, training and establishing integration between the spheres of education, science and production in the use of scientific results listed in the issues.

60110900-Biology education program provides knowledge on biology and its teaching methods, develops skills, develops scientific and practical competencies, prepares competitive biology teachers for secondary schools.”

For the Bachelor’s degree programme Chemistry, TSPU has published the following profile on its webpage:

“One of the urgent requests of today is to radically improve the quality of education in chemistry, introduce a completely new system of teaching these subjects in secondary schools, provide educational institutions with modern laboratories, textbooks and other educational equipment, attract qualified teacher-coaches to these areas, train personnel

and establish close communication and cooperation between the fields of Education and Science.

60110800-in the chemistry education program, knowledge is given in chemistry and the methodology of its teaching, scientific and practical competencies are formed, and teachers of Chemistry are prepared for schools of general and Secondary Education."

For the Master's degree programme Methodology of teaching exact and natural sciences (Biology), TSPU has published the following profile on its webpage:

"To fundamentally reform the quality of education in Biology, introduce an innovative system of teaching special disciplines in Higher Education, provide educational establishments with textbooks, modern laboratories, and other educational equipment in accordance with international standards, attracting qualified teachers and coaches to Biology education, training personnel, and establishing integration between the fields of education, science, and production in the use of scientific results are considered urgent issues.

70110901 – Methodology of Teaching Exact and Natural Sciences (Biology) educational program provides knowledge on the methodology of teaching Biology and special disciplines, develops skills, enhances scientific and practical competencies, and prepares competitive Biology teachers for Higher Education Institutions."

For the Master's degree programme Methodology of teaching exact and natural sciences (Chemistry), TSPU has published the following profile on its webpage:

"One of the pressing challenges of today is to improve the quality of education in the field of chemistry, establish a completely new system for teaching specialized disciplines in higher education, equip educational institutions with modern laboratories, textbooks and other teaching materials, attract qualified teachers-mentors to teach chemistry, train personnel and utilize scientific achievements in the fields of education, science and production through close collaboration and partnership.

70110801- Teaching Exact and Natural Sciences (Chemistry) educational program provides knowledge on the methodology of teaching Chemistry and special disciplines, enhances scientific and practical competencies, and prepares Chemistry teachers for Higher Education Institutions."

C Expert Report for the ASIIN Seal

1. The Degree Programme: Concept, content & implementation

Criterion 1.1 Objectives and learning outcomes of a degree programme (intended qualifications profile)

Evidence:

- Self-Assessment Report
- Study plans of the degree programmes
- Module descriptions
- Homepage TSPU: https://www.tdpu.uz/en
- Homepage Ba Chemistry: https://www.tdpu.uz/en/programs/3
- Homepage Ba Biology: https://www.tdpu.uz/en/programs/6
- Homepage Ma Chemistry Education: https://www.tdpu.uz/en/programs/5
- Homepage Ma Biology Education: https://www.tdpu.uz/en/programs/7
- Discussions during the audit

Preliminary assessment and analysis of the experts:
The experts base their assessment of the learning outcomes on the information provided on the websites and in the Self-Assessment Report of all four degree programmes under review.

For all programmes, Tashkent State Pedagogical University named after Nizami (TSPU) has defined programme learning outcomes. They cover a number of general and specific competences students should acquire in their respective degree programme. Additionally, there are the specific learning outcomes for each module, which are listed in the respective module description.

The experts refer to the Subject-Specific Criteria (SSC) of the Technical Committee Life Sciences as a basis for judging whether the intended learning outcomes of the Bachelor's degree programmes Biology, and the Master's degree programme Methodology of Teaching Exact and Natural Sciences (Biology) as defined by TSPU correspond to the competences as outlined by the SSC. They come to the following conclusions:

Graduates of the Bachelor's degree programme Biology should understand the basic biological processes and be capable of applying the scientific and pedagogical methods of the biological sciences. In addition, graduates should acquire relevant scientific knowledge in the different biological areas such as botany, zoology, biotechnology, microbiology, molecular biology, cell biology, and related natural sciences (chemistry, physics). Furthermore, the students should be able to conduct independent laboratory and fieldwork, plan, implement, assess, and follow up the educational biology learning process and be able to design and perform experiments in biology learning to collect, analyse, and interpret data to solve biological issues. Finally, students should be qualified to conduct life-long learning and work effectively, both individually and in a team, to demonstrate scientific, critical, and innovative attitude in biology learnings, laboratory works, and environmental care.

The Bachelor's degree programme Biology is designed to produce competitive graduates with competences to work as biology educators/teachers, who are able to plan, implement, evaluate, and develop modern biology learning. Most of the graduates of the Bachelor's degree programme Biology will find a suitable occupation in secondary schools or in other educational institutions.

The Master's degree programme Methodology of Teaching Exact and Natural Sciences (Biology) is designed to equip graduates with a deep understanding of biological sciences alongside advanced pedagogical and social skills. The intended learning outcomes focus on content mastery, educational proficiency, and the ability to conduct research in biology education. To this end, graduates should demonstrate an in-depth knowledge of key areas in biology, such as genetics, ecology, evolution, cell biology, physiology, and molecular biology, and be able to plan and conduct advanced biological experiments. In addition, they should understand the field of biology education in theory and practice, to develop and apply biology teaching techniques and methods, and to analyse education management policies and curricula. Furthermore, they should be able to design and carry out complex research activities in the area of biology education, including designing studies, collecting and analysing data, and interpreting results. Consequently, graduates should be able to take over leadership functions in the education sector.

The experts refer to the Subject-Specific Criteria (SSC) of the Technical Committee Chemistry, Pharmacy as a basis for judging whether the intended learning outcomes of the Bachelor's degree programmes Chemistry, and the Master's degree programme Methodology of Teaching Exact and Natural Sciences (Chemistry) as defined by TSPU, correspond with the competences as outlined by the SSC. They come to the following conclusions:

During the course of the Bachelor's degree programme Chemistry, students should acquire a basic knowledge of natural sciences and gain methodological and educational competences in the chemical sciences (analytical chemistry, organic chemistry, inorganic chemistry, physical chemistry, and biochemistry) in order to learn about the structure, dynamics, and energy, as well as the basic principles of separation, analysis, synthesis and characterization of chemicals or complex samples. Furthermore, graduates should also be able to carry out practical work in laboratories and to prepare experiments. Moreover, students should be familiar with the safe handling of laboratory equipment and chemicals and have knowledge about safety and environmental issues. In addition, graduates should acquire the necessary skills to work scientifically as well as in the field of education, adhering to modern methodologies and theoretical concepts in chemistry learning and teaching. This includes designing, implementing, and evaluating chemistry learning media by utilizing information and communication technology. This should qualify graduates to handle chemistry-learning problems and to provide quality chemistry learning that is conducted in classroom or institutions based on scientific data and analysis. Most of the graduates of the Bachelor's degree programme Chemistry will find a suitable occupation in secondary schools or in other educational institutions.

The goal of the Master's degree programme Methodology of Teaching Exact and Natural Sciences (Chemistry) is to impart the necessary professional skills (pedagogic, personal, and social) in chemistry, which are needed to become a successful teacher, education manager, or researcher. To this end, graduates should master advanced theoretical principles in chemistry including organic, inorganic, physical, analytical, and biochemistry, and be able to plan and conduct advanced chemical experiments. In addition, they should understand the field of chemistry education in theory and practice, to develop and apply chemistry teaching techniques and methods, and to analyse education management policies and curricula. Furthermore, they should be able to design and carry out complex research activities in the area of chemistry education, including designing studies, collecting and analysing data, and interpreting results. Consequently, graduates should be able to take over leadership functions in the education sector.

Supplementing the subject-related qualification objectives, students of all degree programmes should have adequate competences in oral and written communication skills, be capable of working autonomously as well as in a team-oriented manner, be able to conduct research activities, and be capable of contributing to the field by publishing research findings or presenting at academic conferences. Furthermore, they should have trained their analytical and logical abilities, be able to apply information and communication technology, and show a social and academic attitude. This includes issues related to academic honesty,

equity, and inclusion in the classroom. Finally, students should acquire communicative and language skills and should develop a strategy for life-long learning.

Several graduates of the Master's programmes continue with their academic education and join a PhD programme, others become teachers at high schools. However, they receive a higher salary and have a higher position than Bachelor graduates usually have. In addition, they can teach at universities or work as consultants in the area of education.

While analysing the learning outcomes of the Master's degree programmes, the experts notice that that there are hardly any differences in the formulation of the learning objectives between the Master's and the respective Bachelor's programmes. Formulations such as "Get acquainted with modern techniques and technologies in science, culture and other fields, evaluate the available opportunities in the research field, verify and test the correctness of a scientific hypothesis" (LO 6) are inappropriate for a Master's degree programme and there is an almost identical formulation in the respective Bachelor's degree programme (LO 16). For this reason, the experts expect TSPU to rewrite the learning outcomes of both Master's degree programmes in order to reflect the higher academic level (EQF 7) in comparison to the Bachelor's programmes. They are many appropriate formulations, which are mostly based on Benjamin Bloom's Taxonomy of Learning Objectives (1956). Especially for Master's programmes competencies such as understanding complex structures by the identification of parts and their relationships (analysis), putting parts together to form a new whole (synthesis), and making based on the value of evidence and material (evaluation) should be conveyed and this needs to be reflected in the learning outcomes.

In summary, the experts are convinced that the intended qualification profiles of all undergraduate programmes under review allow graduates to take up an occupation, which corresponds to their qualification. The degree programmes are designed in such a way that they meet the goals set for them. In addition, the programmes correspond sufficiently with the ASIIN Subject-Specific-Criteria (SSC) of the Technical Committee 10 – Life Sciences (Ba Biology, Ma Methodology of Teaching Exact and Natural Sciences (Biology) and the SSC of the Technical Committee 09 – Chemistry, Pharmacy (Ba Chemistry, Ma Methodology of Teaching Exact and Natural Sciences (Chemistry).

Criterion 1.2 Name of the degree programme

Evidence:

- Self-Assessment Report

Preliminary assessment and analysis of the experts:

During the audit, the experts discuss with TSPU about the appropriate English translation of the names of all degree programmes. They confirm that the original Uzbek names reflect the programmes' objectives and intended learning outcomes appropriately. In addition, the experts appreciate that all four degree can be studied in Russian and Uzbek.

However, the experts point out that the English translation of the Bachelor's programmes does not properly reflect the focus and content of the undergraduate programmes, which is on education in the respective scientific area. For this reason, the experts suggest to name the Bachelor's degree programmes "Biology Education" and "Chemistry Education" or alternatively "Teacher Education Biology" and "Teacher Education Chemistry" in order to make transparent that the focus of the programmes is on educating teachers for secondary schools.

In a similar way, the experts notice that the English names of the Master's programmes are a bit unwieldy and do not reflect the original Uzbek names correctly. It would be more appropriate and useful to call them "Teaching and Research in Chemistry" and "Teaching and Research in Biology".

Criterion 1.3 Curriculum

Evidence:

- Self-Assessment Report
- Study plans of the degree programmes
- Module descriptions
- Discussions during the audit

Preliminary assessment and analysis of the experts:

All four degree programmes under review are offered by the Faculty of Natural Sciences of the Tashkent State Pedagogical University (TSPU).

Education is conducted in Uzbek and Russian. In addition, in each academic year, in the Bachelor's degree programmes, two courses are offered in English, intended for students who are proficient in the English language.

The Bachelor' degree programme Biology is designed to prepare students for careers in education in the field of biology. The programme and spans four years, divided into eight semesters, requiring the completion of 240 ECTS points. The curriculum covers various aspects of biology education, including planning and organizing the educational processes,

ensuring educational effectiveness, and providing assessment and feedback. It also emphasises creating a safe and stimulating learning environment and establishing cooperation with colleagues and parents. The curriculum includes fundamental biology courses (General Biology, Botany, Zoology, Human Anatomy and Physiology, Genetics, Microbiology, Ecology and Environmental Biology) as well as specialized biology courses (Molecular Biology, Evolutionary Biology, Biochemistry, Developmental Biology) The theoretical education is supplemented by practical laboratory and fieldwork in order to provide hands-on training in laboratory techniques such microscopy, dissection, genetic analysis, and experimental design. Students learn to conduct experiments, analyse data, and present their findings. During field trips students gain practical experience in ecological and environmental fieldwork, including biodiversity surveys, habitat assessment, and conservation practices. In addition, students can choose elective courses that allow them to explore specific areas of interest within biology or related fields.

The Bachelor' degree programme Chemistry is designed to prepare students for careers in education in the field of chemistry. The programme spans four years, divided into eight semesters, requiring the completion of 240 ECTS points. The curriculum covers various aspects of chemistry education, including planning and organizing the educational processes, ensuring educational effectiveness, and providing assessment and feedback. It also emphasises creating a safe and stimulating learning environment and establishing cooperation with colleagues and parents. The curriculum includes fundamental chemistry courses (General Chemistry, Organic Chemistry, Inorganic Chemistry, Physical Chemistry, Analytical Chemistry) as well as specialized chemistry courses (Chemical Technology, Chemical Calculation, Biochemistry, Environmental Chemistry). The theoretical education is supplemented by practical laboratory work in order to provide hands-on training in laboratory skills, including synthesis, purification, analysis, and characterization of chemical compounds. In addition students gain hands-on experience with analytical instruments such as spectrometers, chromatographs, and electrochemical analysers. In addition, students can choose elective courses that allow them to explore specific areas of interest within chemistry or related fields.

As the undergraduate programmes focuses on teacher education, pedagogical training has a large share in the curriculum. This includes courses such Educational Psychology, Teaching Methodology in Biology/Chemistry, Curriculum Design, and Internship. This way students are trained in teaching methods specific to biology, including the use of experiments, multimedia resources, and interactive learning. Students also learn to design lesson plans, manage classrooms, and assess student progress. An essential part are the internships (teaching practicum) which the bachelor's students conduct from the third semester. They are following the 4 + 2 model, which means that students spend four days at the university

and two days at secondary schools every week of the semester. During the internships, students first observe the teaching processes and then can also apply their knowledge and teaching methods in real classroom settings. The experts appreciate that this way, students get acquainted with "real life" in schools already from the third semester and can gain sufficient practical experience in teaching.

The general structure of the Bachelor's programmes is depicted in the following table:

Load distribution	**hours**	**credits**
Mandatory subjects	4320	144
Optional subjects	1800	60
Internship	1 080	36
Total	**7 200**	**240**

Table 1: Curriculum Structure Bachelor's programmes, Source: SAR TSPU

One important issue, which the experts discuss in detail with TSPU, is the question why the Bachelor's degree programme does not include a compulsory final project (Bachelor's thesis). Currently "qualification work" as it is called by TSPU either includes a final project or the "Final State Examination", which is both which is offered at the end of the studies. Students have the free choice between these two options and on average 40% to 50% chose to conduct a final project. The experts expect that the Faculty of Natural Sciences introduces a compulsory final project (Bachelor's thesis) for all students. This would also support TSPU's goal of becoming an internationally recognised research university. For this reason, all Bachelor's students should be involved in research activities and conduct a final project (Bachelor's thesis). The final project should allow students to explore a specific area of science or science education in depth, involving experimental work and literature review. It should have a scope of at least six ECTS points, which is the minimum by international standards. Group projects are also possible, as long as each student contributes to the project, is responsible for a distinctive part, and receives an individual grade.

With respect to the offered courses, the experts point out that the share of modern biology content should be increased and a course, for example, in bioinformatics should be offered at least as an elective. The course may be set up in cooperation with another university or research institution in Tashkent.

The Master's degree programme Methodology of Teaching Exact and Natural Sciences (Biology) is designed to train future educators in the effective teaching of biology at various educational levels. The curriculum typically combines in-depth biological content with pedagogical techniques to ensure that graduates are well-prepared to become researchers in the area of biology or to teach biology in schools or other educational institutions. It is a

full-time program that lasts two years, divided into four semesters, and requires the completion of 120 ECTS points.

The Master's degree programme Methodology of Teaching Exact and Natural Sciences (Biology) encompasses the areas pedagogy, biology, and thesis. The pedagogy and biology courses impart professional and practical competences, while the thesis is designed to support the graduates in becoming researchers in biology education or fundamental biology. The curriculum includes only a few compulsory courses such as Methodology of Scientific Research, Methodology of Teaching Special Subjects, Professional Ethics, Development of the Organic World and Anthropology, and Conceptual Foundations of Biology. The rest of the curriculum is dedicated to electives and research work.

The Master's degree programme Methodology of Teaching Exact and Natural Sciences (Chemistry) is designed to train future educators in the effective teaching of chemistry at various educational levels. The programme combines advanced knowledge of chemistry with pedagogical strategies to ensure graduates can effectively teach the subject at various educational levels. It is a full-time program that lasts two years, divided into four semesters, and requires the completion of 120 ECTS points.

The Master's degree programme Methodology of Teaching Exact and Natural Sciences (Chemistry) encompasses the areas pedagogy, chemistry, and thesis. The pedagogy and chemistry courses impart professional and practical competences, while the thesis is designed to support the graduates in becoming researchers in chemistry education or fundamental chemistry. The curriculum includes only a few compulsory courses such as Methodology of Scientific Research, Methodology of Teaching Special Subjects, Professional Ethics, Physico-Chemical Methods of Analysis, and Chemical synthesis. The rest of the curriculum is dedicated to electives and research work.

Both Master's programmes are designed to produce graduates who are not only proficient in scientific knowledge but also capable of applying their skills in practical, educational, or research settings.

The general structure of the Master's programmes is depicted in the following table:

Distribution of load	**hour**	**credit**
Mandatory modules	840	28
Optional modules	960	32
Scientific research	1800	60
TOTAL	3 600	120

Table 2: Curriculum Structure Master's programmes, Source: SAR TSPU

During the four semesters, Master's students must also complete their Master's thesis (18 ECTS plus 12 ECTS for its preparation). The process of preparing for the thesis commences early in the programme, with the Master's thesis topic being assigned to students during the first semester. This allows them to start to develop their individual profile early and supports them to finish their studies on time. The master's thesis covers the research activities as well as reporting on the research project.

In general, the experts confirm that both the Bachelor's degree programmes as well as the Master's degree programmes are well designed and impart a broad range of competencies so that graduates can find suitable jobs as teachers, educators, and researchers. The experts gain the impression that the graduates of all four degree programmes under review are well prepared for entering the labour market and can find adequate jobs in Uzbekistan. They stress that the programmes are well balanced between subject specific and educational content.

After analysing the module descriptions and the study plans, the experts confirm that all four degree programmes under review are divided into modules and that each module is a sum of coherent teaching and learning units. All practical lab work and internships are well integrated into the curriculum and the supervision by the Faculty of Natural Sciences guarantees for their respective quality in terms of relevance, content, and structure.

In summary, the experts confirm that the choice of modules and the structure of the curriculum ensure that the intended learning outcomes of the respective degree programme can be achieved.

International Mobility

TSPU is actively advancing internationalisation by establishing partnerships with numerous universities from several countries such as Belarus, Kazakhstan, Korea, Russia, and Turkey through Memorandums of Understanding or Agreements, facilitating collaborative teaching and research activities. Students' mobility at TSPU is coordinated by the International Office which serves as the main center of the university in coordinating students' exchange programs for both TSPU students going abroad as well as receiving international students from neighbouring countries.

TSPU provides some opportunities for students to conduct internships and exchange programmes abroad. Students who take part in student exchanges through cooperation programmes can gain recognition of the acquired credits after obtaining approval from their department. The credits acquired abroad are transferable to TSPU after approval by the Dean's Office.

The International Office at TSPU is responsible for managing and coordinating the international activities such as coordinating and managing student mobility programmes, developing and maintaining relationships with partner institutions and organisations around the world, recruiting and admitting international students, providing support and assistance to international students during their time at TSPU, such as helping with housing, visa issues, and other practical matters. Some financial support is available for students that want to spend some time abroad. As the experts learn during the audit, within the last academic year, 160 students from TSPU spent some time abroad and received partial or full scholarships.

However, the number of students, from either the biology or the chemistry programmes, who spend some time abroad is still low despite students' high interest. For example, in 2022/23 four chemistry students and two biology students have participated in international mobility programmes.

The students confirm during the discussion with the experts that some opportunities for international academic mobility exist and that the credits acquired abroad are recognised at TSPU. However, they also point out that they wish for more places and scholarships for long- and short-term stays abroad. The number of available places in the mobility programmes is still limited and there are restrictions due to a lack of sufficient financial support. The lack of financial support hinders students from joining the outbound programmes. The experts understand these problems and recommend to increase the efforts to further internationalising TSPU by offering more places in international exchange programmes and more scholarships.

The experts emphasise that it is very useful for students to spend some time abroad already during the later semesters of their Bachelor's studies to improve their English proficiency and to get to know other educational systems. To this end, it would also be very useful to offer more subject-specific courses that are at least partly taught in English. In addition, the experts emphasise that not only the students but also the teachers should improve their English proficiency in order to be able to teach more in English and to expand the possibilities to conduct international research collaborations.

A good starting point for initiating more international co-operations are the personal international contacts of the faculty members and the guest lecturers. It is also possible for students and teachers to apply to international organisations like the German Academic Exchange Council (DAAD) for receiving funds for stays abroad. In addition, TSPU should invite more academics from renowned international universities as guest lecturers.

In summary, the experts appreciate the effort to foster international mobility and support TSPU to further pursuing this path. However, with respect to academic mobility there is still room for improvement.

Criterion 1.4 Admission requirements

Evidence:

- Self-Assessment Report
- Website of the University
- Discussions during the audit
- Law "On Education" No. ZRUz-637
- Decree of the President of the Republic of Uzbekistan "On the organisation of admission to study in state higher educational institutions" No. UP-60

Preliminary assessment and analysis of the experts:
The admission regulations for Master's and Bachelor's students at TSPU are published on the university's website. They are mainly regulated by the Republic of Uzbekistan and determined by the Law "On Education" No. ZRUz-637 and Decree of the President of the Republic of Uzbekistan "On the organisation of admission to study in state higher educational institutions" No. UP-60.

Admission to Bachelor's degree programmes is additionally regulated by the Decision of the Cabinet of Ministers of the Republic of Uzbekistan No. RP-393 "On Adopting the Regulations on the Procedure for Admission to Studies, Transfer, Readmission and Exclusion of Students at Higher Educational Institutions". Applicants for Bachelor's degree programmes must have a certificate of graduation from a secondary school or a diploma of graduation from a college (vocational school). Practical/vocational experience is not required. Applicants must also pass a state examination administered by the State Testing Centre.

When applying for admission to higher education, applicants choose the subject they wish to study. Admission to higher education institutions is based on the results of the state examination. Applicants with the highest scores are recommended for state scholarships within the pre-announced allocation of scholarship places. In the next group, applicants are recommended by the State Commission for enrolment with tuition fees within the available number of study places. A special decree of the President of the Republic of Uzbekistan established special quotas for the admission of girls, disabled persons and children from low-income families to university education under additional allocations based on a state scholarships.

The examination subjects corresponding to the Bachelor's degree programmes of the higher education institutions are approved by the Ministry of Higher Education, Science and Innovation and announced at least six months before the start of the examinations.

For applicants to the Bachelor's degree programmes Chemistry and Biology the state exam will be held in three compulsory subjects - History of Uzbekistan, Native Language, Mathematics, and two specialty subjects, which are determined by the respective department of TSPU.

Admission to the Master's programmes is granted to graduates of a Bachelor's programme. According to KMRUz No. 393, "Decision on the Approval of the Rules for Admission to Higher Education Institutions, Transfer, Readmission and Exclusion of Students", admission to the Master's programme is based on a selection procedure based on the results of entrance examinations in the field of education and in English.

However, since the academic year 2022/2023, admission to the Master's programme at public higher education institutions will be based on the GPA of the Bachelor's degree. The admission strictly follows the order of scores, while no additional examination will be held. The minimum GPA at TSPU for admission to Master's programmes is 2.8. Additionally, all applicants for Master's programmes need to submit a foreign language certificate (usually the foreign language is English) certificate with the minimum level of B2.

The tuition fees are determined by the State Commission on Admission to the Educational Institutions of the Republic of Uzbekistan on the proposal of the Ministry of Higher and Secondary Special Education in consultation with the relevant ministries.

Foreign citizens shall be admitted to educational institutions of the Republic of Uzbekistan on a fee basis in accordance with the procedure established for citizens of the Republic of Uzbekistan, unless otherwise provided by the legislation of the Republic of Uzbekistan or international treaties.

The experts see that both Bachelor's degree programmes receive many applications and the demand is higher than the number of available study places. During the last five years, between 290 (2019/20) and 195 (2021/22) candidates applied for the Chemistry programme and between 554 (2019/20) and 475 (2022/23) for the Biology programme. The capacity of both programmes is between 75 and 100 students per intake. The exact numbers are shown in the following table:

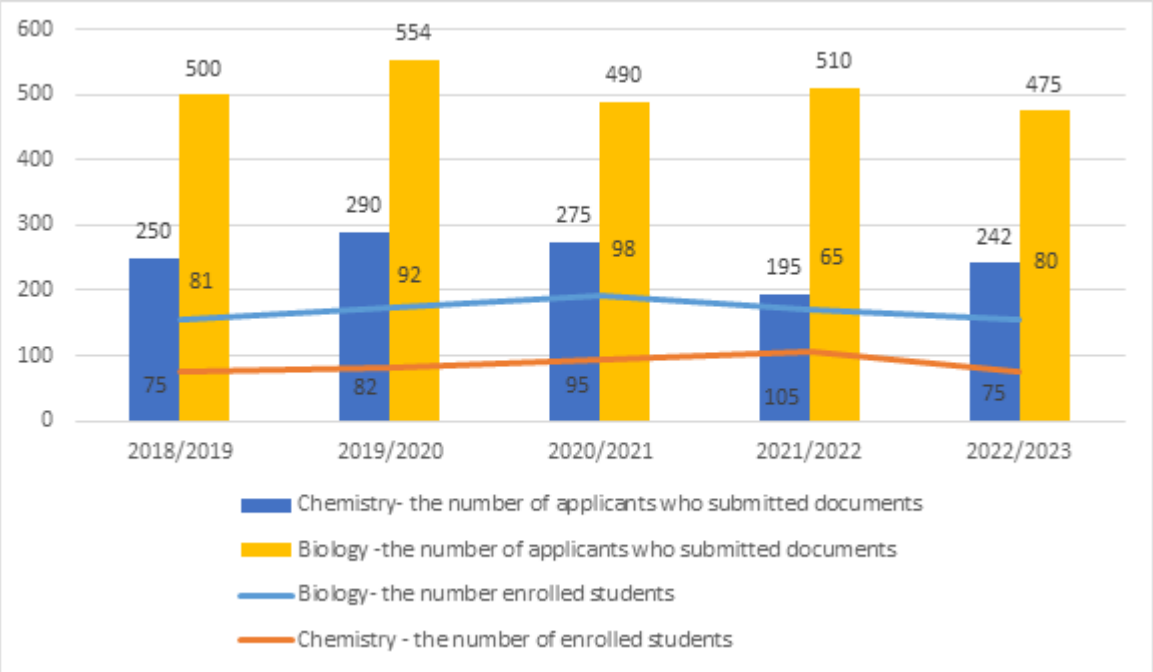

Table 3: Applications and Enrolment, Bachelor's programmes, source: SAR TSPU

By contrast, the number of applications for the Master's degree programmes is much lower. According to TSPU this is due to the high foreign language requirements for Master's programmes, which prevents students from applying. However, this is changing as the English proficiency of students is increasing. This academic year (2024/25) there were much more applications than available study places (10) in both Master's programmes.

All students at TSPU, who do not receive a state scholarship have to pay tuition fees. The tuition fee for foreign citizens for one year of Bachelor's programme is 1200 US dollars and for a Master's programme it is 1800 US dollars. For citizens of the Republic of Uzbekistan, the yearly tuition fees for a Bachelor's degree programme are determined at 18 times the basic calculation amount, and for a Master's degree programme at 22 times the basic calculation amount. In 2023, these amounts were determined as 6412610 UZS (464 €) for Bachelor's degree programme and 7 771 270 UZS (562 €) for Master's degree programme. Women do not have to pay any tuitions fees if they enrol in a Master's degree programme at TSPU.

In summary, the experts find the terms of admission to be binding and transparent.

Criterion 1.5 Work load and credits

Evidence:

- Self-Assessment Report

- Study plans
- Module descriptions
- Discussions during the audit

Preliminary assessment and analysis of the experts:
TSPU applies the European Credits Transfer System (ECTS) for measuring the students' total workload. The experts confirm that ECTS points are awarded for all mandatory parts of the degree programmes, including work practices (internships). The workload includes contact hours and time for independent work.

The Bachelor's degree programmes encompass 240 ECTS and one ECTS credit is equal to 30 hours of students' total workload. The Master's degree programmes encompass 120 ECTS points. Details on the students' total workload in hours are presented in the module descriptions of each degree programme.

The standard period of study 4 years (8 semesters) for the Bachelor's degree programmes and 2 years (4 semesters) for the Master's degree programmes.

In summary, the experts conclude that the total work load of the degree programmes is adequate and that there is no structural pressure on the quality of teaching and the level of education due to the work load. The students express their general satisfaction with the amount and the distribution of their work load. The estimated time budget is realistic, and the students can usually complete the respective degree programme without exceeding the standard study period.

Criterion 1.6 Didactic and Teaching Methodology

Evidence:

- Self-Assessment Report
- Study plans
- Module descriptions
- Discussions during the audit

Preliminary assessment and analysis of the experts:

Various teaching and learning methods such as lectures, class and group discussions, case studies, demonstrations, assignments, simulations, experiments, field studies, teaching practise, and problem-based learning are applied in both undergraduate programmes un-

der review. Structured activities include homework, assignments (reading or problem exercises) and practical activities. Group project assignments are given in some courses to develop students' skills in teamwork, communication, and leadership. The assignments and exercises should help students to develop their abilities with respect to critical thinking, written/oral communication, data acquisition, problem solving, and presentations.

During the classes, active and interactive teaching methods (e.g. lectures, discussions, reports, presentations, and group work) are applied. TSPU wants to encourage the students to gain knowledge from different scientific areas and wants them to be able to solve specific problems through an interdisciplinary approach. This should ultimately contribute to the transition from a teacher centered to a student oriented teaching method. In order to involve all students in the learning process and to develop their thinking and analytical skills, the teaching staff uses several methods of training and gives assignments on different levels of complexity.

The most common method of learning in the Bachelor's degree programmes is class session, with several courses having integrated laboratory work. Lecturers generally prepare presentations to support the teaching process. At Bachelor level, the students first gain theoretical knowledge and have more practical classes in their further studies. At Master level, students conduct more individual scientific research. In general, the following teaching methods are used in the degree programmes: lectures; seminars, laboratory classes, internships, small group activities, and final thesis.

With individual or group assignments, such as discussions, presentations, or written tasks, students are expected to improve their academic as well as their soft skills. Laboratory work covers laboratory preparation, pre- or post-tests, laboratory exercises, reports, discussions, and presentations. In addition, practical activities should enable students to be acquainted with academic research methods.

In the Master's degree programmes, more student centred learning models are applied in order to improve students' analytical and scientific skills. To this end, in most courses didactic methods such as cooperative learning, case studies, and project based learning are applied. In general, the focus in the Master's degree programmes is on self-organised learning and research oriented teaching and learning methods.

In summary, the expert group considers the teaching methods and instruments to be suitable to support the students in achieving the intended learning outcomes. In addition, they confirm that the study concepts of all programmes under review comprise a variety of teaching and learning forms as well as practical parts that are adapted to the respective subject culture and study format. It actively involves students in the design of teaching and learning processes (student-centred teaching and learning).

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion 1:

The experts appreciate that TSPU will revise and specify the goals and learning outcomes of the Master's degree programmes. By order of the Rector, a working group was created with national and foreign professors, representatives of the education sector, and Master's students. The experts expect to receive the verification of the updated learning outcomes of both Master's programmes in the further course of the procedure.

The experts strongly support to change the English names of all four degree programmes to "Teacher of Chemistry" and "Teacher of Biology" for the Bachelor's programmes and "Teacher-researcher in Chemistry" and "Teacher-researcher in Biology" for the Master's degree programmes. This way, it becomes transparent what the content and goal of the respective degree programme is.

The experts acknowledge that TSPU will introduce a compulsory final project (Bachelor's thesis) to the curriculum of the Bachelor's programmes in 2024/25. The experts expect to receive the verification of the updated curriculum of both Bachelor' programmes in the further course of the procedure.

The experts confirm that the courses "Bioinformatics," "Fundamentals of Genomics," "Fundamentals of Genetics", "Biophysics", and "Biotechnology" have been introduced into the curriculum of the Bachelor's degree programme Biology as electives.

The experts are glad to hear that TSPU will increase its efforts of further internationalising the degree programme and to better promote students' and teachers' academic mobility.

The experts consider criterion 1 to be mostly fulfilled.

2. Exams: System, concept and organisation

Evidence:

- Self-Assessment Report
- Module descriptions
- Regulation on the system of control and evaluation of students' knowledge in higher education institutions
- Discussions during the audit

Preliminary assessment and analysis of the experts:

In the Uzbek system, students' assessment is based on continuous evaluations as well as on midterm and final exams. Students' continuous and midterm exams are evaluated by the teachers who conduct the lectures, seminars, practical or laboratory sessions. Students who have collected at least 60% (30 grades) of the maximum score (50 grades) allocated for the continuous and midterm exams are allowed to take part at the final exam, which can be oral, written, or computer based. The final exam is evaluated on a 50-grade scale, and students need to score at least 60% (30 grades) in order to pass. The students' academic performance is determined by the total grades earned from all types of assessments (continuous, midterm, and final) and is recorded in the students' academic record in the electronic system (HEMIS). The HEMIS information system provides e-learning services to administrative staff, professors, and students for the main areas of activity of higher education institutions. The information system acts as a bridge between the university and the Ministry of Higher Education, Science and Innovation. It reduces the number of different information from the university, rejects their paper form, and digitises the management system. It allows TSPU to manage study plans, lessons, and schedules and includes information about students' learning success.

Mid-term exams are carried out during the semester in order to assess the knowledge and practical skills of the student after the completion of the relevant section of the degree program. The form and duration of the mid-term is determined by the relevant department based on the nature of the subject and the hours allocated to the subject. There is no mid-term exam for courses with less than two academic hours per week. If a student does not enter the mid-term and (or) final exam for valid reasons (illness etc.), the respective exam may be reassigned to that student on the basis of an order from the Dean of the Faculty.

The final examination at the end of the semester is carried out by a teacher, who has not conducted classes in the respective course, meaning that a teacher who has taught the

relevant discipline is forbidden from participating in the final examination. Specialists and experienced teachers from other higher educational institutions or stakeholders (preschool institutions, general secondary education organizations) may be involved in the final assessment and evaluation.

A student who, for non-valid reasons, misses 25% or more of the scheduled classroom hours for a discipline, will be suspended from that subject and is not be eligible for the final exam. Students who are not allowed to take the final exam, as well as receiving an unsatisfactory grade on the final exam, have acquired as so called “academic debt”. Academically indebted students have the right to re-take courses in the following semesters at their own expense.

A short summer semester may be organised for the subjects not mastered in the previous semesters during the summer vacation of 1 - 3 year undergraduate and first year graduate students. For students who fail to accumulate sufficient credits, it is possible to extend the total duration of Bachelor’s studies up to 8 years and of Master’s studies up to 4 years. On average, around 10% of the Bachelor’s students do not progress from year to year due to various reasons such as family conditions, academic debts, health issues etc. In the Master’s programmes, almost all students fulfil their academic obligations as planned.

The grades are awarded on a scale from two to five: “2” (unsatisfactory”, "3" (satisfactory), "4" (good) or "5" (excellent). Students who are dissatisfied with their grade have the right to appeal to the Appeals Commission, which consists of the chair of the committee and at least four members from among the professors of the relevant discipline who did not participate in the evaluation of the student. The appeal needs to be filed within 24 hours from the time the exam result is announced and will be considered by the Appeals Commission within two days. Midterm examinations are obligatory and carried out in accordance with the academic calendar. Form and content of midterm examinations are determined by the teacher of each module. The grading scale is depicted in the following table:

American system (A- F) / (ball)	**Evaluation system (grade)**	**Evaluation**
"A+" / (91-100)	"5"	Excellent

"A" / (86-90)		
"B+" / (81-85)	"4"	Good
"B" / (71-80)		
"C+" / (66-70)	"3"	Satisfying
"C" / (60-65)		
«F» / (0-59)	"2"	Not satisfying

Table 5: Grading scale, Source: SAR TSPU

In the Master's programmes, the completion of a Master's thesis is a mandatory requirement (18 ECTS plus 12 ECTS for its preparation). The process of preparing for the thesis commences early in the programme, with the Master's thesis topic being assigned to students during the first semester. This allows them to start to develop their individual profile early and supports them to finish their studies on time.

The experts inquire about the Master’s theses and would like to know, whether these are done at the university or externally at companies or research institutions; they also ask about the involved quality management. They learn that several Master’s students, do their thesis at external research institutions, for example, at the Academy of Science, which is the main scientific organization of the Republic of Uzbekistan. It coordinates research in all areas of science and technology.The quality of external research activities is checked by the supervisor, and one supervisor of the final thesis must be a member of the teaching staff.

Master's students can chose do conduct their research activities either in the area of fundamental sciences or in the area of science education.

As part of the on-site visit, the experts also inspect exemplary examinations as well as Master's theses from all courses of study. Overall, they are satisfied with the quality of the examinations and theses.

In summary, the experts confirm that the different forms of examination used are competence-oriented and are suitable overall for verifying the achievement of the intended learning outcomes as specified in the respective module descriptions. The form of examination is determined individually for each course and published in the respective module description. The forms of examination are based on the main content of the modules and the level is appropriate for the respective degree programme.

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion 2:

TSPU does not comment on this criterion in its statement.

The experts consider criterion 2 to be fulfilled.

3. Resources

Criterion 3.1 Staff and Development

Evidence:

- Self-Assessment Report
- Staff Handbook
- Study plans
- Module descriptions
- Discussions during the audit

Preliminary assessment and analysis of the experts:

At TSPU, the staff members have different academic positions. There are professors, associate professors, assistant professors, senior teachers, and teachers. The academic position of each staff member is based on research activities, publications, academic education, and supervision of students. For example, a full or an associate professor needs to hold a PhD

degree. In addition, the responsibilities and tasks of a staff member with respect to teaching, research, and supervision depend on the academic position.

The teaching staff involved in both Chemistry programmes includes currently 4 full professors, 31 associate professors, 2 senior teachers, and 11 teachers. 45 of them have a doctoral degree (78 %), the rest have a Master's degree.

According to the documents provided by TSPU, the current academic staff of the three Biology Departments (Botany and Ecology, Zoology and Anatomy, Biology and its Teaching Methodology) consists of 13 full professor, 31 associate professors, 3 senior teachers, and 13 teachers. 42 of them have a doctoral degree (70 %), the rest have a Master's degree.

Only staff members with a doctoral degree can teach in the Master's programmes. Assistant professor, senior teachers and teachers supervise seminars, practical sessions, and laboratory work but do not give any lectures. In addition, there are non-academic staff members consisting of librarians, technicians and administrative staff.

The experts discuss with TSPU's management how new staff members are recruited. They learn that every year the faculties and departments announce their vacancies to TSPU's management, which subsequently announces the vacancies on the university's homepage. However, the experts note that a large share of the teachers are graduates from TSPU. The representatives of the Rector' Office explain that TSPU is open to hire graduates from all universities, nevertheless, many members of the teaching staff are graduates from TSPU. This is also due to the fact that TSPU is the most prestigious and oldest pedagogical universities in Uzbekistan and produces highly qualified graduates. The experts understand this reasoning but point out that TSPU should make sure that academic staff members also acquire scientific experience at other universities either in Uzbekistan or abroad.

During the audit, the experts inquire how high the teaching load is and if enough opportunities are offered to the academic staff members to conduct research activities. They learn that academic staff members at TSPU previously had a teaching load of 700 contact hours per academic year, which was just recently reduced to 400 contact hours per year, or 10 hours per week. This reduction resulted in a significant increase of the research output (finished PhD theses, scientific papers etc.) and is highly appreciated by the experts. The members of the teaching staff confirm during the audit that their teaching load is now appropriate and leaves them enough time for conducting research activities.

In summary, the experts confirm that the composition, scientific orientation and qualification of the teaching staff are suitable for successfully implementing and sustaining both degree programmes.

Staff Development

TSPU encourages training of its academic staff for improving the educational abilities and teaching skills. For example, the university has a training centre where teachers can attend courses to improve their pedagogical skills as well as other skills such as foreign languages. TSPU also provides financial support to teachers who wish to pursue doctoral studies or other academic development and research activities.

During the audit, the experts inquire if the teaching staff has the opportunity to spend time abroad and to participate in international projects. They learn that there is a budget funded by the university for academic staff who want to go abroad e.g. for taking part at conferences or workshops. In general, the teachers are satisfied with the existing opportunities and the available financial support.

In summary, the experts confirm that TSPU offers sufficient support mechanisms and opportunities for members of the teaching staff who wish for further developing their professional and teaching skills.

Student Support

TSPU provides a support system for all students; it includes consultations with advisors about the individual educational plan and the study progress. Each academic advisor is a member of the academic staff and is responsible for several students from her/his classes. He/she is the student's first port of call for advice or support on academic or personal matters. The role of the academic advisor is to help the students with the process of orientation during the first semesters, the introduction to academic life and the university's community, and to respond promptly to any questions. They also offer general academic advice, make suggestions regarding relevant careers and skills development and help if there are problems with other teachers.

In addition, the students can contact their advisor any time for assistance in academic questions. The members of the teaching staff are available on any issues regarding the degree programmes and offer advice on particular modules, as well as on required papers or reports.

The expert group notes approvingly the dedication and motivation of the teaching staff; there are enough resources available to provide individual assistance, advice, and support for all students. The support system helps the students to achieve the intended learning outcomes and to complete their studies successfully and without delay.

Criterion 3.2 Funds and equipment

Evidence:

- Self-Assessment Report
- Visitation of the facilities
- Discussions during the audit

Preliminary assessment and analysis of the experts:

Approximately, 80% of the university's budget are provided by the Uzbek government and around 20% are derived from tuition fees and other sources such as cooperations with companies or other institutions. Additional funds for research activities can be provided by the Uzbek government, but the university has to apply for them. Moreover, the Islamic Development Bank provides funding e.g. for purchasing new laboratory equipment.

The academic staff members emphasise that from their point of view, both the Bachelor's as well as the Master's programmes under review receive sufficient funding for teaching and learning activities. The students confirm this positive impression and state their satisfaction with the available resources.

During the audit, the experts visit the laboratories at the Faculty of Natural Sciences. They notice that there are no bottlenecks due to missing equipment or a lacking infrastructure. The technical equipment for adequately teaching the students is available. Moreover, the experts learn during the audit that students can use and operate the instruments in the laboratories by themselves after being trained and instructed by lab supervisors. Only some more sophisticated devices are not operated by the students during the laboratory sessions, but they are allowed to use them for conducting research activities. There are enough instruments and kits available so that the experiments are conducted in groups of two students.

The most critical point from the experts' point of view is the fact that none of the visited laboratories in the Faculty of Natural Sciences follows international safety standards. The experts point out that the basic personal protective equipment that needs to be available to all persons working in laboratories includes safety goggles, laboratory coats, and hand gloves. It must be worn all the time when working in the laboratory and students should be trained in the right use of the equipment. Moreover, there should be emergency exits signs, eye-washers, emergency showers, and posters with the safety regulations. The fire extinguishers need to be fixed to a wall and a chemical waste management system needs to be adopted. Additionally, it would important to guarantee a constant temperature in the laboratories. Otherwise, some instruments may not work reliably.

The experts notice that TSPU has currently no micro-teaching laboratory, only a room where students can be recorded while giving mock-lectures to pupils is available. As micro-

teaching is an important teacher training and faculty development technique whereby the professors and fellow students observe and review a teaching session, such a laboratory should be available at TSPU. This way, students can get constructive feedback from professors or fellow students about what has worked and what improvements can be made to their teaching technique. The representatives of TSPU explain that the university will move to a new campus within the next few years and that on the new campus there will be a laboratory for micro-teaching. The experts support these plans but think that it would be useful to establish such a laboratory as soon as possible already in the current facilities.

During the audit, the students express their satisfaction with the available scientific literature and the library. Remote access via VPN is possible and TSPU offers access to several scientific digital databases such as Scopus and SpringerLink, so that teachers and students can access current scientific publications and e-books.

The experts judge the available funds, the technical equipment, the infrastructure, and the facilities (laboratories, library, seminar rooms etc.) to comply with the requirements for sustaining the degree programmes.

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion 3:

The experts appreciate that TSPU has already undertaken several measures for improving the safety standards in the laboratories. For example, personal protective equipment (laboratory gowns, safety glasses and gloves) have been purchased for each laboratory. Fire extinguishers were installed in specially designated places, as well as special bins (for solids, liquid, acid, salts, etc.) for the disposal of spent reagents. Emergency exit signs and safety posters were installed in a visible place in each laboratory room. The experts expect to receive verification of the other planned measures (maintaining a constant temperature in the laboratories, installation of emergency showers, and launching micro-laboratory rooms for students and faculty) in the further course of the procedure.

The experts consider criterion 3 to be mostly fulfilled.

4. Transparency and documentation

Criterion 4.1 Module descriptions

Evidence:

- Self-Assessment Report
- Module descriptions
- Homepage TSPU: https://www.tdpu.uz/en
- Homepage Ba Chemistry: https://www.tdpu.uz/en/programs/3
- Homepage Ba Biology: https://www.tdpu.uz/en/programs/6
- Homepage Ma Chemistry Education: https://www.tdpu.uz/en/programs/5
- Homepage Ma Biology Education: https://www.tdpu.uz/en/programs/7
- Discussions during the audit

Preliminary assessment and analysis of the experts:

After studying the module descriptions, experts observe that the module descriptions do not include all necessary information. They point out that the module descriptions need to inform correctly about the students' total workload (in hours per semester) the form of exams, the awarded ECTS points and the teaching language. For example, in the Master's programmes several courses are offered in English but this information is not mentioned in the module descriptions. Moreover the module descriptions need to mention, what exams (oral, written computer-based) are conducted and what kind of mid-term and final exam is conducted. In general, the experts point out that the module handbooks need to be complete and that the information with respect to the awarded ECTS points in the module descriptions needs to be the same as in the study plans. Additionally, the module descriptions should be linked with the respective study plan on the programmes' homepages.

Criterion 4.2 Diploma and Diploma Supplement

Evidence:

- Self-Assessment Report
- Sample Transcript of Records for each degree programme
- Sample Degree Certificate for each degree programme
- Sample Diploma Supplement for each degree programme

Preliminary assessment and analysis of the experts:
The experts confirm that the students of all degree programmes under review are awarded a Degree Certificate, a Transcript of Records, and a Diploma Supplement after graduation. The Diploma Supplement contains all required information about the degree programme. The Transcript of Records lists all the courses that the graduate has completed, the achieved credits, grades, and cumulative GPA.

Criterion 4.3 Relevant rules

Evidence:

- Self-Assessment Report
- All relevant regulations as published on the university's webpage

Preliminary assessment and analysis of the experts:
The experts confirm that the rights and duties of both TSPU and the students are clearly defined and binding. All rules and regulations are published on the university's website and the students receive the course material at the beginning of each semester.

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion 4:

The experts are glad to hear that the module descriptions of all four degree programmes will be revised. They expect to receive the updated module handbooks in the further course of the procedure.

The experts consider criterion 4 to be mostly fulfilled.

5. Quality management: quality assessment and development

Evidence:

- Self-Assessment Report
- TSPU University Charter
- Sample surveys for students, teachers, and partners
- Discussions during the audit

Preliminary assessment and analysis of the experts:

The highest academic board at TSPU is the University Council, which is responsible for implementing and supervising all academic processes at TSPU. The Rector of TSPU is the Chairman of the University Council. Vice-rectors, deans, senior university professors and leaders of public organisations are its members.

The Dean is the Head of the Faculty of Natural Sciences with the authority and responsibility for administering all teaching and learning activities within the faculty. Finally, there are the Heads of the Departments, who are responsible for implementing all educational activities within the respective degree programmes.

The organisation structure of TSPU is depicted in the following diagram:

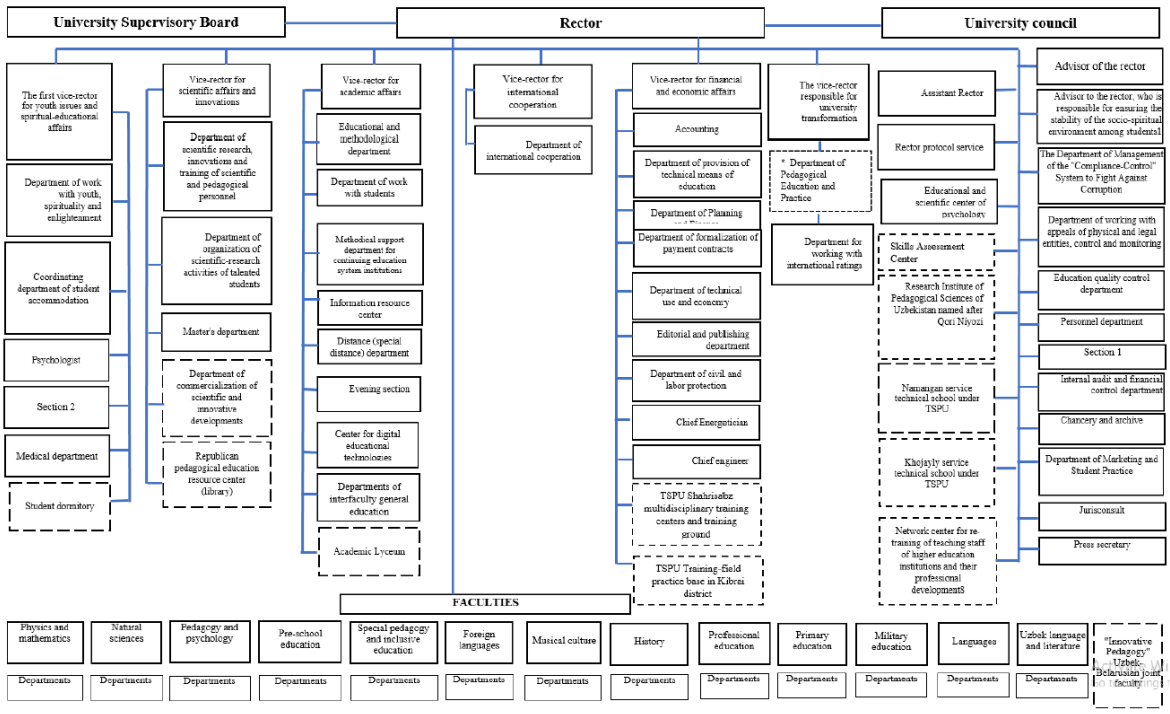

Diagram 1: Structure of TSPU, Source: Homepage TSPU

Monitoring of university education quality is carried out by the Department of Education Quality Control, which is an administrative unit of TSPU. The department's regulations are approved by the University Council. The main goal of the department is to evaluate the compliance of students' knowledge with the expected educational standards, control the quality of the educational processes, organise internal quality assessments, identify factors that negatively affect the quality of education, and take measures to eliminate and prevent them.

In order to evaluate the quality of the educational processes at TSPU, the Department of Education Quality Control conducts surveys with students, teachers, and employers.

Satisfaction surveys to gather feedback from students are conducted online at the end of each semester. Students assess various aspects such as quality of course work, soft skills, planning, student involvement, teaching and learning methods, and course descriptions in each enrolled course. Giving feedback on the classes is compulsory for the students. This way, student can offer insights on the course content, lecturers, and their overall teaching and learning experience. This platform allows students to contribute feedback on the course's quality and its alignment with their learning requirements.

The results of the survey are discussed and analysed in the meetings of the Faculty's Scientific Council. Any shortcomings identified in the courses are evaluated and possibly resolved during these meetings. The Department of Education Quality Control prepares an analytical report on the basis of the data collected and submits the final conclusions to the Rector of the University and the Vice-Rector for Academic Affairs. In accordance with the Rector's instructions, the results of the survey are made available to the University Council, but individual names will not be disclosed and the results will be presented in summary form. The results of the survey will also be communicated to students. In addition to formal evaluations, students are encouraged to provide verbal feedback directly to their teachers, which is then discussed in class. Additionally, students can also give direct feedback (anonymously) to the Vice Rector for Student Affairs.

When asked about their satisfaction with evaluations and general quality management at TSPU, students confirm that evaluations take place regularly and that the results are communicated to them. They state that their critical points are recognised by the university and that changes are made to the programmes on this basis.

Similar to the student evaluation process, annual surveys are conducted with partners from high schools and other educational institutions. TSPU records their recommendations regarding the theoretical and practical training as well as about the internships. In addition, the employers explain during the audit interviews that all of them are in contact with TSPU and are regularly invited to meeting to give their feedback on the programmes and the

needs of the job market. Moreover, TSPU has an Advisory Board on university level with representatives from the stakeholders (government, students, employers, alumni) as members. In addition to the Advisory board TSPU has established an Employer Council, which meets twice a year. The employers indicate that their suggestions are usually incorporated into the programmes and that they are satisfied with the way they are involved in further developing the programmes.

With respect to job opportunities and professional careers, TSPU is well informed about their graduates. As all employers in Uzbekistan also use HEMIS (Higher Education Management System) to register their employees, the government knows about the data from the job market and where graduates find jobs. This digital information system includes "Administrative management", "Educational process", "Scientific activity" and "Financial management" modules. This data is also available to the universities.

As the experts learn during the audit, due to population growth, there is an increasing amount of pupils and consequently a rising demand for teachers. Uzbekistan needs about 4000 new teachers per year, about 60% of all teachers in Uzbekistan are graduates of TSPU; especially Russian speaking teachers are in high demand. As a consequence, the graduates have very good job opportunities as high school teachers and several Master's graduates work as researchers or are professors at different Uzbek universities.

The experts gain the impression that the quality assurance system of TSPU is well designed and ensures high quality and continuous further development of the study programmes. The feedback of all stakeholders is taken into account by the programme coordinators and changes are made instantly. The experts appreciate that there is good and fruitful cooperation between the stakeholders (ministry, employers, alumni) and the university and confirm that TSPU regularly monitors and reviews the degree programmes to ensure that they achieve the objectives set for them and responds to the needs of the students.

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion 5:

TSPU does not comment on this criterion in its statement.

The experts consider criterion 5 to be fulfilled.

D Additional Documents

Before preparing their final assessment, the panel asks that the following missing or unclear information be provided together with the comment of the Higher Education Institution on the previous chapters of this report:

- none

E Comment of the Higher Education Institution (08.10.2024)

TSPU provides the following statement:

Having reviewed the ASIIN Expert Report, the TSPU administration asks to take into consideration the following information:

1.1. We partially agree with the conclusions of experts. We note that the degree programs at Bachelor and Master's degrees were developed in full compliance with the requirements of state educational standards of the Republic of Uzbekistan and approved by external experts, including the Chemical Association of the Republic of Uzbekistan. Positive reviews were taken from external experts on Chemistry and Biology programs both on bachelor and Master's degree (External reviews from researchers are shown in Appendixes from 1 to 4) (At the same time, the university supports the recommendation of ASIIN experts to revise and specify the goals and learning outcomes of Master's degree programs. By order of the rector, a working group was created from among national and foreign professors, representatives of the education sector and master's students. Currently, the content of degree programs is already being analyzed with the involvement of local and foreign experts (*The list of local and foreign experts is given in Appendix 5).*

University specialists, together with representatives of educational organizations of Uzbekistan, process the content, goals, and learning outcomes of training master's programmes based on the requirements of the **National Qualifications Framework** (https://lex.uz/docs/4814154), as well as the European Qualifications Framework (EQF 7).

These redesigned degree programmes will be implemented from the 2025-2026 academic year.

1.2. Taking into consideration the recommendations of experts, we consider it correct to use the English translation of the bachelor degree programs **"Teacher of Chemistry"** and **"Teacher of Biology**," and the master's degree programs name as - **"Teacher-researcher in Chemistry"** and **"Teacher-researcher in Biology."**

1.3. Supporting the recommendations of ASIIN experts and demonstrating commitment to improving the quality of education, the Academic Council of the university decided:

1. to introduce in 2024/2025 into the bachelor's degree programs "Chemistry" and "Biology" the mandatory module "Final qualification work," which provides for the implementation of:

Individual final qualification work/Group Project work.

2. to approve the criteria for evaluating the Group Project Work for evaluating each graduate separately *(The decision of the Academic Council is given in Appendix 6 and curricula is shown in Appendix 7).*

In the corresponding curricula for the academic year 2024-2025, 6 credits have been allocated for students to complete their final qualification work.

The final attestation of master's degree programs includes the mandatory writing and defence of a master's thesis.

The university supports the opinion of experts that «With respect to the offered courses, the experts point out that the share of modern biology content should be increased and a course, for example, in bioinformatics should be offered at least as an elective».

Taking into account the recommendation of experts and discussions during the audit, the following disciplines: "Bioinformatics," "Fundamentals of Genomics," "Fundamentals of Selection," "Biophysics", "Biotechnology" (5 ECTS) have already been introduced into the curricula as elective courses and elective disciplines *(Curricula is given in Appendix 7).*

The following disciplines have been introduced in the Biology bachelor's degree program:

In the mandatory subjects' block:

Fundamentals of Genetics and Genomics, 10 credits in total, semesters 3-4;

Biotechnology, 6th semester, 6 credits

Biophysics and bioinformatics, total 8 credits, 5th and 6th semesters;

In the elective subjects' block:

Fundamentals Selections, 4 credits, 8th semester.

International mobility

The university continues to work on international mobility on an ongoing basis.

It is worth noting that from 2020 to 2022, during a pandemic, it was very difficult to organize work on international mobility.

However, taking into account the reasonability of expert opinions on international mobility, we have taken the following measures:

• To strengthen international mobility, memoranda and agreements are concluded with foreign universities and the scope of links and collaboration is expanding.

• To cover the costs (travel, accommodation, tuition) for sending students to foreign universities on international mobility, the university will provide grants and scholarships.

In order to strengthen international mobility of students and teachers, informational and financial support will be improved and additional training courses will be organized aimed at improving proficiency in a foreign language.

Measures are being taken to teach specialized subjects in a foreign language.

In particular, groups have been formed that can take courses in a foreign language and subject teachers who have a certificate of English at least at the B2 level, who conduct specialized subjects (in the speciality) in English (*The order of the university rector on the organization of teaching specialized subjects in a foreign language and certificates of foreign language competence of professors and teachers is given in Appendix 8).*

In addition, according to the decision of the Government of the Republic of Uzbekistan, since the 2022/2023 academic year, applicants are required to have a certificate of knowledge of a foreign language when applying for master's and doctoral degree programs (*Decree of the President of the Republic of Uzbekistan is given in Appendix 9).*

In order to improve the international status of the university over the past 4 years, memoranda have been signed with prestigious foreign universities such as Korea National University of Education, Dankuk university, Ankara University, Arizona University *(Information about foreign higher education institutions with which the university has signed Memorandum (agreement) of cooperation) for the last 5 years is given in Appendix_10)*

The invitation of well-known scientists working in foreign universities takes place for lectures, seminars and master classes.

Over the past 3 years, lecturers from more than 10 foreign universities have been involved in the educational process within the framework of the four degree programmes, and this activity is being intensified *(List of teachers of foreign universities participating in the educational process is given in Appendix_ 11).*

3.1. TSPU named after Nizami is the main higher educational institution for the training of teaching staff in the Republic. The university has been training highly qualified teaching staff for higher educational institutions for many years. Based on this, talented graduates are attracted to work at the university.

About 30% of the faculty of departments teaching at TSPU are graduates of other higher educational institutions and research institutes.

Currently, the process of hiring new teaching staff is carried out by the Public Council of the university in 3 stages:

1) University vacancies are announced through the Republican press-media.

2) The composition formed by the Public Council considers the applications of candidates and conducts interviews with them.

3) Applicants organize open lessons in their specialty. Experts give conclusions on the classes held.

The Public Council gives an opinion on the employment of applicants who have successfully passed all stages

In future activity, taking into account the proposals and recommendations of ASIIN experts, priority will be given to attracting graduates from other higher educational institutions and research institutes.

3.2. We highly appreciate and express our gratitude for the opinions and comments expressed by experts in ensuring conditions for the safety of students and lecturers.

Our attitude regarding the deficiencies in allocated funds and equipment criteria identified by experts is as follows:

- measures have been defined to ensure safety in the laboratory room and further improve working conditions.

- special protective equipment has been purchased for each laboratory room. For example, laboratory gowns, safety glasses and gloves were purchased in sufficient quantities (*photos of supplies are given in Appendix 12);*

- fire extinguishers available in the laboratory room were installed in specially designated places, as well as special bins (for solids, liquid, acid, salts, etc.) were installed for the disposal of spent reagents remaining from experiments *(photographs are given in Appendix 12);*

- emergency exit diagrams and safety posters are installed in a visible place in each laboratory room *(photos are given in Appendix 12);*

- Currently, a project has been developed to maintain the temperature in educational and laboratory premises at a certain level, installation of a special shower for washing eyes and hands in emergency cases, and launching micro-laboratory rooms for students and faculty. By February 2025, all the work provided for by the project will be completed and commissioned.

Until 2027, in the new university CAMPUS under construction, it was decided to create a special micro-laboratory according to the speciality of each faculty for students to undergo trial classes.

4.1. Measures taken on deficiencies identified by the experts on modules description criteria :

Currently, four degree programs are being completely revised. At the same time, the degree programs specifies the conditions for current control, intermediate control and final control, student information and assessment criteria, as well as the languages of the training modules. Also, within the specified time frame, the modules will be presented in full volume and in accordance with the requirements

F Summary: Expert recommendations (21.10.2024)

Taking into account the additional information and the comments given by TSPU, the experts summarize their analysis and **final assessment** for the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Biology	With requirements for one year	-	30.09.2030
Ba Chemistry	With requirements for one year	-	30.09.2030
Master Methodology of teaching exact and natural sciences (Biology)	With requirements for one year	-	30.09.2030
Master Methodology of teaching exact and natural sciences (Chemistry)	With requirements for one year	-	30.09.2030

Requirements

For all degree programmes

A 1. (ASIIN 3.2) All laboratories need to follow international standards with respect to safety measures.

A 2. (ASIIN 4.1) Rewrite the module descriptions to include information about the students' total workload, exam forms, and teaching languages.

For the Bachelor's programmes

A 3. (ASIIN 1.3, 2) Introduce a compulsory final project (Bachelor's thesis) to the curriculum of the Bachelor's programmes. The final project should introduce students to research activities.

For the Masters' programmes

A 4. (ASIIN 1.1) The learning outcomes of the Master's programmes need to reflect the higher academic level (EQF 7) and need to be different from the learning outcomes of the Bachelor's programmes.

Recommendations

For all degree programmes

E 1. (ASIIN 1.3) It is recommended to further promote the students' academic mobility and to establish international cooperations especially in the area of teacher education.

E 2. (ASIIN 3.2) It is recommended to invite more international guest lecturers.

E 3. (ASIIN 3.2) It is recommended to improve students' and teachers' English proficiency.

For the Bachelor's programmes

E 4. (ASIIN 1.2) It is recommended to change the English translation of the names of the degree programmes to Bachelor Biology Education and Bachelor Chemistry Education.

For the Master's programmes

E 5. (ASIIN 1.2) It is recommended to change the English translation of the names of the degree programmes to Master Teaching and Research in Biology and Teaching and Research in Chemistry.

G Comment of the Technical Committees (22.11.2024)

Technical Committee 09 – Chemistry, Pharmacy (18.11.2024)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure and sees that the experts wants to impose four requirements. These concern the safety standards in the laboratories, the module descriptions, a compulsory Bachelor's thesis and the learning objectives of the Master's degree programmes. In addition, five recommendations are to be made concerning the improvement of academic mobility, English language skills, the invitation of more international guest lecturers and the English names of the degree programmes. The Technical Committee is of the opinion that the current English translations of the degree programme names are not only inappropriate, but also incorrect, as they do not correctly reflect the actual course content. It is therefore in favour of upgrading the two corresponding recommendations (E4 and E5) to requirements. Otherwise, the Technical Committee agrees with the proposed requirements and recommendations.

The Technical Committee 09 – Chemistry, Pharmacy recommends the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Biology	With requirements for one year	-	30.09.2030
Ba Chemistry	With requirements for one year	-	30.09.2030
Master Methodology of teaching exact and natural sciences (Biology)	With requirements for one year	-	30.09.2030
Master Methodology of teaching exact and natural sciences (Chemistry)	With requirements for one year	-	30.09.2030

Technical Committee 10 – Life Sciences (22.11.2024)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure and sees that the experts wants to impose four requirements. These concern the safety standards in the laboratories, the module descriptions, a compulsory Bachelor's thesis and the learning objectives of the Master's degree programmes. In addition, five recommendations are to be made concerning the improvement of academic mobility, English language skills, the invitation of more international guest lecturers and the English names of the degree programmes. The Technical Committee agrees with the opinion of the TC 09 that the current English translations of the degree programme names are not only inappropriate, but also incorrect, as they do not correctly reflect the actual course content. Therefore, the TC suggests to upgrade the two corresponding recommendations (E4 and E5) to requirements. Otherwise, the Technical Committee agrees with the proposed requirements and recommendations.

The Technical Committee 10 – Life Sciences recommends the award of the seals as follows:

Degree Programme	**ASIIN-seal**	**Subject-specific label**	**Maximum duration of accreditation**
Ba Biology	With requirements for one year	-	30.09.2030
Ba Chemistry	With requirements for one year	-	30.09.2030
Master Methodology of teaching exact and natural sciences (Biology)	With requirements for one year	-	30.09.2030
Master Methodology of teaching exact and natural sciences (Chemistry)	With requirements for one year	-	30.09.2030

H Decision of the Accreditation Commission (06.122024)

Assessment and analysis for the award of the subject-specific ASIIN seal:

The Accreditation Commission discusses the procedure and points out that the learning outcomes of the Bachelor's degree programmes should be verified with respect to students' attitude towards patriotism and religion. Both these aspects can hardly be assessed by exams and should be deleted as intended learning outcomes or carefully reworded. Otherwise, the AC follows the suggestions of TC 09 and TC 10 to change recommendations E4 and E5 to requirements.

The Accreditation Commission decides to award the following seals:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Biology	With requirements for one year	-	30.09.2030
Ba Chemistry	With requirements for one year	-	30.09.2030
Master Methodology of teaching exact and natural sciences (Biology)	With requirements for one year	-	30.09.2030
Master Methodology of teaching exact and natural sciences (Chemistry)	With requirements for one year	-	30.09.2030

Requirements

For all degree programmes

A 1. (ASIIN 3.2) All laboratories need to follow international standards with respect to safety measures.

A 2. (ASIIN 4.1) Rewrite the module descriptions to include information about the students' total workload, exam forms, and teaching languages.

For the Bachelor's programmes

A 3. (ASIIN 1.3, 2) Introduce a compulsory final project (Bachelor's thesis) to the curriculum of the Bachelor's programmes. The final project should introduce students to research activities.

A 4. (ASIIN 1.2) Change the English translation of the names of the degree programmes e.g. to Bachelor Biology Education and Bachelor Chemistry Education so that they correctly reflect the content of the respective degree programme.

For the Masters' programmes

A 5. (ASIIN 1.1) The learning outcomes of the Master's programmes need to reflect the higher academic level (EQF 7) and need to be different from the learning outcomes of the Bachelor's programmes.

A 6. (ASIIN 1.2) Change the English translation of the names of the degree programmes e.g. to Master Teaching and Research in Biology and Master Teaching and Research in Chemistry so that they correctly reflect the content of the respective degree programme.

Recommendations

For all degree programmes

E 1. (ASIIN 1.3) It is recommended to further promote the students' academic mobility and to establish international cooperations especially in the area of teacher education.

E 2. (ASIIN 3.2) It is recommended to invite more international guest lecturers.

E 3. (ASIIN 3.2) It is recommended to improve students' and teachers' English proficiency.

Appendix: Programme Learning Outcomes and Curricula

According to the Self-Assessment Report, the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor's degree programme Biology:

Learning outcomes
LO 1. Create a Biology curriculum applying the forms and methods of teaching in accordance with the goals of the secondary education. Use methods aimed at developing students' basic and scientific competencies and life skills. Assess learners' knowledge and administer feedback. Determine tasks according to the goals of Biology, prepare and implement didactic materials related to the subject of the lesson. Use new educational changes in professional activity and achieve growth in professional activity by self-development.
LO 2. Demonstrate patriotism, national values and active citizenship.
LO 3. Understand and interpret the objective truth about religions, can classify the philosophical and theoretical aspects and social functions of religions.
LO 4. Monitor the strengthening of students' physical health, develop hygiene skills, teach them to engage in physical education and sports, instill in them determination, independence, perseverance, discipline, a sense of responsibility, friendship and camaraderie, and develop age-related creative abilities.
LO 5. Manage collective and project work of students based on their age characteristics. Cooperate with the pedagogical staff and parents of learners (persons who replace them) in solving educational problems.
LO 6. Regulate educational activities by using modern, interactive forms and methods of educational work in lessons and out-of-class activities. Use methods of self-control and ensure harmony of theory and practice.
LO 7. Create mutual respect and equal opportunities among learners, make optimal decisions in unusual situations, manage a safe and developing learning environment in the modern media world.
LO 8. Can fluently express their own speech in Uzbek, Russian and foreign languages. Demonstrate the culture of communication in everyday life.
LO 9. Prepare and implement didactic materials for practical application based on scientific disciplines on the structure of living organisms, the system of organs, their diversity, the laws of transmission, their classification, Phylogeny, Ecology, and Nature Conservation. Explain modern ideas about the diversity of animals in individual systematic groups, with issues of protection, reproduction and rational use of animal resources; have practical skills; know measures to prevent and control parasitic organisms.
LO 10. Know the characteristics of the organization and biology of insects, consider general issues of insect ecology, become familiar with the most important pests of agriculture and forestry and the main areas of plant protection; apply knowledge in practical activities

LO 11. Prepare and implement didactic materials for practical application based on knowledge of the structure of the plant world, organ system, diversity, systematics, phylogeny, origin, distribution laws.
LO 12. Be able to put into practice the knowledge acquired in the field of Human Anatomy and Physiology and Developmental Biology and their scientific research methods. Determine the structure of the organs of the human body system; know the functions and mechanism of vital activity of the human body, compare central and peripheral organs of immunity; use the knowledge gained to improve your health.
LO 13. Be able to calculate qualitative and quantitative changes in natural events and phenomena, conduct logical analysis, understand the scientific landscape of the universe, perform integration between Natural Sciences.
LO 14. Explain the Laws of Heredity and Variation, the mechanisms of heredity, discusses information on the molecular basis of Heredity, emphasize the information about the diversity of new productive breeds, varieties and strains.
LO 15. Get acquainted with modern techniques and technologies in science, culture and other fields, and determine the available opportunities in the research field, apply theoretical knowledge in practice.
LO 16. Explain the biochemical mechanisms of the body's vital functions, taking into account high-molecular compounds and their metabolism; analyze processes and phenomena in living nature from the point of view of Physical and Chemical Laws, understand the structure of biophysical processes in Biosystems.
LO 17. Analyze and diagnose changes in various physiological and biochemical processes caused by viruses in plants and microorganisms; reveal the biochemical mechanisms of the body's vital functions using the example of some high-molecular compounds and their exchange; know the assimilation processes occurring in living organisms in nature, use them in production.
LO 18. Explain the patterns of development of the organic world in the past and present; determine the stages of cellular and tissue embryonic development; name the stages of anthropogenesis; discuss the importance and significance of the teachings about evolution and the role of the driving forces of evolution in the diversity of organisms on Earth, cultivating interest in Biology.
LO 19. Be able determine and solve global problems related to ecology, nature protection, the significance of the world of plants in nature and human life. Identify systematic and chemical groups of medicinal plants and apply them in practice; know the vegetative processes of cultivated plants and be able to practice their cultivation; know how to care for agricultural crops, taking into account soil and climatic conditions and be able to store agricultural products.
LO 20. Implement the mechanisms of growth and reproduction of microbiological objects in laboratory conditions, recognize methods for identifying microorganisms in laboratory and production conditions.
LO 21. Know the legal basis for nature management and environmental protection, consider the basic patterns of distribution of living organisms, develop a caring attitude towards nature and living organisms.

The following **curriculum** is presented:

No	Code of the module	Names of education blocks, subjects and types of activities	The study load of a Student (in hours)								Distribution of academic loads in semesters (hour and credit)				yearly credits
			Total amount of load	Classroom Lessons (in hours)						Independent Study	weekly hours in the semesters		amount of credits in the semesters		
				Total	Lecture	practical	Labaratory	Seminar							
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
First Year											semester 1	semester 2	semester 1	semester 2	
											15	15	18	18	
1.00.		**Mandatory subjects**	**1680**	**734**	**310**	**230**	**44**	**150**		**946**	**24**	**24**	**30**	**26**	**56**
1.01	PSY108	General Psychology	300	120	60			60		180	4	4	6	4	10
1.02.	O'EYT104	The latest history of Uzbekistan	120	60	30			30		60		4		4	4
1.03.	MSVAX104	Media literacy and culture of information	150	60	30			30		90		4		5	5
1.04.	O'RT104	Practical Uzbek (Russian) language	180	90		90				90	6		6		6
1.05.	FALMAD104	Philosophy	120	60	30			30		60		4		4	4
1.06.	Zoo110	Zoology I	300	120	60	60				180	4	4	6	4	10
1.07.	Bot1011	Botany I	330	134	60	30	44			196	4	4	6	5	11
1.08.	DB106	Developmental Biology	180	90	40	50				90	6		6		6
		Internship	**120**							**120**			**0**	**4**	**4**
		Total in per semester	**1800**	**734**						**1066**	**24**	**24**	**30**	**30**	**60**

Second Year											semester 3	semester 4	semester 3	semester 4	
											15	15	18	18	
1.00.		**Mandatory subjects**	**1230**	**600**	**300**	**204**	**0**	**96**		**630**	**20**	**20**	**21**	**20**	**41**
1.01.	PED208	General Pedagogy	240	120	60	10		50		120	4	4	4	4	8
1.02.	InkT.GP304	Inclusive education. Hospital pedagogy	120	60	30	14		16		60		4		4	4
1.03.	DIN204	Religious studies	120	60	30			30		60	4		4		4
1.04.	HAPHY208	Human anatomy and physiology I	240	120	60	60				120	4	4	4	4	8
1.05.	Zoo208	Zoology II	240	120	60	60				120	4	4	4	4	8
1.06.	Bot209	Botany II	270	120	60	60				150	4	4	5	4	9
2.00.		***Optional subjects***	***240***	***120***						***120***	**4**	**4**	**4**	**4**	**8**
2.01.	AT204	Application of Information Technology in Professional Activities (ECTS)	120	60	20	20	20			60	4		4		4
2.02.	BH204	Human biology	120	60	30	30				60	4		4		4
2.03.	K204	Chemistry	120	60	30		30			60		4		4	4
2.04.	OzResKon204	New constitution of the Republic of Uzbekistan	120	60	30	30				60		4		4	4
2.05.	Geob204	Geobotany	120	60	30	30				60		4		4	4
2.06.	JMS204	Physical culture and sports	120	60		60				60		4		4	4
		Internship	**330**							**330**			**5**	**6**	**11**
		Total in per semester	**1800**	**720**						**1080**	**24**	**24**	**30**	**30**	**60**

Third Year											semester 5	semester 6	semestr 5	semester 6	
											15	15	18	18	
1.00.		**Mandatory subjects**	**750**	**360**	**150**	**180**	**30**	**0**		**390**	**12**	**12**	**13**	**12**	**25**
1.01.	FGS3010	Fundamentals of genetics and selection	300	150	60	90				150	4	6	4	6	10
1.02.	BTM3011	Biology teaching methodology I	330	150	60	90				180	4	6	5	6	11
1.03.	HAPHY304	Human anatomy and physiology II	120	60	30		30			60	4		4		4
2.00.		***Optional subjects***	***720***	***360***						***360***	**12**	**12**	**12**	**12**	**24**
2.01.	KSXT304	Foreign Languages in Vocational Fields (ECTS)	240	120		120				120	4	4	4	4	8
2.02.	Bk304	Beekeeping	120	60	30	30				60	4		4		4
2.03.	PhP304	Physiologiy of plants	120	60	30	30				60		4		4	4
2.04.	Biot304	Biotechnology	120	60	30	30				60		4		4	4
2.05.	BK304	Biochemistry	120	60	30	30				60	4		4		4
2.06.	Aph304	Age physiology and hygiene	120	60	30	30				60		4		4	4
2.07.	Pr304	Parasitology	120	60	30	30				60		4		4	4
2.08.	GM304	General microbiology	120	60	30	30				60	4		4		4
2.09.	SI304	The science of sericulture	120	60	30	30				60	4		4		4
		Internship	**330**							**330**			**5**	**6**	**11**
		Total in per semester	**1800**	**720**						**1080**	**24**	**24**	**30**	**30**	**60**
Fourth Year											**semester 7**	**semester 8**	**semester 7**	**semester 8**	
											15	**15**	**19**	**18**	
1.00.		**Mandatory subjects**	**660**	**300**	**104**	**130**	**0**	**66**		**360**	**16**	**4**	**17**	**5**	**22**
1.01.	UTTVZY405	Trends and modern approaches in continuing education	150	60	24			36		90	4		5		5
1.02.	BTM406	Biology teaching methodology II	180	90	30	30		30		90	6		6		6
1.03.	CPEFB4011	Solving problems and exercises from biology	330	150	50	100				180	6	4	6	5	11
2.00.		***Optional subjects***	***840***	***420***						***420***	**8**	**20**	**8**	**20**	**28**
2.01.	ED404	Evolutionary theory	120	60	20			40		60		4		4	4
2.02.	BTTD404	Technologies of teaching biology and design	120	60	20			40		60		4		4	4
2.03.	EEP404	Ecology and environmental protection	120	60	30	30				60	4		4		4
2.04.	Biog404	Biogeography	120	60	30	30				60	4		4		4
2.05.	GG404	Fundamentals of Genomics	120	60	30	30				60		4		4	4
2.06.	Bioph404	Biophysics	120	60	30	30				60		4		4	4
2.07.	Imn404	immunology	120	60	30	30				60		4		4	4
2.08.	Wm404	The world of microorganisms	120	60	30	30				60		4		4	4
2.09.	BBA404	Biological basis of agriculture	120	60	30	30				60		4		4	4
2.10.	MPUzb404	Medicinal plants of Uzbekistan	120	60	30	30				60		4		4	4
2.11.	Ent404	Entomology	120	60	30	30				60		4		4	4
2.12.	Vir404	Virusology	120	60	30	30				60		4		4	4
2.12.	MOLBIO404	Molecular biology	120	60	30	30				60	4		4		4
2.13.	Ps404	Plant science	120	60	30	30				60	4		4		4
		Internship	**300**							**300**			**5**	**5**	**10**
		Total in per semester	**1800**	**720**						**1080**	**24**	**24**	**30**	**30**	**60**
		total	**7 200**	**2894**						**3226**			**120**	**120**	**240**

According to the Self-Assessment Report, the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Master's degree programme Methodology of Teaching Exact and Natural Sciences (Biology):

Learning Outcomes
LO 1. Develop a curriculum in the continuous education system in accordance with the goals of the Chemistry curriculum, analyze the forms and methods of teaching, compare methods aimed at developing learners' professional competencies and life skills. Assess learners' knowledge and administer feedback.
LO 2. Analyze literature related to scientific research, evaluate available opportunities, classify and differentiate scientific research methods, tests put forward hypotheses, conduct experimental tests on the research topic, summarize the results, prove the research hypothesis based on the obtained scientific results.
LO 3. Compare new changes in education system in the development strategy of New Uzbekistan, can evaluate their effectiveness and achieve growth in professional activity by self-development.
LO 4. Get acquainted with modern techniques and technologies in science, culture and other fields, evaluate the available opportunities in the research field, verify and test the correctness of a scientific hypothesis.
LO 5. Discuss hypotheses about the origin of living organisms, compare adaptations of organisms to the environment, determine the place of Human in the classification of animals, analyze hypotheses about the formation of human society.
LO 6. Compare information about specific characteristics and levels of structure of living organisms, identify the differences between them, evaluate the role of living organisms in nature and human life.
LO 7. Determine tasks according to the objectives of Biology, prepare didactic materials related to the subject of the discipline and implement them into practice. Create mutual respect and equal opportunities among students, make optimal decisions in unusual situations, develop and manage environment of safe and secure skills in the world of modern media.
LO 8. Be able to calculate qualitative and quantitative changes in events and phenomena occurring in nature, conduct logical analyzes and perform integration between Natural Sciences.
LO 9. Activate cognitive interest in the sections being studied; create conditions for career guidance; analyze information on the organization of biological objects at the cellular and organismal level; promote the formation of a responsible attitude towards the environment and one's health.
LO 10. Generalize the idea of the fundamental role of biologically active substances in the metabolism and energy, separate the mechanisms of the transmission of hereditary information and the regulation and integration of metabolic processes in living organisms; develop the scientific competence of the master.

The following **curriculum** is presented:

T/p	Qualification code of the subject	Names of educational subjects and types of scientific activity	The study load of a student (in hours)							Distribution of academic loads in semesters (hours and credits).			
			The volume of the general load	The classroom lessons (in hours)					independent study	Weekly classroom hours per semester		Amount of credits per semester	
			hours	overall	lecture	practical	laboratory	seminar					
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*11*	*12*	*13*	*14*	*15*
		FIRST COURSE								*semester-1*	*semester-2*	*semester-1*	*semester-2*
										15	*15*	*18*	*19*
1.00		**Mandatory subjects**	**450**	**180**	**90**	**30**	**0**	**60**	**270**	**8**	**4**	**10**	**5**
1.01	MSR105	Methodology of scientific research	150	60	30			30	90		4		5
1.02	RE105	The reforms in the education system in the new development strategy of Uzbekistan	150	60	30			30	90	4		5	
1.03	MTSS105	Methodology of teaching special subjects	150	60	30	30			90	4		5	
2.00		**Optional subjects**	**450**	***180***					***270***	**4**	**8**	**5**	**10**
2.01	*MFSPFB105*	*Methodological foundations of solving problems from Biology*	*150*	*60*	*30*	*30*			*90*		*4*		*5*
2.02	*ES05*	*Environmental sustainability*	*150*	*60*	*30*	*30*			*90*		*4*		*5*
2.03	*UICTTB105*	*Use of ICT in teaching Biology*	*150*	*60*	*30*	*30*			*90*		*4*		*5*
2.04	*HNA105*	*Higher nervous activity*	*150*	*60*	*30*	*30*			*90*	*4*		*5*	
2.05	*IMG105*	*Immunogenetics*	*150*	*60*	*30*	*30*			*90*	*4*		*5*	
2.06	*FB105*	*Fundamentals of Biotechnology*	*150*	*60*	*30*	*30*			*90*	*4*		*5*	
3.00.		**Scientific activity**										**15**	**15**
		Overall in semester	**900**							*12*	*12*	*30*	*30*

		SECOND COURSE								*semester-3*	*semester-4*	*semester-3*	*semester-4*
										15	*15*	*18*	*19*
1.00		**Mandatory subjects**	**390**	**150**	**64**	**70**	**0**	**16**	**240**	**6**	**4**	**8**	**5**
1.01	DOWA205	Development of the organic world and anthropology	150	60	30	30			90	4		5	
1.02	PE203	Professional ethics	90	30	14			16	60	2		3	
1.03	CFB205	Conceptual foundations of Biology	150	60	20	40			90		4		5
2.00		**Optional subjects**	**510**	210					***300***	***6***	***8***	**7**	**10**
2.01	*IIB05*	*Interdisciplinary integration in Biology*	*150*	*60*	*20*	*40*			*90*		*4*		*5*
2.02	*IABT204*	*International assessment in biology teaching*	*120*	*46*	*20*	*26*			*74*	*3*		*4*	
2.03	*Cyt204*	*Cytology*	*120*	*44*	*20*	*24*			*76*	*3*		*4*	
2.04	*ITBE205*	*Innovative technologies in Biological education*	*150*	*60*	*30*	*30*			*90*		*4*		*5*
2.05	*EPA205*	*Evolution of plants and animals*	*150*	*60*	*30*	*30*			*90*		*4*		*5*
2.06	*BTTD203*	*Biology teaching technologies and design*	*90*	*44*	*20*	*24*			*46*	*3*		*3*	
2.07	*ENZ205*	*Enzymology*	*150*	*60*	*30*	*30*			*90*		*4*		*5*
3.00.		**Scientific activity**										**15**	**15**
		Overall in semester	**900**							*12*	*12*	*30*	*30*
		Overall:	**1800**	**720**					**1080**				

According to the Self-Assessment Report, the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor's degree programme Chemistry:

Learning Outcomes
LO 1. Create a Chemistry curriculum applying the forms and methods of teaching in accordance with the goals of the secondary education. Use methods aimed at developing students' basic and scientific competencies and life skills. Assess learners' knowledge and administer feedback. Determine tasks according to the goals of Chemistry, prepare and implement didactic materials related to the subject of the lesson.
LO 2. Demonstrate patriotism, national values and active citizenship.
LO 3. Understand and interpret the objective truth about religions, can classify the philosophical and theoretical aspects and social functions of religions.
LO 4. Monitor the strengthening of students' physical health, develop hygiene skills, teach them to engage in physical education and sports, instill in them determination, independence, perseverance, discipline, a sense of responsibility, friendship and camaraderie, and develop age-related creative abilities.
LO 5. Manage collective and project work of students based on their age characteristics. Cooperate with the pedagogical staff and parents of learners (persons who replace them) in solving educational problems.
LO 6. Regulate educational activities by using modern, interactive forms and methods of educational work in lessons and out-of-class activities. Use methods of self-control and ensure harmony of theory and practice.
LO 7. Create mutual respect and equal opportunities among learners, make optimal decisions in unusual situations, manage a safe and developing learning environment in the modern media world.
LO 8. Demonstrate the culture of communication in everyday life.
LO 9. Use new educational changes in professional activity and achieve growth in professional activity by self-development. Be able to carry out research in scientific research institutes and scientific centers on subjects related to the field of chemistry and their teaching methodology and apply their results in practice.
LO 10. Can calculate qualitative and quantitative changes, conduct logical analyzes in events and phenomena occurring in nature. Understand the scientific landscape of the world, integrate Natural Sciences.
LO 11. Classify substances according to their composition and structure, properties (classification), use Chemical Laws and theories to explain chemical processes, can write all types of chemical reaction equations, demonstrate elements of safety techniques, interpret experimental results, use chemical terminology fluently and correctly, can conduct laboratory experiments independently, present laboratory reports and draw up graphs, use standard chemical laboratory equipment in solving educational problems, independently determine the qualitative and quantitative composition of

substances, check, control the direction of the chemical process based on thermodynamic indicators.
LO 12. Present laboratory reports and draw up graphs, use standard chemical laboratory equipment to solve educational problems, independently determine and check the qualitative and quantitative composition of substances
LO 13. Present laboratory reports and draw up graphs, use standard chemical laboratory equipment to solve educational problems, control the direction of the chemical process based on thermodynamic indicators.
LO 14. List the main stages of creating chemical technological systems, the principles and general strategy of the systems approach, determine the energy and energy basis of chemical production, classify the types of functional materials in chemical technology.
LO 15. Discuss environmental risks in case of disruption of the main chemical production facilities; types and patterns of migration and transformation of pollutants in natural environments; sequence of actions in case of violations of the normal operating mode of a chemical enterprise, possess skills in the field of production and consumption of chemical products with minimal environmental damage at all stages of production: from energy consumption to waste disposal
LO 16. Get acquainted with modern techniques and technologies in science, culture and other fields, determine the available opportunities in the research field, apply theoretical knowledge in practice.
LO 17. Forming a systematic approach to the problems of Modern Biochemistry with the possibility of further use of the acquired knowledge for the analysis and assessment of the state of the body of biological objects; have an idea of the structure, functions and significance of the main biopolymers that make up a living organism, as well as lipids, enzymes, vitamins and hormones; carry out diagnostics and determine minerals; give a geochemical assessment of the environment
LO 18. Promote mastery of the skills of searching, analyzing and summarizing information presented in various sign systems (texts, schemes, tables, diagrams), associate the use of integration of Natural Sciences with each other in performing tasks.
LO 19. Have the skills to collect and use information necessary for the situation, changes, reforms in the educational and training process, the creation and development of educational systems, assessing the effectiveness of educational systems; acquire skills in the practical application of acquired scientific knowledge on entrepreneurial activity, have the skills to identify modern forms of entrepreneurial activity, and also draw up scientific conclusions from them.

The following **curriculum** is presented:

No.	Qualification code of science	Names of education blocks, subjects and types of activities	Student's work load (in hours)								Distribution of academic loads in semesters (hour and credit)				
			Total amount of load	(in hours)						Independent study	weekly hours in the semester		amount of credits in semester		amount of annual credits
				Total	lecture	practical	laboratory work	seminar							
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
FIRST YEAR											1-semester	2-semester	1-semester	2-semester	
											15	15	18	18	
1.00.		**Compulsory subjects**	**1680**	**720**	**300**	**210**	**30**	**180**		**960**	**24**	**24**	**30**	**26**	**56**
1.01	PSY108	General Psychology	300	120	60			60		180	4	4	6	4	10
1.02.	TLHU104	The latest history of Uzbekistan	120	60	30			30		60		4		4	4
1.03.	MLCI104	Media literacy and culture of information	150	60	30			30		90		4		5	5
1.04.	PURL104	Practical Uzbek (Russian) language	180	90		90				90	6		6		6
1.05.	PHSC104	Philosophy	120	60	30			30		60		4		4	4
1.06.	MATH105	Mathematics	180	76	30	46				104	5		6		6
1.07.	ISS110	Introduction to specialist subject area	180	74	30	14		30		106	5		6		6
1.08.	GCH110	General Chemistry	300	120	60	30	30			180	4	4	6	4	10
1.09.	CHC109	Chemical Calculation I	150	60	30	30				90		4		5	5
		Internship	**120**							**120**			**0**	**4**	**4**
		Total per semester	**1800**	**720**						**1080**	**24**	**24**	**30**	**30**	**60**

SECOND YEAR											3-semester	4-semester	3-semester	4-semester	
											15	15	18	18	
1.00.		**Compulsory subjects**	**1230**	**600**	**240**	**84**	**180**	**96**		**630**	**20**	**20**	**21**	**20**	**41**
1.01.	PED208	General Pedagogy	240	120	60	10		50		120	4	4	4	4	8
1.02.	INCE.HP304	Inclusive education. Hospital Pedagogy	120	60	30	14		16		60		4		4	4
1.03.	RS204	Religious studies	120	60	30			30		60	4		4		4
1.04.	INCH206	Inorganic Chemistry	150	60	30		30			90	4		5		5
1.05.	OCH206	Organic Chemistry	240	120	50		70			120	4	4	4	4	8
1.06.	ACH208	Analytical Chemistry	240	120	40		80			120	4	4	4	4	8
1.07.	CHC204	Chemical Calculation I	120	60		60				60		4		4	4
2.00.		**Optional Subjects**	240	120						*120*	4	4	4	4	8
2.01.	IT204	Application of Information Technologies in	120	60	20	20	20			60	4		4		4
2.02.	CMCH204	Computer Modeling of Chemistry	120	60	20	20	20			60	4		4		4
2.03.	PHY204	Physics	120	60	30	30				60		4		4	4
2.04.	CONSUZR204	Constitution of the Republic of Uzbekistan in new edition	120	60	30	30				60		4		4	4
2.05.	EPE04	Ecology and protection of the environment	120	60	30	30				60		4		4	4
2.06.	PHYSEDS204	Physical Education and Sport	120	60		60				60		4		4	4
		Internship	**330**							**330**			**5**	**6**	**11**
		Total per semester	**1800**	**720**						**1080**	**24**	**24**	**30**	**30**	**60**

THIRD YEAR											5-semester	6-semester	5-semester	6-semester	
											15	15	18	18	
1.00.		**Compulsory subjects**	**750**	**360**	**120**	**150**	**60**	**30**		**390**	**12**	**12**	**13**	**12**	**25**
1.01.	PCh304	Physical chemistry	120	60	30		30			60	4		4		4
1.02.	ChT304	Chemical technology	120	60	30		30			60		4		4	4
1.03.	MTCh308	Methodology of teaching chemistry	270	120	60	30		30		150	4	4	5	4	9
1.04.	ChC308	Chemical Calculation III	240	120		120				120	4	4	4	4	8
2.00.		**Optional subjects**	720	360						*360*	**12**	**12**	**12**	**12**	**24**
2.01.	FLPF304	Foreign languages in the professional field	240	120		120				120	4	4	4	4	8
2.02.	BIOCh304	Biochemistry	120	60	30	10	20			60	4		4		4
2.03.	ChCC304	Chemistry of complex compounds	120	60	20	20	20			60	4		4		4
2.04.	QCh304	Quantum chemistry	120	60	30	10	20			60	4		4		4
2.05.	YPH304	Youth physiology and hygiene	120	60	20	20		20		60	4		4		4
2.06.	CCh304	Colloid chemistry	120	60	30	30				60		4		4	4
2.07.	ECh304	Electrochemistry	120	60	30	30				60		4		4	4
2.08.	GCh304	Geochemistry	120	60	30	30				60		4		4	4
2.09.	EM304	Education management	120	60	30			30		60		4		4	4
		Internship	**330**							**330**			**5**	**6**	**11**
		Total per semester	**1800**	**720**						**1080**	**24**	**24**	**30**	**30**	**60**

FOURTH YEAR											7-semester	8-semester	7-semester	8-semester	
											15	15	19	18	
1.00.		**Compulsory subjects**	**660**	**300**	**84**	**150**	**0**	**66**		**360**	**16**	**4**	**17**	**5**	**22**
1.03.	TCEdMA405	Trends in continuing education and modern approaches	150	60	24			36		90	4		5		5
1.01.	MTCH406	Methodology of teaching chemistry II	180	90	30	30		30		90	6		6		6
1.02.	CHC406	Chemical calculation IV	180	90		90				90	6		6		6
1.04.	ECH405	Environmental chemistry	150	60	30	30				90		4		5	5
2.00.		***Optional subjects***	840	420						*420*	**8**	**20**	**8**	**20**	**28**
2.01.	ICH404	Industrial ecology	120	60	20	20	20			60	4		4		4
2.02.	CHP404	Chemistry of polymers	120	60	20	20	20			60	4		4		4
2.03.	MCHE404	Methodology of chemistry experiments	120	60	20	20	20			60	4		4		4
2.04.	SS404	Structure of substances	120	60	20	20		20		60		4		4	4
2.05.	PCO404	Preparation Course for Olimpiad	120	60	20	20	20			60		4		4	4
2.06.	MTTCH404	Modern Technologies in Teaching Chemistry	120	60	20	20		20		60		4		4	4
2.07.	IES404	International Evaluation Studies	120	60	20	20		20		60		4		4	4
2.08.	GCH404	Green Chemistry	120	60	20	20		20		60		4		4	4
2.09.	BioCH404	Biorganic Chemistry	120	60	20	20		20		60		4		4	4
2.10.	BionCH404	Bioinorganic Chemistry	120	60	20		20	20		60		4		4	4
2.11.	FEnPM404	Fundamentals of Entrepreneurship Personal Management	120	60	30			30		60		4		4	4
2.12.	Econ404	Economy	120	60	30			30		60		4		4	4
		Internship	**300**							**300**			**5**	**5**	**10**
		Total per semester	**1800**	**720**						**1080**	**24**	**24**	**30**	**30**	**60**
		TOTAL	**7 200**	**2880**						**3240**			**120**	**120**	**240**

According to the Self-Assessment Report, the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Master's degree programme Methodology of Teaching Exact and Natural Sciences (Chemistry):

Learning Outcomes
LO 1. Develop a curriculum in the continuous education system in accordance with the goals of the Chemistry curriculum, analyze the forms and methods of teaching, compare methods aimed at developing learners' professional competencies and life skills. Assess learners' knowledge and administer feedback.
LO 2. Analyze literature related to scientific research, evaluate available opportunities, classify and differentiate scientific research methods, tests put forward hypotheses, conduct experimental tests on the research topic, summarize the results, prove the research hypothesis based on the obtained scientific results.
LO 3. Compare new changes in education system in the development strategy of New Uzbekistan, can evaluate their effectiveness and achieve growth in professional activity by self-development.
LO 4. Discuss world practical experience and environmental, toxicological aspects of nanotechnology; analyze achievements and trends in the development of nanotechnology for the production of modern nanomaterials; distinguish between the main approaches and techniques for carrying out "green" chemical synthesis; prepare information and disseminate the ideas of "green chemistry" among specialists and the public to achieve the goals of sustainable development of society
LO 5. Conduct a critical analysis of the results of own experimental and theoretical calculations, interpret them correctly; navigate the variety of options for the chromatographic method, be able to select correctly the appropriate option depending on the properties of the object under study and interpret experimental results.
LO 6. Get acquainted with modern techniques and technologies in science, culture and other fields, evaluate the available opportunities in the research field, verify and test the correctness of a scientific hypothesis.
LO 7. Analyze scientific literature and classify physical and chemical research methods, demonstrate the skills of conducting research experiments in practice based on physical and chemical methods of analysis, experiment with samples for physical and chemical research methods.
LO 8. Determine the appropriate research method depending on the structure of the substance and the given task, evaluate and analyze the results of laboratory research.
LO 9. Have the skills to collect and use information necessary for the situation, changes, reforms in the educational and training process, the creation and development of educational systems, assessing the effectiveness of educational systems; acquire skills in the practical application of acquired scientific knowledge on entrepreneurial activity, have the skills to identify modern forms of entrepreneurial activity, and also draw up scientific conclusions from them.

The following **curriculum** is presented:

N	Modules' Qualification Code	Names of academic modules and types scientific activities	Student's work load (in hours)							Distribution of academic loads in the semester (hour and credit)			
			Amount of total loads	Classroom lessons (in hours)					Independent work	weekly hours in the semester		amount of credits in semester	
			hours	total	lecture	practical	labaratory	seminar					
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*11*	*12*	*13*	*14*	*15*
		Year 1								*1-semester*	*2-semester*	*1-semester*	*2-semester*
										15	*15*	*18*	*19*
1.00		**Mandatory modules**	**450**	**180**	**90**	**30**	**0**	**60**	**270**	**8**	**4**	**10**	**5**
1.01.	SRM104	Scientific research methodology	150	60	30			30	90		*4*		**5**
1.02.	ESRNDSU	Education system reforms in "New development strategy of Uzbekistan"	150	60	30			30	90	4		**5**	
1.03.	MTSS105	Methodology of teaching special subjects	150	60	30	30			90	*4*		**5**	
2.00		**Optional modules**	**450**	180					***270***	**4**	**8**	**5**	**10**
2.01.	*BNN105*	*Basics of Nanoscience and Nanotechnology*	*150*	*60*	*20*	*20*		*20*	*90*	*4*		*5*	
2.02.	*FTOCH105*	*Fundamentals of Theoretical Organic Chemistry*	*150*	*60*	*20*	*20*		*20*	*90*	*4*		*5*	
2.03.	*EOCH105*	*Experimental Organic Chemistry*	*150*	*60*	*20*	*40*			*90*		*4*		*5*
2.04.	*MIAM105*	*Modern instrumental analysis methods*	*150*	*60*	*20*	*20*	*20*		*90*		*4*		*5*
2.05.	*MPCHT105*	*The methods of making experiment and analyzing its results*	*150*	*60*	*20*	*40*			*90*		*4*		*5*
2.06.	*MPCHT105*	*Modern polymer chemistry and technology*	*150*	*60*	*20*	*20*		*20*	*90*		*4*		*5*
3.00.		**Scientific research**										**15**	**15**
		Total per semester								*12*	*12*	*30*	*30*

		Year 2								*1-semester*	*4-semester*	*3-semester*	*4-semester*
										15	*15*	*18*	*19*
1.00		**Compulsory subjects**	**390**	**150**	**64**	**70**	**0**	**16**	**240**	**6**	**4**	**8**	**5**
1.01.	AFKM205	Physico-chemical method of analysis	150	60	30	30			90	*4*		**5**	
1.02.	KM202	Professional spirituality	90	30	14			16	60	*2*		**3**	
1.03.	KS205	Chemical synthesis	150	60	20	40			90		*4*		**5**
2.00		**Optional subjects**	**510**	210					***300***	*6*	*8*	7	**10**
2.01.	EMVKT205	*Electrochemistry: methods and applications in chemistry*	*150*	*60*	*20*	*40*			*90*	*4*		**5**	
2.02.	XA205	*Chromatographic analysis*	*150*	*60*	*20*	*20*	*20*		*90*	*4*		**5**	
2.03.	ZS205	*Modern spectroscopy and its implementation in the structural analysis*	*150*	*60*	*20*	*20*	*20*		*90*		*4*		**5**
2.04.	KFI205	*Experimental physical chemistry*	*150*	*60*	*30*		*30*		*90*	*4*		**5**	
2.05.	YK205	*Green chemistry*	*150*	*60*	*30*	*10*	*20*		*90*		*4*		**5**
2.06.	TM205	*Education management*	*150*	*60*	*30*			*30*	*90*		*4*		**5**
2.07.	TA205	*Business basics*	*150*	*60*	*30*			*30*	*90*		*4*		**5**
2.08.	AKNA205	*Theoretical foundation of inorganic chemistry*	*150*	*60*	*20*	*20*	*20*		*90*	*4*		**5**	
3.00.		**Scientific research**										**15**	**15**
		Total per semester								*12*	*12*	*30*	*30*
		Total	**1800**	**720**					**1080**				