ASIIN Seal

Accreditation Report

Bachelor's Degree Programmes
Biochemistry and Biotechnology
Pharmacy

Master's Degree Programmes
General and Medical Biochemistry
Pharmacy

Provided by
Yerevan State University, Armenia

Version: 8 December 2023

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]
Բակալավր Կենսաքիմիա և կենսատեխնոլոգիա	Bachelor in Biochemistry and Biotechnology	ASIIN	-	09, 10
Ընդհանուր և բժշկական կենսաքիմիայի մագիստրոս	Master in General and Medical Biochemistry	ASIIN	-	09, 10
Բակալավր դեղագործություն	Bachelor in Pharmacy	ASIIN	-	09, 10
Մագիստրատուրա դեղագործության ոլորտում	Master in Pharmacy	ASIIN	-	09, 10
Date of the contract: 04.11.2021 **Submission of the final version of the self-assessment report:** 05.03.2023 **Date of the audit (online):** 26.09. – 28.09.2023				
Expert panel: Prof. Dr. Moritz Bünemann, University of Marburg Prof. Dr. Gert Fricker, University of Heidelberg Associate Prof. Dr. Anahit Saharyan, Yerevan State Medical University Jürgen Meyer, Wuppertal Gisane Khachatryan, Russian-Armenian University, student				
Representative of the ASIIN headquarter: Rainer Arnold				
Responsible decision-making committee:				

[1] ASIIN Seal for degree programmes;
[2] TC: Technical Committee for the following subject areas: TC 09 – Chemistry, Pharmacy, TC 10 – Life Sciences

Accreditation Commission	
Criteria used: European Standards and Guidelines as of 15.05.2015 ASIIN General Criteria as of 28.03.2014 Subject-Specific Criteria of Technical Committee 09 – Chemistry, Pharmacy 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 and First time of offer
Ba Biochemistry and Biotechnology	Kensabanutyan bakalavr / Bachelor of Biology	-	6	Full time	-	8 semesters	240 ECTS	1995
Ma General and Medical Biochemistry	Kensabanutyan magistros / Master of Biology	-	7	Full time	-	4 semesters	120 ECTS	2017
Ba Pharmacy	Farmaciayi bakalavr / Bachelor of Pharmacy	-	6	Full time	-	8 semesters	240 ECTS	2013
Ma Pharmacy	Farmaciayi magistros / Master of Pharmacy	-	7	Full time	-	2 semesters	60 ECTS	2016

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

For the Bachelor's degree programme Biochemistry and Biotechnology, Yerevan State University (YSU) has presented the following profile in the Self-Assessment Report:

"The programme aims to prepare specialists majoring in the specialty of "Biochemistry and Biotechnology" with fundamental knowledge and skills in:

- comprehensive programs for the conservation of the biodiversity of living organisms, developing and maintaining their collections and herbariums, performing microbial sampling in the environment, industry, and various ecological systems, as well as identification and classification of biological objects.
- selection of biological objects and appropriate methods for biotechnological, biochemical, microbiological and cytogenetic studies, designing programs for the application of microbial and plant metabolic products in the fields of biotechnological production, medicine, and pharmacy,
- determination of structure and function of macromolecules, regulation of their metabolic pathways in different pathological conditions,
- experimental data collection and statistical analysis using computer programs, formulation and solving problems arising during scientific research in various fields of biochemistry, biotechnology and pedagogical activities."

For the Master's degree programme General and Medical Biochemistry, Yerevan State University (YSU) has presented the following profile in the Self-Assessment Report:

"The aim of the programme is to prepare specialists with fundamental theoretical and practical knowledge and skills in the professional fields of biochemistry and general medicine, who are able to carry out professional activities in biochemical, clinical-laboratory, medical-diagnostic, immunological and medical-genetic fields as well as in scientific research institutions."

For the Bachelor's degree programme Pharmacy, Yerevan State University (YSU) has presented the following profile in the Self-Assessment Report:

"The programme aims to:

- Prepare high-quality pharmacists in accordance with international standards, provide the students with basic knowledge and skills in this field, which will enable them to work in pharmacies, pharmaceutical production companies, drug regulatory organizations,

customs services, expert organizations, healthcare, medical, forensic, research and educational institutions and other fields with pharmacists in demand.

- Provide the students with basic knowledge to determine main drug groups in accordance with the international system requirements, as well as analyze and evaluate the pharmacological groups used in the treatment of a specific disease based on the pharmacological effect and the mechanism of action.

- Introduce students to the processes of the drug procurement, quality control, transportation, storage, evaluation of effectiveness, development of regulation on medicines circulation and formulation of the normative documents.

- Provide the students with basic knowledge on research and certification of drug synthesis and composition, study of the mechanisms of action, research and organizational activities for obtaining new types of medicaments."

For the Master's degree programme Pharmacy, Yerevan State University (YSU) has presented the following profile in the Self-Assessment Report:

"The programme aims to:

- develop students' professional knowledge of the principles and methods of management and marketing for pharmaceutical companies in accordance with contemporary international requirements and the issues of entrepreneurial activities in the competitive field of the pharmaceutical market,

- provide in-depth and comprehensive knowledge in the field of pharmaceutical industry, in particular, quality assurance, marketing, post-marketing observations, clinical trials, contemporary rational-targeted therapy in clinical pharmacology,

- provide students with professional skills for the synthesis of drugs, research and certification of the structure, study of the mechanisms of action, as well as research activities to obtain new drugs from pharmaceutical preparations."

C Expert Report for the ASIIN Seal

1. The Degree Programme: Concept, content and 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 YSU: https://www.ysu.am/en
- Homepage Institute of Pharmacy: https://www.ysu.am/en/faculty/495
- Homepage Ba Pharmacy: http://www.ysu.am/education/en/1663930073
- Homepage Ma Pharmacy: http://www.ysu.am/education/en/1663930021
- Homepage Faculty of Biology: https://www.ysu.am/en/faculty/87
- Homepage Ba Biochemistry and Biotechnology: http://www.ysu.am/education/en/1663073634
- Homepage Ma General and Medical Biochemistry: http://www.ysu.am/education/en/1663331375
- Discussions during the audit

Preliminary assessment and analysis of the experts:
The experts base their assessment of the learning outcomes on the information provided in the module descriptions and in the Self-Assessment Report of all four degree programmes under review. For all programmes, Yerevan State University (YSU) has described Learning Outcomes (LO), which cover a number of specific competences students should acquire in their respective degree programme. The LO of each degree programme are published on the programme's website.

The experts refer to the Subject-Specific Criteria (SSC) of the Technical Committee 10 - Life Sciences as a basis for judging whether the intended learning outcomes of the Bachelor's degree programmes Biochemistry and Biotechnology and the Master's degree programme

General and Medical Biochemistry as defined by YSU correspond with the competences as outlined by the SSC. They come to the following conclusions:

Students of the Bachelor's degree programme Biochemistry and Biotechnology should acquire systematic knowledge in different fields of biology and be able to use the basic facts, concepts, principles, and theories of the discipline. Additionally, they should have basic knowledge of other disciplines (e.g. chemistry, physics) relevant to biology. Moreover, students should learn how to assess, interpret, and synthesise biological data and information and can employ specific research methods. In this respect, students also learn to work practically in laboratories and during field trips with living organisms while respecting the required ethical norms and safety regulations. Furthermore, graduates should be able to carry out research activities under some academic guidance from teachers or researchers. Finally, they should be able to work in a group, to present their results in written form and orally, and continue their academic education in a Master' degree programme.

The demand for skilled professionals in the field of biotechnology by the labour market provided a fresh impetus to add to the Bachelor's degree programme a new profile in biotechnology. As a result, the LOs were updated and new modules were incorporated into the programme (such as "Introduction to Biochemistry and Biotechnology"; "Basics of Biotechnology", and "Biotechnological Methods").

Graduates of the Master's degree programme General and Medical Biochemistry should have in-depth and systemic knowledge in their area of specialisation, can use and apply facts, concepts, principles, and theories as well as the practical aspects of the discipline and have a solid understanding of relates scientific areas. In the area of biochemistry, students should acquire the skills to use clinical biochemical laboratory methods e.g. for analysing compounds of blood, urine, and other liquids from organisms (lipoproteins, cholesterol, creatinine, electrolytes, transaminases, glucose, etc.). Furthermore, they should be able to use quantitative methods for analysing organisms.

Additionally, graduates should be able to independently carrying out scientific research activities, while assessing, interpreting, and processing biochemical data and information. They should also be able to work in laboratories and in the nature with living organisms under the observation of ethical norms and safety regulations. Moreover, they can work as team leaders, can set and explain tasks, and assign roles to the team members.

As a result of the cooperation between the Department of Biochemistry, Microbiology and Biotechnology and the National Center of Oncology named after V.A. Fanarjyan, the learning outcomes of the Master's degree programme General and Medical Biochemistry were revised and updated. Particularly, several new topics were added among them biochemical methods in clinical diagnosis, oncometabolism and its correlation with other diseases.

The experts confirm that the learning outcomes of both biochemistry programmes were defined taking into account the requirements of the National and International Qualifications Framework (NQF and EQF) for Bachelor's and Master's qualifications, as well as the current needs and demands of the labour market. In particular, the objectives of the degree programmes were developed to prepare qualified specialists equipped with theoretical knowledge and practical skills for diagnostics, pharmaceutics, phytobacteriology, sanitarian microbiology, as well as food production and health care.

Graduates of the biochemistry programmes can find suitable jobs in various areas such as biotechnological and biochemical laboratories and companies, food production and safety, cosmetic companies, healthcare and medical institutions, environmental organisations and monitoring services, agriculture, consulting services, and scientific organizations and research institutes.

The Bachelor's degree programme Pharmacy is designed to impart students with the necessary theoretical knowledge and practical skills in various fields of pharmacy such as pharmacy management and economics, production of drug substances, awareness of pharmaceutical properties, quality control and assessment of drugs, pharmacopoeia analysis, pharmacognosy, toxicology, and hygiene. Additionally, graduates should have sufficient knowledge in pharmacy related sciences (medicine, chemistry, and biology). Moreover, graduates should be able to carry out scientific research activities, understand and solve issues of production of drug substances in laboratories and the industry, as well as be able to deal with chemical and biological substances. During these activities, students should know and follow the necessary safety regulations, learn how to gather and process relevant pharmaceutical information, and be able to present the results.

Finally, graduates should have the professional competencies to work in drugstores, to certify drugs, and to implement quality control measures.

Graduates of the Bachelor's degree programme Pharmacy can be employed in public and hospital drugstores, drug circulation regulatory bodies and institutions (e.g., Ministry of Health of the Republic of Armenia, Health Inspectorate, the Scientific Center of Drug and Medical Technology Expertise etc.), pharmaceutical companies, and scientific research and educational institutions. Moreover, they are qualified to continue their academic studies on a Master's degree level either at YSU or at other universities in Armenia or abroad.

The Master's degree programme Pharmacy has the goal to impart profound and advanced theoretical knowledge and practical skills in various fields of pharmacy, especially in the organisation and management of pharmaceutical activities, drug production, and pharmacological effects of drugs, quality control and certification of drugs, toxicology, and hygiene.

Additionally, graduates should be able to independently carry out scientific research activities, be familiar with methodological characteristics and principles of modern technical equipment, be informed about current developments and regulations in the area of pharmacy, and know about economic competitiveness. Finally, graduates should be qualified to continue their academic education and join PhD programmes.

The experts confirm that the learning outcomes of both Bachelor's and Master's degree programmes Pharmacy reflect the nine internationally accepted competencies that a pharmacist should possess. A proficient pharmacist should be a caregiver, decision-maker, communicator, manager, life-long learner, researcher, teacher, leader, and entrepreneur. To this end, the pharmacy programmes are design to equip students with the necessary competencies, which will enable them to carry out professional activities in pharmaceutical agencies, pharmacies, pharmaceutical manufacturing companies, scientific research institutes, centres for drug evaluation, hospitals, customs, legal and other specialized commissions, as well as to pursue postgraduate studies in pharmacy and related fields.

Around 50 % of the Bachelor's students are planning to continue their academic education in a Master's degree programme either at YSU or at another university in Armenia or even abroad. With the respect to pharmacy, approximately half of the students will work as pharmacists in a pharmacy. In general, the job perspectives of the Master's and Bachelor's graduates are very good in Armenia, as there is a continuous demand for well educated young scientists e.g. in the area of diagnostics and health care.

In summary, the experts are convinced that the intended qualification profiles of all 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. The objectives and intended learning outcomes of all degree programmes under review are reasonable and well founded.

The experts conclude that the objectives and intended learning outcomes of the Bachelor's degree programmes Biochemistry and Biotechnology and the Master's degree programme General and Medical Biochemistry adequately reflect the intended level of academic qualification (EQF 6 for the Bachelor's programme and EQF 7 for the Master's programme) and correspond sufficiently with the ASIIN Subject-Specific-Criteria (SSC) of the Technical Committee 10 – Life Sciences.

In a similar way, the objectives and intended learning outcomes of the Bachelor's degree programmes Pharmacy and the Master's degree programme Pharmacy comply with the intended academic qualification (EQF 6 for Ba Pharmacy and EQF 7 for Ma Pharmacy).

Criterion 1.2 Name of the degree programme

Evidence:

- Self-Assessment Report

Preliminary assessment and analysis of the experts:

The names of the degree programmes are approved by the Decision of the Government of the Republic of Armenia on Specialties and Qualifications of Higher Professional Education.

No cases of misunderstanding and disagreement regarding the programme names have been reported by the teaching staff or students.

The experts confirm that the English translations and the original Armenian names of all four degree programmes under review correspond with the intended aims and learning outcomes of the respective degree programme.

Criterion 1.3 Curriculum

Evidence:

- Self-Assessment Report
- Study plans of the degree programmes
- Module descriptions
- Homepage YSU: https://www.ysu.am/en
- Homepage Institute of Pharmacy: https://www.ysu.am/en/faculty/495
- Homepage Ba Pharmacy: http://www.ysu.am/education/en/1663930073
- Homepage Ma Pharmacy: http://www.ysu.am/education/en/1663930021
- Homepage Faculty of Biology: https://www.ysu.am/en/faculty/87
- Homepage Ba Biochemistry and Biotechnology: http://www.ysu.am/education/en/1663073634
- Homepage Ma General and Medical Biochemistry: http://www.ysu.am/education/en/1663331375
- Discussions during the audit

Preliminary assessment and analysis of the experts:

The biochemistry programmes under review are offered by the Department of Biochemistry, Microbiology and Biotechnology, which is part of the Faculty of Biology. The Depart-

ment of Pharmacy is responsible for the Bachelor's and Master's degree programmes Pharmacy. Each semester is equivalent to 15 weeks of learning activities. Besides these learning activities, there is usually one week for each of the two midterm exams and for the final exams.

The Bachelor's degree programme Biochemistry and Biotechnology is designed for four years with 240 ECTS points, including 20 ECTS points for the Bachelor's thesis (Graduate Work), and is offered as a full-time programme. It consists of general modules (40 ECTS points) and professional modules (200 ECTS points), which include compulsory and elective courses (16 ECTS points) as well as "Educational Practice" (2 ECTS points), "Professional Practise" (6 ECTS points) and "Graduate Work" (20 ECTS points). The programme covers such professional courses as "Introduction to Biochemistry and Biotechnology", "Biochemical Methods", "Biotechnological Methods", "Biochemistry 1, 2, 3", "Ecology and Environmental Biotechnology", "Basics of Biotechnology", "Microbiology and Virology", "Plant Physiology and Biochemistry", which treat the main areas of biochemistry and biotechnology. In addition, courses in natural sciences as well as mathematics and statics are offered. This includes courses such as "Applied Statistics and Data Analysis", "Mathematics 1, 2", "Physics 1, 2", "Organic Chemistry", "Analytic Chemistry", and "Inorganic Chemistry". The general modules are offered in the first three semesters and cover subjects such as history, languages (Russian, English/French/German), physical education, law, philosophy, and IT.

Since 2017, the curriculum of the Bachelor's degree programme Biochemistry and Biotechnology underwent several changes, which were based on the feedback from employers and students/graduates. For example, the laboratory courses were broken down into two separate parts- "Biochemical Methods" and "Biotechnological Methods", which provide students with practical skills and professional competencies for carrying out specialized laboratory work. In 2018, the course in "Microbiology and Virology" was expanded and a research component was added, in order to better prepare students for conducting research activities. Additionally, the courses "Plant Physiology and Biochemistry", "Biochemistry of Biomembranes", "Biophysical Chemistry", "Basics of Biotechnology", "Bioenergetics", "Introduction to Biochemistry an Biotechnology" were introduced and updated. The new courses should enable students to acquire practical skills for working with modern equipment, master innovative biochemical, microbiological, and biotechnological methods and applying them in relevant fields.

The Master's degree programme General and Medical Biochemistry is designed for two years with 120 ECTS points, including 27 ECTS points for the Master's thesis and is offered as a full-time programme. The curriculum covers general modules (15 ECTS points), professional modules (60 ECTS points) and research modules (45 ECTS points). The general modules include the two compulsory courses "IT Technologies" and "Research Planning and

Methods" as well as two electives (languages). The professional modules cover the different areas of biochemistry with a special focus on medical aspects in order to gain essential competencies as the analysis and interpretation of laboratory results, evaluation of metabolic changes in pathological conditions, and the application of biochemical methods. This includes compulsory courses such as "Medical Biochemistry", "Clinical Biochemistry", „Spectroscopic Methods", "Special Chapters in Enzymology", „Regulation of Microbial Metabolism", "Cellular Mechanisms of Drug Action", „Biomembranes in Norm and Pathology", and "Biochemistry of Organ System". Additionally, students can choose 21 ECTS points from elective courses. The research modules include four scientific seminars, one in each semester, professional practise (6 ECTS points) and the Master's thesis (27 ECTS points).

Similar to the Bachelor's degree programme, several changes were implemented in the curriculum of the Master's degree programme. In 2019, the new courses "Regulation of Microbial Metabolism", "Microbial Metabolism and Antibiotics", "Food Biochemistry and Safety", "Biochemistry of Emergency Situations and Stress Response" were introduced. The goal is to ensure that graduates are able to present the biochemical indicators during various metabolic processes, are able to evaluate the biological value of plant-based food products and know about current issues with regard to food safety, and are able to analyse the age characteristics of pharmacotherapy as well as apply the principles of rational antibiotic therapy.

Both Biochemistry programmes offer students the opportunity to gain work practice in a company. The Bachelor's degree programme Biochemistry and Biotechnology includes an educational work practice (internship) with duration of two weeks and one professional-industrial work practice with a duration of four weeks. During the 5th to 8th semesters of Bachelor's studies, students may also undertake a pedagogical work practice, which is an elective. The Master's degree programme General and Medical Biochemistry includes one professional work practice with a duration of two weeks. It is designed to equip students with the analytical skills and competences to present research findings. It is monitored by the scientific supervisor of the Master's thesis.

Educational work practice is conducted in the YSU educational-industrial centres, while professional work practice is conducted in research and scientific-industrial centres, food control institutions, and diagnostic laboratories, as well as in other specialized organisations that have the necessary facilities, resources, and specialists. The work practice should help students to improve their knowledge and skills by utilising modern equipment and by applying innovative methods of biochemistry and biotechnology. Educational and professional practices are assessed as a pass-fail assessment. Students pass if she/he has participated in the work practice, completed the tasks specified by the programme, and

submitted a final report on the practice or completed the internship diary (opinion-description) within the specified period.

The optional pedagogical work practice lasts eight weeks and takes place in different secondary schools in Armenia. It allows students to gain teaching skills and learn various teaching methods. It is assessed through a final exam.

The Bachelor's degree programme Pharmacy is designed for four years with 240 ECTS points, including 20 ECTS points for the Bachelor's thesis (graduation project), and is offered as a full-time programme. The curriculum consists of general modules (44 ECTS points) and professional modules (196 ECTS points), which include compulsory and elective courses (4 ECTS points) as well as "Educational Practice" (2 ECTS points), "Professional Practise 1, 2" (11 ECTS points) and "Graduate Work" (20 ECTS points). The programme covers such professional courses as "Biotechnology", "Pharmaceutical Chemistry 1, 2, 3", "Pharmacological Technology 1, 2, 3", "Pharmacology 1, 2", "Pharmacology Management and Economics 1, 2", "Pharmacognosy 1, 2", "General Hygiene", and "Bioethics", which treat the main areas of pharmacy. In addition, courses in natural sciences as well as mathematics are offered. This includes courses such as "Mathematics", "Biology", "Botany", "Physics", "Organic Chemistry 1, 2", "Analytical Chemistry", "Biochemistry", and "Bioorganic Chemistry". The general modules are offered in the first three semesters and cover subjects such as history, languages (Russian, English/French/German), physical education, law, philosophy, and IT.

The Bachelor's degree programme Pharmacy includes a field work practice (internship) with a duration of two weeks and two professional-industrial work practices with a total duration of 11 weeks. The latter are held in the country's leading pharmaceutical manufacturing organisations and pharmacy chains. The work practices are designed to help students to better learn about manufacturing and quality control of drugs, and the respective technological and sanitary regulations.

During the work practices, students are assigned supervisors from the respective YSU departments and pharmaceutical companies. They closely cooperate with each other throughout the work practice. The internships are assessed as a pass-fail test. Students pass if she/he has participated in the work practice, completed the tasks specified by the programme, submitted the work practice diary within the specified period, and received the recommendation of the supervisors.

The Master's degree programme Pharmacy is designed for two semesters with 60 ECTS points, including 14 ECTS points for the Master's thesis, and offered as a full-time programme. The curriculum covers general modules (8 ECTS points), professional modules (30 ECTS points) and research modules (22 ECTS points). The general modules include three

compulsory courses “IT Technologies in Professional Field”, “Research Planning and Methods”, and “Contemporary Issues of Profession” as well as one elective (languages). The professional modules cover the different areas of pharmacy with a special focus on pharmaceutical manufacturing, drug distribution, quality assessment, storage, sale and monitoring, and pharma-economics. This includes compulsory courses such as “Pharmaceutical Technology”, “Pharmaceutical Care”, “Methods of Drug Structure Analysis”, “Pharmaceutical Management and Economics”, “Basics of Good Manufacturing Practice”, “Clinical Pharmacology”, “Biotechnology”, and “Technology of Cosmetic Preparation”. Additionally, students can choose 4 ECTS points from elective courses. The research modules include a scientific seminar (2 ECTS points), professional practise (6 ECTS points), and the Master’s thesis (14 ECTS points).

The Master's degree programme Pharmacy includes a professional work practice (internship) that aims to help students developing research and teaching skills. It is monitored by the scientific supervisor of the Master's thesis.

As explained in the Self-Assessment Report, there are some problems with regard to clinical pharmacology. Despite the fact that it is one of the essential directions of pharmacology, it is an underdeveloped field in the Republic of Armenia. Even though the degree programmes include courses in pharmacology and clinical pharmacology, the graduates do not have the required degree of competences to meet the demands of the labour market. To solve this issue, regular discussions are held in the Ministry of Health of the Republic of Armenia and attempts are made to establish cooperations with major clinics in Armenia so that students will have a chance to do their clinical work practice (internship) there. In the SWOT analysis of the Master’s degree programme Pharmacy, this issue is outlined as a weakness and is incorporated in the programme’s improvement plan. In particular, it is planned to establish a vivarium at the Institute of Pharmacy within the next five years for carrying out laboratory work as well as research activities in the fields of pharmacology and pathophysiology. In addition, a course in pharmaceutical care will be added to the curriculum to teach students the outcome of a patient's drug therapy. The experts point out that it is a critical aspect of the Pharmacy programmes that by international standards, the scope of academic education in clinical pharmacy and pharmacology in the Master’s degree programme Pharmacy is very low and should be increased. Additionally, it would be useful to introduce Bachelor’s students to clinical pharmacy and pharmacology. To this end, the experts recommend establishing a fully furnished pharmacology lab at the Department of Pharmacy in the near future. Currently, YSU compensates for the lack by cooperating with different clinics and the national academy of sciences in Yerevan, where students can conduct practical work and internships as well as theses. However, this solution is not ideal and should only be temporarily, until YSU can provide the required facilities on its campus.

The programme coordinators also point out that despite the fact that both Bachelor's and Master's degree programmes Pharmacy cover professional work practices (internships), employers, particularly in pharmacy chains, require graduates to undergo additional training to get a job. Taking this into account, a pharmacy has been set up at the Institute of Pharmacy, where students can develop practical skills in pharmacy organisation and management.

Both pharmacy programmes have seen a number of improvements in recent years. The courses “Bioethics” and “Medical and Pharmaceutical Commodical Science” were incorporated in the Bachelor’s degree programme in 2017 and 2020 respectively in view of the ever-increasing demand of the labour market to be familiar with the wide range of medical products and their properties.

In 2019, independent research work (projects) was introduced to the curriculum of the Bachelor’s degree programme Pharmacy. These projects are part of some of the modules e.g., in “Pharmaceutical Technology”, “Pharmacognosy”, “General Hygiene”, and “Pharmaceutical Management and Economics”. The projects are designed to enable students to conduct research independently or as part of a team, and to analyse and present the research findings to an audience.

In 2018, the course “Pharmaceutical Technology” was removed from the Master's degree programme Pharmacy as it was already a part of the Bachelor's degree programme. This opened up space for the course in Basics of GMP with the practical classes held at a pharmaceutical company, where students learn about drug production activities and normative documents. In 2020, the course “Pharmacogenetics” was replaced by the course “Gene Therapy”, because gene therapy is a new direction in the treatment of certain diseases, and pharmacists play a key role here.

The experts discuss, why there are so many compulsory general modules in the first two semesters of the Bachelor’ degree programmes. As mentioned before, these modules cover topics such as such as history, languages (Russian, English/French/German), physical education, law, and philosophy. The programme coordinators explain, that this is based on a regulation by the Armenian Ministry of Education, Science, Culture and Sports which requires all Armenian universities to offer these subjects as compulsory modules in all Bachelor’s degree programmes. The experts understand that some general modules are useful for all Bachelor’s students, but the amount (40 ECTS points) and the lack of a choice does not appeal to them. Additionally, students confirm in the discussion with the experts, that they have already had these topics in high school and think it is not necessary to repeat them at university. Moreover, also the teachers would like to have more flexibility here and obviously a respective initiative was already brought to the attention of the Ministry. The experts support these plans and emphasise that it would be very useful to reduce the

amount of compulsory general modules in the first two semesters of the Bachelor's degree programmes could be in favour of more electives and subject-specific classes.

In the discussion with the experts, some students point out that for a better understanding of physiology, it would be useful to also offer a course in anatomy in the Bachelor's degree programme Biochemistry and Biotechnology. The experts understand that there is an introductory part in the physiology course, but it would be useful to expand this by offering an anatomy course as an elective.

After analysing the module descriptions and the study plans, the experts confirm that all 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 Department of Biochemistry, Microbiology and Biotechnology as well as the Department of Pharmacy guarantee 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

YSU 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. In case of international mobility when a student completes a certain period of study (a semester or a year) at a European university, the earned credits are recognized according to the ECTS regulations, i.e. according to the provisions of the tripartite agreement concluded in advance by the student and the sending and receiving universities. The recognition of domestic or intra-university mobility periods as well as the credits earned at other universities, is carried out in accordance with the procedures for transfer (recognition) of credits established by a relevant decision of the Armenian Government.

YSU's goal is to attract more international students and guest lecturers. To this end, YSU has established a budget for offering scholarships to them, YSU is strongly interested in building cooperations with high quality universities worldwide and international accreditation is one step to raise YSU's reputation and to foster internationalisation. For example, the Faculty of Biology has regularly guest lecturers from universities in Germany, Norway, Bulgaria, and Poland. Additionally, both the Department of Pharmacy as well as the faculty of Biology routinely organise an international scientific conference on current scientific topics enabling the teachers and the students to become familiar with the recent scientific achievements and advances in the field.

The Department of International Cooperation of YSU 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 YSU, such as helping with housing, visa issues, and other practical matters.

The Department of Biochemistry, Microbiology and Biotechnology cooperates with foreign universities such as Saarland University, Germany, University of Bergen, Norway, Arctic University, Norway, and Belgorod State National Research University, Russia. The cooperation includes two international exchange programmes with Saarland University and Arctic University and joint research groups.

Within the last five years (2017 – 2022), there were seven outgoing students from the Bachelor's degree programme Biochemistry and Biotechnology. All of them studied at Saarland University in Germany. During the same period, three Master's students went abroad. Two also studied at Saarland University and one at Arctic University, Norway. On the other hand, both Biochemistry programmes did not host any incoming students.

The experts note that the level of academic mobility is low in the case of both biochemistry programmes, but students have the opportunity to carry out the experimental part of the Bachelor's or the Master's thesis abroad. Additionally, YSU has been involved in the Erasmus+ mobility programmes of the European Union since 2014. The major obstacle for undergraduate students to engage in academic mobility is the low level of foreign language proficiency. This issue can be addressed by additional English language courses and by integrating English elements (e.g. presentations) in the regular courses.

The Institute of Pharmacy cooperates with several foreign universities and research institutions such as Belgorod National Research University, Russia, People's Friendship University, Russia, Moscow State University, University of Rostock, Germany, Wismar University, Germany, and the A.N. Nesmeyanov Institute of the Russian Academy of Sciences.

In the scope of the "Network University" project, for instance, YSU and the People's Friendship University of Russia (PFUR) concluded an agreement to implement a double Master's degree programme in Pharmacy. For three years, several students enrolled in the programme have received double diplomas of the Republic of Armenia and the Russian Federation by completing the 1st year of study at the PFUR and the 2nd year at YSU.

For about 10 years, a number of students of the Master's and Bachelor's degree programmes in Pharmacy have done their Bachelor's or Master's theses at the University of Rostock in Germany and Belgorod National Research University in Russia.

In the framework of the Master's degree programme in Pharmacy, two students from Belgorod State National Research University of the Russian Federation (in 2021) were accepted by the Institute of Pharmacy, where they carried out their final thesis research, as well as participated in second semester courses.

Within the Erasmus+ program, the Department of Pharmacy accepted one student from the University of Almeria, Spain (in 2019), who participated in the "Biotechnology" course of the Bachelor's degree programme in Pharmacy for one semester.

From the Department of Pharmacy, two students of Master's degree programme Pharmacy went to Belgorod State National Research University of the Russian Federation (in 2017 and 2018) and 3 students went to the University of Rostock in Germany (in 2018 and 2020) for papering their master's degree theses. On the other hand, in both pharmacy programmes there are several foreign students, but all of them have an Armenian family background (expatriates).

The experts notice that there are no special windows for individual mobility in the curricula of the degree programmes, but students can avail themselves of academic mobility. For instance, they can complete a certain period of their studies at a foreign university within the framework of Erasmus+, or do the Bachelor's or Master's thesis there and transfer the acquired credits to YSU.

The experts confirm that several opportunities for going abroad exist and YSU offers support and advice for students interested in exchange studies at a foreign university. However, the number of outgoing and incoming students is still low. Although, there are several international co-operations, only a few students take this opportunity and study abroad. Academic staff members can attend workshops and conferences abroad or can conduct their research activities at international universities.

During the audit, students mention, that they are interested in international mobility possibilities and that the credits acquired abroad are recognised at YSU. However, only few students take this opportunity and spend some time during their studies abroad. They explain that Armenian students are traditionally reluctant to study abroad. They explain this reluctance with personal and social reasons like strong ties to their families. Additionally, students are not very confident of their English proficiency.

The experts understand these reasons and see that academic mobility was severely impacted by the Corona pandemic, but the restrictions have been resolved and traveling and studying abroad is easily possibly again. However, it would be useful to encourage students to take part at long term (one or two semesters) academic mobility programmes (e.g. ERASMUS+) in order to study or conduct research projects at universities abroad.

The experts emphasise that it is very useful for students to spend some time abroad already during their Bachelor's studies to improve their English proficiency, to get to know other educational systems, and to enhance their job opportunities.

In summary, the experts confirm that opportunities for international educational exchange for students exist and students are well informed about the offers. Nevertheless, the academic mobility of the students is low and the experts recommend stronger encouraging students to spend some part of their academic education abroad. Additionally, the experts suggest establishing an official Erasmus coordinator in the Department of Pharmacy. If a position like this already exists, the students are not informed about this. The experts appreciate the efforts to foster international mobility and support YSU and the Department of Biochemistry, Microbiology and Biotechnology as well as the Department of Pharmacy to further pursuing this path.

Criterion 1.4 Admission requirements

Evidence:

- Self-Assessment Report
- Government Decision No. 597 of April 26, 2012 (Admission regulation to Bachelor's study programmes in Armenia)
- Government Decision No. 469 of April 1, 2021 (Admission regulation for foreign citizens to higher educational institutions in Armenia)
- Decision N 9/2 of YSU Academic Council of May26 2022 (Admission regulation to Master's degree programmes at Yerevan State University
- Discussions during the audit

Preliminary assessment and analysis of the experts:
As described in the Self-Assessment Report, the admission procedure for the Bachelor's programmes in Armenia is constituted by regulations issued by the Armenian Ministry of Education, Science, Culture and Sports and conducted through a nationwide unified exam after completing the high school or vocational school. The admission procedure is organised by the centralized professional body under the Armenian Government, which is called "Assessment and Testing Centre" (A&TC).

Applicants apply online to A&TC according to their preferences in terms of the higher education (HEI) institution and degree programme. They receive their individual schedule of the centralised exams (mainly written tests) and take them in the special places allotted by the Ministry. All applicants have to take part at a subject-specific exam which based on

their preferred degree programme. For example, applicants to the Bachelor's degree programme Biochemistry and Biotechnology or the Bachelor's degree programme Pharmacy need to take an examination in any two of the following subjects: chemistry, biology, and physics. After the end of the admission exam period (Jun-July), A&TC composes the final lists of the admitted student's by HEI and programme and provides them to HEIs. Only admission tests results are taken into account. In case of equal grade points between several applicants, the Grade Point Average (GPA) of high school diploma is considered.

According to the new regulation starting from 2020, high school graduates can apply only for one programme in one university, independent of the education mode (free- or tuition based). Before that (till 2019) they could apply for two Bachelor's degree programmes for tuition free education and six programmes for tuition based education in different universities.

YSU has only very limited influence on the national admission rules to the Bachelor's degree programmes. In the national Armenian system, school graduates with the highest score in the admission tests are awarded government grants and can choose their preferred university and degree programme.

The admission process for international students, is regulated by a relevant decision of the Armenian Government and consists of an interview conducted by YSU and the Ministry of Education, Science, Culture and Sports. It aims to test the applicant's level of proficiency in Armenian as well as subject-specific knowledge. YSU has a department of preparatory courses for international students, which admits foreigners holding a certificate of secondary education, including those who do not have a sufficient command of the Armenian language. Not only do they get a chance to deepen their knowledge in chemistry, biology, physics, etc., but also study Armenian.

For admission to the Master's programmes, applicants need to have a Bachelor's degree from a similar scientific background. Admissions within the same area of specialization takes place without any exams and is only based on the student's Grade Point Average (GPA) in the Bachelor's degree. International students and graduates form other Armenian universities than YSU applying for a Master's degree programme at YSU have to pass an additional interview/oral exam. The list of questions is provided to the applicants so that they can prepare for the oral exam.

The maximum intake per year is 46 students in the Bachelor's degree programme Biochemistry and Biotechnology, 60 students in the Bachelor's degree programme Pharmacy, 25 students in the Master's degree programme General and Medical Biochemistry, and 100 students in the Master's degree programme Pharmacy. However, this quota is not reached

by any of the four degree programmes. The number of newly enrolled students is on average below the number of available study places.

The number of available study places, applications, and newly enrolled students in the four programmes under review in the academic year 2021/22 is depicted in the following table:

Degree Programme	Maximum intake 2021-2022	Number of applications 2021-2022	Newly enrolled students 2021-2022
Bachelor Biochemistry and Biotechnology	46	40	33
Master General and Medical Biochemistry	25	10	10
Bachelor Pharmacy	60	77	48
Master Pharmacy	100	40	40

Table 1: Statistical data on enrolled students, Source: SAR YSU

The experts observe that the number of admitted students in all degree programmes under review is below the maximum intake. They ask the programme coordinator for the reason, why the annual intake is lower than the capacity of the programmes. The programme coordinators explain that if applicant do not achieve the required threshold score in the national admission test they are not admitted to the programme, even if there are more available places.

Tuition fees at YSU are different for Armenian students and foreigners. YSU has several financial aid programs that help students cover part of the cost of education. Additionally, the students with the highest scores in the national admission test receive a tuition waiver. If a student has good grades in his first semesters at the university, she or he can apply during the studies for a state grant. It is also possible to enroll on a fee-paid basis. The exact costs and information on the availability of scholarships can be found on the website of YSU. Currently, the tuition fees for Armenian students are 500 000 AMD (1120€) for the Bachelor's degree programme Biochemistry and Biotechnology, 500 000 AMD (1120€) for the Master's degree programme General and Medical Biochemistry, 500 000 AMD (1120€) for the Bachelor's degree programme Pharmacy and 650 000 AMD (1586€) for the Master's degree programme Pharmacy. International students pay a minimum of 2,500 USD.

In summary, the experts find the terms of admission to be binding and transparent. They confirm that the admission requirements support the students in achieving the intended learning outcomes.

Criterion 1.5 Work load and credits

Evidence:

- Self-Assessment Report
- Study plans
- Module descriptions
- YSU Regulation on Study Process Organisation
- Discussions during the audit

Preliminary assessment and analysis of the experts:
YSU 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, one ECTS point is awarded for 30 hours of students' workload. Details on the students' total workload in hours are presented in the module descriptions of each degree programme.

The students' total workload in both Bachelor's degree programmes under review amounts to 240 ECST points distributed over 8 semesters, with an average student workload of 30 credits per semester. On the hand, the Master's degree programme Pharmacy is designed for two semesters with a workload of 60 ECTS points, while the Master's degree programme General and Medical Biochemistry has a workload of 120 ECTS points in 4 semesters.

After each semester, the lecturer can adjust the amount of independent work as a result of oral or written inquiries from students and calculation of classroom activities. The allocation of credits for other modules such as work practice, independent work, and theses is based on the number of weeks provided for the fulfilment of the respective tasks. The further details of workload calculation are described in the YSU Regulation on Study Process Organisation.

The experts point out that the module descriptions need to include information about the students' total workload (including the time needed for self-studies) in hours per semester (see criterion 4.1). Currently, only the attendance time in lectures and practical laboratory work is mentioned in the module descriptions.

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. Several students, especially in the Master's degree programmes, work besides studying and it possible to combine this, because the workload at the university is not too high and the schedule has some flexibility.

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:
During the classes, active and interactive teaching methods (e.g. lectures, discussions, reports, presentations, and group work) are applied. YSU 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.

Teachers are encouraged and supported in using different and modern teaching and learning methods, including collaborative learning, mobile learning and gamification, use of video materials, flipped classroom, and blended teaching. YSU also has several active learning classrooms and a lecture capture video-studio where lectures can be recorded and streamed.

In addition, YSU has established the "Teaching Excellence Award", which is awarded to those teaching staff members who best utilise innovative teaching and learning methods. To support these opportunities, YSU runs a Moodle-based online learning and teaching management platform, where the faculty members can employ modern digital teaching tools. The students confirm that the digital platform works fine, and that it is used by some teachers for offering hybrid teaching methods like flipped classroom. On this digital platform students can also access their schedule, the exams, and the results.

Moreover, students actively participate in the "International Youth Conference" held annually by the YSU Student Scientific Society (SSS), where they get a chance to present the findings of their independent research works, listen to the talks of leading specialists representing various fields and take part in the organisation of the conference.

In summary, the experts consider 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 thank YSU for explaining, that the Master's degree Pharmacy already includes a six-credit course in clinical pharmacology. However, the Bachelor's degree programme Pharmacy does not include a course in clinical pharmacology, and the experts support the plan of including a course called "Fundamental Principles of Clinical Pharmacology" with a three-credit workload in the Bachelor's degree programme in the upcoming academic year.

With respect to pharmacology, this topic is included in two semesters of the Bachelor's degree programme Pharmacy with a total workload of 12 credits. The Master's degree programme Pharmacy does not include a course in pharmacology, and YSU considers including "Therapeutic Pharmacology" in the Master's degree programme. The experts support this idea.

The experts appreciate that YSU recognises the necessity of establishing a fully furnished pharmacological lab at the Department of Pharmacy and plans to establish and equip this laboratory by the end of 2024.

Reducing the amount of non-subject-specific courses in the two Bachelor's programmes is highly supported by the experts. To this end, they are glad that the general education component of both Bachelor's programmes will be reduced from 44 ECTS points to 27 ECTS points, starting from the next academic year. Instead, more elective and subject-specific courses will be offered.

The experts appreciate that YSU will split the course "Human & Animal Physiology" into two separate courses "Human Anatomy" and "Human & Animal Physiology" In order to take the importance of human anatomy into account. The new modules will be offered starting from the academic year 2024/2025.

Establishing a Language Centre at YSU would be very useful and would help further improving the students' language training. The experts also support the plan of integrating some English related elements in the regular courses, such as making presentations, writing assignments, and conducting literature analysis in English.

The experts are glad to hear that YSU will foster students' academic mobility, e.g. by establishing more international cooperations and by encouraging students to spend one or two semesters abroad. They thank YSU for pointing out, that there is already an Erasmus coordinator in each faculty. However, the students do not seem well informed about this fact.

The experts consider criterion 1 to be mostly fulfilled.

2. Exams: System, concept and organisation

Evidence:

- Self-Assessment Report
- Module descriptions

- YSU Regulation on Study Process Organisation
- Discussions during the audit

Preliminary assessment and analysis of the experts:
According to the Self-Assessment Report, there is a period for midterm exams and a period for the final exams. The form of the exams for each module (e.g., written and oral exams, reports, independent works, papers) is specified in the module descriptions. Periods of examinations are scheduled in the Academic Calendar, which is announced via the YSU homepage.

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 sum of all points, for the midterm exams and the ongoing monitoring, are entered into the electronic journal by the teacher.

During the examination period the students must take all exams according to the schedule in strict accordance with the individual study plan. In some cases (due to illness, family emergency and other similar reasons) a missed exam can be retaken. Students who have not shown up for a midterm exam or pass-fail assessment shall re-take it within five days after the recovery according to the schedule approved by the dean's office. Students missing the final exam for a valid reason shall retake it during the re-sit period. Students can retake a failed exam twice if at the given semester the sum of his/her failed course credits does not exceed 12 ECTS points. The further details are described in the YSU Regulation on Study Process Organisation.

At YSU, a 20-point scale is used for assessing a student's learning results. The minimal positive assessment threshold is 10 points. The assessment scale is presented below:

Assessment resultant point	Grade
18-20	*«Excellent»*
14-17	*«Good»*
10-13	*«Satisfactory»*
0-9	*«Unsatisfactory»*

Table 2: Assessment Scale, Source: SAR YSU

On average, there are four to five exams per week in Bachelor's programmes and students can achieve 5 points per mid-term and 10 for the final exam. The YSU regulations allows more flexibility in the master's degree programmes and other forms of assessment (research, presentations etc.) are applied.

YSU offers additional support for students with disabilities, who are provided with personal assistance. Thus, for example, students with hearing impairment are assigned a sign language interpreter who helps them throughout their studies including the exam periods.

The final exams are conducted in various forms. Oral exams are applied in a number of modules, tests are PC based; and most final exams are written exams. A detailed examination plan is handed out to the students at the start of each semester.

The experts observe that there are a lot of exams in the Bachelor's degree programmes. By YSU regulation, there may not be more than five first mid-term, five second mid-term, and five final exams, so in total, students can have a maximum of 15 exams per semester. This is a lot of exams per semester and YSU should think about reducing the number and giving teachers more flexibility in determining the amount and form of exams. A process to this effect process has been started two years ago and the experts encourage YSU to continue on this path and give teachers more flexibility in choosing the forms and numbers of assessments, as it is already possible in the Master's degree programmes.

The experts inquire about the Bachelor's and Master's theses and would like to know, whether these are done at the university or externally at companies or research institutions. They learn that several students, especially in the Master's degree programmes, do their final thesis at external research institutions (e.g. National Academy of Science) or in private companies. 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.

Students are well informed about the different research projects of the teachers and what possible topics for theses they offer, most master's students continue their research project from the Bachelor's programme and conduct their master's thesis in the same laboratory. However, it is also possible to choose a new or different topic and laboratory.

In cases where the student does not show up for the exam due to childbirth, she is allowed to take the exam at her earliest convenience, wherefore she submits a written notice to the Dean. YSU also has additional support tools during the exams for students with disabilities, who are provided with personal assistance by the teaching and support staff. A relevant specialist is designated to provide additional assistance in the educational process.

Every student in the programmes under reviews required to do a final project (Bachelor's, Master's thesis). The Bachelor's thesis is a scientific work report written by students in the Bachelor's programme that focuses on a specific and usually consists of literature study, practical research, data analysis and presentation in figures or tables, and writing the thesis under the supervision of a teacher. Students can choose topics for their thesis according to the areas offered by the research groups of the different departments. In addition, students

can develop their own ideas and look for a suitable supervisor. It is also possible to conduct the thesis outside YSU in the industry or at a research institute.

The preparation and defense of the Bachelor's thesis is carried out in the 8th semester. By the end of the 7th semester, all students should have assigned topics and supervisors for their Bachelor's thesis. Preparation of the thesis work is carried out under the guidance and supervision of the supervisor. The pre-defense of the thesis is carried out with the participation of the heads of the degree programme as well as the supervisor of the student's graduate work. The public defense of the Bachelor's thesis is carried out in accordance with the regulation "Conducting the final attestation of graduates of higher educational institutions of the Republic of Armenia", which is approved by the Ministry of Education, Science, Culture and Sport of the Republic of Armenia.

The Master's thesis is an academic paper, which includes an independent in-depth study of a scientific topic and which creates innovation or provides new contributions to the scientific or technological development of respective scientific area, in this case biology or neurosciences. The Master's thesis is conducted with the guidance of the thesis advisor, the results need to be presented in a public defense. The further details are described in the "Regulation on the Completion and Assessment of Master's Degree Thesis in Yerevan State University".

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

If students do not agree with a grade, they have the right to appeal on the day of publishing the grades by requesting the assessing lecturer or the exam board to re-evaluate the grade. In cases where the appeal is not granted they can submit a written notice on the same day to the Department Head and to the Dean. The students confirm that they are informed about the appealing process and that there have been successful cases in the past.

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:

The experts appreciate that YSU will reduce the number of mid-term and final exams per semester. For instance, the number of final exams is now limited to 4 for the 1st and 2nd years of study, and for the 3rd and 4th years of study it is limited to 5. Starting from the academic year 2024/25, the Bachelor's degree programmes Pharmacy and Biochemistry and Biotechnology will follow this example. They also appreciate that the new regulation on student assessment gives the teachers more flexibility in determining the forms of the mid-term exams.

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 YSU, the staff members have different academic positions. There are professors, associate professors, assistant professors, lecturers, and teaching assistants. The academic position of each staff member is based on research activities, publications, academic education, supervision of students, and other supporting activities. The responsibilities and tasks of a staff member with respect to teaching, research, and supervision depend on the academic position. In addition, there are non-academic staff members consisting of librarians, technicians and administrative staff. The number of teachers is based on the number of students in the respective degree programme.

The number of professors and lecturers in the different degree programmes according to their academic position and the share of teachers with a PhD degree in the academic year 2021/22 is depicted in the following table:

Degree programme	Number of students	Number of professors	Number of associate professors	Number of assistant professors	Number of lecturers	Number of teaching assistants	Share of teachers with a doctorate
Ba Biochemistry and Biotechnology	104	1	9	6	-	7	70%
Ma General and Medical Biochemistry	25	4	7	3	-	4	78%
Ba Pharmacy	158	5	24	19	10	8	62%
Ma Pharmacy	40	2	5	7	1	8	61%

Table 3: Statistical data on teaching staff and their academic position, Source: SAR YSU

The teaching staff from Armenia is supplemented by visiting international professors. For example, three of the Master's courses in the General and Medical Biochemistry programme (Food Biochemistry and Safety; Medical Biochemistry 1; Clinical Biochemistry 1) are taught by visiting professors. They also supervise Bachelor's graduation papers and Master's theses as well as serve on defence commissions as chairs or members. In addition, technical staff, such as laboratory assistants and technicians, are employed to carry out the laboratory courses.

The experts discuss with the programme coordinators the composition and qualification of the teaching staff. They learn that the reason why the share of teachers with a doctorate is not 100 % in the Master's degree programmes is that several lecturers come from private companies and are experts in their specific field but do not have doctorate. However, full professors and associate professors need to have a doctorate, assistant professors need to have at least a Master's degree.

The experts observe that almost all of the members of the teaching staff conduct research activities and involve students in them. The experts conclude that the research activities carried out by the teaching staff are in line with and support the level of academic qualification aimed at.

The experts discuss with YSU's management how new staff members are recruited. They learn that every year the faculties and departments announce their vacancies to YSU's management, which subsequently announces the vacancies publicly. New teachers receive a contract for one year and if they perform well, they receive a contract for additional three or five years. However, these contracts have to be prolonged after the time limit is reached.

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 teachers at YSU spend on average between 600 and 700 hours per year on teaching

activities, which includes giving lectures but also supervising lab work and grading papers. The members of the teaching staff confirm during the audit that their teaching load is quite high and some reduce their teaching hours (which results in a lower wage) or work late in the evenings in order to have more time for conducting research activities. The experts see that the average teaching load is quite high by international standards, but YSU has already recognised this issue and a new regulation allows teachers to spend an additional 50 hours on 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

As described in the Self-Assessment Report, YSU has the Center for Continuing Education, which implements various training programmes for enhancing the teaching staff qualification. It offers long-term and short-term educational programmes and organises public lectures, seminars, summer schools, and workshops for students, professors, researchers, etc.

There is a credit system-based scientific-educational programme with a duration of 5 years aimed at developing the professional competencies and pedagogical skills of the teaching staff. It encompasses educational and research components with compulsory and elective courses.

In addition, YSU runs a number of other programmes to help faculty members developing their research, pedagogical, and professional skills as well as encouraging them to utilise innovative teaching methods and technologies and promoting and spreading the best practice. To promote a better research culture and encourage faculty members to use up-to-date methods, YSU operates a monetary incentive scheme offering bonuses to successful teachers. The YSU Annual Award for Excellence in Teaching, was introduced in 2020 seeking to motivate lecturers to adopt innovative and productive teaching methods and disseminate best practice within the university.

Moreover, members of the teaching staff regularly undergo training organised within the framework of various international programmes. For example, in 2017, the ERASMUS+ programme “Promoting Innovative Teaching and Learning to Enhance Student Learning Experience in Eastern Partnership Countries (Printel)” was implemented at YSU. The primary goal was to introduce and promote modern interactive and technologically enhanced methods of teaching and learning.

The programme coordinators and department heads regularly conduct classroom observations to monitor and adjust lecturers’ performance to assess whether or not they adopt

and apply innovative and effective teaching methods in the classroom. Lecturers' performance is also evaluated through students' surveys conducted at the end of the semester, the results whereof are discussed during departmental meetings and the scientific council of the faculty. Those discussions aim to help the members of the teaching staff to improve their instructional strategies and methods and to promote their career advancement.

The experts discuss with the members of the teaching staff the opportunities to spend time abroad and to participate in international projects. They learn that there are several international cooperations and that there is a special fund for financing the participation at international conferences. A sabbatical – in the sense of an extended period of time, when university teachers are allowed to stop their usual work in order to follow their research interests - is not possible at YSU or at any other Armenian university, but teachers can spent a couple of weeks abroad and conduct their research activities there while some other teacher covers their teaching load.

In general, the experts gain the impression that several opportunities for teachers exist to spend time abroad and to participate in international projects. The teachers confirm this positive assessment and state their satisfaction with the existing opportunities. Moreover, the experts see that the continuous development programme of teaching staff, which have been operating at YSU since 2007, is aimed at improving the quality of programme delivery, especially at introducing innovative and technology-enhanced interactive teaching approaches in the classroom. Finally, the experts confirm that YSU offers sufficient support mechanisms and opportunities for members of the teaching staff who wish to further develop their professional and teaching skills.

Student Support

Each year of students has a "curator" who is a teacher and acts as a students' advisor. They provide students with relevant information about the study programmes and educational processes. Additionally, students can always contact the respective programme coordinator and individual teachers.

Until 2021, there were no psychological services at YSU provided to students. For this reason, the "Psychological Support Laboratory" has been established in 2021. It offers individual and group consultations, which are provided by Master's degree students of the department of Psychology under the supervision of experienced psychotherapists

Students can also get assistance from the YSU Alumni and Career Center to connect with potential employers and find a suitable job after graduation. The YSU Center for Student Affairs aims to promote cooperation between YSU student organisations (Student Council, Student Scientific Society) and the Rectorate. Students enrolled in the degree programmes can receive the support of the Student Council and the Student Scientific Society, which

regularly organise scientific and cultural events, awareness days, entertainment programmes, etc.

Regrettably, not many students are able to participate in grant-funded research projects at the departments. The level of students' foreign language proficiency is rather low since there are no foreign language communication clubs at YSU, where students could improve their English proficiency and hone their communication skills in an informal setting.

The expert group notes approvingly the good and trustful relationship between the students and 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:
Basic funding of the degree programmes under review and the respective facilities is provided by YSU, the Department of Pharmacy, and the Department of Biochemistry, Microbiology and Biotechnology.

The experts discuss with the teachers what resources are available for conducting research activities. The teachers explain that, on the one hand, funding can be applied for from YSU and the Armenian government and, on the other hand, there are some joint research projects with private companies or public institutions through which additional funding can also be obtained. Furthermore, additional funds (e.g. from the EU) can also be obtained through participation in international projects. The experts consider it particularly positive that both Bachelor's and Master's students are involved in these research projects and that most of the teachers conduct research activities and that many applied research projects with a direct connection to local problems and issues are carried out.

The Faculty of Biology operates two research centers: the Center of Excellence for Applied Biology and the Innovative Center for Microbial Biotechnology and Biofuels. The Faculty of Biology conducts scientific research mainly in molecular and cellular biology, molecular biophysics, membrane biophysics, biochemistry, botany and mycology, microbiology,

microbial and plant biotechnology, human molecular genetics and cell genetics, genetic engineering, zoology and histology, human and animal higher nervous physiology, as well as in the direction of ecology and environmental protection of biocenoses.

The majority of lecturers teaching in the biochemistry programmes conducts scientific research activities. They are also involved in state and international research grant projects as research associates or principle investigators. The new equipment acquired through grant funds helps introduce new teaching methods and update the laboratories. The Microbial Biotechnologies and Biofuel Innovation Center was opened in 2018, co-financed by YSU, the Armenian Government, and the World Bank. It is equipped with modern instrument, which is especially lauded by the experts.

Most of the teaching staff at Department of Pharmacy is involved in research projects, with a focus on bio-organic syntheses of potential pharmacologically active compounds, the development of new methods for controlling drug chemical structure quality, biomedical screening, medicinal plants growing in the territory of the Republic of Armenia, and the biotransformation and toxicological properties of drugs.

During the on-site visit, the experts can see for themselves that the laboratories are equipped with the necessary basic equipment as well as with some advanced and modern laboratory equipment, but that there are a number of outdated instruments in the teaching laboratories of the Faculty of Biology (e.g. laminar flow hoods, microscopes). This impression is confirmed by both the students and the teachers, who, in conversation with the experts, assess some of the technical material equipment of the teaching laboratories as worthy of improvement.

In addition, the experts critically remark that the budget for running the devices in the laboratories, for maintenance and spare parts as well as for chemical reagents for the laboratory experiments should be increased, so that all the experiments can be carried out.

On the other hand, the research laboratories are well equipped, especially the Microbial Biotechnologies and Bio-fuel Innovation Center and Scientific and Educational Center for Drug Quality Control and Monitoring. Here modern and sophisticated dives are available for teachers and advanced students to conduct their research activities and final projects (theses).

The most critical point from the experts' point of view is the fact that all the laboratories in the Department of Pharmacy as well as in the Faculty of Biology do not follow 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.

Students should be trained in the right use of the equipment (e.g. the need to change contaminated gloves before touching a door handle or a keyboard, which also might be used by persons not wearing safety gloves). The personal protective equipment should be stored separately from street clothes. In addition, working safety hoods should be available in all labs (with exhaust to the outside) and chemicals and solvent containers should be labeled properly and be stored in special lockers with exhausts leading outside the labs. Moreover, there should be emergency exits signs and posters with the safety regulations. Finally, it is important that all students know how sterile work in a laboratory is conducted and that at least once year a safety inspection of the laboratories should be done. This does not only include wearing gloves, but also hair should be covered and pipette tips need to be changed for different reagents. The teachers need to make sure that all students are familiar with sterile work, especially if they are preparing personnel for further work in diagnostic laboratories.

The experts stress that it is very positive that students at YSU get sufficient practical experience by working in laboratories from the first semester, as practical laboratory work is essential to promote students' learning of science and scientific skills. However, there are many hazardous substances and instruments used in the laboratories, which causes a significant risk of accidents and presents a danger to human health, and the natural environment. This demands care in order to protect human health, conserve the natural environment and to prevent laboratory accidents. As a consequence, YSU needs to draw up a plan, how the internationally accepted safety standards are adopted in all laboratories in the near future.

During the audit, the students express their general satisfaction with the available resources and conditions of studying, thereby confirming the positive impression of the expert group. The students also express their satisfaction with the library and the available literature there. Remote access via VPN is possible and YSU offers access to several scientific digital databases and students can access current scientific papers, e-books, and papers.

In summary, the expert group judges the available funds, the technical equipment, and the infrastructure (laboratories, library, seminar rooms etc.) to comply – besides the mentioned restrictions – with the requirements for adequately sustaining the degree programmes.

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

The experts thank YSU for explaining that the average total workload of the teaching staff member is 710 hours per year, while the classroom/contact hours on average equal to 420

hours. Additionally, in 2023/24 a new regulation has been introduced, which allows teachers to spend additional 50 hours on research activities, correspondingly reducing the teaching staffs' workload.

The experts point out that from their point of view some of the technical equipment in the teaching laboratories is outdated and should be replaced. They appreciate that equipment maintenance and upgrading is a priority for YSU and it is planned to purchase new microscopes. Providing additional funds of 10 million AMD for supplying the educational laboratories of the Faculty of Biology and Institute of Pharmacy with the necessary chemical reagents, spare parts and other laboratory materials/supplies starting from September 2024 is a very good starting point.

The experts appreciate that they take the experts' comments regarding the safety measures in the laboratories seriously and that they will introduce several measures (providing basic personal protective equipment, training students in the right use of the laboratory equipment and protective means, installing special cupboards for separate storage of the personal protective equipment, putting up will emergency exit signs and posters with the safety regulations, installing working safety hoods with exhaust to the outside, as well as special lockers with exhausts leading outside the labs to store properly labelled chemicals & solvent containers, and conducting annual safety inspections of the laboratories). The experts expect YSU to verify the implementation of these measures 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 YSU: https://www.ysu.am/en
- Homepage Institute of Pharmacy: https://www.ysu.am/en/faculty/495
- Homepage Ba Pharmacy: http://www.ysu.am/education/en/1663930073
- Homepage Ma Pharmacy: http://www.ysu.am/education/en/1663930021

- Homepage Faculty of Biology: https://www.ysu.am/en/faculty/87
- Homepage Ba Biochemistry and Biotechnology: http://www.ysu.am/education/en/1663073634
- Homepage Ma General and Medical Biochemistry: http://www.ysu.am/education/en/1663331375
- Discussions during the audit

Preliminary assessment and analysis of the experts:
The students, as all other stakeholders, have access to the module descriptions via the respective programme's homepage.

After studying the module descriptions of the Master's degree programmes, the experts observe that the module descriptions include almost all necessary information. However, the experts stress that all module descriptions need to include the detailed information about students' total workload, which includes contact hours as well as time needed for self-studies in hours per semester. Additionally, the module descriptions need to make transparent how the different exams contribute to the final grade (e.g., first mid-term exam 25 %, second mid-term exam 25 %, and final exam 50 %). Currently, only the attendance time in lectures and practical laboratory work is mentioned in the module descriptions and if there is more than one exam, it is not clear how the courses' final grade is calculated.

Criterion 4.2 Diploma and Diploma Supplement

Evidence:

- Self-Assessment Report
- Sample Transcript of Records 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 Diploma and a Diploma Supplement after graduation. The Diploma consists of a Diploma Certificate and a Transcript of Records. The Diploma Supplement contains almost 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. However, the Diploma Supplement does not include any statistical data on the assessment results in the respective degree programme as stipulated by the ECTS guidelines. YSU should close this gap.

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 auditors confirm that the rights and duties of both KazNU and the students are clearly defined and binding. All rules and regulations are published on the university's website and the students receive the relevant course material at the beginning of each semester. This includes a syllabus, which contains more detailed information about the course's content, the exams and the exam schedule that the module descriptions.

In addition, all relevant information about the degree programmes (e.g., module handbook, study plan, intended learning outcomes) is available on the English homepages of the programmes.

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

The experts confirm that YSU has updated the module descriptions of all four programmes under review. The module descriptions now include the required information on the students' total workload and the contribution of the different exams to the final grade.

YSU has updated the Diploma Supplement, which includes statistical information on the distribution of the GPA. The experts are satisfied with the provided samples.

The experts consider criterion 4 to be fulfilled.

5. Quality management: quality assessment and development

Evidence:

- Self-Assessment Report
- YSU Quality Assurance Policy
- Discussions during the audit

Preliminary assessment and analysis of the experts:

The experts discuss the quality management system at YSU with the representatives of the Rector's Office and the programme coordinators. They learn that there is an institutional system of quality management aiming at continuously improving the degree programmes. This system relies on internal as well as external quality assurance. Internal quality assurance encompasses all activities focused on implementing measures for improving the teaching and learning quality at YSU. The Quality Assurance Center is an independent structural unit of Yerevan State University, whose mission is to implement internal quality assurance mechanisms and promote a culture of continuous quality improvement in the university.

The organisational structure of YSU is depicted in the following diagram:

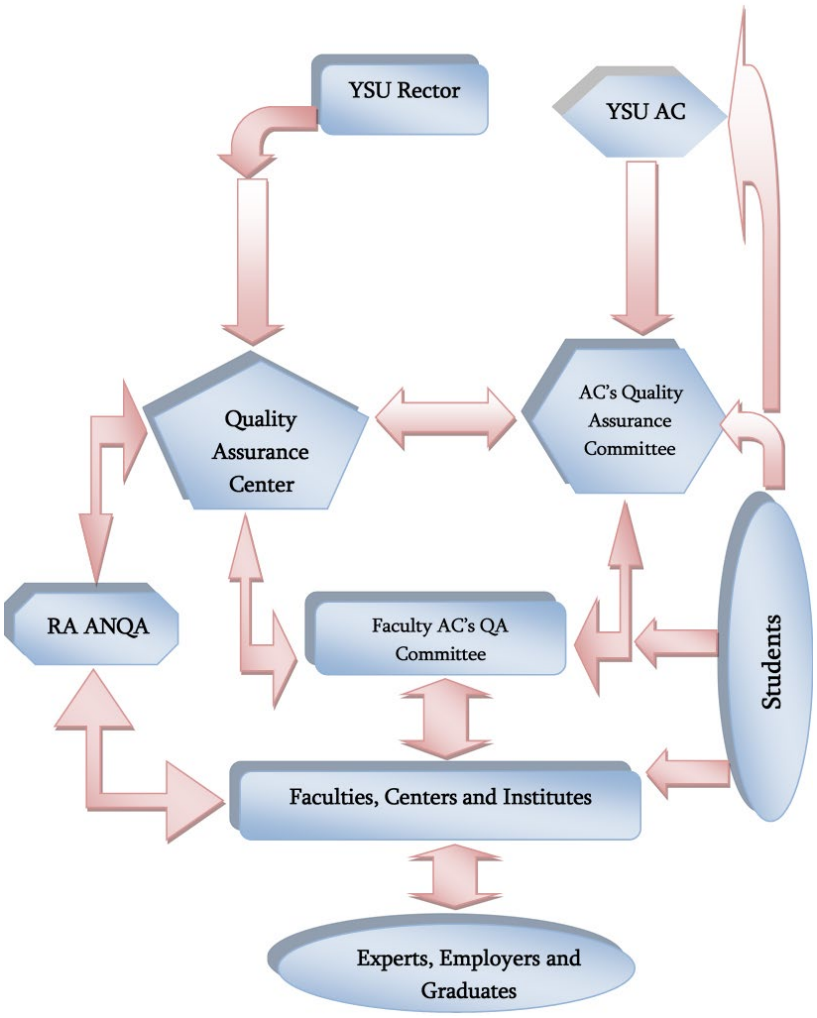

Diagram 1: YSU Organisational Structure, Source YSU SAR

The YSU Board of Trustees is the highest governing body of the university, it approves YSU's strategic development plans, structure, staff list, and additions and changes to them, as

well as YSU's annual budget of income and expenses, its amendments, annual financial reports, annual reports on YSU's activities and annual balance sheet. Additionally, the Board of Trustees organises and approves the election of the Rector, as well as hears and evaluates the annual reports of the Rector's activities and implementation of the strategic plan. The Board of Trustees of YSU has 20 members and is formed from representatives of YSU faculty, students, and the governmental institutions.

The YSU quality assurance policy, which is consistent with the requirements of European standards and guidelines (ESG) was adopted in 2012. The policy establishes the organisational structure of the YSU QA system, its operating mechanisms and procedures, the main structures and actors involved, whose interaction is presented in the diagram above. As depicted, all the main structures and units of the University, as well as the most important internal and external stakeholders are involved in the QA processes.

The following QA processes are organised at YSU:

1. Student surveys on teaching quality and effectiveness in order to help to evaluate the professional and pedagogical qualities of the teaching staff, as well as the quality of specific courses and academic modules. Since 2002 YSU has been conducting student surveys on teaching effectiveness during which all study modules/courses are assessed by students every semester to check the quality of their delivery.
2. Surveys on graduate satisfaction in order to determine graduates' satisfaction with the content and teaching methods of academic programmes, learning resources and supporting services, as well as organization of the educational process and general educational environment at YSU. Since 2008, YSU has been carrying out annual graduate satisfaction surveys where YSU graduates provide a full assessment of their study programme to determine if they were content with their education at YSU.

The aim of the current monitoring and periodic review is to evaluate the quality of the offered degree programmes and their alignment with the intended learning outcomes, as well as to check their continuous development and relevance.

All student (teaching quality and effectiveness) survey results are initially discussed confidentially within the respective departmental meeting without students' participation. The Head of the Department presents the survey results for each teacher/course and gives particular attention to the results of teachers with low performance. Each teacher gets familiar with his/her shortcomings and gets advised by the Head of the Department on the possibilities of improving the performance. Negative feedback and measures for solving them are discussed during the departmental meeting.

During the second stage, the survey results are discussed in the Faculty Academic Council's (AC) meeting with students' participation. Students have 25% places in the Faculty AC (as well as in YSU AC). They can raise questions regarding the follow-up activities of the Head of Department or the Deans regarding the issues expressed in the survey results. If teachers continually receive negative feedback during the surveys he or she can be replaced or even dismissed from the university.

At YSU, there is the Student Council, which is the representative, supreme self-governing body of the students. Here, students can express their interests and views ensuring their participation in the quality assurance processes. Hence, students' representatives of YSU Student Council can vote and give their opinion in the meetings of YSU Academic Council.

Students are also involved in programme evaluation process by participating in the graduate satisfaction surveys. The second part of the survey questionnaire refers to the different aspects of the degree programme. This way, students evaluate the programme. Besides, students are involved in the programme quality monitoring committees (one of the four members) and take part in focus group discussions faculty members to identify the strengths and weaknesses of the programmes. Subsequently a plan for improving the programme is drawn up. The experts gain the impression that the Department of Biochemistry, Microbiology and Biotechnology as well as the Department of Pharmacy take the students' feedback seriously and changes are made if necessary. The feedback loops are closed. The experts especially appreciate the active student body, their representation on all levels, and their direct involvement in the quality assurance processes at YSU.

The YSU Alumni and Career Center was established in 2006. In the course of its activities, the center organises meetings on the current requirements and problems of the labour market, with the involvement of employers, workshops on writing resumes and application, as well as seminars on self-presentation and other oft skills. Additionally, the Alumni and Career Center regularly informs students and alumni about job vacancies, internships, volunteer work, programmes, and other vocational opportunities.

Employers and other external stakeholders are also members of the academic councils on university and faculty level. Furthermore, they are participating at the focus group discussions with teachers and students on programme level. The experts appreciate that YSU stays in contact with its alumni and the employers and actively involves all stakeholders in the quality assurances processes. In general, YSU has good contact to employers and involves them in the quality assurances processes.

The experts discuss with the programme coordinators why there is a SWOT analysis only for the Master's degree programmes but not for the Bachelor's degree programmes. They

learn that a detailed monitoring process for the Bachelor's programmes, with the involvement of students, has already been started and the goal is to have a SWOT analysis within the next few semesters. The experts appreciate this development and encourage YSU to complete this process as soon as possible.

In summary, the expert group confirms that the quality management system is suitable to identify weaknesses and to improve the degree programmes. The students and all other stakeholders are involved in the quality assurance processes.

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

The experts appreciate that both Bachelor's degree programmes under review will monitored more closely and a SWOT analysis will be carried out.

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 (09.11.2023)

YSU provides the following statement:

YSU agrees with the majority of remarks and recommendations made by the expert panel and suggests the below remedies for eliminating the shortcomings and overcoming the weaknesses. For the remaining part of the expert's remarks and observations, YSU provides additional clarifications and proofs of the already implemented measures.

Based on these, YSU provides the following statement:

1. Low level of Clinical Pharmacy & Pharmacology skills in Pharmacy BA and MA programmes (Criterion 1.3, pp.16-17).

The experts point out that it is a critical aspect of the Pharmacy programmes that by international standards, the scope of academic education in clinical pharmacy and pharmacology in the Master's degree programme Pharmacy is very low and should be increased. Additionally, it would be useful to introduce Bachelor's students to clinical pharmacy and pharmacology. To this end, the experts recommend establishing a fully furnished pharmacology lab at the Department of Pharmacy in the near future.

Clinical pharmacology is included in the Pharmacy Master's degree programme with a 6-credit workload (64 hours of lectures, 32 hours of laboratory work, and 84 hours of individual work). We believe that in a one-year Master's programme this workload is sufficient for Clinical pharmacology. Regarding the observation, that the Bachelor's degree programme in Pharmacy does not include Clinical pharmacology, it is accurate, and we plan to include "Fundamental Principles of Clinical Pharmacology" with a 3-credit workload in the Bachelor's degree programme in the upcoming academic year.

Pharmacology is included in two semesters of the Bachelor's degree programme in Pharmacy with a total workload of 12 credits (60 hours of lectures, 30 hours of laboratory work, 60 hours of practical work, and 210 hours of individual work). We believe that this workload is sufficient for the Bachelor's degree programme. The Master's degree programme in Pharmacy does not include Pharmacology, as students sufficiently cover this course in the Bachelor's degree programme. In the upcoming academic year, we will consider including "Therapeutic Pharmacology" in the Master's degree programme.

The necessity of establishing a fully furnished pharmacological lab at the Department of Pharmacy has been acknowledged, and YSU plans to establish and equip this laboratory by the end of 2024. To achieve this goal, an implementation strategy has been formulated, a

roster of essential equipment has been made up, and necessary resources (20 million AMD) are planned to allocate in the 2024 YSU budget. Please refer to ***Annex-1*** for the list of the specified equipment to be acquired. Meanwhile, there is a vivarium for animals at the Faculty of Biology, and the Institute of Pharmacy will also utilize it after its territorial expansion.

2. To reduce the number of compulsory general modules in the first two study years in both BA programmes (Criterion 1.3, p.18).

YSU already implemented this recommendation for all its 50 BA programmes commencing in the 2023/2024 AY (see ***Evidence #1****. Structure & Content of YSU 2023/24 AY BA programmes*) except the two BA programmes under this review (the general education component of the programmes has been reduced from 44 ECTS credit to 27 ECTS credits, i.e. by 38.6%). This is because of the contract requirement between YSU and ASIIN, which states that no significant changes can be made in the accredited programme without ASIIN prior permission (s*ee YSU-ASIIN Contract, Par.7*). Currently, having the experts' recommendation with this regard, the general education component of both BA programmes in *Pharmacy* and *Biochemistry & Biotechnology* will be reduced accordingly, starting from the next academic year. Consequently, instead of the reduced general courses, more elective and subject-specific courses will be introduced, as the expert panel kindly recommends it.

It is worth mentioning that several changes in line with the expert panel's above-mentioned recommendation have already been made in these BA programmes. For instance, in the curriculum of the *Pharmacy* BA programme commenced in the 2021/22 AY the following changes have been made compared with the curriculum submitted to ASIIN with SARs (see *Appendix.7* of the *Pharmacy* SAR and ***Evidence-5.*** *Updated curriculum of Pharmacy BA program for 2021-22 AY admission*):

1. Credits for the general study component have been decreased from 44 credits to 38.
2. Credits for the professional component have been increased from 163 credits to 169.
3. Elective courses have been added to the professional component with a total workload of 6 credits.
4. Elective courses from related programmes (mobility window) have been added to the professional block with a total workload of 10 credits.

The same is true in the case of the *Biochemistry & Biotechnology* BA programme curriculum (see ***Evidence-4.*** *Updated curriculum of Biochemistry & Biotechnology BA program for 2021-22 AY admission*).

3. To offer an Anatomy course in the Biochemistry & Biotechnology BA programme as an elective one (Criterion 1.3, p.18).

Considering the importance of the *Anatomy* subject for all students involved in the *Biochemistry & Biotechnology* BA programme and its de facto presence in the study module *Human & Animal Physiology* (7 ECTS credits, 90 contact hours, 4th semester) as an introductory component, as well as following the kind recommendations of the expert panel, it is envisaged to split this study module into two separate modules entitled as *Human Anatomy* (2 ECTS credits, 30 contact hours, 3rd semester) and *Human & Animal Physiology* (5 ECTS credits, 60 contact hours, 4th semester). The new modules will be adopted in the programme starting from the 2024/2025 AY. The modified course descriptors are provided for your reference (see ***Evidences # 2 & 3.*** *Course descriptions for Human Anatomy and Human & Animal Physiology modules*).

4. Low level of foreign/English language proficiency in all four study programmes under the review (Criterion 1.3, pp.19-20).

Currently, English is a compulsory module in all YSU study programmes during the 1st and 2nd semesters at BA and MA levels. For instance, in BA programmes it amounts to 8 ECTS credits, while in MA programmes it is 9 ECTS credits. The results of the student and graduate surveys, as well as focus group discussions with students, show that while they are mostly satisfied with the level of general English knowledge, their main complaints concern English proficiency in the professional field. There were several attempts by the programme committees to offer one or two specialization modules in English. Nevertheless, these attempts failed due to significant disparities in English proficiency among students in the group. Besides, there were some students in the groups whose foreign language was not English (e.g. German or French).

Currently, the idea of establishing a Language Centre at YSU is under consideration and the concept has already been elaborated. The Centre will provide additional extracurricular English language training to students upon their request. Moreover, in accordance with the recommendations of the expert panel, it is envisaged to integrate some English related elements in the regular courses in the upcoming academic year, such as making presentations of individual or group works, writing assignments, and conducting literature analysis in English, etc.

For instance, it is planned have students present their research work in English from the study modules *Microbiology & Virology*, *Biochemical Methods*, *Plant Physiology & Biochemistry*, *Bioenergetics*, and *Biotechnological Methods* in the *Biochemistry & Biotechnology* BA programme. Students in all programmes will be encouraged to submit their research work reports in English. In *General & Medical Biochemistry* MA programme there is a *Scientific Seminar* module lasing 4 semesters. Students will be recommended to deliver their speeches and presentation in English. Furthermore, despite the Armenian being the compulsory language of instruction in the HE system of Armenia, the *Medical Biochemistry* course in the MA programme will be offered in English.

YSU offers internal grants for guest lecturers, who will deliver the lectures in English, fostering English language proficiency among students. The Faculty of Biology and Institute of Pharmacy will actively participate in these grant competitions during the upcoming years.

5. There are no special windows for the individual mobility in the Pharmacy BA and Biochemistry & Biotechnology BA curricula (Criterion 1.3, p.20).

It is worth mentioning that the curricula of both BA programmes submitted to ASIIN for review refer to the 2021-2022 AY graduation, i.e. they refer to the period when the SARs for the two programmes were being elaborated. At that time, all YSU BA programmes commencing in the 2021-2022 AY, including *Pharmacy* and *Biochemistry & Biotechnology*, were restructured to include academic mobility windows during the 6th and 7th semesters of study, comprising 10-15 ECTS credits (see ***Evidences # 4 & 5.*** *Updated curricula of both BA programmes under the review for 2021/22 AY admission* with mobility windows highlighted in yellow). Since there were no graduates in the new programmes with mobility windows at that time, YSU submitted the curricula of the existing programmes, which had graduates at that time for review. Currently, all first and second year YSU students are involved in the BA programmes with mobility windows.

6. Students' academic mobility is low in all four programmes under review (Criterion 1.3, pp.20-21).

YSU agrees on this observation made by the expert panel and will take necessary actions to foster students' academic mobility, e.g. by seeking more long-term Erasmus+ mobility programme cooperation with EU partner HEIs in the fields of *Biology* and *Pharmacy*, and encouraging students to spend one or two semesters abroad.

The experts' report also mentioned the necessity of Erasmus+ coordinators appointment. In this regard, it is worth mentioning that since 2014, YSU has appointed ECTS/Erasmus+ coordinators at all faculties/institutes who are responsible for international affairs and academic mobility at their respective faculties/institutes. These coordinators work closely with the YSU International Cooperation Office (ICO) to ensure effective academic coordination and facilitate communication between the ICO and faculty members. The faculty ECTS/Erasmus+ coordinators have the responsibility of informing students about available mobility programmes with YSU participation (this information is also disseminated among YSU students by ICO), managing both incoming and outgoing student and staff mobility, etc. The coordinator of the Faculty of Biology is Hayarpi Javrushyan (hg.javrushyan@ysu.am) and the coordinator of the Institute of Pharmacy is Anna Mkrtchyan (anna_mkrtchyan@ysu.am).

There is a growing interest among students wishing to study abroad every year. For instance, two students from the *Biochemistry & Biotechnology* BA programme have already

been selected to study at Saarland University, Germany during the spring semester of 2024. In 2024, the programme has planned new mobility programmes with the University of Teramo, Italy, the University of Burgundy, France, and Friedrich Schiller University Jena, Germany.

Currently, YSU implements two double-degree diploma programs in *Pharmacy* in collaboration with the Network University of the CIS and Belgorod University. YSU also implements a double-degree diploma program in *Biology* in partnership with the Bourgogne Franche Comte University.

Within the frameworks of bilateral agreements in the fields of *Pharmacy* and *Biology,* YSU has staff and student mobility with the Friedrich-Schiller University of Jena, Humboldt University of Berlin, University of Greifswald, Beijing Institute of Technology, and Ryukoku University (Kyoto, Japan).

Within the frameworks of the Erasmus+ program, YSU has signed 15 Inter-Institutional Agreements (IIAs) in the field of *Pharmacy* and 17 IIAs in the field of *Biology* with European HEIs (Bourgogne Franche Comte, Università degli Studi di Teramo, Saarland University, Friedrich-Schiller University of Jena, etc.)

7. There is an excessive number of exams in the Bachelor's degree programmes (Criterion 2, p. 28).

As already mentioned, starting from the 2023/24 AY, all BA degree programmes, except the two under this review (please refer to the reason in the statement 2 above), were revised and restructured. One of the main goals for this was to decrease the number of programme constituent courses/study modules and make the programmes more consolidated. As a result of this, action the number of study modules has decreased on average from 58-60 to 45-47 (see ***Evidence #1***. *Structure & Content of YSU 2023/24 AY BA programmes*). Hence, the number of interim and final exams per semester has also decreased. For instance, the number of final exams is now limited to 4 for the 1st and 2nd years of study, and for the 3rd and 4th years of study it is limited to 5. The examination session lasts 3 weeks, which allowing students to prepare well for the exams. Starting from the 2024/25 AY, the *Pharmacy* and *Biochemistry & Biotechnology* BA programmes will be restructured as well.

As to the excessive number of interim exams, it should be mentioned that the student assessment regulation has also been changed since the 2022/23 AY, giving the teachers more flexibility in determining the forms of the interim exams/assessments. For instance, according to the new regulation, teachers can assign an individual or group research work instead of the second interim exam, or assign midterm checks instead of the formal interim exam, etc. (see ***1. Required Evidences_ YSU.*** 1. *Study Process Organisation & Examination Regulations & Student Workload*, Part 6, Point 6.2. Course assessment, pp.7-8, submitted to ASIIN

along with the 2 SARs). These measures will considerably reduce the students' examination burden.

8. The average teaching workload is quite high by international standards (Criterion 3.1, p.32).

It should be mentioned that the system of the teaching staff workload calculation in Armenian HEIs considerably differs from that of the EU and USA universities. In the Armenian HE system, all elements/activities carried out by the teacher during the academic year are counted for his/her workload; regardless of whether it is in or outside of the classroom. For instance, according to the statistics from the last 4 academic years of 2018/19-2021/22, the distribution of YSU teaching staff total workload amongst different kinds of teaching/learning/supervising and other activities is as follows (see ***Evidence # 6.*** *Statistics on YSU teaching staff total workload*):

1. Classroom/contact hours (lectures, seminars/practical work, laboratories) - 60%;
2. Exams (interim and final exams, individual or group work/assignments checks, etc.) - 17%;
3. Supervision (of BA graduation works, MA master's theses, Doctoral dissertations) - 17.5%;
4. Work practice/internship (supervision from the YSU side) - 3%;
5. Other activities (membership or work in different YSU commissions, panels and councils, task forces and working groups, etc.) – 2.5%.

Taking into account that the average total workload of the teaching staff member is 710 hours during the above-considered years, the classroom/contact hours on average equal to 420.

Besides, since the 2023/24 AY, a new regulation has been introduced in YSU, that allows teachers to spend additional 50 hours on research activities, correspondingly reducing the teaching staff workload. Moreover, recently a new regulation is adopted by the rector's order that establishes a teaching assistance (TA) position at YSU for MA and PhD students, who will carry out some instructional duties/activities of the teaching staff, mainly for professors and associate professors (see ***Evidence # 7****. Regulation on TA position at YSU*). These TAs will consult students, check their assignments, facilitate laboratory and practical works and seminars, mange electronic resources, etc. It will also reduce the teaching staff workload considerably. It is planned that the TA position will be operational starting from the next semester of the current AY.

In addition, in 2021, YSU has adopted a system of internal research grants, which requires involvement of foreign guest lecturers. This allows the teachers, actively involved in the research activities, further reduce their personal teaching workload as grant holders.

9. There are a number of outdated instruments in the teaching laboratories of the Faculty of Biology (e.g. laminar flow hoods, microscopes, etc. / Criterion 3.2, p.35).

The laboratories of the *Department of Biochemistry, Microbiology & Biotechnology* are adequately equipped with the necessary number of laminar flow hoods. Currently, the Department's laboratories equipped with a sufficient quantity of laminar flow hoods are in a good working condition (see ***Evidence # 8.*** *Pictures of the laminar flow hoods in the Biochemistry Department's laboratories*). These hoods are accessible to all department staff and students engaged in research and educational activities. The equipment maintenance and upgrading is a priority for the Department. Its research groups secure a substantial number of research grants, which provide the necessary financial resources for the continuous upgrading of the equipment, including the laminar hoods.

As far as the outdated microscopes concerns, the *Faculty of Biology* and YSU central administration will upgrade the above-mentioned laboratories with new equipment, including microscopes. Particularly, YSU will allocate up to 10 million AMD for the procurement of new microscopes and other instruments by the end of 2024.

10. Budget necessary for running the devices in the laboratories, for maintenance and spare parts, as well as for chemical reagents for the laboratory experiments should be increased, so that all the experiments can be carried out properly (Criterion 3.2, p.36).

Additional funds amounting to 10 million AMD will be allocated from the YSU budget on a yearly basis to supply educational laboratories of the Faculty of Biology and Institute of Pharmacy with the necessary chemical reagents, spare parts and other laboratory materials/supplies starting from September 2024, ensuring that every student can conduct individual experiments.

11. Laboratories in the Institute of Pharmacy and Faculty of Biology do not follow international safety standards. YSU should draw up a plan to adopt internationally accepted safety standards into all the laboratories in the near future (Criterion 3.2, pp.36-37).

YSU takes this observation quite seriously. The following measures will be implemented by the *Faculty of Biology*, *Institute of Pharmacy* and YSU central administration to meet the recommendations of the expert panel:

1. All students and staff working in the laboratories will be provided with the basic personal protective equipment (safety goggles, laboratory coats, hand gloves, etc.) by February 2024.
2. Students will be trained in the right use of the laboratory equipment and protective means starting from September 2024, so that they all know how the sterile work in a

laboratory is conducted. A standardized short training will be mandatory for all students working in the laboratories.

3. Special cupboards for separate storage of the personal protective equipment and means in laboratories will be installed by February 2024.
4. The laboratories will be equipped with the emergency exits signs and posters with the safety regulations by February 2024.
5. All laboratories will be equipped with the working safety hoods with exhaust to the outside, as well as with special lockers with exhausts leading outside the labs to store properly labeled chemicals & solvent containers. It is envisaged to complete this international safety standard by February 2025.
6. Annual safety inspections of the laboratories will be carried out starting from September 2024.

To implement above-mentioned remedy measures, YSU allocates 15 million AMD in the 2024 financial year budget.

12. Module descriptions do not include required student self-study time (individual study workload) per semester (Criterion 1.5, p.25 and Criterion 4.1, p.38), as well as information on the different exams contribution to the final grade (Criterion 4.1, p.38).

The mentioned information regarding the student self-study time per semester and the final grade's breakdown into different assessments in the module descriptions is provided in the curricula of the given programme (see ***0. SARs & Appendices.*** *Appendices # 7 and 8 of both SARs*, Curricula of BA and MA programmes under the review) and in the YSU Student Assessment Regulation (see ***1. Required Evidences_YSU.*** 1. *Study Process Organisation & Examination Regulations & Student Workload*, Part 6, Point 6.2. Course assessment, pp.7-8), which have been submitted to ASIIN along with the 2 SARs.

However, taking into account the expert panel's recommendations regarding the above-mentioned deficiencies, as well as the desire of making this information easily accessible to students, the module descriptors of all programmes under the review have been updated to include the information on the student self-study workload per week and different exams contribution (in percentages) to the final grades (see ***Evidences # 9, 10, 11 & 12.*** *Updated Programme Specifications & Course Descriptions of four programmes under the review*). Since in the YSU system of module descriptors, all the workload, including the total and class/contact hours, are presented on a weekly basis, the student individual/self-study workload is also presented per week, which is, more understandably, measurable and controllable by students and teachers compared to that provided on a semester/yearly basis.

13. Diploma Supplements (DS) do not include statistical data on the student's grade distribution within the degree programme in line with the ECTS rules (Criterion 4.2, p.38).

Following the ASIIN programme accreditation criteria, during the self-evaluation process, YSU already took the necessary measures in order to include the required data on grade distribution in the DSs of all four programmes under the review. Consequently, the DSs of the above-mentioned four degree programmes issued in 2023 already contain the necessary data, meeting the requirements stated in the *ECTS User's Guide* (see ***Evidences # 13, 14, 15 & 16.*** *Samples of updated DSs issued for graduates of four degree programmes under the review in 2022/23 AY;* page 8 and page 6). The DSs of all other YSU degree programmes will contain these data starting from the 2024 graduation year.

14. Quality monitoring of both BA programmes has not been implemented and SWOT analysis has not been carried out yet (Criterion 5, p.43).

The 2 BA programmes under the review are now being monitored along with other 50 YSU BA degree programmes. The process started by the rector's order from 20 October 2022, and according to the time schedule, will be completed by 30 April 2024 (see ***Evidence # 17.*** *The rector's order & time schedule on monitoring of YSU BA programmes*). The main purpose of the YSU programme monitoring is to carry out programme SWOT analysis and elaborate improvement plans of study programmes (see ***1. Required Evidences_YSU.*** *10. Regulation on Monitoring & Review of Study Programs*, submitted to ASIIN along with 2 SARs).

F Summary: Expert recommendations (15.11.2023)

Taking into account the additional information and the comments given by YSU, 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 Biochemistry and Biotechnology	With requirements for one year	-	30.09.2029
Ma General and Medical Biochemistry	With requirements for one year	-	30.09.2029
Ba Pharmacy	With requirements for one year	-	30.09.2029
Ma Pharmacy	With requirements for one year	-	30.09.2029

Requirements

For all degree programmes

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

Recommendations

For all degree programmes

E 1. (ASIIN 1.3) It is recommended to increase students' academic mobility by better encouraging students to spend some time abroad.

E 2. (ASIIN 3.1) Teachers should be encouraged to become leading authors in international publications.

E 3. (ASIIN 3.2) It is recommended to update the equipment in the teaching labs.

For the Pharmacy programmes

E 4. (ASIIN 3.2) It is recommended to provide a fully furnished pharmacology lab at the Department of Pharmacy.

G Comment of the Technical Committees (22.11.2023)

Technical Committee 09 – Chemistry, Pharmacy (22.11.2023)

Assessment and analysis for the award of the ASIIN seal:

The TC sees that YSU has by well-equipped research laboratories, e.g. the "Microbial Biotechnologies and Biofuel Innovation Center" and the "Scientific and Educational Center for Drug Quality Control and Monitoring". Graduates have very good employment opportunities and there is a comprehensive quality management system with student representation at all levels. However, the Technical Committee also believes that the safety standards in the laboratories need to be improved and that the international mobility of students should be better promoted. Other points of criticism (e.g. module descriptions, Diploma Supplement) have already been eliminated by YSU immediately after the audit, so that no further requirements should be imposed.

The Technical Committee discusses the procedure and agrees with the proposed requirement and recommendations overall.

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 Biochemistry and Biotechnology	With requirements for one year	-	30.09.2029
Ma General and Medical Biochemistry	With requirements for one year	-	30.09.2029
Ba Pharmacy	With requirements for one year	-	30.09.2029
Ma Pharmacy	With requirements for one year	-	30.09.2029

Technical Committee 10 – Life Sciences (20.11.2023)

Assessment and analysis for the award of the ASIIN seal:

The TC discusses the procedure and points out that the safety standards in the laboratories need to be improved and that the international mobility of students should be better promoted. The proposed conditions and recommendations are supported. However, the TC suggests deleting the term "good laboratory practice" in requirement A1, as the requirement to follow international safety standards in the laboratories is sufficient.

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 Biochemistry and Biotechnology	With requirements for one year	-	30.09.2029
Ma General and Medical Biochemistry	With requirements for one year	-	30.09.2029
Ba Pharmacy	With requirements for one year	-	30.09.2029
Ma Pharmacy	With requirements for one year	-	30.09.2029

H Decision of the Accreditation Commission (08.12.2023)

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

The Accreditation Commission discusses the procedure and decides to follow the assessment of the experts and the Technical Committee 10. Thus, the additional comment in brackets (good laboratory practise) is cancelled, because requiring safety measures in the laboratories according to international safety standards is sufficient. Otherwise, the AC agrees with the proposed requirements and recommendations.

The Accreditation Commission decides to award the following seals:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Biochemistry and Biotechnology	With requirements for one year	-	30.09.2029
Ma General and Medical Biochemistry	With requirements for one year	-	30.09.2029
Ba Pharmacy	With requirements for one year	-	30.09.2029
Ma Pharmacy	With requirements for one year	-	30.09.2029

Requirements

For all degree programmes

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

Recommendations

For all degree programmes

E 1. (ASIIN 1.3) It is recommended to increase students' academic mobility by better encouraging students to spend some time abroad.

E 2. (ASIIN 3.1) Teachers should be encouraged to become leading authors in international publications.

E 3. (ASIIN 3.2) It is recommended to update the equipment in the teaching labs.

For the Pharmacy programmes

E 4. (ASIIN 3.2) It is recommended to provide a fully furnished pharmacology lab at the Department of Pharmacy.

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 Biochemistry and Biotechnology:

Programme learning outcomes
A. Professional knowledge and understanding Upon completion of the program, the student will be able to: A1. Define and present natural science's basic principles, concepts, and foundations, interpret and present the theoretical and experimental connection between mathematics, chemistry, physics, biology, and pharmacology. A2. Introduce and present the morphological, structural, metabolic, genetic, ecological, taxonomic features of living organisms at the molecular, cellular, tissue and organ structural levels. Describe the biodiversity on Earth and the interaction between the organisms and their habitats. A3. Point out the main structure and features of the proteins, carbohydrates, fats and nucleic acids. Explain the role of enzymes, vitamins, and hormones in metabolic processes, mechanisms of regulation of metabolism. A4. Explain the fundamental issues of human and cellular physiology and immunology, understand the common origin and evolution of the organic world, the place, and the role of molecular and evolutionary genetics in biology. Describe the thermodynamic properties in biological systems. A5. Present the basic biochemical and bioenergetic processes in living organisms, the structural features and function of biomembranes. Present the physiological and biochemical patterns of living organisms in norm and under stress conditions. Define the diseases caused by microbes and it's prevention. A6. Describe the modern biotechnological methods used in the field of ecology, agriculture, manufacturing and medicine. Present the main biotechnological productions. A7. Present the methods used in general biology, biochemistry, microbiology, and biotechnology, as well as the safety instructions for working in biological laboratories.
B. Practical professional skills Upon completion of the program, the student will be able to: B1. Apply mathematical, physical and chemical methods to solve problems in the field of biology. B2. Apply optical, chemical, biochemical, analytical, genetic, molecular, microbiological and computer software methods in biotechnological, manufacturing, biomedical and other fields. B3. Prepare and differentiate microscopic slides of different organ systems tissues and microbes. Use the diagnostic indicators to reveal contamination in ecosystems.

34. Carry out studies of hematopoietic systems, determine the activity of enzymes and implement pathological examinations of biological material samples, solve problems in the field of medical biochemistry. 35. Apply methods of genetics, cytology, physiology, molecular biology, biochemistry and biophysics, to the study of microbes and plants. Determine in practice the structure of microbial communities in different ecosystems. 36. Evaluate the bioenergetic efficiency of bacterial fermentation and respiration. Develop programs for the use of metabolic products of plants and microbes in biotechnology, medicine, and pharmacology. 37. Design activities in the field of biochemistry and biotechnology, conduct scientific research, test ways to solve professional problems, and make theoretical and practical conclusions. Evaluate and analyze the experimental results obtained in the process of problem-solving.
C. General (transferable) skills Upon completion of the program, the student will be able to: C1. Obtain professional information in native and any other foreign languages, as well as carry out professional communication. Get acquainted with the world culture, behavioral etiquettes, healthy lifestyle, and skills in providing first aid to the population in emergencies. C2. Use various sources of information related to biology. Master a data processing systems, database packages (NCBI, etc.), computer, and multipurpose local network systems. C3. Conduct research, apply methods and demonstrate receptiveness to innovations in the field of professional activity (academic, clinical, industrial, and related fields). Design ways of conservation and rational use of nature, and adhere to the norms of professional ethics. C4. Work in a team, prepare scientific reports, conduct professional debates, summarize the research results, as well as actively participate in conferences, seminars and discussions.

The following **curriculum** is presented:

Module number	Name of Educational Module	Credits	Hours						Terms																Evaluation form
									1		2		3		4		5		6		7		8		
			Total	Lec.	Prac.	Lab.	Sem.	Indep.	Credit	Aud. hour	Credit	Aud. hour	Credit	Aud. hour	Credit	Aud. hour	Credit	Aud. hour	Credit	Aud. hour	Credit	Aud. hour	Credit	Aud. hour	
	GENERAL MODULES	**40**	**1320**	**210**	**450**	**0**	**30**	**600**	**14**	**16**	**14**	**16**	**8**	**10**	**4**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	
	Compulsory Modules	**36**	**1200**	**150**	**450**	**0**	**30**	**540**	**14**	**16**	**14**	**16**	**4**	**6**	**4**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	
1106/B01	Main Issues of Armenian History -1	2	60	30				30	2	2															Test
1704/B02	Russian-1	4	120		60			60	4	4															Test
2301/B03	Introduction to IT Application	2	60		30			30	2	2															Test
1401/B04	Armenian Language and Speech Culture-1	2	60		30			30	2	2															Test
0001/B05	Physical Education	0	30		30				0	2															Test
1602/B14 // 1604/B14 // 1608/B14	English/German/French-1	4	120		60			60	4	4															Test
1106/B06	Main Issues of Armenian History -2	2	60	30				30			2	2													Test
1704/B07	Russian-2	4	120		60			60			4	4													Test
0001/B08	Physical Education	0	30		30						0	2													Test
1401/B09	Armenian Language and Speech Culture-2	2	60		30			30			2	2													Test
1901/B10	Basics of Law	2	60	30				30			2	2													Test
1602/B15 // 1604/B15 // 1608/B15	English/German/French-2	4	120		60			60			4	4													Test
0001/B11	Physical Education	0	30		30								0	2											Test
1302/B12	Basics of Philosophy	4	120	30			30	60					4	4											Test
0001/B13	Physical Education	0	30		30										0	2									Test
0002/B16	Civil Defense and First Aid in Emergency Situations	4	120	30	30			60							4	4									Test
	Elective Modules	**4**	**120**	**60**	**0**	**0**	**0**	**60**					**4**	**4**											
1007/B17	Basics of Economics	2	60	30				30																	Test
1005/B17	Basics of Business	2	60	30				30																	Test
1202/B17	Basics of Political Science	2	60	30				30																	Test
1107/B17	Basics of Cultural Studies	2	60	30				30																	Test
2101/B17	Basics of Religion Studies	2	60	30				30																	Test
1311/B17	Basics of Ethics	2	60	30				30																	Test
2203/B17	Basics of Sociology	2	60	30				30																	Test
1308/B17	Basics of Logics	2	60	30				30																	Test
1306/B17	Basics of Psychology	2	60	30				30																	Test

	PROFESSIONAL MODULES	200	6000	1135	75	980	0	3630	17	16	15	12	25	24	27	26	31	28	29	26	30	26	26	0	
	Compulsory Modules	**160**	**4800**	**1135**	**75**	**980**	**0**	**2610**	**17**	**16**	**13**	**12**	**25**	**24**	**27**	**26**	**31**	**28**	**20**	**17**	**27**	**23**	**0**	**0**	
0704/B18	Zoology of Invertebrates	3	**90**	23		22		45	3	3															Exam
0608/B19	Inorganic Chemistry	4	**120**	30		30		60	4	4															Exam
0102/B20	Mathematics – 1	4	**120**	30	30			60	4	4															Exam
0709/B21	Introduction to Biochemistry and Biotechnology	3	**90**	26		4		60	3	2															Exam
0703/B22	Mycology and Algology	3	**90**	30		15		45	3	3															Exam
0410/B23	Physics – 1	2	**60**	15		15		30			2	2													Exam
0704/B24	Zoology of Vertebrates	3	**90**	23		22		45			3	3													Exam
0703/B25	Higher plants	4	**120**	30		15		75			4	3													Exam
0102/B26	Mathematics – 2	4	**120**	30	30			60			4	4													Exam
0410/B27	Physics – 2	3	**90**	23		22		45					3	3											Exam
0708/B28	Ecology and Environmental Biotechnologies	5	**150**	45		30		75					5	5											Exam
0709/B29	Applied Statistics and Work with Data	2	**60**	15	15			30					2	2											Exam
0603/B30	Organic Chemistry	6	**180**	45		45		90					6	6											Exam
0709/B31	Biochemistry – 1	4	**120**	30		15		75					4	3											Exam
0707/B32	Cell Structure and Physiology	2	**60**	15		15		30					2	2											Exam
0608/B33	Analytic Chemistry	3	**90**	23		22		45					3	3											Exam
0706/B34	General and Special Histology	3	**90**	23		22		45							3	3									Exam
0410/B35	Physics – 3	5	**150**	38		37		75							5	5									Exam
0709/B36	Biochemistry – 2	7	**210**	45		60		105							7	7									Exam
0604/B37	Physical Chemistry	5	**150**	38		37		75							5	5									Exam
0706/B38	Human and Animal Physiology	7	**210**	45		45		120							7	6									Exam
0709/B39	Biophysical Chemistry – 1	3	**90**	23		22		45									3	3							Exam
0709/B40	Biochemistry – 3	3	**90**	20		25		45									3	3							Exam
0706/B41	Molecular Immunology	2	**60**	20		10		30									2	2							Exam
0709/B42	Radiation Biochemistry	2	**60**	15		15		30									2	2							Exam
0709/B43	Plant Physiology and Biochemistry	9	**270**	60		60		150									9	8							Exam
0709/B44	Microbiology and Virology – 1	5	**150**	30		30		90									5	4							Exam
0709/B45	Microbiology and Virology – 2	7	**210**	45		45		120											7	6					Exam
0704/B46	Molecular Biology	5	**150**	30		30		90											5	4					Exam
0709/B47	Biomembrane Biochemistry	2	**60**	20		10		30											2	2					Exam
0709/B48	Biophysical Chemistry-2	6	**180**	40		35		105											6	5					Exam
0709/B49	Basics of Biotechnology	5	**150**	45		15		90													5	4			Exam
0709/B50	Bioenergetics	4	**120**	30		15		75													4	3			Exam

0709/B51	Biochemical Methods	10	300	50		85		165														10	9			Exam
0704/B52	Biotechnological Methods	8	240	40		65		135														8	7			Exam
0707/B53	General and Evolutionary Genetics	7	210	45		45		120									7	6								Exam
	Elective Modules	**12**	**360**					**180**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**9**	**9**	**3**	**3**	**0**	**0**		
0709/B54	Introduction to Medicine	3	90	30		15		45											3	3						Exam
0709/B54	Introduction to Microbial Metabolism	3	90	30		15		45											3	3						Exam
0709/B55	Medical Microbiology	3	90	30		15		45											3	3						Exam
0709/B55	Enzymology	3	90	30		15		45											3	3						Exam
0709/B56	Metabolism Regulation	3	90	30		15		45											3	3						Exam
0709/B56	Agricultural Biotechnology	3	90	30		15		45											3	3						Exam
0709/B57	Classification of Prokaryotes	3	90	30		15		45													3	3				Exam
0709/B57	Biochemistry of Nucleic Acids	3	90	30		15		45													3	3				Exam
	Other Educational Modules	**28**	**840**	**0**	**0**	**0**	**0**	**840**	**0**	**0**	**2**	**0**	**0**	**0**	0	0	0	0	0	0	0	0	26			
0704/B58	Educational Practice	2	60					60			2	0														Test
0709/B59	Professional practice	6	180					180															6			Test
0709/B60	Graduate Work	20	600					600															20			Def.
	TOTAL	**240**	**7320**	**1345**	**525**	**980**	**30**	**4230**	**31**	**32**	**29**	**28**	**33**	**34**	**31**	**32**	**31**	**28**	**29**	**26**	**30**	**26**	**26**	**0**	**240**	
	Number of Modules								**11**		**11**		**9**		**7**		**7**		**7**		**5**		**2**		**59**	

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

Programme learning outcomes
A. Professional knowledge and understanding Upon completion of the program, the student will be able to: A1. Present fundamental and applied problems of profession, describe the possible molecular mechanisms of action and regulation of different enzymes and hormones in different organ systems, as well as present the expediency of combining different methods during biochemical studies. A2. Explain pathological conditions, which lead changes in the structure of basic macromolecules and different components of metabolism, cell membranes, and transport systems. A3. Present clinical markers for diagnosis and explain the molecular mechanisms of the effect of certain drugs, chemotherapeutic agents, and xenobiotics in body. A4. Formulate the biochemical properties and metabolism regulation of microbes; describe the application of genetic engineering in different fields. A5. Describe possible structural-functional changes in living cells under the influence of external harmful factors. A6. Present the biochemical components and it's synthesis in plants. Formulate the norms of the diet that contribute to the healthy maintenance of the body.
B. Practical professional skills Upon completion of the program, the student will be able to: B1. Carry out various experimental studies with biological objects; develop the ways to solve the biochemical problems; subject the obtained data to statistical analysis; prepare reports and scientific publications. B2. Identify compounds of clinical significance; study the dynamics of their changes in different pathological conditions and under the influence of different stress factors. B3. Evaluate the biological value, quality, and safety of food products and assess the presence of dangerous additives in essential food. B4. Analyze the age-specific features of pharmacotherapy; apply the principles of rational antibiotic therapy. B5. Evaluate and compare the biochemical processes in the body in normal and pathological conditions. B6. Apply modern methods macromolecules and approaches to the study of biomembranes, as well as methods of genetic engineering; evaluate the bioenergetic efficiency of microbial metabolism.
C. General (transferable) skills Upon completion of the program, the student will be able to: C1. Carry out research planning: apply the principles of method selection; choose accurate data; use analytical and comparative methods and design business proposals using innovative technologies.

C2. Preserve the norms of professional ethics during the implementation of various activities in the field of biochemistry, evaluate biological compounds as substrate in biotechnology and markers in diagnostics.

C3. Evaluate the quality and safety of food products, formation of a culture of proper nutrition in the maintenance of health; analyze the existing problems of food safety in Armenia and outer countries

C4. Work in a team, analyze experimental results and theoretical material; prepare reports, participate in scientific debates, conferences, seminars; comment on the scientific data obtained themselves and from the literature.

The following **curriculum** is presented:

Module number	Name of Educational Module	Credits	Hours						Terms								Evaluation form
									1		2		3		4		
			Total	Lec.	Prac.	Lab.	Sem.	Indep.	Credit	Aud. hour	Credit	Aud. hour	Credit	Aud. hour	Credit	Aud. hour	
EDUCATIONAL MODULES		75	2250	465	135	150	0	1500	27	18	27	18	21	14	0	0	
	GENERAL MODULES	15	450	15	135	0	0	300	12	8	3	2	0	0	0	0	
0309/M01	IT Technologies	3	90		30			60	3	2							Test
0709/M02	Research Planning and Methods	3	90	15	15			60	3	2							Test
	Elective Modules																
1602/M03//1604/M03//1608/M03//1704/M03	English-1/German-1/French-1/Russian-1	6	180		60			120	6	4							Test
1602/M04//1604/M04//1608/M04//1704/M04	English-2/German-2/French-2/Russian-2	3	90		30			60			3	2					Test
	PROFESSIONAL MODULES	15	450	120	0	30	0	300	15	10	0	0	0	0	0	0	
0709/M05	Regulation of Microbe Metabolism	6	180	45		15		120	6	4							Test
0709/M06	Special Chapters of Enzymology	6	180	45		15		120	6	4							Exam
0709/M07	Current Problems of Profession	3	90	30				60	3	2							Exam

	PROFESSIONAL MODULES	45	1350	330	0	120	0	900	0	0	24	16	21	14	0	0	
	Compulsory Modules	*24*	*720*	*165*	*0*	*75*	*0*	*480*	*0*	*0*	*24*	*16*	*0*	*0*	*0*	*0*	
0709/M08	Spectroscopic Methods in Biochemistry	3	90	15		15		60			3	2					Exam
0709/M09	Cellular-molecular Mechanisms of Action of Drugs	3	90	30				60			3	2					Exam
0709/M10	Medical Biochemistry –1	3	90	30				60			3	2					Exam
0709/M11	Clinical Biochemistry -1	3	90	15		15		60			3	2					Exam
0709/M12	Biochemistry of Organ Systems	6	180	45		15		120			6	4					Exam
0709/M13	Biomembranes in Norm and Pathology	6	180	30		30		120			6	4					Exam
	Elective Modules	*21*	*630*	*165*	*0*	*45*		*420*	*0*	*0*	*0*	*0*	*21*	*14*	*0*	*0*	
0709/M14	Microbe Metabolism and Antibiotics	3	90	30				60					3	2			Exam
0709/M14	Genetic Engineering and DNA Recombination	3	90	30				60					3	2			Exam
0709/M14	Plant Biochemistry	3	90	15		15		60					3	2			Exam
0709/M14	Hormonal Regulation of Metabolism	3	90	30				60					3	2			Exam
0709/M14	Mechanisms of Neutralization of Poisons, Toxins և Xenobiotics	3	90	30				60					3	2			Exam
0709/M14	Food Biochemistry and Security	3	90	30				60					3	2			Exam
0709/M15	Biochemistry of Emergency Situations and Stress Response	6	180	45		15		120					6	4			Exam
0709/M15	Medical Biochemistry -2	6	180	45		15		120					6	4			Exam
0709/M15	Clinical Biochemistry -2	6	180	30		30		120					6	4			Exam
	RESEARCH MODULES	45	1350	0	0	0	120	1230	3	2	3	2	9	2	30	2	
0709/M16	Scientific Seminar	3	90				30	60	3	2							Test
0709/M17	Scientific Seminar	3	90				30	60			3	2					Test
0709/M19	Scientific Seminar	3	90				30	60					3	2			Test
0709/M21	Scientific Seminar	3	90				30	60							3	2	Test
0709/M18	Professional practice	6	180					180					6	0			Test
0709/M20	Master's thesis	27	810					810							27	0	Defence
	TOTAL	120	3600	465	135	150	120	2730	30	20	30	20	30	16	30	2	
	Number of Modules								7		8		7		2		24

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

Programme learning outcomes
A. Professional knowledge and understanding Upon completion of the programme, the student will be able to: A1. Define the basic principles and concepts of modern natural science, global and local environmental issues, formulate the general provisions of mathematics. A2.Present the chemical compounds (inorganic and organic) composition, properties, methods of analysis, their toxicological effects, as well as the safety instructions for working with these substances. A3.Introduce the basics of physiology and anatomy, describe the main pathways of the body metabolism, as well as the causes of pathological processes and hereditary diseases and the latest examination methods. A4. Describe the pharmacological properties of drugs, the incompatibility and bioavailability of the application, present the issues of pharmacokinetics, pharmacodynamics, pharmacogenetics, biotechnology, etc. A5.Formulate the theoretical and experimental basics for the collection, procurement, processing, standardization and use of pharmaceutical raw materials, cover the theoretical basics of medicine production in pharmacies and factories and their technological rules and sanitary norms, assess their quality at different stages of production according to the requirements of normative documents. A6.Present the methods of pharmacopoeia analysis of drug synthesis, quality assessment and control norms and requirements. A7. Define the principles and basics of management to undertake and organize pharmaceutical activities in different units of drug circulation, describe the types of medical and pharmaceutical commodity, organize all the work of the pharmacy database and drug quality control laboratory by the application of new economic, social-psychological and organizational management methods.
B. Practical professional skills Upon completion of the programme, the student will be able to: B1. Carry out syntheses and structural studies of chemical compounds of different nature,predict the mechanisms of chemical conversions, their toxicological effects and ways of prevention. B2. Study the basics and achievements of modern biology, botany, biotechnology, biomedicine, as well as applied fields. Analyze the structural features of the organism and organsystems and the mechanisms of their regulation. Distinguish the main groups of bacteria and cover their role in nature and human life. B3. Work in pharmaceutics with information sources and constantly updated drugs, study their pharmacokinetic and pharmacogenetic features.

B4. Organize and implement the collection of pharmaceutical raw materials, drugstore and industrial drug production, assess their quality at different stages of production, means of environmental protection and sanitary conditions of the production.

B5. Carry out and organize pharmacy activities,distinguish medical and pharmaceutical commodity, analyze economic indicators, develop the financial plan and production programme and take measures to increase economic efficiency.

B6. Cover the ways of obtaining the main classes of drugs, the modern requirements and approaches of pharmaceutical analysis, the structural features of drugs, predict their biological activity and role in pharmacology, carry out the quantitative and qualitative determination of active components.

C. General (transferable) skills

Upon completion of the programme, the student will be able to:

C1. Work in a team, prepare reports, summarize the research results, as well as actively participate in conferences, seminars and discussions.

C2. Use various sources of information related to pharmaceutics (Internet, e-libraries, advertising materials, newsletters, scientific articles, reports), analyze new information, understand the data of modern medical literature and apply it in practice.

C3. Obtain professional information in native and any other foreign languages, as well as carry out professional communication.

C4. Preserve the norms of professional ethics during the implementation of various functions in the field of pharmaceutics, be proactive and responsible while making decisions and implementing them, show humanity, strive for self-improvement, lead a healthy lifestyle and advocate it.

C5. Present consumers in an accessible way the main characteristics of the drugs and their belonging to a certain group in line with the requirements of international drug systems.

The following curriculum is presented:

Name of Educational Module	Credits	Hours					Terms																Evaluation form
							1		2		3		4		5		6		7		8		
		Total	Lec.	Prac.	Lab.	Indep.	Credit	Aud. hour	Credit	Aud. hour	Credit	Aud. hour	Credit	Aud. hour	Credit	Aud. hour	Credit	Aud. hour	Credit	Aud. hour	Credit	Aud. hour	
GENERAL MODULES	44	1320	255	525	0	660																	
Compulsory Modules	40	1200	195	525	0	600	20	22	12	14	2	4	6	8									
Armenian Language and Speech Culture	4	120	0	60	0	60	2	2	2	2													Test
Main Issues of Armenian History	4	120	60	0	0	60	2	2	2	2													Test
English/German/French	8	240	0	120	0	120	4	4	4	4													Test
Russian	8	240	0	120	0	120	4	4	4	4													Test
Introduction to IT Application	2	60	0	30	0	30	2	2															Test
Civil Defense and First Aid in Emergency Situations	4	120	30	30	0	60	4	4															Test
Introduction to Ecology and Environmental Protection	2	60	30	0	0	30	2	2															Test
Basics of Law	2	60	30	0	0	30					2	2											Test
Applied Statistics and Working with Data	2	60	15	15		30							2	2									Test
Basics of Philosophy	4	120	30	30	0	60							4	4									Test
Physical Education	0	0	0	120	0	0	0	2	0	2	0	2	0	2									Test
Elective Modules	4	120	60	0	0	60							4	4									
Introduction to Business	2	60	30	0	0	30																	Test
Introduction to Political Science	2	60	30	0	0	30																	Test
Basics of Culturology	2	60	30	0	0	30																	Test
Basics of Religion Studies	2	60	30	0	0	30																	Test
Basics of Ethics	2	60	30	0	0	30																	Test
Basics of Sociology	2	60	30	0	0	30																	Test
Basics of Logics	2	60	30	0	0	30																	Test
Basics of Psychology	2	60	30	0	0	30																	Test
Introduction to Economics	2	60	30	0	0	30																	Test
Modern Concepts of Natural Science	2	60	30	0	0	30																	Test

PROFESSIONAL MODULES	196	5280	1075	290	865	2660																
Compulsory Modules	163	4890	1075	290	865	2660	10	10	17	17	30	27	22	22	32	30	31	26	21	25	0	0	
General and Inorganic Chemistry	4	120	30	0	30	60	4	4															Exam
Biology	4	120	30	0	30	60	4	4															Exam
Latin-1	2	60	0	30	0	30	2	2															Exam
Mathematics	3	90	15	30	0	45			3	3													Exam
Latin-2	2	60	0	30	0	30			2	2													Exam
Botany	4	120	30	0	30	60			4	4													Exam
Human Anatomy	3	90	30	0	15	45			3	3													Exam
Organic Chemistry-1	5	150	30	0	45	75			5	5													Exam
Toxicological Chemistry	7	210	45	0	45	120					7	6											Exam
Analytical Chemistry	7	210	45	0	45	120					7	6											Exam
Normal Physiology	4	120	30	0	15	75					4	3											Exam
Physics	4	120	30	0	30	60					4	4											Exam
Organic Chemistry-2(Chemistry of Natural Compounds)	4	120	30	0	30	60					4	4											Exam
Biochemistry-1	4	120	30	0	30	60					4	4											Exam
Physical and Colloidal Chemistry	5	150	30	0	45	75							5	5									Exam
Bioorganic Chemistry	4	120	30	0	30	60							4	4									Exam
Pharmaceutical Chemistry-1	4	120	30	0	30	60							4	4									Exam
Microbiology-1	4	120	30	0	30	60							4	4									Exam
Biochemistry-2	3	90	15	0	30	45							3	3									Exam
Basics of Drug Quality Assessment	2	60	15	15	0	30							2	2									Exam
Pharmacology- 1	7	210	30	30	30	120									7	6							Exam
Microbiology -2 (Immunology, Virology)	3	90	30	0	15	45									3	3							Exam
Biotechnology	4	120	30	0	30	60									4	4							Exam
Pharmaceutical Chemistry -2	5	150	30	0	45	75									5	5							Exam

Pharmaceutical Technology -1 (industrial)	5	150	30	0	45	75									5	5						
Pharmacology Management and Economics -1	5	150	30	30	0	90									5	4						Exam
Pathological Physiology	3	90	45	0	0	45									3	3						Exam
Pharmacology- 2	5	150	30	30	0	90											5	4				Exam
Pharmaceutical Chemistry -2	5	150	30	0	30	90											5	4				Exam
Pharmacognosy -1	5	120	30	0	30	90											5	4				Exam
Pharmacology Management and Economics -2	7	210	45	30	0	135											7	5				Exam
Pharmaceutical Technology -2(pharmacy)	6	180	30	0	60	90											6	6				Exam
Medical and Pharmaceutical Commodical Science	3	90	15	30	0	45											3	3				Exam
Bioethics	2	60	15	15	0	30													2	3		Exam
Drug Production Standardization and GXP System	4	120	30	10	0	80													4	4		Exam
Pharmaceutical Technology-3 (drug incompatibility)	3	120	30	10	0	50													3	4		Exam
Pharmacognosy -2	7	210	40	0	40	130													7	8		Exam
General Hygene	5	150	30	0	30	90													5	6		Exam
Other Educational Modules	**33**	**390**							**2**	**0**			**0**				**0**		**5**		**26**		
Educational Practice	2	60							2	0												Test
Professional Practice-1	5	150																	5	0		Test
Professional Practice-2	6	180																			6	0	Test
Graduate Work	20																				20		Def.
TOTAL	**240**	**6600**	**1330**	**815**	**865**	**3320**	**30**	**32**	**31**	**31**	**32**	**31**	**32**	**34**	**32**	**30**	**31**	**26**	**26**	**25**	**26**	**0**	**240**
Number of Modules							**10**		**9**		**7**		**8**		**7**		**6**		**5**		**0**		**52**

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

Programme learning outcomes
A. Professional knowledge and understanding Upon completion of the programme, the student will be able to: A1. Describe the peculiarities of drug preparation (pharmacy and industrial) and GMP requirements for individual classes of pharmaceutical products according to the technological schemes and equipment for manufacturing, modern requirements, and approaches for the production of various pharmaceutical products, as well as manufacturing and preparation of medical cosmetics, A2. Present the methodological features and principles of modern analytical equipment used for qualitative and quantitative research of drugs and pharmaceutical products, A3. Cover modern clinical pharmacology and contemporary methodology of evidence-based medicine, its issues and development models, requirements and approaches of international classification of drugs, dependence of drug effect upon genetic polymorphism, A4. Present the pricing environment of the pharmaceutical market, the principles of pharmaceutical pricing, the aspects of competition in the pharmaceutical market, methods and laws of pharmacoeconomics and carry out document formulations, A5. Obtain professional information from foreign language sources, conduct professional communication, as well as read and translate texts.
B. Practical professional skills Upon completion of the programme, the student will be able to: B1. Analyze and ground the effectiveness of different classes of drugs in rational therapy, the issues of drug and its dosage selection according to the polymorphic variants of the patient's genes based on the ideas of modern medicine, targeted therapy and biomarkers, B2. Carry out quantitative and qualitative analysis of pharmaceutical preparations and biologically active and support materials in line with modern requirements, B3. Analyze and understand the advantages and disadvantages of the technologies of materials used in the production of drugs and medical cosmetology, B4. Analyze and understand the peculiarities of wholesale and retail sale of drugs, be able to assess the existing pharmaceutical markets, make predictions, planning and monitoring of the pharmaceutical market, B5. Use various sources of information related to pharmacology and medicine (Internet, e-libraries, advertising materials, newsletters, scientific articles, reports), carry out a comprehensive analysis of the obtained results and determine the results stemming

from them, analyze and understand the data of modern medical literature and apply them in practice.

C. General (transferable) skills

Upon completion of the programme, the student will be able to:

C1. Analyze the existing problems in the pharmaceutics and assess the possibilities and the necessary resources for their solution,

C2. Analyze and assess the relevance of specialty development issues and priorities in line with the requirements of international systems of drugs,

C3. Develop, analyze and present the results of research and scientific-practical activities through articles and reports, as well as actively participate in conferences, seminars and discussions.

The following curriculum is presented:

PHARMACY-Master															Appendix 8
Name of Educational Module	Credits	Hours					Terms								Evaluation form
							1				2				
		Total	Lec.	Prac.	Lab.	Indep.	Credit	Aud. hour	Credit	Aud. hour	Credit	Aud. hour	Credit	Aud. hour	
GENERAL MODULES	**8**	**240**	48	80	0	112	8	16	0	0	0	0			
Compulsory Modules	**6**	**180**	**48**	**48**	**0**	**84**	**6**	**12**	**0**	**0**	**0**	**0**			
IT Technologies in Professional Field	2	60	0	32	0	28	2	4							Test
Research Planning and Methods	2	60	16	16	0	28	2	4							Test
Contemporary Issues of Profession	2	60	32	0	0	28	2	4							Test
Elective Modules	**2**	**60**		**32**		**28**	**2**	**4**							
English/German/French/Russian	2	60	0	32	0	28	2	4							Test
PROFESSIONAL MODULES	**30**	**900**	**287**	**64**	**222**	**476**	**8**	**16**	**16**	**32**	**6**	**12**			
Compulsory Modules	**26**	**780**	**223**	**32**	**190**	**364**	**8**	**16**	**12**	**24**	**6**	**12**			
Methods of Drug Structure Analysis	4	**120**	32	0	32	56	4	8							Exam
Biotechnology	2	**60**	16	0	16	28	2	4							
Clinical Pharmacology -1	2	**60**	32	0	30	28	2	4							Exam
Technology of Cosmetic Preparations	2	**60**	15	0	16	28			2	4					Exam
Pharmaceutical Care	4	**120**	32	32	0	56			4	8					Exam
Clinical Pharmacology -1	4	**120**	32	0	32	56			4	8					Exam
Basics of GMP	2	**60**	16	0	16	28			2	4					Exam
Pharmacology Management and Economics	4	**120**	32	0	32	56					4	8			Exam
Pharmaceutical Technology (sterile drugs)	2	**60**	16	0	16	28					2	4			Exam
Elective Modules	**4**	**120**	**64**	**32**	**32**	**112**			**4**	**8**					**Exam**
Methods of Drug Quality Analysis	2	**60**	16	0	16	28									
Methods of BACs Quality Analysis	2	**60**	16	0	16	28									
Pharmacogenetics	2	**60**	16	16	0	28									
Gene Therapy	2	**60**	16	16	0	28									
RESEARCH MODULES	**22**	**660**		**30**		**628**					**8**	**4**	**14**		
Scientific Seminar	2	**60**		30		28					2	4			Test
Professional Practice	6	**180**				180					6	0			Test
Maser Work	14	**420**				420							14		Defence
TOTAL	**60**	**1800**	**335**	**174**	**222**	**1216**	**16**	**32**	**16**	**32**	**14**	**16**	**14**	**0**	
Number of Modules							**7**		**5**		**3**		**0**		