



ASIIN Seal

Accreditation Report

Bachelor's Degree Programmes

Teacher, Natural Science Education (Biology)

Teacher, Natural Science Education (Chemistry)

Teacher, Natural Science Education (Geography)

Teacher, Natural Science Education (Physics)

Provided by

Mongolian National University of Education (MNUE)

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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
Байгалийн ухааны боловсрол бакалавр (Биологийн багш)	Bachelor degree programme Teacher, Natural Sciences Education (Biology)	ASIIN	none	10
Байгалийн ухааны боловсрол, бакалавр (Химийн багш)	Bachelor degree programme Teacher, Natural Sciences Education (Chemistry)	ASIIN	none	09
Байгалийн ухааны боловсрол бакалавр (Газар зүйн багш)	Bachelor degree programme Teacher, Natural Sciences Education (Geography)	ASIIN	none	11
Байгалийн ухааны боловсрол, бакалавр (Физикийн багш)	Bachelor degree programme Teacher, Natural Sciences Education (Physics)	ASIIN	none	13
<p>Date of the contract: 01.12.2016</p> <p>Submission of the final version of the self-assessment report: 29.08.2018</p> <p>Date of the onsite visit: 09.05. – 10.05.2019</p> <p>at: Ulaanbaatar, Mongolia</p>				

¹ ASIIN Seal for degree programmes

² TC 09 – Chemistry, TC 10 – Life Sciences, TC 11 – Geosciences, TC 13 - Physics

<p>Peer panel:</p> <p>Dr. Angela Fösel, Erlangen University</p> <p>Prof. Dr. Gabriele Hornung, University of Kaiserslautern</p> <p>Dr. Monika Pohlmann, University of Cologne</p> <p>Prof. Dr. Mark Vetter, University of Applied Sciences Würzburg-Schweinfurt</p> <p>Oyundari Chuluunkhuyag, PhD Student, National University of Mongolia</p>	
<p>Representative of the ASIIN headquarter: Rainer Arnold</p>	
<p>Responsible decision-making committee: ASIIN Accreditation Commission for Degree Programmes</p>	
<p>Criteria used:</p> <p>European Standards and Guidelines as of 15.05.2015</p> <p>ASIIN General Criteria as of 28.03.2014</p> <p>Subject-Specific Criteria of Technical Committee 09 – Chemistry as of 29.03.2019</p> <p>Subject-Specific Criteria of Technical Committee 10 – Life Sciences as of 09.12.2011</p> <p>Subject-Specific Criteria of Technical Committee 11 – Geosciences as of 09.12.2011</p> <p>Subject-Specific Criteria of Technical Committee 13 – Physics as of 09.12.2016</p>	

In order to facilitate the legibility of this document, only masculine noun forms will be used hereinafter. Any gender-specific terms used in this document apply to both women and men.

B Characteristics of the Degree Programmes

a) Name	Final degree (original/English translation)	b) Areas of Specialization	c) Corresponding level of the EQF ³	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Bachelor degree programme Teacher, Natural Sciences Education (Biology)	Bachelor Biology Teacher	I	6	Full time	No	4 years	125 Mongolian Credits, 208 ECTS	Fall semester 2014
Bachelor degree programme Teacher, Natural Sciences Education (Chemistry)	Bachelor Chemistry Teacher		6	Full time	No	4 years	125 Mongolian Credits, 217 ECTS	Fall semester 2014
Bachelor degree programme Teacher, Natural Sciences Education (Geography)	Bachelor Geography Teacher		6	Full time	No	4 years	125 Mongolian Credits, 205 ECTS	Fall semester 2014
Bachelor degree programme Teacher, Natural Sciences Education (Physics)	Bachelor Physics Teacher		6	Full time	No	4 years	125 Mongolian Credits, 203 ECTS	Fall semester 2014

For the Teacher, Natural Science Education programmes the Mongolian National University of Education (MNUE) has defined the following mission:

“The revised mission of the university is stated as “Providing education sector with creative teachers and professionals capable of developing every child”. In compliance with this mission, the aim of the teacher education program is formulated as “preparing teachers and professionals with profound knowledge and skills of organizing teaching and learning based on differentiation and individual needs of students, and are capable of applying knowledge and skills to their pedagogical practices, and willing to develop students and oneself”. The educational objectives of the program (PEOs) have been defined based on the vision and mission of the university with the methodologies necessary to solve complex problems and effectively articulate their ideas to the scientific community.”

³ EQF = The European Qualifications Framework for lifelong learning

C Peer Report for the ASIIN Seal

1. The Degree Programmes: Concept, content, and implementation

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

Evidence:

- Self-Assessment Report
- Study plans
- Module descriptions
- Sample Diploma Supplements
- Webpage School of Mathematics and Natural Sciences: <http://smns.mnue.mn/>
- Discussions during the audit

Preliminary assessment and analysis of the peers:

The peers refer to the Subject-Specific Criteria (SSC) of the ASIIN Technical Committees Life Sciences (TC 10), Chemistry (TC 09), Geosciences (TC 11), and Physics (TC 13) as a basis for judging whether the intended learning outcomes of the Teacher, Natural Science Education programmes, as defined by MNUE, correspond with the competences as outlined by the respective SSC. The SSC are the result of an assessment, regularly performed by ASIIN Technical Committees, which summarise what is considered as good practice by a professional community formed equally by academics and professional practitioners in higher education and is required as future-oriented quality of training in the labour market.

The peers come to the following conclusions:

MNUE has provided an extensive list of programme learning outcomes (PLO) and course learning outcomes (CLO) for each degree programme.

The PLO's are divided into three areas:

- [general] personal knowledge, skills, and attitudes
- [specific] knowledge, skills, and attitudes of teacher education
- academic [subject-specific] knowledge, skills, and attitudes

The first two areas are identical for each of the four Teacher, Natural Science Education programmes and cover objectives such as creative learning and self-development, proficiency in Mongolian language, culture and history and a foreign language (English), protecting the natural environment, maintaining healthy and safe life. In addition, students should become familiar with aspects of child development, the learning process and its monitoring and acquire teacher's values and ethics as well as a teacher's professional knowledge, skills, and attitudes. A strong emphasis is laid on the development of social skills. Students should be able to effectively communicate, work in teams and ethical concepts and professional abilities should be taken into account within their future profession as a teacher.

The third area are the subject-specific learning outcomes for each degree programme. According to the submitted tables, graduates of the Chemistry programme should learn about the history and development of chemical sciences, understand the basic laws of nature as well as basic theories and concepts of chemical science. They should be able to quantify and define components, structure, and property of chemical substances and to determine the classification of chemicals and their relationship. Graduates should follow safety rules and be familiar with safety and technical regulations in order to prevent negative effects to human body and the environment. In addition, they should learn to work in a group, to conduct experiments and to explain, describe, classify and quantify chemical reactions. Moreover, graduates should be able to choose chemical research methods, to define product needs, and to describe the process of chemical production.

Graduates of the Biology programme should be able to evaluate the existence and distribution of physical objects or phenomena in nature, to understand fundamental theories, laws and principles of biology, and become familiar with and use professional terms and terminologies. In addition, they should understand the structure, function, inheritance, genetic variation and the underlying biological mechanisms, and learn about artificial selection and bioengineering methods. Graduates should also be able to identify living organisms, to distinguish and name taxonomic units, and learn about their distribution and ecologic relevance. Moreover, they should understand the structure and dynamics of ecological system in order to be able to contribute to biodiversity and nature conservation, the proper use of natural resources, to solving ecological problems and to supporting sustainable development. Finally, graduates should be familiar with biological field and laboratory research methods, be able to test hypotheses by addressing research question and to explain research results.

In the Geography programme, the intended learning outcomes include becoming familiar with the historical development of geography and understanding its importance and its key concepts and principles. Graduates should be able to recognize, illustrate, and describe

interactions of natural and social matters by using geospatial descriptions and technology. They should also be able to define characteristics, roles and interdependence of the components of geographical layers and be able to explain the spatial dependence of geographical environment and socio-economic phenomena. In addition, students should learn about research methods by observing, measuring, preparing, and using samples, collections and learning aids. Moreover, graduates should be able to explain the geographical order of natural and social matters and phenomena, and their causes within various territorial spheres, and draw their own conclusions. Finally, they should be familiar with natural and social problems, and be able to explain the influencing factors, causes and consequences based on the principles of sustainable development.

Graduates of the Physics programme should be able to describe and explain natural phenomena based on a profound knowledge of laws in Physics, Chemistry, Biology, Geography, and Mathematics and be able to describe the underlying concepts and principles. In addition, they should have a profound knowledge of the historical development and achievements in the field of Physics (Mechanics and Molecular Physics, Electromagnetism, Optics, Atomic Physics, Nuclear Physics and Theoretical Physics) and envisage its future development. Students should acquire knowledge and skills for identifying, expressing, modelling, measuring, estimating, and explaining the laws of classical mechanics, relativistic mechanics, and theoretical mechanics and be able to explain the processes on particular examples. Moreover, they should be able to describe and explain the theory of Molecular Kinetics and the laws of Thermodynamics and have the necessary knowledge and skills for describing and explaining fundamental concepts and laws of Electromagnetism, Geometric and Wave Optics, and Atomic and Nuclear Physics. Finally, graduates should be able to explain the main concepts of electric devices and electronics, have a clear understanding of the structure and principles of electrical systems, and be able to analyse and calculate some simple electric circuits.

The auditors hold the view that the objectives and intended learning outcomes of the Teacher, Natural Science Education programmes as mentioned in the Self-Assessment Report are reasonable. The peers point out that the objectives and learning outcomes of all four programmes under review should be accessible to all stakeholders. For example, this could be achieved by publishing them on MNUE's webpage.

Based on the Self-Assessment Report and the discussions during the on-site-visit, the peers see that graduates of all four programmes under review acquire the necessary subject-specific and teaching related competences. They obtain the fundamental theoretical knowledge in the respective subject, and are able to solve subject-relevant problems and can present the results. During the course of their studies, the students also acquire social competences, such as the ability to work in a team, and to communicate with each other.

During the audit, employers (secondary school principals, representatives of national institutes and governmental institutions) express their satisfaction with the quality of education at MNUE and the knowledge and abilities of the graduates of the Teacher, Natural Science Education programmes. They stress that there is high demand for graduates from MNUE. For example, young teachers are needed in all natural sciences in order to be able to replace older teachers that will retire within the next few years.

The auditors discuss with the Department Heads about the areas of occupation. They learn that in all four Teacher, Natural Science Education programmes, the majority of graduates will be employed as teachers in secondary schools. The rest work for example in laboratories, in governmental or non-governmental institutions or in private companies e.g. the mining industry, or in the areas of ecology and nature preservation. In addition, approximately 5 % of the graduates will continue with a Master's programme either at MNUE or at other universities in Mongolia or abroad.

MNUE closely cooperates with the City Education Department in Ulaanbaatar. The City Education Departments receives the request from the secondary schools on the one hand and the profiles of the graduates on the other hand, and then they try to match demand and offer. This process works rather well and the auditors appreciate this matching procedure.

In summary, the auditors are convinced that the intended qualification profile of the four programmes under review allow graduates to work as teachers or to take up a qualified occupation outside schools. The peers judge the objectives and learning outcomes to be suitable to reflect the intended level of academic qualification (EQF 6) and to correspond with the ASIIN Subject-Specific-Criteria (SSC) of the relevant Technical Committee.

Criterion 1.2 Name of the degree programme

Evidence:

- Self-Assessment Report

Preliminary assessment and analysis of the peers:

The auditors hold the opinion that the English translation and the original Mongolian names of the Teacher, Natural Science Education programmes correspond with the intended aims and learning outcomes as well as the main course language (Mongolian).

Criterion 1.3 Curriculum

Evidence:

- Self-Assessment Report
- Study plans
- Module descriptions
- Webpage School of Mathematics and Natural Sciences: <http://smns.mnue.mn/>
- Discussions during the audit

Preliminary assessment and analysis of the peers:

MNUE has developed and included in the Self-Assessment Report a comprehensive matrix for each degree programme that shows, which intended learning outcome should be achieved by which module. These matrices make apparent that the objectives of the Teacher, Natural Science Education programmes are substantiated by the modules and it is clear to the peers, which knowledge, skills and competences students will acquire in each module.

In summary, the peers see that the curricula allow the students to achieve the intended learning outcomes.

Criterion 1.4 Admission requirements

Evidence:

- Self-Assessment Report
- Undergraduate Admission Regulations 2018-2019 of MNUE
- Discussions during the audit

Preliminary assessment and analysis of the peers:

Admission to MNUE depends on the grades of the high school graduates in the General Entrance Exam (GEE). All Mongolian high school graduates that want to study at a university in Mongolia must complete this nationwide exam. They must achieve a threshold number of points in the GEE in order to be admitted to MNUE. According to the Self-Assessment Report, the minimum score was 480 (out 800) in 2018.

Applicants from Ulaanbaatar can apply online for admission to MNUE, whereas high school graduates from rural areas are treated separately. This is done in order to ensure that students from all over Mongolia can study at MNUE. In addition, the admission regulations

allow the admittance of excellent individuals based on certain achievements (e.g. winning first place in a national Olympiad) and MNUE gives priority to high school graduates who have completed a “teacher profession” elective course while studying at high school. The further details are regulated in the Undergraduate Admission Regulations 2018-2019 of MNUE.

During the period of 2015-2018, a total number of 318 students were admitted to the Biology programme, 285 to the Chemistry programme, 235 to the Geography programme, and 323 to the Physics programme. Approximately 50 % of the enrolled students come from rural areas whereas the other half come from Ulaanbaatar. The demand for the Teacher, Natural Science Education programmes is high and remained constant during the last few years. Only 32 % of the applicants have been admitted since 2015. The number of available study places is based on the demands of the education departments of urban and rural areas and on the surveys and data on professional teachers’ demand submitted by the Ministry of Education, Culture, Science and Sports (MECSS). The yearly admission quotas are set by the University Governing Board and reviewed by MECSS.

The peers discuss with the Dean of the School of Mathematics and Natural Sciences and the Department Heads, how it is ensured that enough students from rural areas outside Ulaanbaatar are admitted and how MNUE makes sure that enough graduates go back to their home communities to become teachers there. They learn that there are enough qualified applications from high school graduates from rural areas. In addition, local governments offer scholarships for students from the countryside to study at MNUE, but in return students are obliged to go back to their home community after graduation to become secondary school teachers there. Therefore, there is often an agreement between the student and the local authorities to make sure that there are enough secondary school teachers in the rural area outside Ulaanbaatar. Moreover, the teaching practicum can also be conducted in the hometown and MNUE helps with financing travel costs.

The students point out that most students from rural areas go back after graduation. Only some stay in Ulaanbaatar, because they have received job offers from schools in Ulaanbaatar and think that staying in the city offers them more opportunities for their personal and professional development. On the other hand, some students from Ulaanbaatar prefer working as a teacher in more rural areas.

In summary, the auditors 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.

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

MNUE does not comment on this criterion in its statement. The peers consider criterion 1 to be fulfilled.

2. The Degree Programmes: Structures, methods, and implementation

Criterion 2.1 Structure and modules

Evidence:

- Self-Assessment Report
- Study plans
- Module descriptions
- MNUE Academic Regulations
- Webpage School of Mathematics and Natural Sciences: <http://smns.mnue.mn/>
- Discussions during the audit

Preliminary assessment and analysis of the peers:

The Teacher, Natural Science Education programmes are offered by the School of Mathematics and Natural Sciences of MNUE.

Students study full-time and need to fulfil the Biology/Chemistry/Geography/Physics teacher programme requirements as well as the Teacher Education Foundation Courses and the General Foundation Courses. All three areas are divided into compulsory and elective courses. Graduates receive a Bachelor’s degree in Educational Studies and are eligible to teach their specific subject (Biology, Chemistry, Geography, or Physics) at secondary schools.

The following table describes the structure of the degree programmes:

Area	Credits	compulsory	elective
General Foundation Courses	23	19	4
Teacher Education Foundation Courses	18	14	4

Professional Courses (Biology, Chemistry, Geography)	64	56	8
Professional Courses (Physics)	69	62	7
Teaching Practicum	13	13	-
Field Practicum I + II (Biology, Chemistry, Geography)	5	5	-
Community Work	2	2	-
Total	125	109	16

The General Foundation Courses encompass compulsory classes in “Information and Communication Technology”, “English II”, “Mongolian Language and Stylistics”, “History and Culture of Thinking”, “Creative Thinking”, “History and Culture of the Mongols”, “Physical Education I + II”, “Disaster Management”, and “Natural Science”. In addition, students have to take electives in the total amount of 4 credits from the fields of Humanities, Social Sciences, or Natural Sciences.

Starting from the academic year of 2018-2019, MNUE has incorporated voluntary community work and allocates 2 credits to this new course to encourage students’ participation in social/community work. The General Foundation Courses and the Community Work have to be covered by all students at MNUE, independent of the major.

The Teacher Education Foundation Courses encompass the following compulsory classes: “Introduction to Teacher Profession”, “General Psychology”, “Educational Psychology”, “Foundations of Learning and Teaching”, “Theory and Methodology of Training”, and “Research Methodology”. Also in this area, students have to choose electives with a total amount of 4 credits. Moreover, students have to take several classes as “Teaching Practicum”, for which 13 credits are awarded.

The most important area are the “Professional Courses” that constitute the subject-specific education in the four different programmes. In Biology, Chemistry, and Geography this section encompasses 64 credits in compulsory courses and 8 credits in electives. Since there is no “Field Practise” in Physics, the Professional Courses encompass 69 credits for compulsory courses and 7 credits for electives.

As described in the Self-Assessment Report, students conduct several school-based teaching practica, which help them gaining sufficient practical experience in teaching. The involved Departments (Biology, Chemistry, Geography, and Physics) have concluded several collaboration agreements with a number of secondary schools and involve the

schoolteachers in the mentorship training. An evaluation of the teaching practicum was performed in 2018 to assess its objectives, organization and outcomes. Based on the findings, the structure of the practicum was revised to four courses (Orientation Practicum in the first semester, Study Practicum in the third semester, Guided Practicum in the fifth semester, and Teaching Practicum in the seventh semester) with 13 credits in total. The students who complete the practicum with a grade above 70 % are allowed to take the next practicum.

During the Orientation Practicum, students should become acquainted with teaching in schools and related classroom activities. They are supposed to familiarise themselves with teaching at secondary schools, pupils' activities and to reflect on the teacher's profession and gain insights of their personal goals. In the Study Practicum, students should observe, diagnose and explore child psychology and the associated learning processes. By shadowing (accompanying) teachers, students should develop a good understanding of a teacher's professional activities. Moreover, students are expected to try out small-scale activities using classroom observations, interviews, logs and questionnaires. Gradually, students should take a more active role in the Guided Practicum so they are able to plan and develop content and methodology of lessons and have their first teaching experience under the guidance of mentors. Students are expected to learn from a particular teacher and get involved in lesson planning and teaching. The focus of the Teaching Practicum is on allowing students to teach and assess pupils independently. It provides students with opportunities to actively engage in all educational activities at school including co-teaching, collaborative planning of lessons, and designing teaching aids.

In the course of the practica, students are divided into small groups, depending on the availability of mentor teachers, the number of participating students, and the students' own preferences. All students are provided with "MNUE Teaching Practicum Guide" which is a guideline for teaching and assessing pupils.

Coordinators from the School of Mathematics and Natural Sciences and the Didactics Departments supervise all types of practica. The only exception is the Study Practicum, which is supervised by professors from the School of Educational Studies, due to its orientation towards teacher and learner research and teaching/learning processes.

The peers appreciate the well-designed curricula of all four Teacher, Natural Science Education programmes that prepare students very well for working as secondary school teachers. They especially laude the good cooperation with secondary schools (coaching and mentoring programme) and the comprehensive teaching practica for students in the different phases of the training, beginning with hospitations and subsequent guided self-acting practice.

It is difficult to arrange the practical training in the secondary schools and to offer enough placements for all students. MNUE also trains teachers (mentors) at secondary schools that act as advisors for students during the practical training. This requires a big effort from MNUE, because they must find suitable placements for hundreds of students each year and must ensure that the students are adequately supervised and advised during their practical training,

With respect to the Biology programme, the peers positively point out the manifold field trips. Samples are collected, determined according to biological systematics, and presented. Another positive aspect is that the students are able to focus on a certain biological topic over the course of their education and to deepen it towards the end. They develop their competences gradually in a particular subject-area. In addition, they learn to present their topic professionally, as the sample posters show. The peers observe that Genetics is given only small room in the current curriculum of the Biology programme. This area is essential for “modern” Biology and is currently undergoing an enormous development worldwide. Genetic techniques in particular are ground breaking. Therefore, Genetics should be given a stronger focus in the curriculum, the respective laboratory should be considerably enlarged and the technical equipment adapted to modern requirements (see Criterion 4.3).

The auditors confirm that the Chemistry programme covers all the basic areas of chemical sciences (organic, inorganic, physical, analytical and theoretical chemistry) and students learn about the related chemical concepts. They only suggest introducing excursions and field trips e.g. visiting chemical companies or research facilities in order to get them acquainted with practical applications of Chemistry. Especially for future teachers it is important to become familiar with experimental methods of chemistry, chemical hazards, and have a sound knowledge of safety and environmental issues. The auditors observe some serious deficits in this area and stress that international quality and safety standards must be met (see Criterion 4.3).

Field trips are also of great importance in the Geography programme and the peers acknowledge that students have sufficient opportunities to visit the countryside and to get practical experience on-site. In addition, there is plenty material to make geography related topics more vivid (like climate parameter measurements, astrophysical basics, cartographic principals, way-finding and positioning systems). On the other hand, the peers see that there is a very strong focus on Physical Geography, whereas Human Geography is somewhat neglected. Traditionally, mainly Physical Geography is taught, because Mongolia is a vast country with only a small human population. Therefore, dealing with the nature is more important than treating social and economic issues.

Since Geography is a synthesis discipline and an applied environmental science, Human Geography should be given a greater weight in the curriculum. Understanding and finding solutions for recent ecological and socio-economic challenges is feasible only by considering both branches of modern geography, because there is a strong relationship between human activity and natural conditions. This is especially important for school teachers in order to improve the environmental education measures. Therefore, more content regarding Social, Urban, Economic, Traffic, Agricultural, and Population Geography should be introduced into the degree programme.

The auditors are satisfied with the curriculum of the Physics programme. They only suggest introducing excursions and field trips e.g. visiting power plants or research facilities in order to get them acquainted with practical applications of Physics.

Currently all classes in the Teacher, Natural Science Education programmes are taught in Mongolian, but MNUE is preparing to offer some classes in English. It is planned to establish this within the next few years. Some teachers have graduated from international universities e.g. USA and are willing and able to teach in English. The auditors explicitly support these plans and stress that it necessary to better foster teachers' and students' English proficiency. For this reason, the peers suggest teaching more subject-specific elements in English. For example, this could be achieved by offering poster presentations and oral presentations in English, which will also improve the students' communication skills.

International Mobility

In the last few years, MNUE has established several long and short term student exchange programmes with international universities (Teacher Training Institute from Switzerland, Aichi and Akita University from Japan, Hyogo University of Education, Teacher Training North-Eastern University of China, Teacher Training University of Inner Mongolia, Erlian Branch of Teacher training university of Inner Mongolia, Novosibirsk Teacher Training and Kalmik universities from Russia). For example, 36 students from the School of Mathematics and Natural Sciences took part in the exchange programme with Aichi University from 2016 to 2018.

The peers discuss with the programme coordinators whether there are windows of mobility for the students and point out that the international visibility and reputation of a university is increased by its research activities and the academic mobility of staff members and students.

Only a few Bachelor's students spend some time abroad, usually in form of a short-term stay in China, Japan, Russia or South Korea. Scholarships from the government are available

and MNUE has concluded three agreements with international universities (Japan, South Korea) for joint programmes. In addition, there are some exchange programmes and language courses at international universities. For example, around 20 students per year from the School of Mathematics and Natural Sciences take part at short-term students' exchange programmes, mostly with Japan. Moreover, the Geography Department sends students (two per year) to Inner Mongolia (China) and Russia.

Since the auditors learn from students that some of them want to spend some time abroad during the Bachelor's programme, the School of Mathematics and Natural Sciences should initiate exchange programmes with international universities and actively support the students in gaining international experience. In addition, MNUE should provide scholarships for qualified students that want to go abroad and invite more guest lecturers. The auditors emphasize that it is very useful for students to spend some time abroad already during their Bachelor's studies to improve their English proficiency and to learn about current methods in teacher education. In addition, the English language is essential for research to read, understand and publish international publications.

With respect to the recognition of credits gained at other institutions, the peers learn that there are regulations for recognising achievements and competences acquired outside MNUE. The details are described in the MNUE Academic Regulations.

Criterion 2.2 Workload and credits

Evidence:

- Self-Assessment Report
- Study plan
- Module descriptions
- MNUE Academic Regulations
- Discussions during the audit

Preliminary assessment and analysis of the peers:

Students are expected to earn at least 125 Mongolian credits (CP) in the Teacher, Natural Science Education programmes. There are two main and two mid-semesters in the academic year, which starts from the third week of August and ends in the second week of May. Each main semester (spring and autumn) lasts 16 weeks. Each mid-semester (winter and summer) lasts 8 weeks. During these semesters, students can re-sit the courses, and it is possible for them to earn 1-2 additional credits by taking elective courses. According to

the university regulations, the amount of credits to earn each semester is at least 10 and at most 21.

A students' workload depends on the contact and self-study hours. It is identified in the module descriptions as a : b : c : d (e). Here a, b, c and d stand for a number of lectures, seminars, lab and practice hours studied in a week, respectively, and e stands for students' independent study hours for particular courses. As stated in the MNUE Academic Regulations, classroom learning is done through lectures (no more than 120 students), seminars (30 students on an average), labs (10-15 students) and practical classes (40 students).

In the Biology programme the total workload in 4 years is 6240 hours, including 2960 hours dedicated to self-studies, 752 hours to lectures, 928 hours to seminars, 864 to labs, and 736 to practical classes.

The numbers are similar in the Geography programme, although there seems to be an emphasis on seminars. The total workload is 6160 hours, including 2624 hours dedicated to self-studies, 624 hours to lectures, 1216 hours to seminars, 768 to labs, and 928 to practical classes.

In the Chemistry programme, there is an expected focus on laboratory work and surprisingly the total workload with 6512 hours is significantly higher than in the other three degree programmes. Of the total workload, 3168 hours are dedicated to self-studies, 592 hours to lectures, 864 hours to seminars, 1184 to labs, and 704 to practical classes.

The Physics programme has a total workload of 6096 hours, of which 2960 hours are dedicated to self-studies, 640 hours to lectures, 1216 hours to seminars, 704 to labs, and 576 to practical classes.

According to MNUE's Academic Regulations, one Mongolian credit corresponds to 48 hours of workload, and credits are allocated depending on the course type (lecture, seminar, laboratory, or practical class) and self-study hours. In detail, 1 credit corresponds to 48 lecture hours (16 hours in classroom and 32 independent study hours), 48 seminar hours (32 in classroom and 16 independent study hours) and 48 laboratory hours (48 hours in classroom). In addition, 32 hours of student work per semester, such as teaching practice or research work for the Bachelor's thesis equals one credit. As a result, there is no official conversion rate between Mongolian credits and ECTS.

The degree programmes each award 125 CP in 8 semesters but the total workload is somewhat different. Compared to the ECTS, the total number of credits gained is equivalent to 208 (Biology), 205 (Geography), 217 (Chemistry), and 203 (Physics) if the total workload is divided by 30.

The auditors discuss with the Dean and the Department Heads and the students about the scope of the Diploma thesis (Bachelor's thesis), the related workload, and the awarded credit points. They gain the impression that the students regularly spent more time on the Bachelor's thesis than expected. Since the workload of the students was only estimated by the teachers and seems to be too low in comparison to the actual time needed by the students, the peers suggest asking the students directly how much time they really spend on the thesis. This is especially necessary because previously, only very good students (GPA above 3.7) were allowed to write a Bachelor's thesis, whereas now it is compulsory for all students. In any case, MNUE must make sure that the actual workload of the students and the awarded credits for the Bachelor's thesis correspond to each other.

According to the Self-Assessment Report, in 2014 84 students were enrolled in the Biology programme. 53 (63%) of them graduated from the School and 11 (13%) are still studying, 5 (6%) have transferred to other degree programmes, 9 (10.7 %) left for financial issues, and 6 (7.1%) left the school due to their health problems. Therefore, the dropout rate is 20 out of 84 students or 24% in the Biology programme.

In 2014, 73 students were enrolled in the Chemistry programme; 35 (48 %) of them have already graduated and 21 (29%) had a year-leave and are still studying. 12 students (16 %) have transferred to other programmes or universities and 5 (7 %) left the programme due to health problems. In summary, 17 out of 73 students (23 %) have dropped out of the Chemistry programme.

In 2014, 113 students were enrolled in the Geography programme. 51 (45 %) of them have graduated in the meantime and 30 (27 %) had a year-leave or are continuing their studies. 23 (20 %) students have transferred to other programmes or universities and 9 (8 %) left the school due to health problems. This results in a dropout rate of 28 % (32 out of 113 students) in the Geography programme.

In 2014, 128 students were enrolled in the Physics programme. 61 (48 %) of them have already graduated and 19 (15%) had a year-leave or are still studying. 20 (16%) have changed their degree programme, and 29 (22%) left the programme due to their family issues. Thus, 49 out of 128 students (38 %) have dropped out of the Physics programme.

As the students confirm during the discussion with the auditors, some students drop out of the degree programmes because of personal reasons or financial problems. Other students change to other programmes or universities because they realise that becoming a teacher does not match their interests and abilities. In case of financial problems, MNUE tries to help by offering a schedule for later payment or payment by instalments. In addition, MNUE contacts students that miss classes and offers support and advice. As a result of the increased effort, the dropout rates at MNUE are decreasing from year to year.

The peers also discuss with the students and graduates about the average length of studies. According to the students and graduates, it is no problem to finish the Teacher, Natural Science Education programmes within 8 semesters. Some are even able to finish their degree programme within 7 semesters. Only sometimes, the studies are prolonged, because students may have problems with paying the tuition fees so that in addition to their studies, they must work to earn money.

In summary, the auditors conclude that there seems to be no general structural pressure on the quality of teaching and the level of education due to the workload. The total workload appears to be adequate and the students are able to complete the degree programmes without exceeding the regular period.

Criterion 2.3 Teaching methodology

Evidence:

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

Preliminary assessment and analysis of the peers:

In the Teacher, Natural Science Education programmes, several different educational methods such as lectures, seminar, laboratory work, and practical classes are applied in order to adequately prepare the students for their future role as schoolteachers. Faculty members are required to act as role models and to use active, participatory, learner-centered teaching methods such as problem solving, case studies, and small group activities.

The overall learning model at MNUE is aimed at improving the students' competences through discussions, practical work, and lectures with the goal to prepare teachers that are "capable of developing every child".

Lectures include discussions and note taking, while seminars are organized by joint participation and efforts of both teachers and students. Preparing and making presentations, discussion, debates, questions and answers, writing projects, and case studies are widely used in seminars and practical classes. Lab work is organised in small groups and designed to impart good laboratory and practical skills. Field trips give students the opportunities for observing, studying and collecting samples for further deepening

their understanding of the natural environment. The peers positively acknowledge that assignments and laboratory work are essential parts of many courses.

Students are regularly provided with assignments and homework that require calculating, performing investigations, conducting comparative studies, analysing, exploring and coming up with conclusions. They are also given tasks such as writing projects and independent work that requires problem-solving and higher-order thinking.

To help students achieving the intended learning outcomes and to facilitate adequate learning and teaching methods, MNUE provides a digital learning platform; called University Learning Management System (ULMS). The Students web is a subdivision of ULMS. In total, there are four subsystems (Students web, Teachers web, Office of Academic Programmes and Teacher Development, Online/Distance training); they have a unified database and everyone can use it according to their access level.

ULMS plays a vital role for administrating the degree programmes by facilitating the planning and organising of training, registration, online admission, assessment of students, teachers' workload, selection of courses and tutors, learning scheduling, and issuing diplomas and transcripts of records.

The Student Web enables students to make course selections, access online course material, receive assessment results, pay tuition fees, access study schedules, a calendar of annual activities, news and updated information, and to communicate with their academic advisor and teachers.

In summary, the peer group judges the teaching methods and instruments to be suitable to support the students in achieving the intended learning outcomes.

Criterion 2.4 Support and assistance

Evidence:

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

Preliminary assessment and analysis of the peers:

MNUE provides a support system for all students on different levels. It includes consultations with an advisor for academic affairs about scholarships, graduation requirements and general study regulations. On a more personal level, teachers are

available for advice on each course. In addition, students have the opportunity to participate in student clubs and social activities.

The system of support and assistance, which results in a trustful atmosphere between students and teaching staff, is one of the strengths of MNUE. The peers see that the teachers are accessible and 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. The students are well informed about the services available to them.

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

MNUE does not comment on this criterion in its statement. The peers consider criterion 2 to be mostly fulfilled.

3. Exams: System, concept and organisation

Criterion 3 Exams: System, concept and organisation
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Evidence:

- Self-Assessment Report
- Study plan
- Module descriptions
- MNUE Academic Regulations
- MNUE Graduation Assessment Guidelines
- Discussions during the audit

Preliminary assessment and analysis of the peers:

According to the Self-Assessment Report, a variety of examination forms is used for assessing the intended learning outcomes. In the course of the degree programme, the students' achievements are assessed via different methods such as midterm exams, assignments and homework, laboratory reports, presentations, and the final exams. There is also an ongoing monitoring of the students' progress in their studies; it is evaluated by the teaching staff based on attendance, participation, and preparation for the classes.

The elements used for the grading are described in detail in the course descriptions (module description). Students cannot miss more than a third of the classes, otherwise, they fail the course. Attendance is registered by the teachers and documented in MNUE's electronic system.

Students who meet all the requirements are given a graduate exam or Diploma thesis (Bachelor's thesis) at the end of their studies. The graduation exam comprises of 30% of tasks in educational studies and 70% of professional course content.

In a case of writing a diploma thesis, students are waived from the graduate exam. Students with a GPA of 3.4 and more are eligible to write a Diploma thesis on the topic they select; it also includes an oral defense of the results. The defense contributes 30 % to the final grade of the diploma thesis. Since this year, the Diploma thesis is a compulsory course for all students in the Teacher, Natural Science Education programmes. Each Department provides a list of possible topics for the Bachelor's thesis and students can chose the topic they are interested in. Furthermore, it is possible to do the Bachelor's thesis outside MNUE e.g. at governmental research facilities. The peers point out that no module description of the Bachelor's thesis was submitted by MNUE. For this reason, the peers ask MNUE to hand it in with the statement on the report

During the period of 2016-2019 a total number of 57 students in the Biology programme, 15 students in the Chemistry programme, 40 students in the Geography programme, and 17 students in the Physics programme have submitted their diploma theses.

However, starting from the academic year of 2019-2020, all Departments of the School of Mathematics and Natural Sciences will require all students to write a diploma thesis. This decision was made at the Director`s Board meeting in December 2018 and related changes were made in the Academic Regulations.

The auditors discuss with Dean of the School of Mathematics and Natural Sciences and the Department Heads about the possibility to repeat a failed exam. They learn that on an individual basis, students can repeat a failed exam, if they can explain the reasons for failing (may be personal or health problems) to the teacher. If a student fails a class, the student can repeat the course during the summer session if he has achieved more than 40 % of the required grade points. If a student has achieved less than 40 %, he needs to repeat the class in the next semester. However, there is no limit for the number of possible repetitions of a class.

Services and support provided to disabled students are regulated in the MNUE Academic Regulations. The Departments and all units of MNUE take the responsibility to support students with disabilities and assist them throughout their studies taking their special

needs and requirements into account. All Departments are obliged to provide an appropriate learning environment and learning tools for students with disabilities. Currently, there are 89 students at MNUE with some form of disability. Four disabled students are currently enrolled in the Teacher, Natural Science Education programmes.

The students confirm during the audit, that there is a general exam schedule; overlaps are usually avoided and if necessary students and teachers can decide to shift the exam date.

During the audit, the peers inspect sample examination papers and Diploma theses and are overall satisfied with the general quality of the samples.

The peers confirm that there is a form of assessment for each course and that all students are well informed about the form of assessment and the details of what is required to pass the course. The organisation of the exams guarantees that delays in the study progress are avoided. The relevant rules for examination and evaluation criteria are available as legal documents, as both students and lecturers confirm during the audit. The date and time of the exams and how the exams are taken is announced to the students in due time at the beginning of each semester.

The peers come to the conclusion that the examinations are suitable to verify whether the intended learning outcomes are achieved or not.

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

The peers thank MNUE for submitting the thesis and graduation examination guidelines for each degree programme as well as the MNUE undergraduate diploma thesis requirements. The peers see that MNUE wants to establish a uniform framework for the thesis and has taken some important steps in this direction. Nevertheless, they still miss a verification of the actual workload for the Bachelor's thesis. In addition, MNUE needs to make sure that the awarded credits correspond with the workload and students should know how many hours they are supposed to work on the thesis.

The peers consider criterion 3 to be mostly fulfilled.

4. Resources

Criterion 4.1 Staff

Evidence:

- Self-Assessment Report
- Staff handbook
- MNUE Teaching Staff Work Regulations,
- Study plan
- Module descriptions
- Discussions during the audit

Preliminary assessment and analysis of the peers:

At MNUE, the staff members have different academic positions. There are full professors, associate professors, senior lecturers, teachers and assistants. The academic position of every staff member is based on research activities, publications, academic education, supervision of students, and other supporting activities. For example, an associate professor should have worked at a higher education institution for more than 10 years with at least 5 years of teaching experience at MNUE without interruption, and needs to hold a PhD degree. The further details are determined in MNUE Teaching Staff Work Regulations. In addition, there is a difference in teaching load depending on the academic position (e.g. 11 credit hours for a full professor and 16 credit hours for a lecturer). Department Heads can receive a reduction of the teaching load, and there are also financial incentives for excellent teaching and successful research activities (e.g. number of publications).

According to the SAR, the Biology Department employs 19 staff members including five professors, one associate professor, three senior lecturers, seven lecturers and three assistants. In the Chemistry Department there are 14 staff members including two professors, three associate professors, two senior lecturers, one lecturer and three assistants. The staff of the Geography Department encompasses 12 staff members including two professors, two associate professors, two senior lecturers, three lecturers and one assistant. The Physics Department employs 19 staff members including five professors, one associate professor, three senior lecturers, seven lecturers and three assistants.

Most staff members in all four Departments hold a PhD; those lecturers who hold a Master's degree are all currently enrolled in PhD programmes.

The General Foundation Courses and the Teacher Education Courses are taught by lecturers from the School of Educational Studies and the School of the Social Sciences and the Humanities.

Almost all staff members have permanent contracts, but every three years all teachers have to reapply for their position. Based on performance indicators (e.g. research activities, course evaluations) staff members can be up- or downgraded.

The student-teacher ratio in the academic year 2018/19 in the Biology programme is 313:16 = 19.6, in the Chemistry programme 203:8 = 25.3, in the Geography programme 174:9 = 19.3, and in the Physics programme 260:11 = 23.6. MNUE has the goal to have 21 students per teacher, so in the Chemistry and Physics programmes this goal is not reached. The difference in the student-teacher ratio between the Departments is due to the fact that there are more staff members in the subjects where the need for schoolteachers is higher (e.g. Biology and Geography). However, the peers consider the student per teacher ratio to be quite low, especially in comparison to similar degree programmes in Germany.

The peers discuss with MNUE's management the procedure for hiring new staff members. First, the teaching load of each Department is determined and if there is need for additional staff members a request is forwarded to MNUE's management and subsequently the vacancies are announced publicly. New staff members are hired as assistant teachers, who have a lower teaching load in the first year of teaching. After successfully teaching for one year, assistant teachers can apply for the permanent position of a "regular teacher" with the full teaching load. Assistant teachers also have to take part in compulsory courses for personal and professional development. In addition, there is a mentoring system, where more experienced staff members advice new teachers.

In summary, the peers confirm that the composition, scientific orientation and qualification of the teaching staff is suitable for successfully implementing and sustaining the Teacher, Natural Science Education programmes. There are enough resources available for administrative tasks, supervision and guidance of the students.

Criterion 4.2 Staff development

Evidence:

- Self-Assessment Report
- Staff handbook
- Discussions during the audit

Preliminary assessment and analysis of the peers:

At MNUE, there are sufficient offers and support mechanisms available for staff members who wish to further develop their professional and teaching skills. For example, there is a Teacher Development Center at MNUE that offers courses for personal and professional

development of the faculty members. Teachers also have the opportunity to join international research projects, to take part at conferences and workshops abroad, and to visit partner universities. For example, MNUE approved and supported 71 international research collaborations between staff members from MNUE and international researchers in 2018. Moreover, a teacher exchange programme with Japan exists and MNUE regularly invites guest lecturers from Japan, South Korea or USA.

During the discussion with the peers, the teachers express their satisfaction with the support by the university and the opportunities for further didactic and scientific development. For example, workshops are offered regularly according to the needs of the staff members. In addition, more experienced teachers tutor young lecturers.

A paid leave of absence for participating in international research projects is possible, and several staff members have international contacts with universities in Russia, China, Japan or South Korea.

Criterion 4.3 Funds and equipment

Evidence:

- Self-Assessment Report.
- On-site-visit of the laboratories, classrooms, and the library
- Discussions during the audit

Preliminary assessment and analysis of the peers:

The auditors discuss with MNUE's management how the university is financed and how the Departments receive their budget. They learn that in 2018 77% of MNUE's total budget derived from tuition fees (in 2018 one credit cost 71,5 thousand MNT (26 €) per semester) The rest of MNUE's funds comes from different services provided by MNUE (e.g. training courses, projects, dormitories); the running costs (electricity, water etc.) are covered by the government. Budget allocation is based on the Department's request, the number of students, and the programme's requirements (e.g. chemicals and laboratory equipment).

During the audit, the peer group also visits some laboratories, classrooms and the nearby libraries in order to assess the quality of infrastructure and technical equipment. They notice that there are no apparent bottlenecks due to missing equipment or a lacking infrastructure. However, the peers notice that the buildings need to be renovated and advanced technical equipment is missing. In addition, the different Departments of the School of Medicine and Natural Sciences are located in different buildings and it would be better if there was one modern building for all the Departments.

In the Biology programme, the peers observe that the technical equipment is rather good and the laboratories all well-equipped. The only weak point they identify is the neglect of Genetics in the curriculum. As mentioned before, this is an important field of Biology and should be given more room. Therefore, the Genetics laboratory should be considerably enlarged and the technical equipment adapted to modern requirements, so that prospective biology teachers are able to teach this discipline safely and in line with the current state of science.

The peers point out that in the Department of Geography especially the GIS-Equipment should be improved. From their point of view it is necessary to provide better computer hardware for higher resolution visualisations and better graphic hardware performance. In addition, the Department should purchase licenses for standard GIS and remote sensing software.

With respect to safety regulations, the peers see that there is room for improvement especially in the Department of Chemistry. While visiting the laboratories they notice that the safety measures are not up to international standards. This especially concerns missing emergency exit signs, fire extinguishers and eye showers. Students and lab personnel need to wear safety glasses and some of the furniture in the laboratories is inflammable. Following safety regulations is especially important for future schoolteachers, because later they are responsible for the safety measures in the schools and that the experiments conducted there do not put the pupils in danger and that hazards are avoided. The peers expect MNUE to address these issues and to improve the safety measures in the laboratories.

The basic technical equipment is available in sufficient numbers at the Chemistry Department, although some of it is not state of the art. For an adequate teacher training, it is necessary to adapt the technical equipment in the laboratories to modern standards. For example for research projects or the Bachelor's thesis, students need modern analytical equipment (photometry, infrared, UV-visible spectroscopy, etc.) in order to be able to perform spectroscopic measurements.

The auditors point out that the technical equipment in the Department of Physics needs to be updated and improved. For example, it would be very useful to purchase modern thermal cameras and modern optical devices such as computer-based spectrometers, lenses, and equipment for doing computer-based measurements. Students should be able to conduct more inquiry-based experiments and follow less „cook-book like recipes. Hands-on experience with suitable instruments is especially important for future teachers that need to pass on their knowledge to pupils. In addition, it is very important to follow safety standards in the labs and to use up-to-date electrical wires and safety connecting cords.

In general, it is not necessary to purchase expensive and sophisticated instruments for high-end research in a teacher education programme, but the auditors expect MNUE to provide modern instruments that can also be used in secondary schools to conduct and demonstrate experiments in all fields of Natural Sciences. In addition, there should be enough modern instruments for conducting research activities, both by the teachers and the students in their Diploma Theses. For this reason, MNUE needs to submit a concept for updating and improving the instruments and the technical equipment in Physics, Geography, and Chemistry Departments. In comparison, they judge the facilities in the Biology Department to be mostly adequate.

The new MNUE libraries offers access to electronic scientific and educational resources and to the electronic library system, including current publications that are needed for study and research. Moreover, access to international scientific databases like SpringerLink is possible.

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

MNUE does not comment on this criterion in its statement. The peers consider criterion 4 to be mostly fulfilled.

5. Transparency and documentation

Criterion 5.1 Module descriptions

Evidence:

- Self-Assessment Report
- Study plans
- Module descriptions
- Webpage School of Mathematics and Natural Sciences: <http://smns.mnue.mn/>
- Discussions during the audit

Preliminary assessment and analysis of the peers:

The auditors confirm that the module descriptions are accessible to all students and teachers via the university's homepage. In general, the module descriptions include all necessary information about the course's objectives and content, its link to the programme

objectives as well as prerequisites, workload, teaching methodology, exam requirements, literature and teaching staff.

The only weak points the peers identify are the missing descriptions of the Bachelor's thesis, the fact that the ECTS credit points are not mentioned and that the literature references need to be updated. The peers expect MNUE to submit the missing module descriptions of the Bachelor's thesis together with its statement and to update the module descriptions.

Criterion 5.2 Diploma and Diploma Supplement

Evidence:

- Self-Assessment Report
- Sample Diploma Supplement
- Sample Bachelor Diploma

Preliminary assessment and analysis of the peers:

The peer group confirms that a Diploma and a Diploma Supplement is issued to every student upon graduation.

The subject-specific Diploma Supplement contains all necessary information about the objectives, structure, content and the individual results of the student.

Criterion 5.3 Relevant rules

Evidence:

- Self-Assessment Report
- Webpage School of Mathematics and Natural Sciences: <http://smns.mnue.mn/>

Preliminary assessment and analysis of the peers:

The auditors confirm that the rights and duties of both MNUE and the students are clearly defined and binding. The only critical point is that not all course relevant information is accessible by the stakeholders. This problem could, for example, be solved by publishing the module descriptions, study plans, programme learning outcomes, and academic regulations on the website of the School of Mathematics and Natural Sciences and hence make them available to all stakeholders. The auditors expect MNUE to address this issue.

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

MNUE does not comment on this criterion in its statement. The peers consider criterion 5 to be mostly fulfilled.

6. Quality management: Quality assessment and development

Criterion 6 Quality management: Quality assessment and development

Evidence:

- Self-Assessment Report
- Discussions during the audit
- MNUE Guidelines for Academic Programme Evaluation
- MNUE Curriculum Committee Regulation

Preliminary assessment and analysis of the peers:

The auditors discuss the quality management system at MNUE with the programme coordinators. They learn that there is a continuous process in order to improve the quality of the degree programme, carried out through internal and external evaluation.

External quality assessment of the degree programme is provided by the accreditation of the degree programmes by the National Council for Higher Education Accreditation of Mongolia.

Internal evaluation of the quality of the Teacher, Natural Science education programmes is mainly provided through student surveys. The students give their feedback on the courses and the teachers' performance by filling out two separate questionnaires online (students' course evaluation survey and students' satisfaction survey). Giving feedback is compulsory for the students; otherwise, they cannot access their grades on ULMS. The Monitoring and Evaluation Office and the Office of Academic Programmes and Teacher Development implement both surveys. The students' satisfaction survey is conducted annually and has the goal to evaluate MNUE's services, the infrastructure and facilities. The students' course evaluation survey includes questions about the performance of the respective teacher and needs to be filled out for each course and the end of every semester. The peers point out that this survey is not aimed at improving the structure or the content of the course but is only used for assessing the teacher's proficiency in teaching and advising. It would be very

useful, from the auditors' point of view, to ask students also about each course's content, structure, and quality. In addition, the students' satisfaction survey should also include questions about the content, structure, and quality of the whole degree programme. The students' answers should then be used for further improving each course and the whole degree programme. Finally, students should receive feedback on the results of the surveys and if there is criticism, students should be informed about the steps that are taken to solve the issues.

The results of the surveys are analysed through UMLS and the results are sent to the Monitoring and Evaluation office, the Office of Academic Programmes and the Vice-President for Academic Affairs.

The peers observe during the audit that students are not informed about the surveys' results, and there is not yet an established process on analysing the students' feedback and on using it for further developing the degree programme.

According to the MNUE Guidelines for Academic Programme Evaluation, a survey on the employers' evaluation of the graduates' competencies and personality building and a survey on the graduates' evaluation of the current essential knowledge and skills shall be conducted every two years. In addition, a survey on the graduates' employment rates and their continuous professional development is conducted annually by the Student Development Office.

The auditors discuss the quality management system at MNUE with the university's management. MNUE has established curriculum committees at different levels. On a university-wide level, there is the MNUE Curriculum Committee. It is comprised of 23 people and chaired by the Vice President of Academic Affairs. Members are the Director of the Office of Curriculum and Teacher Development, the Departments Heads, the Dean of the School of Educational Studies, the Director of the Institute of Education, a principal of a secondary school, a student, and additional faculty members. The MNUE Curriculum Committee is responsible for the final discussion and approval of academic programmes. In addition, there is one branch committee and two sub-committees at the School of Mathematics and Natural Sciences. There is a branch curriculum committee and two curriculum sub-committees at the School of Mathematics and Natural Sciences. The branch committee has the goal to ensure integrative discussion across the Departments. Members are the Dean, Department Heads, and a representative of the Academic Affairs Office. Programme reforms and improvements are discussed in the sub-committees that are represented by 6 people – Department Heads and faculty members of the related department, a secondary school representative, a district educational department officer, and a representative of the Academic Affairs Office.

The auditors gain the impression that the School of Mathematics and Natural Sciences take the students' feedback seriously and changes are made if there is negative feedback. For example, students sometimes discuss with their teachers directly about the course content and possible improvements. Nevertheless, the peers see that the results of the course evaluations are not discussed with the students and not used for further developing the degree programmes. As a consequence, the peers expect MNUE to inform students about the results of the course evaluations and the teachers should discuss with them about possible improvements in the respective course. The feedback loops need to be closed and students should be directly involved in the process of further developing the degree programmes.

The peers learn from MNUE's partners from public institutions and secondary schools that some of them are members of the different curriculum committees and regularly discuss the needs and requirements of the job market and possible changes to the degree programmes. As the peers consider the input of the school principles to be very important, they appreciate their involvement.

In summary, the peers expect MNUE to analyse students' feedback, to inform students about the results of the surveys, and to involve students directly in the processes of further developing the degree programmes.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 6:

MNUE does not comment on this criterion in its statement. The peers consider criterion 6 to be mostly 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:

- Module descriptions of the Bachelor's thesis

E Comment of the Higher Education Institution (30.06.2019)

The institution provided a short statement as well as the following additional documents:

- Biology thesis and graduation examination guidelines
- Geography thesis and graduation examination guidelines
- Physics thesis and graduation examination guidelines
- Chemistry thesis and graduation examination guidelines
- MNUE undergraduate diploma thesis requirements
- Extract from MNUE Intellectual Property Regulations regarding plagiarism

F Summary: Peer recommendations (12.07.2019)

Taking into account the additional information and the comments given by MNUE, the peers 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 Teacher Education Biology	With requirements for one year	-	30.09.2024
Ba Teacher Education Chemistry	With requirements for one year	-	30.09.2024
Ba Teacher Education Geography	With requirements for one year	-	30.09.2024
Ba Teacher Education Physics	With requirements for one year	-	30.09.2024

Requirements

For all degree programmes

- A 1. (ASIIN 3) Make sure that the actual workload for the Bachelor's thesis corresponds with the awarded credit and define common standards with respect to quality and length of the thesis.
- A 2. (ASIIN 5.2) Create and submit a complete module description for the Bachelor's thesis.
- A 3. (ASIIN 5.3) Ensure that all relevant course-related information is accessible for all stakeholders.
- A 4. (ASIIN 6) Close the feedback loops and discuss with the students about the course evaluation results.

For the Teacher Education programmes Chemistry, Geography, and Physics

- A 5. (ASIIN 4.3) Submit a concept for updating and improving the instruments and the technical equipment in the laboratories.

For the Teacher Education programme Chemistry

- A 6. (ASIIN 4.3) Align the safety measures in the laboratories with international standards.

Recommendations

For all degree programmes

- E 1. (ASIIN 2.1) It is recommended to foster teachers' and students' English proficiency, establish more international exchange programmes and better promote academic mobility.
- E 2. (ASIIN 5.2) It is recommended to update the literature references in the module descriptions and mention the ECTS.

For the Teacher Education programme Biology

- E 3. (ASIIN 2.1) It is recommended to put a stronger focus on genetics and to expand the respective laboratory.

For the Teacher Education programme Geography

- E 4. (ASIIN 2.1) It is recommended to give more weight to Human Geography.

For the Teacher Education programme Physics

- E 5. (ASIIN 2.1) It is recommended to conduct excursions and field trips.
- E 6. (ASIIN 4.3) It is recommended to improve and update the wiring of the electronic instruments.

G Comment of the Technical Committees (12.09.2019)

Technical Committee 09 - Chemistry (09.09.2019)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee notes that the auditors have identified the technical equipment and the quality of the theses as major shortcomings of the degree programmes. Since it is not to be expected that the technical equipment can be significantly improved within the next few months, but rather that a longer time horizon has to be planned for due to financial restrictions, the auditors have imposed a requirement for the submission of an appropriate concept. The Technical Committee agrees with this solution and endorses the proposed requirements and recommendations.

The Technical Committee 09 - Chemistry recommends the award of the seals as follows:

Degree Programme	ASIIN seal	Subject-specific labels	Maximum duration of accreditation
Ba Teacher Education Biology	With requirements for one year	-	30.09.2024
Ba Teacher Education Chemistry	With requirements for one year	-	30.09.2024
Ba Teacher Education Geography	With requirements for one year	-	30.09.2024
Ba Teacher Education Physics	With requirements for one year	-	30.09.2024

Technical Committee 10 – Life Sciences (05.09.2019)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee notes that the auditors have identified the technical equipment and the quality of the theses as major shortcomings of the degree programmes. Since it is not to be expected that the technical equipment can be significantly improved within the next few months, but rather that a longer time horizon has to be planned for due to financial restrictions, the auditors have imposed a requirement for the submission of an

appropriate concept. The Technical Committee agrees with this solution and endorses the proposed requirements and recommendations.

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

Degree Programme	ASIIN seal	Subject-specific labels	Maximum duration of accreditation
Ba Teacher Education Biology	With requirements for one year	-	30.09.2024
Ba Teacher Education Chemistry	With requirements for one year	-	30.09.2024
Ba Teacher Education Geography	With requirements for one year	-	30.09.2024
Ba Teacher Education Physics	With requirements for one year	-	30.09.2024

Technical Committee 11 - Geosciences (09.2019)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee follows the assessment of the auditors without changing the proposed requirements and recommendations.

The Technical Committee 11 - Geosciences recommends the award of the seals as follows:

Degree Programme	ASIIN seal	Subject-specific labels	Maximum duration of accreditation
Ba Teacher Education Biology	With requirements for one year	-	30.09.2024
Ba Teacher Education Chemistry	With requirements for one year	-	30.09.2024
Ba Teacher Education Geography	With requirements for one year	-	30.09.2024
Ba Teacher Education Physics	With requirements for one year	-	30.09.2024

Technical Committee 13 - Physics (12.09.2019)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the accreditation procedure as well as the relevant requirements and recommendations. Regarding recommendation 6 (It is recommended to improve and update the wiring of the electronic instruments), the TC is of the opinion that this does not adequately cover all the safety aspects mentioned in the report. Furthermore, safety aspects are important and should warrant a requirement. Therefore, the TC suggests to add the requirement 6 (Align the safety measures in the laboratories with international standards) also for the Bachelor programme Teacher Education Physics.

The Technical Committee 13 - Physics recommends the award of the seals as follows:

Degree Programme	ASIIN seal	Subject-specific labels	Maximum duration of accreditation
Ba Teacher Education Biology	With requirements for one year	-	30.09.2024
Ba Teacher Education Chemistry	With requirements for one year	-	30.09.2024
Ba Teacher Education Geography	With requirements for one year	-	30.09.2024
Ba Teacher Education Physics	With requirements for one year	-	30.09.2024

For the Teacher Education programmes Chemistry and Physics

A 6. (ASIIN 4.3) Align the safety measures in the laboratories with international standards.

H Decision of the Accreditation Commission (20.09.2019)

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

The Accreditation Commission agrees with the suggestion of the Technical Committee 13 – Physics to enlarge requirement A 6 to the Bachelor’s degree programme Physics, because safety standards are very important and need to be followed in all laboratories. At the same time, recommendation E 6 can be deleted, because the issue is now included in requirement A 6. Finally, the Accreditation Commission decides to enlarge recommendation E 5 to the Bachelor’s degree programme Chemistry, because it is mentioned in the report that also in this programme no field trips or excursion are conducted.

The Accreditation Commission for Degree Programmes decides to award the following seals:

Degree Programme	ASIIN seal	Subject-specific labels	Maximum duration of accreditation
Ba Teacher Education Biology	With requirements for one year	-	30.09.2024
Ba Teacher Education Chemistry	With requirements for one year	-	30.09.2024
Ba Teacher Education Geography	With requirements for one year	-	30.09.2024
Ba Teacher Education Physics	With requirements for one year	-	30.09.2024

Requirements

For all degree programmes

- A 1. (ASIIN 3) Make sure that the actual workload for the Bachelor’s thesis corresponds with the awarded credit and define common standards with respect to quality and length of the thesis.
- A 2. (ASIIN 5.2) Create and submit a complete module description for the Bachelor’s thesis.
- A 3. (ASIIN 5.3) Ensure that all relevant course-related information is accessible for all stakeholders.

A 4. (ASIIN 6) Close the feedback loops and discuss with the students about the course evaluation results.

For the Teacher Education programmes Chemistry, Geography, and Physics

A 5. (ASIIN 4.3) Submit a concept for updating and improving the instruments and the technical equipment in the laboratories.

For the Teacher Education programmes Chemistry and Physics

A 6. (ASIIN 4.3) Align the safety measures in the laboratories with international standards.

Recommendations

For all degree programmes

E 1. (ASIIN 2.1) It is recommended to foster teachers' and students' English proficiency, establish more international exchange programmes and better promote academic mobility.

E 2. (ASIIN 5.2) It is recommended to update the literature references in the module descriptions and mention the ECTS.

For the Teacher Education programme Biology

E 3. (ASIIN 2.1) It is recommended to put a stronger focus on genetics and to expand the respective laboratory.

For the Teacher Education programme Geography

E 4. (ASIIN 2.1) It is recommended to give more weight to Human Geography.

For the Teacher Education programmes Physics and Chemistry

E 5. (ASIIN 2.1) It is recommended to conduct excursions and field trips.

I Fulfilment of Requirements (17.09.2020)

Comments of the peers and the Technical Committees (03.09.2020)

Requirements

For all degree programmes

- A 1. (ASIIN 3) Make sure that the actual workload for the Bachelor's thesis corresponds with the awarded credit and define common standards with respect to quality and length of the thesis.

Initial Treatment	
Peers	fulfilled Vote: unanimous Justification: Common standards with respect to quality and length of the thesis have been developed but it still needs to be verified that the workload for the Bachelor's thesis corresponds with the awarded credits. Therefore, they suggest that a note on the workload and ECTS points should be included in the letter to the university.
TC 09	fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers.
TC 10	fulfilled Vote: unanimous Justification: The TC agrees with the peers.
TC 11	fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers.
TC 13	fulfilled Vote: unanimous Justification: The TC agrees with the peers.

- A 2. (ASIIN 5.2) Create and submit a complete module description for the Bachelor's thesis.

Initial Treatment	
Peers	fulfilled Vote: unanimous Justification: A module description for the Bachelor's thesis has been submitted.

TC 09	fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers.
TC 10	fulfilled Vote: unanimous Justification: The TC agrees with the peers.
TC 11	fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers.
TC 13	fulfilled Vote: unanimous Justification: The TC agrees with the peers.

A 3. (ASIIN 5.3) Ensure that all relevant course-related information is accessible for all stakeholders.

Initial Treatment	
Peers	fulfilled Vote: unanimous Justification: The course-related information is now accessible via MNUE's webpage.
TC 09	fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers.
TC 10	fulfilled Vote: unanimous Justification: The TC agrees with the peers.
TC 11	fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers.
TC 13	fulfilled Vote: unanimous Justification: The TC agrees with the peers.

A 4. (ASIIN 6) Close the feedback loops and discuss with the students about the course evaluation results.

Initial Treatment	
Peers	fulfilled Vote: unanimous Justification: Students are now informed about the results of the course evaluations.
TC 09	fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers.
TC 10	fulfilled Vote: unanimous

	Justification: The TC agrees with the peers.
TC 11	fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers.
TC 13	fulfilled Vote: unanimous Justification: The TC agrees with the peers.

For the Teacher Education programmes Chemistry, Geography, and Physics

A 5. (ASIIN 4.3) Submit a concept for updating and improving the instruments and the technical equipment in the laboratories

Initial Treatment	
Peers	fulfilled Vote: unanimous Justification: A sufficient concept has been submitted.
TC 09	fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers.
TC 10	fulfilled Vote: unanimous Justification: The TC agrees with the peers.
TC 11	fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers.
TC 13	fulfilled Vote: unanimous Justification: The TC agrees with the peers.

For the Teacher Education programmes Chemistry and Physics

A 6. (ASIIN 4.3) Align the safety measures in the laboratories with international standards.

Initial Treatment	
Peers	fulfilled Vote: unanimous Justification: The safety measures have been improved and are now sufficient.
TC 09	fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers.
TC 10	fulfilled Vote: unanimous Justification: The TC agrees with the peers.
TC 11	fulfilled

	Vote: unanimous Justification: The TC follows the assessment of the peers.
TC 13	fulfilled Vote: unanimous Justification: The TC agrees with the peers.

Decision of the Accreditation Commission (17.09.2020)

Degree programme	ASIIN-label	Subject-specific label	Accreditation until max.
Ba Teacher Education Biology	All requirements fulfilled*	-	30.09.2024
Ba Teacher Education Chemistry	All requirements fulfilled*	-	30.09.2024
Ba Teacher Education Geography	All requirements fulfilled*		30.09.2024
Ba Teacher Education Physics	All requirements fulfilled*		30.09.2024

* The Accreditation Commission for Degree Programmes decides to include the following reference into the notifying letter to the HEI:

“In the course of the re-accreditation procedure, it will be reviewed if the students’ actual workload corresponds with the awarded ECTS credits, especially for the Bachelor’s thesis.”

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 Teacher, Natural Science Education programmes:

- attain verbal and written communication skills, teamwork skills, self-development; and knowledge, skills and attitudes for lifelong learning;
- be child-friendly, respect and follow humanistic and ethical principles;
- acquire skills to facilitate students' learning process, and use effective methodology in teaching and learning process, disseminate and share it with others;
- gain ability to create, use and improve digital tools, teaching and learning aids that meet needs and demands of learners, schools, education sector and a society at large;
- effective and ethical use of achievements in the biological/chemical/geographical/physical sciences in teaching and learning process;
- keep updated on the latest achievements in the biological/chemical/geographical/physical sciences and their impact on development of individuals, education and a society, and substantiate the findings to others.

The following **course overview** and study plans are presented:

MONGOLIAN NATIONAL UNIVERSITY OF EDUCATION SCHOOL OF MATHEMATICS AND NATURAL SCIENCES TEACHER, Natural Sciences Education CURRICULUM FRAMEWORK					
Program Index:		D011402			
Academic Degree:		Bachelor's			
Previous Education:		Secondary			
Mode of Study		Full-time			
Codes	Courses	Credits	Pre-requisites	Semester	Time allocation
I. General Foundation Courses		25			
Compulsory Courses		21			
1	S.IT101 Information and Communication Technology	2		spring	0:0:4:0(3)
2	S.EL102 English II	3	S.EL101	fall	0:2:0:4(5)
3	S.ML101 Mongolian Language and Stylistics	3		fall	2:2:0:0(5)
4	S.SS101 History and Culture of Thinking	2		fall	1:2:0:0(3)
5	S.SS102 Creative Thinking	1	S.SS101	spring	0:2:0:0(2)
6	S.MH101 History and Culture of the Mongols	3		spring	2:2:0:0(5)
7	S.PT101 Physical Education I	1		spring	0:0:0:2(2)
8	S.PT102 Physical Education II	1	S.PT101	fall	0:0:0:2(2)
9	S.SS103 Disaster Management	1		fall	0:0:0:2(2)
#	S.SS205 Natural Science	2			1:2:0:0(2)
#	S.VH199 Voluntary Community work	2		activity	
Elective Courses		4			
The Humanities:					
1	S.SS104 Health and Life Skills	2		any	0:2:0:0(2)
2	S.ML103 Mongolian Script	2		any	0:4:0:0(3)
3	S.EL101 English I	3		any	0:2:0:4(5)
4	S.FL101 Russian	2		any	0:0:0:4(3)
5	S.FL102 Chinese	2		any	0:0:0:4(3)
6	S.FL103 Korean	2		any	0:0:0:4(3)
7	S.FL104 Japanese	2		any	0:0:0:4(3)
8	S.FL105 German	2		any	0:0:0:4(3)
9	S.EL103 English III	2	S.EL102	any	0:0:0:4(3)
Social Sciences:					
1	S.PL101 Legal Studies	2		any	1:2:0:0(3)
2	S.PL102 Political Science	2		any	1:2:0:0(3)
3	S.EC101 Economics	2		any	1:2:0:0(3)
4	S.GC108 Globalization and Culture	2		any	1:2:0:0(3)
5	S.GS109 Gender and Sustainable Development	2		any	1:2:0:0(3)
Natural Sciences:					
1	S.SS106 Ecology and nature conservation	2		any	1:2:0:0(3)
2	S.SS107 Mathematics	2		any	1:2:0:0(3)
II. Teacher Education Foundation Courses		21			
Compulsory Courses		14			
1	S.TI201 Introduction to Teacher Profession	1		fall	0:2:0:0(2)
2	E.GP202 General Psychology	2		spring	1:2:0:0(3)
3	E.EP207 Educational Psychology	3	E.GP202	fall	2:2:0:0(5)
4	E.ES201 Foundations of Learning and Teaching	3		fall	1:4:0:0(5)
5	E.ES211 Theory and Methodology of Training	3		spring	2:2:0:0(5)
6	E.ER201 Research Methodology	2		fall	1:0:2:0(3)
Teacher Education Practicum		3			
1	H.TP230 Orientation Practicum	1	S.TI201	fall	0:0:0:2(2)
2	H.TP255 Study Practicum	2		spring	0:0:0:4(3)
Elective Courses		4			
1	E.EL201 Methodology of E-Learning	2	S.IT101	any	0:0:4:0(3)
2	E.ES206 Child Protection	1		any	0:2:0:0(2)
3	E.ES204 Curriculum Studies	1	E.ES203	any	0:2:0:0(2)
4	E.ES205 Teacher Ethics	1	E.ES201	any	0:2:0:0(2)
5	E.ES207 School Study	2		any	1:2:0:0(3)
6	T.PE203 Basis of Special Needs Education	2		any	1:2:0:0(3)
7	E.EL202 Methodology of Instructional Materials	2	M.TM261	any	0:2:0:2(3)
8	M.IM210 Integrated Methodology	2		any	0:2:0:0(3)
9	S.EM201 Educational Measurement	2		any	1:2:0:0(3)
#	E.EP201 Psychology of Human Development	2		fall	1:2:0:0(3)

0 Appendix: Programme Learning Outcomes and Curricula

III Professional Courses					
PHYSICS		79			
Compulsory Course		72			
1	M.PH402 General Education School Physics	2		spring	1:0:2:0:(3)
2	M.PH403 Elementary Physics-1	2		fall	0:4:0:0:(3)
3	M.PH404 Mechanics	4		fall	2:2:2:0:(5)
4	M.PH405 Molecular Physics	4	M.PH404	spring	2:2:2:0:(5)
5	M.PH406 Electricity and Magnetism	4	M.PH405	fall	2:2:2:0:(5)
6	M.PH407 Optics	4	M.PH406	spring	2:2:2:0:(5)
7	M.PH408 Atomic Physics	3	M.PH406	spring	2:2:0:0:(5)
8	M.PH409 Nuclear Physics	3	M.PH408	fall	2:2:0:0:(5)
9	M.PH410 Theoretical Physics	3	M.PH408	fall	2:2:0:0:(5)
#	M.PH411 Basis of Electrical Technology	3	M.PH406	spring	1:2:2:0:(5)
#	M.PH412 Basic of Electronics	3	M.PH411	fall	1:0:4:0:(5)
#	M.MA471 Calculus 1	3		fall	2:2:0:0:(5)
#	M.MA472 Algebra and Geometry	3	M.MA471	spring	2:2:0:0:(5)
#	M.PH435 Practice of Experimental Physics	2		any	0:0:4:0:(3)
#	M.PH415 Elementary Physics-2	2		any	0:4:0:0:(3)
#	M.PH417 Oscillations and Waves	4		any	1:2:0:0:(3)
#	M.PH418 Practice of Physics Problem Solving I	2		any	0:4:0:0:(3)
#	M.PH419 Practice of Physics Problem Solving II	2		any	0:4:0:0:(3)
#	M.TM462 Teaching Methodology of Physics I	3	E EP203	spring	1:2:2:0:(5)
#	M.TM472 Teaching Methodology of Physics II	4	M.TM262	fall	1:2:2:0:(5)
#	M.TP401 Guided Practicum	5	H.TP260	spring	0:0:0:6:(5)
#	M.TP402 Teaching Practicum	5	H.TP270	fall	0:0:0:8:(5)
#	S.BA490 Diploma Thesis, Graduation Examination	2		any	0:0:0:4:(3)
Elective Courses A		5			
1	M.PH430 Model of Physics Systems	2		any	0:0:4:0:(3)
2	M.PH431 Electronic System Maintenance	2	M.PH411	any	1:0:2:0:(3)
3	M.PH303 Astronomy	2		spring	1:2:0:0:(2)
4	M.PH434 Problems of Modern Physics	2		any	1:2:0:0:(3)
5	M.MA473 Calculus 2	3	M.MA471	any	2:2:0:0:(5)
6	M.PH302 Environmental Physics	1			
7	M.PH413 Physics Literacy	1		spring	0:2:0:0:(2)
8	M.PH401 History of Physics	1		fall	0:2:0:0:(2)
Elective Courses B		2			
1	M.BI301 Biology	2		any	1:0:2:0:(3)
2	M.GE301 Geography	2		any	1:0:2:0:(3)
3	M.CH301 Chemistry	2		any	1:0:2:0:(3)
4	M.PH301 Physics	2		any	1:0:2:0:(3)
5	M.MA301 Mathematics	2		fall	0:4:0:0:(3)
Total credits:		125			

0 Appendix: Programme Learning Outcomes and Curricula

BIOLOGY		79			
Compulsory Courses		71			
1	M.BI401	Plant Anatomy and Morphology	4		spring 2:0:4:0:(5)
2	M.BI402	Zoology I: Invertebrate Animals	4		fall 2:0:4:0:(5)
3	M.BI415	Cytology, Histology and Embryology	3		spring 2:0:2:0:(5)
4	M.BI404	Microbiology	3	M.BI403	spring 2:0:2:0:(5)
5	M.BI405	Plant Systematics	4	M.BI401	fall 2:0:4:0:(5)
6	M.BI406	Zoology II: Vertebrate Animals	4	M.BI402	spring 2:0:4:0:(5)
7	M.BI416	Biochemistry	3	M.BI404	fall 2:0:2:0:(3)
8	M.BI408	Human Anatomy and Physiology	3	M.BI406	spring 2:0:2:0:(5)
9	M.BI409	General Ecology	3		spring 1:2:2:0:(5)
#	M.BI410	Genetics and Selection	3	M.BI407	spring 2:0:2:0:(5)
#	M.BI411	Evolution	3	M.BI406	spring 2:2:0:0:(3)
#	M.BI412	Plant Physiology	3	M.BI405	spring 2:0:2:0:(5)
#	M.BI417	Molecular Biology	2	M.BI410	fall 1:0:2:0:(3)
#	M.BI433	Practicum of Botany and Zoology	2	M.BI406	fall 0:0:4:0:(3)
#	M.BI438	Biological statistics	2		fall 1:0:2:0:(3)
#	M.BI431	Parasitology	2	M.BI402	fall 1:0:2:0:(3)
#	M.BI423	Field Practicum I	3	M.BI401	spring 0:0:0:6:(5)
#	M.BI414	Field Practicum II	2	M.BI406	spring 0:0:0:4:(3)
#	M.TM461	Teaching Methodology of Biology I	3	E EP203	fall 1:2:2:0:(5)
#	M.TM481	Teaching Methodology of Biology II	3	M.TM261	spring 1:2:2:0:(5)
#	M.TP401	Guided Practicum	5	H.TP255	spring 0:0:0:10(8)
#	M.TP402	Teaching Practicum	5	H.TP275	fall 0:0:0:10(8)
#	S.BA490	Diploma Thesis, Graduation Examination	2		any 0:0:0:4:(3)
Elective Courses		6			
1	M.BI420	Geobotany	2	M.BI405	any 1:2:0:0:(3)
2	M.BI434	Plant and Animal Ecology	2	M.BI409	any 1:0:2:0:(3)
3	M.BI435	Palynology	2	M.BI401	any 1:0:2:0:(3)
4	M.BI436	Entomology	2	M.BI402	any 1:0:2:0:(3)
5	M.BI421	Plant Introduction	2	M.BI401	any 1:0:2:0:(3)
6	M.BI422	Reproductive Health Education	2	M.BI408	any 1:2:0:0:(3)
7	M.BI426	Biogeography	2	M.BI406	any 1:2:0:0:(3)
8	M.BI430	Biotechnology	2	M.BI430	any 1:2:0:0:(3)
9	M.BI424	Medicinal Plants	2	M.BI401	any 1:0:2:0:(3)
#	M.BI425	Latin Language	1		any 0:2:0:0:(2)
#	M.BI303	Modern Approaches in Biology	1		any 0:2:0:0:(2)
Elective Courses B		2			
1	M.GE419	Geographic Information System	2		spring 1:0:2:0:(3)
2	M.BI301	Biology	2		any 1:0:2:0:(3)
3	M.GE301	Geography	2		spring 1:0:2:0:(3)
4	M.CH301	Chemistry	2		spring 1:0:2:0:(3)
5	M.PH301	Physics	2		spring 1:0:2:0:(3)
6	M.MA301	Mathematics	2		spring 0:4:0:0:(2)
		Total credits:	125		

0 Appendix: Programme Learning Outcomes and Curricula

CHEMISTRY			79		
Compulsory Courses			71		
1	M.CH417	Chemical Laboratory Techniques	2		any 1:2:0:0:(3)
2	M.CH402	General Chemistry	4		any 1:2:4:0:(6)
3	M.CH403	Inorganic Chemistry	4	M.CH402	any 1:2:4:0:(6)
4	M.CH405	Organic Compounds Functional Groups	4	M.CH404	any 1:2:4:0:(6)
5	M.CH406	Qualitative Analysis of Substances	2	M.CH402	any 1:0:2:0:(3)
6	M.CH407	Quantitative Analysis of Substances	3	M.CH406	any 1:0:4:0:(5)
7	M.CH408	Chemical Thermodynamics	4	M.CH402	any 1:2:4:0:(6)
8	M.CH419	Chemical Kinetics and Electrochemistry	4	M.CH408	any 1:2:4:0:(6)
9	M.CH410	Basics of Chemical Technology	2	M.CH403	any 1:0:2:0:(3)
#	M.CH411	The Essential Chemical Industry	3	M.CH410	any 1:0:4:0:(5)
#	M.CH412	Biochemistry	3	M.CH405	any 1:0:4:0:(5)
#	M.CH413	Physical, Chemical Methods of Analysis	3	M.CH407	any 1:2:2:0:(5)
#	M.CH414	Basics of Colloidal Chemistry	3	M.CH409	any 1:0:4:0:(3)
#	M.CH420	Secondary School Chemistry	3		any 1:2:2:0:(5)
#	M.CH436	Environmental Chemistry	2		any 1:0:2:0:(3)
#	M.CH421	Field Practicum	2		any
#	M.CH418	Fundamental Organic Chemistry	4	M.CH402	any 1:2:4:0:(6)
#	M.TM463	Methodology of Teaching Chemistry I	3	E.EP203	fall 1:2:2:0:(5)
#	M.TM473	Methodology of Teaching Chemistry II	4	M.TM262	spring 1:2:2:0:(5)
#	M.TP275	Guided Practicum	5	H.TP260	spring 0:0:0:6:(5)
#	M.TP285	Teaching Practicum	5	H.TP270	fall 0:0:0:8:(5)
#	S.BA490	Diploma Thesis, Graduation Examinations	2		any 0:0:0:4:(3)
Elective Courses			6		
1	M.CH431	Research Methodology in Chemistry	1		any 0:2:0:0:(2)
2	M.CH432	History of Chemistry	1		any 0:2:0:0:(2)
3	M.CH433	Problem Solving Methodology in Chemistry	1		any 0:2:0:0:(2)
4	M.CH434	Chemical Statistics	1		any 0:2:0:0:(2)
5	M.CH443	Nanotechnology	1		any 1:0:0:0:(2)
6	M.CH302	Athmospheric Chemistry	1		any 1:0:0:0:(2)
7	M.CH437	Macro Molecular Compounds	2		any 1:2:0:0:(3)
8	M.CH438	Coordination Compounds	2		any 1:2:0:0:(3)
9	M.CH439	Food Chemistry	2		any 1:0:2:0:(3)
#	M.CH435	Radiochemistry	2		any 1:2:0:0:(3)
#	M.CH441	Chromatography	2		any 0:2:2:0:(3)
#	M.CH442	Applied Chemistry	2		any 1:2:0:0:(3)
Elective Courses B			2		
1	M.BI301	Biology	2		any 1:0:2:0:(3)
2	M.GE301	Geography	2		any 1:0:2:0:(3)
3	M.CH301	Chemistry	2		any 1:0:2:0:(3)
4	M.PH301	Physics	2		any 1:0:2:0:(3)
5	M.MA301	Mathematics	2		fall 0:4:0:0:(3)
Total credits:			125		

0 Appendix: Programme Learning Outcomes and Curricula

D. GEOGRAPHY			79			
Compulsory Courses			72			
1	M.GE401	School Geography	2	M.GE 301	fall	1:2:0:0:(3)
2	M.GE402	Cartography	3	M.GE 301	fall	2:0:2:0:(5)
3	M.GE403	Earth Science	3	M.GE 301	fall	2:0:2:0:(5)
4	M.GE406	History of Geography	1	M.GE 403	any	0:2:0:0:(2)
5	M.GE404	Geology and Mineralogy	3	M.GE403	spring	2:0:2:0:(5)
6	M.GE405	Meteorology and Climatology	2	M.GE403	spring	1:0:2:0:(3)
7	M.GE407	Continental and Marian Geography	2	M.GE406	spring	1:2:0:0:(3)
8	M.GE408	Geomorphology	2	M.GE 403	fall	1:2:0:0:(3)
9	M.GE409	Soil Geography	3	M.GE408	fall	2:0:2:0:(5)
#	M.GE411	Physical Geography of Mongolia	3	M.GE407	spring	2:2:0:0:(5)
#	M.GE412	Landscape Studies	2	M.GE409	spring	1:2:0:0:(3)
#	M.GE416	Socio-economic Geography of the World	2	M.GE415	spring	1:2:0:0:(3)
#	M.GE417	Socio-economic Geography of Mongolia	2	M.GE416	spring	1:2:0:0:(3)
#	M.GE436	Geomorphology of Mongolia	2	M.GE408	any	0:2:0:0:(3)
#	M.GE410	Biogeography	1	M.GE406	spring	0:2:0:0:(3)
#	M.GE418	Climate Change Education	2	M.GE405	any	1:2:0:0:(2)
#	M.GE419	Geographic Information System	2	M.GE402	spring	1:0:2:0:(3)
#	M.GE421	Geocology	2	M.GE412		0:2:0:0:(2)
#	M.GE415	Population Geography	2	M.GE414	any	1:2:0:0:(2)
#	M.GE420	Remote Sensing	2	M.GE419	any	0:0:2:0:(3)
#	M.GE414	World Regional Geography	2	M.GE406	any	1:2:0:0:(2)
#	M.GE437	Local Studies	2	M.GE411	spring	0:2:0:0:(2)
#	M.GE440	Mongolian Regional Geography	1	M.GE411	spring	0:2:0:0:(2)
#	M.FP421	Field Practicum 1	2	M.GE405	spring	
#	M.FP422	Field Practicum 2	3	M.GE412	spring	
#	M.TM464	Methodology of Teaching Geography I	3	E.EP203	fall	1:2:2:0:(5)
#	M.TM474	Methodology of Teaching Geography II	4	M.TM262	spring	1:2:2:0:(5)
#	M.TP475	Guided Practicum	5	H.TP260	spring	0:0:0:6:(5)
#	M.TP485	Teaching Practicum	5	H.TP270	fall	0:0:0:8:(5)
#	S.BA490	Diploma Thesis, Graduation Examination	2		fall	0:0:0:4:(3)
Elective Courses A			5			
1	M.GE430	Permafrost Studies	2	M.GE411	any	1:2:0:0:(3)
2	M.GE431	Hydrology	2	M.GE411	any	1:2:0:0:(3)
3	M.GE432	Mongolian Geology and Paleontology	2	M.GE404	any	1:0:2:0:(3)
4	M.GE433	Historical Geography	1	M.GE406	any	0:2:0:0:(2)
5	M.GE434	Theoretical and Methodological Basis of Land Use	1	M.GE413	any	0:2:0:0:(2)
6	M.GE440	Thematic Cartography	1			
7	M.GE438	Geography Education for Sustainable	1	M.GE418	any	0:2:0:0:(2)
8	M.GE302	Environmental Geography	2		any	1:2:0:0:(3)
9	M.GE303	Environmental Management	1		any	0:2:0:0:(2)
#	M.GE439	Geobotany	2	M.GE411	any	1:2:0:0:(3)
#	M.GE441	Soil Geography of Mongolia	2	M.GE413	any	1:0:2:0:(3)
Elective Courses B			2			
1	M.BI301	Biology	2		spring	1:0:2:0:(3)
2	M.GE301	Geography	2		spring	1:0:2:0:(3)
3	M.CH301	Chemistry	2		spring	1:0:2:0:(3)
4	M.PH301	Physics	2		spring	1:0:2:0:(3)
5	M.MA301	Mathematics	2		fall	0:4:0:0:(3)
Total Credits:			125			

TEACHER, Natural Sciences Education /Biology/

1A semester (Fall): I		17
Compulsory Courses		15
S.TI201	Introduction to Teacher Profession	1
S.IT101	Information and Communication Technology	2
S.EL101	English III	3
S.SS101	History and Culture of Thinking	2
S.MH101	History and Culture of the Mongols	3
S.PT101	Physical Education I	1
S.SC105	Natural Science	2
M.TP230	Orientation Practicum	1
Elective Courses (General Foundation Courses)		2

1B(winter):

1C semester (Spring): II		16
Compulsory Courses		14
E.JP202	General Psychology	2
S.ML101	Mongolian Language and Stylistics	3
M.BI401	Plant Anatomy and Morphology	4
M.BI415	Cytology, Histology and Embriology	3
S.PT102	Physical Education II	1
S.SS107	Creative Thinking	1
Elective Courses (General Foundation Courses)		2

1D (summer)

2A semester (Fall) : III		18
Compulsory Courses		14
E.EP203	Educational Psychology	3
E.ES201	Foundations of Learning and Teaching	3
M.BI402	Zoology I: Invertebrate Animals	4
M.BI403	Microbiology	3
S.SS103	Disaster Management	1
Elective Courses (Teacher Education Foundation Courses)		4

2B(winter):

2C semester (Spring): IV		20
Compulsory Courses		18
E.ES202	Theory and Methodology of Training	3
M.BI406	Zoology II: Vertebrate Animals	4
M.BI416	Biochemistry	3
M.BI423	Field Practicum I	3
M.TP250	Study Practicum	2
M.TM461	Methodology of Teaching Biology I	3
Biology elective Courses B		2

2D (summer):

3A semester (Fall): V		16
Compulsory Courses		16
M.BI405	Plant Systematics	4
E.ER201	Research Methodology	2
M.TP270	Guided Practicum	5
M.BI438	Biostatistics	2
M.TM481	Methodology of Teaching Biology II	3

3B(winter):

3C semester (Spring): VI		13
Compulsory Courses		11
M.BI408	Human Anatomy and Physiology	3
M.BI409	General Ecology	3
M.BI410	Genetics and Selection	3
M.BI414	Field Practicum II	2
Biology elective Courses A		2

3D (summer):

4A semester (Fall): VII		13
Compulsory Courses		11
M.BI417	Molecular Biology	2
M.BI433	Practicum of Botany and Zoology	2
M.BI431	Parasitology	2
M.TP280	Teaching Practicum	5
Biology elective Courses A		2

4B(winter):

4C semester (Spring): VIII		10
Compulsory Courses		8
M.BI412	Plant Physiology	3
M.BI411	Evolution	3
S.BA490	Diploma Thesis, Graduation Examination	2
Biology elective Courses A		2

4D (summer):

0 Appendix: Programme Learning Outcomes and Curricula

TEACHER, Natural Sciences Education /Chemistry/

1A (Fall): I		15	1B(winter)	1C (spring): II		16	1D (summer)
Compulsory Courses		15		Compulsory Courses		14	
S.TI201	Introduction to Teacher Profession	1		E.JP202	General Psychology	2	
S.IT101	Information and Communication Technology	2		S.ML101	Mongolian Language and Stylistics	3	
S.EL101	English II	3		S.PT102	Physical Education -II	1	
S.SS101	History and Culture of Thinking	2		S.SS102	Creative Thinking	1	
S.MH101	History and Culture of the Mongols	3		S.SS103	Disaster Management	1	
S.PT101	Physical Education I	1		M.CH401	Chemical Laboratory Techniques	2	
S.SC105	Natural Science	2		M.CH402	General Chemistry	4	
M.TP230	Orientation Practicum	1		Elective Courses (General Foundation Courses)		2	
2A (Fall) : III		15	2B(winter):	2C (spring): IV		17	2D (summer):
Compulsory Courses		13		Compulsory Courses		15	
E.EP203	Educational Psychology	3		E.ES202	Theory and Methodology of Training	3	
E.ES201	Foundations of Learning and Teaching	3		M.TM263	Methodology of Teaching Chemistry I	3	
M.CH403	Inorganic Chemistry	4		M.CH418	Organic Chemistry	4	
M.CH406	Qualitative Analysis of Substances	3		M.CH407	Quantitative Analysis of Substances	3	
Elective Courses (General Foundation Courses)		2		M.TP240	Study Practicum	2	
				Elective Courses (Teacher Education Foundation Course)		2	
3A (Fall): V		15	3B(winter):	3C (spring): VI		15	3D (summer):
Compulsory Courses		15		Compulsory Courses		11	
E.ER201	Research Methodology	2		M.CH408	Chemical Thermodynamics	4	
M.TM283	Methodology of Teaching Chemistry II	4		M.CH410	Basics of Chemical Technology	2	
M.CH405	Organic Compounds Functional Groups	4		M.CH413	Physical, Chemical Methods of Analysis	3	
M.TP250	Guided Practicum	5		M.CH421	Field Practicum	2	
				Professional elective course-B		2	
				Elective Courses (Teacher Education Foundation Course)		2	
4A (Fall): VII		16	4B(winter):	4C (spring): VIII		14	4D (summer):
Compulsory Courses		14		Compulsory Courses		10	
M.CH419	Chemical Kinetics and Electrochemistry	4		M.CH412	Biochemistry	3	
M.CH411	The Essential Chemical Industry	3		M.CH414	Basics of Colloidal Chemistry	3	
M.CH420	Secondary School Chemistry	2		M.CH436	Environmental Chemistry	2	
M.TP260	Teaching Practicum	5		S.BA490	Diploma Thesis, Graduation Examination	2	
Professional elective course-A		2		Professional elective course-A		4	

0 Appendix: Programme Learning Outcomes and Curricula

TEACHER, Natural Sciences Education /Geography/

1A semester (Fall): I		15	1B(winter):	1C (spring): II	13	1D (summer):
Compulsory Courses		15		Compulsory Courses	11	
S.IT201	Introduction to Teacher Profession	1		E.JP202	General Psychology	2
S.IT101	Information and Communication Technology	2		S.ML101	Mongolian Language and Stylistics	3
S.EL101	English II	3		M.GE402	Cartography	3
S.SS101	History and Culture of Thinking	2		S.PT102	Physical Education -II	1
S.PT101	Physical Education I	1		S.SS107	Creative Thinking	1
M.TP230	Orientation Practicum	1		M.GE406	History of Geography	1
S.SS108	Natural Science	2		Elective Courses (General Foundation Courses)		2
S.MH101	History and Culture of the Mongols	3				

2A (Fall) : III		16	2B(winter):	2C (spring): IV	18	2D (summer):
Compulsory Courses		14		Compulsory Courses	16	
E.EP203	Educational Psychology	3		M.TM264	Methodology of Teaching Geography I	3
E.ES201	Foundations of Learning and Teaching	3		M.GE408	Geomorphology	2
M.GE401	School Geography	2		M.GE405	Meteorology and Climatology	2
M.GE403	Earth Science	3		M.GE407	Continental and Marian Geography	2
M.GE404	Geology and Mineralogy	3		M.FP421	Field trip of Physical Geography	2
Elective Courses (General Foundation Courses)		2		E.ES202	General Psychology	3
				M.TP240	Study Practicum	2
				Professional elective course B		2

3A (Fall): V		16	3B(winter):	3C (spring): VI	16	3D (summer):
Compulsory Courses		16		Compulsory Courses	12	
M.TM284	Methodology of Teaching Geography II	4		M.GE412	Landscape Studies	2
E.ER201	Research Methodology	2		M.GE417	Mongolian Socio-economic Geography	2
M.GE411	Physical Geography of Mongolia	3		M.GE436	Mongolian Geomorphology	2
M.GE419	Geographic Information System	2		M.FP422	Regional Research /Field Trip/	3
M.TP250	Guided Practicum	5		M.GE409	Soil Geography	3
				Elective Courses (Teacher Education Foundation Course)		4

4A (Fall): VII		15	4B(winter):	4C (spring): VIII	14	4D (summer):
Compulsory Courses		13		Compulsory Courses	11	
M.GE416	World Socio-economic Geography	2		M.GE413	Geo-ecology	2
M.GE420	Remote Sensing	2		M.GE414	World Regional Geography	2
M.GE440	Mongolian Regional Geography	1		M.GE415	Population Geography	2
M.GE418	Education of Climate Change	2		M.GE437	Local Studies	2
M.TP260	Teaching Practicum	5		S.BA490	Diploma Thesis, Graduation Examination	2
S.SS103	Disaster Management	1		M.GE410	Biogeography	1
Professional elective course A		2		Professional elective course A		3

0 Appendix: Programme Learning Outcomes and Curricula

TEACHER, Natural Sciences Education /Physics/

1A semester (Fall): I		15	1B(winter)	1C (spring): II		16	1D (summer)
Compulsory Courses		15		Compulsory Courses		16	
S.TI201	Introduction to Teacher Profession	1		E.JP202	General Psychology	2	
S.IT101	Information and Communication Technology	2		S.ML101	Mongolian Language and Stylistics	3	
S.EL101	English II	3		M.PH404	Mechanics	4	
S.SS101	History and Culture of Thinking	2		M.PH403	Elementary Physics-1	2	
S.MH101	History and Culture of the Mongols	3		M.MA471	Calculus and Analysis	3	
S.PT101	Physical Education I	1		S.PT102	Physical Education -II	1	
S.SS108	Natural Science	2		S.SS102	Creative Thinking	1	
M.TP230	Orientation Practicum	1					
2A (Fall) : III		15	2B(winter):	2C (spring): IV		18	2D (summer):
Compulsory Courses		15		Compulsory Courses		18	
E.EP203	Educational Psychology	3		E.ES202	Theory and Methodology of Training	3	
E.ES201	Foundations of Learning and Teaching	3		M.TP250	Study Practicum	2	
M.PH405	Molecular Physics	4		M.PH406	Electricity and Magnetism	4	
M.MA472	Algebra and Geometry	3		M.PH417	Waves	4	
M.PH415	Elementary Physics-2	2		M.PH418	Physics Problem Solving I	2	
				M.TM262	Methodology of Teaching Physics I	3	
3A (Fall): V		18	3B(winter):	3C (spring): VI		16	3D (summer):
Compulsory Courses		18		Compulsory Courses		8	
E.ER201	Research Methodology	2		M.PH411	Basis of Electrotechnics	3	
M.PH407	Optic	4		M.PH419	Physics Problem Solving II	2	
M.TM282	Methodology of Teaching Physics II	4		M.PH402	School Physics	2	
M.PH408	Atomic Physics	3		S.SS103	Disaster Management	1	
M.TP270	Guided Practicum	5		Elective Courses (Teacher Education Foundation Courses)		4	
				Elective Courses (General Foundation Courses)		4	
4A (Fall): VII		13	4B(winter):	4C (spring): VIII		12	4D (summer):
Compulsory Courses		11		Compulsory Courses		7	
M.TP280	Teaching Practicum	5		S.BA490	Diploma Thesis, Graduation Examination	2	
M.PH409	Nuclear Physics	3		M.PH435	Experimental Physics	2	
M.PH412	Basis of Electronics	3		M.PH410	Theoretical Physics	3	
Professional elective course-B		2		Professional elective course-A		5	