ASIIN Seal & European Labels

Accreditation Report

Bachelor's Degree and Master's Degree Programme
Electrical Power Supply

Provided by
Mongolian University for Science and Technology (MUST)

Version: 03 December 2020

Table of Content

A About the Accreditation Process

Name of the degree programme (in original language)	(Official) English translation of the name	Labels applied for [1]	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC)[2]
Ba Цахилгаан хангамж	Electrical Power Supply	ASIIN, EUR-ACE® Label	2013 – 2018; extra-ordinary extension until 2020	02
Ma Цахилгаан хангамж	Electrical Power Supply	ASIIN, EUR-ACE® Label	2013 – 2018; extra-ordinary extension until 2020	02
Date of the contract: 06.12.2018 **Submission of the final version of the self-assessment report:** 20.01.2020 **Date of the online audit:** 28.08.2020 ***Web-Conference***				
Peer panel: Prof. Dr.-Ing. Reiner Schütt, Westkueste University of Applied Sciences; Prof. Dr.-Ing. Harald Weber, University of Rostock; Dr.-Ing. Philipp Last, Siemens AG; Erbold Enkhbold, Student at National University of Mongolia				
Representative of the ASIIN headquarter: Dr. Siegfried Hermes				

[1] ASIIN Seal for degree programmes; EUR-ACE® Label: European Label for Engineering Programmes

[2] TC: Technical Committee for the following subject areas: TC 02 - Electrical Engineering/Information Technology

Responsible decision-making committee: Accreditation Commission for Degree Programmes
Criteria used: European Standards and Guidelines as of 15.05.2015 ASIIN General Criteria, as of 10.12.2015 Subject-Specific Criteria of Technical Committee 02 – Electrical Engineering/Information Technology as of 09.12.2011

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
Electrical Power Supply	B.Sc./Eng./ B.A.(Bachelor of Arts, für die Architekten)	n/a	6	Full time	–	7 – 8 Semesters	135 credit hours (1 Credit hour = ca. 1.7 ECTS)	Fall term / Fall term 2009/10
Electrical Power Supply	M.Sc./Eng./M.A.	n/a	7	Full time in combination with e-learning	2 + 2 Joint Programme with North China Energy University	3 – 4 Semesters	36 credit hours	Fall and spring term / Fall term 2009/10

For the Bachelor's degree programme Electrical Power Supply the institution has presented the following profile in the self-assessment report:

„Students will have theoretical and practical knowledge on building and operating economically electrical appliances and ensuring conditions for the normal operation of electricity consumers of energy and other industrial enterprises. An engineer with good knowledge of automatic control and adequate management as well as foreign language skills will be prepared in the market place. "

For the Master's degree programme Electrical Power Supply the institution has presented the following profile in the self-assessment report:

„Besides working performing duties of an engineer with Bachelor's degree, an Engineer with Master's Degree must have the appropriate theoretical and practical knowledge to teach at a university level, and performs duties of engineers with Bachelor's degree, to make financial estimation for designing and doing research work. In addition, an engineer with Master's Degree must have a strong skill of foreign languages, and morality and ethics. […] Besides having excellent theoretical and practical knowledge, a specialist with Master's

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

Degree will be able to use fluently resources in foreign languages, methods of operating automated facilities, designing technology and using software, doing experiments, calculating electrical power supply."

C Peer Report for the ASIIN Seal[4]

1. The Degree Programme: Concept, content & implementation

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

Evidence:

- Self-Assessment Report, chap. 2.2 and 2.3; available on the internet: http://www.pes.edu.mn/en/page/93 (Bachelor's degree); not found for Master's programme
- Module objectives Matrices for the Bachelor's programme (SAR, p. 19-22) and for the Master's programme (SAR, p. 22f.)
- Audit discussions

Preliminary assessment and analysis of the peers:
The School of Power Engineering and the responsible Department of Electrical Engineering have defined learning outcomes for the study programmes, which are generally adequate with regard to their breadth and scientific content. They address scientific, methodological, knowledge- and competence-related objectives and include translational skills like ethical and professional attitudes of the graduates, too. Further, the peers see that these objectives or intended learning outcomes are accessible on the School's / Department's websites in English language. The expert panel presumes that the learning objectives are available in the original Mongolian language as well, which would be necessary, since Mongolian is the primary teaching language.

Regrettably, the learning outcomes do not distinguish between the Bachelor's and the Master's level, and – in connection with that – do not refer to the programme-specific qualifications of graduates at the respective level. Thus, the "course learning outcomes" do well comprise learning objectives aiming at theoretical, analytical, methodological, evaluation, design, and practical competences as well as translational skills. Nevertheless, there is ob-

[4] This part of the report applies also for the assessment for the European subject-specific labels. After the conclusion of the procedure, the stated requirements and/or recommendations and the deadlines are equally valid for the ASIIN seal as well as for the sought subject-specific label.

viously no differentiation between the Bachelor's and the Master's level; and any programme-related manifestation of these engineering skills and competences remains unclear, too. Hence, the Bachelor's and the Master's level of education must be reflected in the phrasing of the intended learning outcomes.

Moreover, in their present unified form (for the Bachelor's and the Master's level), the objectives could likewise be relating to any Electrical Engineering or even broader to any Engineering degree programme without changing a word. This is definitely not suiting the applicable criterion, which requires that the qualification objectives of degree programmes should be subject-specific and, in that sense, clearly demonstrating the level and qualifications reached before a disciplinary background. Hence, it would not even be sufficient, if the objectives adequately characterized more generally an Electrical Engineering programme; they moreover need to substantiate the qualifications aimed at for graduates in the area of *Electrical Power Supply*, and at the same time clearly *distinguish between the Bachelor's and the Master's level* of education. Consequently, although covering the core engineering competence areas underpinned by the EUR-ACE Framework Standards and the Subject-Specific Criteria (SSC) of the ASIIN Technical Committee 02 – Electrical Engineering and Information Technology, the learning outcomes for the degree programmes under review need to be revised. They should clearly grasp the subject-specific scope of the Electrical Supply programmes and reflect the difference between the Bachelor's and the Master's level at once.

Criterion 1.2 Name of the degree programme

Evidence:

- Relevant chapter of the SAR
- Mongolian University of Science and Technology – President's degree, Folder D: Appendices 10 and 11
- Diploma Supplement, Annexes, Folder E
- Audit discussions

Preliminary assessment and analysis of the peers:

The expert panel acknowledges that the School of Power Engineering / Department of Electrical Engineering has positively responded to suggestions of the previous accreditation in choosing a study name that unambiguously reflects the electrical energy core of the programme. The panel only points to an inconsistent use of the degree programmes' name as different names for the programmes do appear in the documents as well as on the websites

of the School / Department. Thus, “Electrical Power Supply”, “Electrical Supply” and “Electrical Engineering” are in use synonymously as programme names in English. This is assumed to be harmonized as soon as possible.

Criterion 1.3 Curriculum

Evidence:

- Relevant chapter of the SAR
- Study plans in Annexes, Folder F: ECTS Conversion Tables; study plans also available on the internet: http://www.pes.edu.mn/en/page/93 for the Bachelor’s programme; http://www.pes.edu.mn/en/page/95 for the Master’s programme (Download: 18.09.2020)
- Objectives Tables, Folder B: Matrix Bachelor, Matrix Master
- Module handbooks, Folder A: Bachelor, Master
- Results of students satisfaction survey, additional material provided by MUST
- Electricity and Power Supply Specialization: Student Satisfaction Survey – Comparison Academic Years 2011/12 and 2018/19, additional material provided by MUST
- Audit discussions

Preliminary assessment and analysis of the peers:

Overall, the peers are of the opinion that the Electrical Power Supply programmes, in particular the Bachelor’s programme, are well conceptualized. Number, structure, composition and sequence of the modules/courses assembled in the programmes resonate with the demands of the local labour market and are based on a solid scientific foundation. Discussions with the industry partners have contributed to the impression not only of close contacts between MUST and its industry partners, but also that the companies in general are fond of the graduates’ abilities. Industry representatives convincingly made a case that they are asked for their feedback and incentives from their side be taken up in the further development of the degree programmes by MUST. In this connection, the peers positively note that the School of Power Engineering has refined its mode of establishing and improving its degree programmes in recent years, thereby making use of feedback from the main stakeholders more systematically. Accordingly, students, teachers and industry companies alike can initiate the process of (further) developing or modifying the programmes.

Since the programme learning outcomes have not been defined programme- and level-specific, the module-objectives matrices provided in the SAR could only generally demonstrate that core Engineering competence areas are addressed by both the Bachelor’s and the Master’s curricula (see below, sec. C-1). This notwithstanding, the module descriptions

and the objectives tables presented along with the SAR in the view of the peers illustrate not only an appropriate relationship between modular content and module learning outcomes, but also between the latter and the (presumably) intended overall programme qualifications of the graduates. Hence, the panel assumes the above-described shortcomings in the description / formulation of the intended learning outcomes on programme level as essentially an editorial issue.

The peers take note of a series of curricular changes especially on the part of the curriculum of the Bachelor's programme, which have been implemented with respect to the requirements and recommendations of the past accreditation (inclusion of new modules, lapse of certain modules, and refinement of contents of existing modules). Thus, strengthening the students design competences and their knowledge in areas like "Renewable Energy and Hybrid Systems", "Applied Mechanics", "Power Transmission and Distribution Network" and "Power Sector Management and Marketing Strategy" is generally welcomed by the expert panel. Otherwise, the peers are still of the opinion that newly arisen technological challenges in the field of Electrical Power Engineering like carbon free production of electrical power, power-to-x technologies and new storage elements or new digital technologies in the electrical supply sector should be given more weight, especially at the Master's level. The panel recommends considering curricular changes to this end in the medium term.

The overall positive assessment of the level of knowledge, skills and competences resonates with the reported judgment of industry representatives. During the audit days, the latter confirmed that students and graduates have a solid theoretical knowledge base. Despite the university's curricular efforts to enlarge the students' proficiency in English though, the companies would appreciate, if major improvements could be made in this respect. This point is to be addressed in more detail in the next chapter.

The expert panel regrets that the Power Engineering School has not seriously taken up the previous accreditation's advice to reconsider its strategic outlook with regard to thematically connected degree programmes offered by different departments for structural reasons. The peers still think that a revision of the programmes that way would bear the opportunity of a more comprehensive view on the Electrical Power Engineering field, which systematically integrates and interlinks its various parts and topics. Moreover, this approach probably might yield new options for co-operations between the different departments, for concentrating and focusing their research activities and for generating synergies in the allocation of resources and funds (see below sec. 4-3). The panel therefore accepts the School's stance on the issue; however, it would insist on considering the idea at least in the long term.

Criterion 1.4 Admission requirements

Evidence:

- Relevant chapter of the SAR
- Entrance Procedure of Mongolian University of Science and Technology, Folder D: Rules, Appendix 4
- Student statistics (enrolled students) 2015 – 2018, Folder: QA, Appendix QA last version
- Audit discussions

Preliminary assessment and analysis of the peers:
Reportedly, applicants for the Bachelor's programme in Electrical Power Supply have completed 12 years of secondary education. Subject to the MUST admission procedure, applicants then have to undergo an entrance examination. In order to qualify for admission, applicants to the programmes of the Power Engineering School need to evidence a minimum score performance in two subjects of the entrance examination; the score reflects a weighted value of Mathematics and Physics, whereas the score in Mathematics must not fall below 480 points (as programme coordinators clarified in the audit). The decreasing combined threshold score since 2014 is due to a major structural change in the secondary education – the latter being prolonged from 10 to nowadays 12 years – leading to a higher knowledge base of students, in particular in subjects such as mathematics and physics. Admission numbers per academic year are fixed by the Ministry, but have been lifted – as programme coordinators pointed out – after the successful international accreditation.

The enrolment in the Master's programme requires a bachelor degree in a related profession and / or another recognized academic degree amounting to at least 135 (Mongolian) Credit Hours and a GPA of 2.5 at a minimum. Furthermore, applicants have to successfully pass a Master's admission examination.

In general, the peers conclude that admission rules and procedures at MUST take into account the relevance of quality assurance considerations. Overall, they appropriately ensure the admission of students, who are suitable for the Bachelor's or Master's programmes and their respective majors. Regarding the Bachelor's programme, the panel appreciates that the School for Applied Sciences at MUST offers preparatory classes for students failing the entrance examination in order to qualify them for the enrolment at a later stage. It is worthwhile too that some general education courses as part of these preparatory classes will be recognized in the first year of the regular Bachelor's degree programme. In conjunction with the provisions applying to the transfer of students from one semester to the next and

those regulating the possibility of retaking exams, the admission processes are supporting the students in achieving the intended learning outcomes.

The peers acknowledge that rules for the recognition of academic achievements acquired at other universities have been implemented and put into force – although with precautions (see "Regulation for Bachelor study programme" as of 14 April 2014, sec. 12). These rules seem to be adequate to encourage outward mobility of students, which has been exemplified through the learning experiences at other universities of at least some students during the audit hearings.

The available data show a certain decline in the enrolment numbers in recent years. Yet, this finding is relating to aggregated figures for the Power Engineering School, respectively its three departments. In addition, the data are not specified for the Bachelor's and Master's programmes Electrical Power Supply, but again are either added up for both programmes or specified for the Bachelor's or Master's programmes of the entire School.

In order to get a more precise picture about the enrolment numbers and possibly spot significant trends in view of the admission procedures, the panel asks the programme coordinators to procure admission rates for the last five years for the Bachelor's and the Master's programmes (Bachelor and Master separately and also differentiating between fall and spring semester).

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

The peers conclude that the different aspects of the above criterion are met sufficiently yet with few reservations. In its statement, MUST has provided additional information, which the peer panel takes into consideration for its final assessment.

Programme Learning outcomes – Bachelor's degree programme

The peers are thankful for the revised description of the programme learning objectives. The revised descriptions in their view are much more catered to the needs of potential stakeholders like HEIs abroad or business enterprises. In addition, they seem to better grasp the differentiation between the Bachelor and Master level of education. Thus, the panel is satisfied with the wording for the Master's programme, but in comparison finds that the description for the Bachelor's programme still should be more informative regarding the subject-specific knowledge and competences, which students acquire in the programme. The learning outcomes / qualification profile presented in Appendix 2 is to no help either in this respect. Especially at the Bachelor's level, they remain to be very general addressing basic Electrical Engineering skills and competences instead of qualifications more

directed towards the *Power Engineering* fields of competence the programme is mainly aiming at. The peers nevertheless appreciate the achieved improvement and propose to downgrade the originally foreseen requirement at this point to a respective recommendation for the Bachelor's programme only (see below sec. F, E 4.).

Name of the programme

The consistent use of the programmes' name (Electrical Power Supply) in all study-related English speaking documents and information should be checked, in order to avoid misconceptions.

Curriculum

The panel appreciates that the MUST will consider the adoption of technically advanced matters in the Power Engineering field – such as CO2 free production of electrical power, power-to-x technologies and new storage elements or new digital technologies in the electrical supply sector – at least in the curriculum of the Master's programme. The panel confirms a related recommendation (see below, sec. F, E 3.), and would like to have the curriculum evaluated with special regard to the mentioned fields of expertise in the course of the re-accreditation.

Strategic Mission of the MUST Power Engineering School with regard to the Electrical Power Supply programmes

The peers are aware of the organizational structure of the MUST, the Power Engineering School and the Department of Electrical Engineering. Their argument relates to the fact that the different degree programmes in the field of Power Engineering are dispersed across different departments within the PES (Department of Electrotechnics, Department of Electrical Engineering, Department of Thermal Engineering, Department of Advanced Study). The panel – like its predecessors – raises the question of whether it might be considered, at least in the long term, to merge programmes hitherto run by different departments and even to re-structure those departments with a view to the thematic proximity of the programmes they offer. This could possibly result in optimizing the allocation of (personal and physical resources) and also to more conclusive curricula of the degree programmes. Clearly, this amounts to a major strategic shift, which nevertheless might be worthwhile bearing in mind the tremendous technological challenges in the future. However, there is no need for immediate action of MUST or the PES respectively in this regard.

Admission procedure and enrollment numbers

The admission numbers additionally provided by MUST (Appendix 6) seem to confirm the impression that applicant and enrollment numbers of the Bachelor's programme are decreasing considerably (in the academic year 2019/20 to nearly half the number of entrants of the academic year 2016/20). It is difficult to decide whether this apparent negative trend will be corroborated in the coming years. However, this will be affecting the programmes and the allocation of resources. Not least with regard to this perspective, the panel would appreciate considering a merger of thematically linked degree programmes in the longer run in order to attract more students to more comprehensive degree programmes (see above paragraph).

2. The degree programme: structures, methods and implementation

Criterion 2.1 Structure and modules

Evidence:

- Relevant chapter of the SAR
- Study plans in Annexes, Folder F: ECTS Conversion Tables; available on the internet: http://www.pes.edu.mn/en/page/93 for the Bachelor's programme; (Download: 18.09.2020)
- Module handbooks, Folder A: Bachelor, Master
- "Student's Field Practice Training Introductory Practice Guideline", Folder D: Rules, Appendix 7
- "Student's Field Practice Training Introductory Practice-II Guideline", Folder D: Rules, Appendix 8
- "Regulation for Industrial Training (Internship) Course of Bachelor Degree of MUST as of 27 September 2019, available on the internet: https://must.edu.mn/media/uploads/files/bachelor_Regulation_for_internship.pdf (Download: 15.09.2020)
- Results of students satisfaction survey, additional material provided by MUST
- Electricity and Power Supply Specialization: Student Satisfaction Survey – Comparison Academic Years 2011/12 and 2018/19, additional material provided by MUST
- Audit discussions

Preliminary assessment and analysis of the peers:
The Bachelor's and the Master's programmes in Electrical Power Supply are modularized in the sense that they consist of thematically self-contained courses relating to the disciplinary field of Electrical Power Supply.

In the eyes of the peers, the content, composition and sequence of the courses of the Bachelor's programme is reasonable and suits the major aims and core disciplinary outlook of the programmes. Elective courses in the Bachelor's programme of roughly 30-40 ECTS give students enough opportunities to tailor their respective study plan according to individual profile preferences. In this connection, it is appreciable that the students' individual study plan is continuously monitored through study advisors from the department staff. In addition, it is noteworthy that progression rules are in place safeguarding that students possess the prerequisite knowledge, skills and competences for proceeding with courses of the following term or thematically consecutive courses. The panel takes note that the standard duration of the Bachelor's programme varies between 3,5 and 4 years and for the Master's programme between 1,5 and 2 years. That is principally appreciable since it opens the option of a fast track to either programme. At the same time, the mentioned precautionary rules and measures (progression rules, supporting services to individual study plans) appear to foreclose the risk of overburdening students. Consequently, the study duration has barely been an issue neither in the student surveys/evaluations nor in the audit discussion with students. As to that, statistics about study duration indicating that the average duration is exceeding the standard period of study may not necessarily indicate structural deficits, as students – apart from fee grants and scholarships – normally have to pay fees per credit beforehand, which could lead to a prolongation of study anytime. Nevertheless, such statistics should be provided to the peer panel for the last five years, separately for the Bachelor's and the Master's programme (see below sec. 6).

Regarding the Master's programme, the peers understand that mostly already employed students are studying this programme – in parallel to their professional activity. While the Bachelor's programme is seen as the regular degree qualifying for the professional career of graduates, the Master's degree counts as an additional qualification for professionals. It is offered in two streams, profession-oriented and scientifically oriented, whereas students predominantly choose the scientific direction, as programme coordinators indicate. Since most students are already working as engineers, courses are oftentimes delivered in the evening hours and/or in e-learning mode and are arranged highly flexible. The description seems plausible to the peers, especially as all courses in the Master's programme are optional and hence need not be passed in a pre-set order. Master's students confirm and explicitly esteem the organisation and flexible arrangements of the courses in the Master's programme. They appear to be satisfied especially with courses offered in e-learning mode

– a didactical area, in which the Power Engineering School obviously invests considerable efforts.

The English proficiency of graduates, Bachelor's as well as Master's graduates, has already been a major issue in the preceding accreditation process. The expert panel recognizes that MUST and the Power Engineering School have taken measures to raise the general English speaking and writing skills of both the lecturers and the students. Thus, particularly Technical English and Professional English courses are not only mandatory parts of the Bachelor's curriculum, but have been newly included in response to students' and companies' feedback. Still, the English proficiency of students and lecturers alike is found to be very diverse and leaving room for further improvement. Especially industry representatives voice critical comments with respect to this competence area and encourage the university to take further steps to advance the English skills of students. Although acknowledging the efforts of the Power Engineering School to better the situation, the peer panel considers this an ongoing and urgent question to be addressed immediately in order to achieve major progress. It points to the university's aim to provide internationally acknowledged academic programmes and to enable its graduates to enter occupations in international companies or universities abroad for further education. Both objectives necessitate advanced English language skills. Hence, the peer panel urges the Power Engineering School to provide evidence that it has taken meaningful steps to enlarge the English proficiency of both teaching staff and students.

Both programmes underline the application-oriented curricula and orientation to real world engineering problems through lab units, projects and – in the Bachelor's programme – two internships. The peers highly value this profession-oriented approach, as especially the scientific direction of the Master's programme still leaves much room to enlarge the research competences of students, even to prepare them for an academic career.

The internships in the Bachelor's programme are based on cooperation agreements between MUST and the companies, as industry representatives concurrently confirm during the audit discussion. MUST obviously takes responsibility in checking the capacity of companies to provide internship placements. Supervisors in the company and at MUST/the Power Engineering School are assigned and in charge for advice and counselling during the internship. Conditions and requirements of the internships are regulated comprehensively. Surprisingly, in the audit discussion industry representatives raised the issue of more effective internships by way of delivering security trainings in the companies at the earliest possible date, which is seen as a precondition for including students in engineering projects or advanced work assignments.

Apparently differently handled in companies of the public and private sector, the peers consider this primarily an issue of the companies, which nevertheless might also be treated in some way in the obligatory cooperation agreement. As to that, the peers ask for a (translated) sample of a cooperation agreement in order to assess whether major aspects with regard to achieving the intended learning objectives of the internships have been consented.

Criterion 2.2 Work load and credits

Evidence:

- Relevant chapter in the SAR
- Module handbooks, Folder A: Bachelor, Master
- „A Regulation on Assessing Student‘s Knowlegde” Chap. 3.2 “Working load and credit score”, Folder D: Rules, Appendix 11
- Folder F: ECTS Conversion Tables, Annex 2
- Student Satisfaction survey form “Student Evaluation on Teaching Quality”, Folder: QA, Additional material provided by MUST
- Results of students satisfaction survey, Folder: QA, Additional material provided by MUST
- Electricity and Power Supply Specialization: Student Satisfaction Survey, Folder: QA, Additional material provided by MUST
- Audit discussions

Preliminary assessment and analysis of the peers:

The programmes are structured according to the Mongolian credit hour system, which – similar to the ECTS system – includes lecture hours or attendance time as well as self-study time of students. MUST has produced a conversion table for the ratio between Mongolian credit hours and ECTS credit points, which sounds reasonable. According to that, one credit hour approximates 1.8 ECTS credit points. The panel welcomes that some of the study plans of the Bachelor’s and Master’s programmes in Electrical Power Supply have been presented in converted ECTS numbers. It also noticed that the conversion table has been implemented in the Diploma Supplement as well ensuring that stakeholders used to the ECTS understand the underlying conversion ratio. The allocation of credit hours / ECTS credit points to the courses appears plausible to the peers, and no criticism in that respect has been expressed in the discussion with the students nor in the student surveys/evaluations. On the contrary, students generally consider the workload and related credit allocation adequate. Still, significant statistical or qualitative information on whether the credit load

of individual courses realistically reflects the average student's workload is lacking. However, available undated survey results of a "Student satisfaction survey" document more than 40% of responds answering the question "Training load is sufficient to understand the whole content of the course" with a mean value only. A comparison of results between academic years 2011/12 and 2018/19 for the "Electricity and Power Supply specializations" to the same question shows a decrease from 4.04 to 3.6, thus at least indicating the perception of a deviation between credit volume and actual student workload. Yet, these figures are not reliable nor meaningful in the sense that they point to any specific miscalculation within the study programmes under review (see below sec. 6). Obviously, there is no systematic monitoring of the actual workload of students and hence no proof of a realistic credit hour / ECTS credit point distribution. Consequently, the peers consider it necessary to implement a regular monitoring instrument for the student workload in order to adapt either the content or the scheduled credit hours/ECTS of courses according to the actual workload should significant discrepancies be evident.

With regard to the overall credit volume of the Bachelor's programme, the shortened seven-semester version shows a significantly high student workload particularly in the first semesters (34 ECTS, 37 ECTS, 36 ECTS, 34 ECTS). Since the School has set up the programme also in an eight-semester version with a more balanced workload, the shortened version might be understood as an intensive mode of study, best suited for particularly talented students. Otherwise, even then the credit hour or ECTS distribution could be more balanced. Whether programme coordinators should undertake efforts in this direction depends, inter alia, on reliable statistical data about the average duration of study in combination with examination statistics facilitating an in-depths analysis of the study progress particularly in the demanding first semesters. It is helpful therefore that the School of Power Engineering has inserted examination statistics for the academic years 2013 – 2018 in the SAR (see further below sec. 3). Statistics about the average duration of study shall be supplemented.

Criterion 2.3 Teaching methodology

Evidence:

- Relevant chapter of the SAR
- Student Satisfaction survey form "Student Evaluation on Teaching Quality", Folder: QA, Additional material provided by MUST
- Results of students satisfaction survey, Folder: QA, Additional material provided by MUST

- Electricity and Power Supply Specialization: Student Satisfaction Survey, Folder: QA, Additional material provided by MUST
- Audit discussions

Preliminary assessment and analysis of the peers:
The peers learn that lectures, exercises, labs, case studies, seminars, practical training in companies and Bachelor/Master theses with practical work are the core educational methods in the degree programmes. They positively note that the mentioned teaching methodology aims to establish a positive learning environment and encourage active and self-directed learning of students. In addition, the panel could see that the teaching and learning activities are aligned to the achievement of the intended learning outcomes. The Power Engineering Schools commitment to the CDIO-Initiative,[5] which puts an emphasis on engineering fundamentals set in the context of Conceiving — Designing — Implementing — Operating (CDIO) real-world systems and products. Thus, for instance, projects and internships in cooperation with industrial companies introduce students to the technology market and the demands of the production or research departments of companies as do research projects and theses with a view to the specific challenges of applied or fundamental research. Leading students to an increasingly self-directed learning attitude, particularly in the Master programme, requires at first to engaging them in class activities through deliberately designed questions as well as a variety of learning styles such as project proposals, group assignments, and seminars. Supported and supervised learning in such learning settings are the basis for effective self-study periods. It is positively noted that the School has intensified its efforts to provide further e-learning offerings, particularly for the Master students – and apparently did so with tangible success. Students and lecturers unanimously esteem the infrastructure established for the e-learning offers of the School and its positive impact on the didactical competences of lecturers as well as the self-study competences of students.

The reported didactical training offerings for and activities of the teaching staff also contribute to the learner-centred didactical approach of the Power Engineering School.

Criterion 2.4 Support and assistance

Evidence:

- Relevant chapter in the SAR
- Student Satisfaction survey form “Student Evaluation on Teaching Quality”, Folder: QA, Additional material provided by MUST

[5] Further information can be found on the internet: http://www.cdio.org/ (Download: 15.09.2020)

- Results of students satisfaction survey, Folder: QA, Additional material provided by MUST
- Electricity and Power Supply Specialization: Student Satisfaction Survey, Folder: QA, Additional material provided by MUST
- Audit discussions

Preliminary assessment and analysis of the peers:
The peers get a comprehensive picture of the offers related to support and assistance of the students at MUST. On the programme level, academic advisors, academic affairs assistants and members of student unions play a vital role in the learning activities of the students. Additionally, all lecturers of the Department of Electrical Engineering, the Power Engineering School and MUST are available for consulting students in study matters. Study- and module-related information is provided primarily through the module catalogues and on the respective MUST or Power Engineering School websites. In addition, students do have their own representative body (the Student council) providing especially guidance and mentoring for new students. In the audit discussions, the students attest to the trustful, open-minded and helpful guidance of advisors and teaching staff especially in the introductory study period. Hence, the peers conclude that MUST and the School of Power Engineering make adequate resources available to provide assistance, advice and support for all students and that these services are seemingly working well.

However, some of the results of the comparative Student Satisfaction Survey in the Electricity and Power Supply specialties (2011/12 as compared to 2018/19) show an only mean or decreasing rating of certain instances of the student services.[6] The peers can hardly judge the significance of these results, since it is unclear how many students responded in the survey and to which degree programme the expressions need to be ascribed (see sec. 6). Nevertheless, they point the attention of the programme coordinators to the findings in order to make them aware of possible deficits in the coordination of services. Still, they do not doubt that the advisors and the teaching staff are doing their very best to serve the students' well-being and study success.

[6] Cf. the overall rating of the following questions (on a scale of 1 to 5): "Easy success to student services" (3.78 [2018/19] : 3.88 [2011/12]); "Regular time to talk to teachers and students about training related issues" (3.7 [2018/19] : 3.7 [2011/12]); "Flexibility of School when faced with special circumstances like family problems, pregnancy, birth etc." (3.4 [2018/19] : 3.72 [2011/12]).

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

The peers conclude that not all aspects of the above criterion are met sufficiently yet. In its statement, MUST has provided additional information, which the peer panel takes into consideration for its final assessment.

English proficiency of students and teaching staff

The peer panel acknowledges the evidence submitted by MUST with regard to develop and improve the English proficiency of both students and the teaching staff. By far the most crucial and probably effective measure in this respect to them seems to be the envisaged "Work Agreement Contract" between the PES and the MUST School of Foreign Languages, which is explicitly targeted to the development of the English language skills of teachers and students (Appendix 9). However, the signed and sealed contract does not entail the contract period and also misses the cited annexes specifying the "Training Plan" of the English language training (Annex 1) as well as the "Total budgeted cost" (Annex 2). Those two documents are significant in the eyes of the peers, in that they illustrate the contents and conditions of the language training and, additionally, provide information about whether students are free of charge for the training. The panel considers especially the latter important if the training is going to effectively improve the language proficiency of the students. Regarding the duration of this "Work Agreement", the panel is convinced that it must be a long-term endeavor in order to fulfill its aims. This has to be evidenced as well. Hence, the expert panel suggest a requirement to this end focusing on the mentioned aspects of the "Work Agreement" (see below, sec. F, A 1.).

Contract with companies concerning the internship

The peers thank MUST and the PES for providing them with samples of "'Student's Internship Agreements" between the PES and industry companies (Appendix 12). The exemplary contracts provide ample evidence of the suitability of the internships with regard to their study-related objectives in Engineering Practice as well as their quality assurance through the PES. The peers were especially fond of noticing that students are expected to execute a discipline-related curriculum during their internship supervised by MUST and company supervisors, and that they have to finally produce and defend an internship report. In addition, the panel welcomes that the company shall employ students during the full period of their internship, and consequently pay them during this period – although the related clause varies across the samples presented by the PES. Hence, the peers suggest to unmistakably indicating in the internship contract if a student is to be paid during his/her internship by the company. Further, they assume that a termination of the agreement by any

partner will be accompanied by efforts of the PES to ensure an alternative internship placement for the student potentially affected.

Monitoring of students' workload

Since the statement of MUST and the additional documents provided do not entail any information that is suited to change the peers' opinion with regard to a systematic and regular monitoring of the students' workload, they confirm their proposed requirement for this purpose (see below, sec. F, A 2.). MUST – and for that matter the PES – shall establish an instrument or ensure through already existing quality assurance instruments that it collects realistic data about the students' workload on a regular basis enabling it to identify meaningful discrepancies between the ECTS allocation and the actual student workload and remove them effectively.

Statistics about average duration of study (both degree programmes) / distribution of students' workload across semesters – Bachelor's degree programme

Regrettably, the additional documents and comments of the PES do not entail further statistical data and related analysis about the graduates' average duration of study and/or a possible correlation between examination results and a prolonged study duration. This applies particularly to the seven-semester shortened version of the Bachelor's programme, of which there is no specific commentary at all. Lacking any additional information on these explicit requests (see preliminary assessment chap. 2.2 and below D 2.), the peers not only conclude that the PES must lay more stress on the evaluation of the actual student workload (see above). With respect to the seven-semester shortened version of the Bachelor's programme in Electrical Power Supply – as opposed to its eight-semester regular version – they rather consider it necessary to establish a more balanced ECTS distribution per semester in order to facilitate a completion of study within the standard period (see below, sec. F, A 4.).

Against this backdrop, the expert panel particularly suggests analysing workload evaluation results, examination results and data about the average duration of study comprehensively, thus ensuring that potential structural deficits in the degree programmes could be identified and removed at an early stage (see below final assessment sec. 6, and sec. F, E 2.).

3. Exams: System, concept and organisation

Criterion 3 Exams: System, concept and organisation

Evidence:

- Relevant chapter of the SAR
- Module handbooks, Folder A: Bachelor, Master
- Average GPA scores, Folder: QA last version
- "Diploma Project for Bachelor's Degree & Defending Procedure", Folder D: Rules, Appendix 5
- "Master's and Doctorate Training in MUST, Procedure for Defending Degree, Folder D: Rules, Appendix 6
- „A Regulation on Assessing Student's Knowlegde" Chap. 3.2 "Working load and credit score", Folder D: Rules, Appendix 11
- "A Regulation on the Settling of the Bachelor's Degree Programme Procedures at MUST", Folder D: Rules, Appendix 12
- Audit discussions

Preliminary assessment and analysis of the peers:

Students are required to take two term exams on each subject on the 6th and 12th weeks of each semester. Mid-term and final exams are generally conducted in written test mode. Only a few of the major and specialized course-term final tests are taken orally (the School explicitly mentions M.TD370 *Engineering design-1*, M.TD306 *High voltage testing and adjustment*, M.TD324 *Electrical equipment assembly and usage*, M.TD208 *High voltage technique*). On request, peers learned that on overage participant numbers are too high to offer an oral examination, although the latter principally provides an alternative assessment option. The peers also understood that up to three credit hours per semester can be earned through so-called exemption tests, with the exception of major or otherwise important professional courses. They note the principal variety of assessment methods, but still consider the vast predominance of the (written) testing mode in the mid-term and final exams not ideally attuned to the intended learning outcomes of the courses. The panel therefore strongly suggests tailoring the assessment methods of the mid-term and final exams more suitably to the intended learning outcomes. Thus, the variety of assessment methods – apart from multiple choice testing and written examinations – should be raised *factually* in the medium and long run. The peers particularly stress this issue, as it has already been a concern in the past accreditation. However, they still consider a recommendation sufficient, since an outcome-oriented choice of assessment forms can at least be seen in some

instances, and students are explicitly in favour of the existing system judging the assessment methods as overall in line with the defined learning outcomes.

The peers note that in order to graduate from the Bachelor's degree programme a student must write a thesis (diploma project) and present his/her work. The procedure is duly regulated for the Bachelor's as well as the Master's theses. In this connection, the panel sees that the research topic of a newly enrolled Master's student is agreed in the professor's team meeting, while the topic and the thesis supervisors shall be approved by the rector's decree at the beginning of the semester. Thesis' topics according to the available information relate to directions of research and technology transfer of the supervising professors and to focal research/technology fields of organisations and companies. The peers positively note that the Power Engineering School is solely responsible for supervising the diploma projects (theses) and, via so-called "diploma project defence commissions", has also major stakes in the reviewing and consulting process of the projects. Otherwise, the latter consists to a considerable degree of industry representatives (roughly 30%) thus ensuring the profession-orientation of the thesis projects.

By way of the inspection of a sample of thesis works, the peers came to conclude that these project works were of adequate quality in case of the Bachelor theses. Their assessment regarding the Master's project works is somewhat different. Firstly, the panel notes that the profession-oriented Master's degree, although entailing more than one course on research methodology, does not embrace any diploma project or thesis work at all. That alone contradicts the respective accreditation standard requesting a mandatory thesis. As the Master's programme comprises two directions, the profession-oriented version is part of the degree programme and thus cannot be spared in the assessment. In case of the research-oriented Master's programme the graduation project has a volume of just 9 ECTS credit points, which is a remarkably small thesis compared to the usual 16 – 30 ECTS in Germany, for instance. The related accreditation standard requires that the degree programme "comprises a thesis/dissertation or final project which ensures that students work on a set task independently and at the level aimed for". The peers doubt that a small thesis of this size matches the said criterion at the Master level it is aimed for. This is notwithstanding the fact, that the Master's programmes at the Power Engineering School in the panel's understanding are essentially scientific further education offerings for professionals. Hence, the peers consider it indispensable that a Master's thesis must be mandatory in all directions of the Master's programme at offer. Further, the size of the Master's thesis must convincingly reflect the Master level it is aimed for.

The peers recognize that the organisation and administration of examinations is regulated in detail and carried out accordingly. Information about when and how to take certain types of exams, the applicable assessment criteria and related information is made available on

the electronic data management system of MUST (UNIMIS) at the beginning of the semester. In addition, the panel acknowledges that there have been no indications in the available information and data of minor or major deficits in the examination system, its administration and organisation.

With regard to the examination statistics, the peers highly value the data delivered in the SAR for the Bachelor's programme. Obviously, these data clarify the (mean) average GPA scores of Bachelor graduates and provide some deeper insight into those subjects, which primarily contribute to this result. Yet, no further analysis or results of such analysis (and possible follow-up measures) are presented. As evidence of an efficient quality assurance system, it would have been expected not just to present the data but also to demonstrate how the institution is handling the data and sourcing them into its optimization strategy (see below sec. 6).

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

The peers conclude that not all aspects of the above criterion are met sufficiently yet. In its statement, MUST has provided some additional information, which the peer panel takes into consideration for its final assessment.

Assessment methods

The examination schedule presented for the academic 2017/18, 2018/19 and 2019/20 (Appendix 13) illustrates the predominance of written examinations, although it also confirms a considerable number of oral exams. The peer panel highly appreciates the latter, since the graduates' ability to present products, processes and solutions for engineering problems orally is of considerable importance in the work reality of engineers and can hardly be overrated. Nevertheless, the peers have gained the impression that the exams on average might even more be tailored towards the learning outcomes sought for in the individual courses/modules. Hence, they propose a related recommendation (see below, sec. F, E 1.).

Master thesis – Master's degree programme

Regarding the Master thesis, the expert panel reiterates that according to ASIIN accreditation criteria – in line with international standards – a Master degree programme needs to be completed with a Master thesis or respective capstone project. This would certainly apply to all versions of an individual Master's programme offered, and in this case will be required for the research- and the profession-oriented versions of the Master's programme. The peers confirm their opinion that a respective requirement should urge the PES to adapt the profession-oriented version accordingly (see below, sec. F, A 5.).

In addition, the credit volume of the Master thesis in the peers' view needs to adequately reflect the Master's level of education, which they doubt in the case at hand. The panel therefore proposes to supplement the respective requirement in that direction (see below, sec. F, A 5.).

4. Resources

Criterion 4.1 Staff

Evidence:

- Relevant chapter of the SAR
- Staff handbook, Folder C
- Module handbooks, Folder A: Bachelor, Master
- Document "General Performance" 2019, Folder: QA; Additional material by MUST
- A Study of the Electrical Power Supply Programme Instructor's Teaching Load During the 2016 – 2019 Academic Years, Folder: QA, Additional Material provided by MUST
- Audit discussion

Preliminary assessment and analysis of the peers:
According to the SAR, the teaching staff of the Department of Electrical Engineering available for the Electrical Power Supply degree programmes consists of nine lecturers, four contracted lecturers, four practitioners and one assistant to the chair of the department (altogether 18 persons). Six staff members have professorial rank (professors and associate professors), the rest being lecturers (senior lecturers and lecturers). Of the lecturers, seven hold a PhD or doctor's degree, eight graduated with a Master's degree. The peers value positively that the majority of the holders of a PhD or doctor's degree finished their doctoral studies in universities abroad. They note that the age structure of the teaching staff is at least somewhat mixed with roughly 50% of the staff being in age groups up to 50 years. Promises to rejuvenate the staff structure of the School and the Department are supportive.

When it comes to the staff resources, the peers could clearly see that the number of qualified and salaried teaching staff has been continuously decreasing in recent years, not only in the Electrical Power Engineering School in its entirety, but also in the Department. From the peers' point of view, there is an obvious interrelation between this observation and a steady teaching overload of many lecturers at the Department since 2016. Thus, for instance, compared to the respective standard teaching load nearly 50% of the lecturers bear

a 200% or more teaching performance in the academic year 2018/19 (for which most recent figures are available). At the same time, a slight continuous decrease of the average teaching obligations seems to occur due to a concurrent decrease of student numbers. Still, the panel considers the overload of lecturers and professors in the programmes of the Department of Electrical Engineering significant and a problem that needs to be resolved in the near future. An indication of programme coordinators that at least four PhD candidates returning from their further qualification visits at universities abroad will significantly improve the teaching situation is noticed. However, since the panel cannot judge an already unfavourable situation based on an extrapolation, it clearly maintains its view that the present staff resource base is unsatisfying and needs to be improved in order to avoid negative structural effects.

Unfortunately, the peers could not find out exactly whether the decreasing number of professors in recent years is actually affecting the Electrical Power Supply programmes, since the numbers are referring to all departments of the Power Engineering School. Consequently, MUST – or for that matter the Power Engineering School – is required to provide evidence that appropriate measures have been taken to increase the number of (full and associate) professors with teaching obligations in the programmes under review and that these programmes can be managed *without any structural overload*.

Regarding the academic qualification and professional background of professors and lecturers, the expert panel received a positive impression from the SAR and the audit discussions. Academic and professional qualification and experiences are generally fitting the demands of the degree programmes. In addition, research activities of the teaching staff, though limited in their international scope and impact, are helpful to maintain and enhance the quality of the programmes. In the eyes of the peers, the obligatory research work of professors parallel to their teaching obligations principally constitutes a conducive scientific environment for the knowledge transfer from research to teaching.

Criterion 4.2 Staff development

Evidence:

- Relevant chapter in the SAR
- Certificates, Folder: Staff Development, Additional Material provided by MUST
- Information about Research and Conference participation of staff members of MUST School of Power Engineering, Folder: QA, Department of Electrical Engineering, School of Power Engineering
- Audit discussions

Preliminary assessment and analysis of the peers:
It becomes obvious from the SAR and the audit discussion that MUST and the Power Engineering School respectively ardently encourage both the professional and the didactical further qualification of the staff members. Numerous papers, conference participations, seminars, workshops with broad participation of staff members attest to this observation. Widely used e-learning tools, in particular in the Master's programme, generally illustrate the didactical flexibility and proficiency of the teaching staff – an impression explicitly confirmed by the students. Comparative survey results about "School and Teacher Interaction" also provide indications that the teaching competences of staff members have been evaluated favourably, apparently maintained on an already high level and even improved over time.

Criterion 4.3 Funds and equipment

Evidence:

- Relevant chapter of the SAR
- Photos and equipment of laboratories, Folder: Laboratories, Additional material of MUST
- Financial and Material resources, Folder: QA, Department of Electrical Engineering, School of Power Engineering
- Student Satisfaction survey form "Student Evaluation on Teaching Quality", Folder: QA, Additional material provided by MUST
- Results of students satisfaction survey, Folder: QA, Additional material provided by MUST
- Electricity and Power Supply Specialization: Student Satisfaction Survey, Folder: QA, Additional material provided by MUST

Preliminary assessment and analysis of the peers:
As the SAR states, 75% of the School's capital is self-funded and the remainder comes from external sources. The School's budget according to the latest figures in the SAR amounts to the equivalent of roughly 2 Mio. EUR per year. It is mainly composed of study fees, government funds, industry donations as well as research and working projects of the School's staff. The panel learns that the university management expects more funding from government and, additionally, hopes for an increasing financial engagement of the industry through intensified collaboration – without losing sight of its ultimate responsibility for the content and quality of its core teaching and learning processes. The expert panel takes note of the already important role of financial donations of industry companies, in particular with regard to the establishment, maintenance and refurbishment of the lab facilities (to

take just this example, for instance, a donation of ABB helped purchasing the testing laboratory of power plant and substation equipment). The panel appreciates the apparent close and trustful relationship of the Power Engineering School and industry companies and the involvement of the latter either through participation in the education (internships and graduation theses) or through supporting the lab infrastructure for the School's study programmes. At the same time though, the panel cautions the School not to count too much on external support in its core business of delivering Bachelor's and Master's degree programmes. Summarizing their assessment in that respect, the peers conclude that the Power Engineering School appears to be well on track to ensure its adequate financial base.

Because the auditing of the programmes was limited to a remote audit, the expert panel had no opportunity to carefully inspect the infrastructure and facilities of the Power Engineering School and, in particular, for the degree programmes under review. Descriptions and photos delivered to fill this gap could only partly substitute the direct and immediate inspection and especially any immediate experience of the actual working of the lab education at the facilities on site. Nevertheless, the panel positively notes that students, teachers and industry representatives concurrently highlighted very good laboratories and lab equipment of the degree programmes. In this connection, the panel also appreciates the School's explicit intention to strengthen the research capacity of its lab infrastructure (planning of labs for "Renewable Energy Management and Testing" and "Smart Home"), the more so since these labs could be decisive connecting points to technological demands and future developments in the energy technology field (see above sec. 1.3). Furthermore, the peers highly esteem the students' positive feedback to the School's e-learning infrastructure and teaching achievements as well as its web-services in general (see above sec. 2.3 and 2.4).

However, for the above-mentioned reasons, the peers recommend that at least one of the professors in the expert panel shall visit MUST for a close inspection of the laboratory facilities, which might be done, for instance, in the course of the fulfilment of (possible) requirements. The panel lauds the insightful and comprehensive information about the lab equipment (pictures, descriptions) presented by the Power Engineering School. It also credits the School with the assumption of adequate labs living up to the needs of a modern engineering education. Nevertheless, the peers consider it indispensable to confirm this presumption through an onsite inspection.

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

The peers conclude that the above criterion is not met sufficiently yet.

Staff resources

The expert panel is thankful for the list of lecturers, who are in different stages of their academic further qualification abroad (Appendix 15). The panel highly welcomes this capacity building measure of the PES. However, those lecturers' studies abroad will last until 2023 and in only two cases will be completed in the second half of 2021. Hence, the expert panel expects the tight teaching staff situation to remain at least in the short and medium term. With a view to a yearlong teaching overload of a major share of the teaching staff, the panel considers this no longer acceptable. Consequently, there needs to be an immediate remedy for this unfortunate situation in order to maintain and further develop the quality of the programme (see below, sec. F, A 3.).

Equipment

The peers recommend that MUST shall be visited for a closer inspection of the laboratory facilities in the course of the fulfilment of the requirements. They propose a team of at least one the professors together with an ASIIN coordinator. The team shall have the task to confirm the impression that the labs and lab equipment meet international standards.

5. Transparency and documentation

Criterion 5.1 Module descriptions

Evidence:

- Objectives Tables, Folder B: Matrix Bachelor, Matrix Master
- Module handbooks, Folder A: Bachelor, Master
- Audit discussions

Preliminary assessment and analysis of the peers:

The Power Engineering School has procured module handbooks for the Electrical Power Supply degree programmes. The handbooks are available in English and Mongolian language on the MUST websites. In the opinion of the peers, the course/module descriptions therein are concise and informative and, inter alia, contain information about the course content, its intended learning outcomes, prerequisites of the courses, teaching method, examinations, assessment method and grading criteria, frequency and regular cycle of course offerings, workload and credit point allocation, as well as course coordinators and instructors. In particular, course content and intended learning objectives as well as teaching and assessment methods do principally correspond to each other, thus invoking the assumption that courses, didactical concept and exams are mutually reinforcing the

achievement of the intended learning outcomes (as to that see respective sec. 2.3 and 3 of this report).

As the module/course descriptions for the Bachelor's programme are exemplary in each of the above aspects, peers note that the course descriptions for the Master's programme obviously lack details about the examinations. Due to the generally good quality of the course descriptions, they consider this a minor deficiency and trust that the School will redress it at short notice, which they advise accordingly.

Furthermore, the panel could not find a description of the Master course "Software for engineering simulations", which seems to be missing yet. The peers ask the Power Engineering School/Department of Electrical Engineering to add this description to the module handbook for the Master's programme and present it to them as well.

Criterion 5.2 Diploma and Diploma Supplement

Evidence:

- Diploma Supplements, Folder F
- Audit discussions

Preliminary assessment and analysis of the peers:
The university has developed Diploma Supplements for each of the programmes under review. The peers note that the diploma supplement has been designed explicitly to provide sufficient information about the nature, level, context, content and status of the studies that were pursued and successfully completed by the individual graduate. Thus, other stakeholders (be they universities abroad or potential employers) are able to receive an impression on the graduates'/applicants' qualification and to have a basis for a well-founded comparison between qualifications of different graduates/applicants. Hence, the panel deems the Diploma Supplement provided by the Power Engineering School of MUST matching the requirements.

Criterion 5.3 Relevant rules

Evidence:

- Relevant chapter of the SAR
- Study related rules and regulations, Folder D: Rules
- English versions of study-related examinations available on the website: https://must.edu.mn/en/page/306 (Download: 15.09.2020); in addition: http://www.pes.edu.mn/en/page/399 (Download: 15.09.2020)

Preliminary assessment and analysis of the peers:
Study-related rules and provisions have been provided and the most important of them such as admission, study and examination regulations have been translated into English and are available in English on the website, too. However, as most translations are of a poor quality it is strongly suggested undertaking serious efforts to improve on that.

The peers cannot judge whether all rules and regulations, provisions and by-laws with relevance to the studies at MUST are accessible on the website and in English yet. At least, it seems that translations appear on disparate websites of MUST or the Schools and thus might be difficult to find. The peers therefore encourage MUST to provide all major study-related information and rules in English in a systematically ordered manner, which indirectly would benefit the internationalization of the university and contribute to its international networking strategy.

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

The peers conclude that all aspects of the above criterion are met sufficiently. In its statement, MUST has provided some additional information, which the peer panel takes into consideration for its final assessment.

Module descriptions

The peer panel takes note of the updated version of curricula and the module handbook for the Master's degree programme encompassing the description of the course *Software for Engineering Simulation* as requested (Appendix 16_1).

Apart from that– as indicated in their preliminary assessment – the peers expect the PES to supplement the course descriptions of the Master's programme with more detailed information about the assessments (similar to the Bachelor's course descriptions).

6. Quality management: quality assessment and development

Criterion 6 Quality management: quality assessment and development

Evidence:

- Relevant chapter of the SAR
- Information about the Quality Management of MUST available on the internet: https://www.must.edu.mn/en/page/314 (Download: 22.09.2020)

- QMS Quality manual of MUST available on the internet: https://www.must.edu.mn/en/page/314 (Download: 22.09.2020)
- Employer Satisfaction Survey, Folder: QA, Additional material of MUST
- Student Satisfaction survey form "Student Evaluation on Teaching Quality", Folder: QA, Additional material provided by MUST
- Results of students satisfaction survey, Folder: QA, Additional material provided by MUST
- Electricity and Power Supply Specialization: Student Satisfaction Survey, Folder: QA, Additional material provided by MUST
- Audit discussion

Preliminary assessment and analysis of the peers:
The peers take note of the institutions, responsibilities and instruments established at university, School and department level in order to ensure and further develop the quality of the degree programmes. MUST and the Power Engineering School are apparently aware of essential quality assurance principles like the PDCA-cycle or the Japanese "5 C"- philosophy, which both institutions try to adopt to their respective institutional and procedural conditions. Instruments like student, employer, and alumni satisfaction surveys have been implemented in recent academic years. Positive survey results and statistical data provided to the peers beforehand seem to confirm the study success in the degree programmes offered at the Power Engineering School / Department of Electrical Engineering.

On the other hand, traces of a systemic quality assurance approach can only be seen from the year 2016 onwards. It therefore is hardly surprising that peers have found much room for improvement in that respect. Not only do the survey results and statistical data presented to them appear to be randomly collected (mostly undated by the way and thus hardly ascribable to specific student cohorts or academic years), they also are not related to individual programmes, which limits their significance considerably. Even where some performance indicators show decreasing numbers for the compared academic years (for instance, in the case of the students' workload assessment in one of the Student Satisfaction Surveys), there is no indication as to how MUST is interpreting these results and which consequences it plans or is going to implement in order to reverse a possibly negative trend. Data and information need to be collected, analysed and followed up cyclically and systematically, if they are to generate meaningful results. In addition, they should be gathered on programme level in order to get substantial information on the study progress and success as well as possible deficits in the programmes. Deficits, defects and shortcomings can hardly be identified through cross-programme average scores. In this respect, the peers ask for reliable statistical data about the average duration of study – separately for the

Bachelor's and Master's programme – for the previous accreditation period (2014 – 2019) in order to get a more comprehensive picture of the study progress and success of the students.

Despite the above-mentioned incompleteness of the quality assurance system judged from its appearance in the SAR, the expert panel acknowledges that the mentioned surveys and evaluations are conducted on a regular basis and that they too are responsive, as students, teachers and industry representatives concurrently confirm. Although this per se is highly commendable, the expert panel recommends continuing with the implementation of a quality assurance system that includes a systematic collection, analysis, documentation and following up of the results it produces.

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

Overall, the peers conclude that the requirements related to the quality assurance of the programmes under review are met sufficiently. In its statement, MUST has provided some additional information, which the peer panel takes into consideration for its final assessment.

The expert panel positively values the institutional arrangements and methodological instruments the PES has already implemented. Overall, the panel received the impression that those arrangements and instruments are functional in the sense that they work towards the quality assurance and quality development of the degree programmes under consideration. With a view to the findings about the student workload, the examination statistics, the average duration of study and possible correlations between those figures, the panel nevertheless suggests to further develop the quality assurance system with a focus on the systematic collection, analysis, documentation and following up of its results.

D Additional Documents

Before preparing their final assessment, the panel ask 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:

D 1. Enrolment numbers for the last five years for the Bachelor's and the Master's programmes (Ba and Ma separately and also differentiating between fall and spring semester) [ASIIN 1.4]

D 2. Statistics about average duration of study (separately for the Bachelor's and Master's programme) for the last five years; examination statistics from semesters 1-4 of the shortened version of the Bachelor's programme and for the past three years [ASIIN 2.2, 6]

D 3. Module description for "Software for engineering simulations" (English) [ASIIN 5.1]

D 4. Translated exemplary contract with companies concerning the internship [ASIIN 2.1]

E Comment of the Higher Education Institution (26.10.2020)

The institution provided a detailed statement as well as a series of additional documents concerning the requested information according to section D of this report.

F Summary: Peer recommendations (06.11.2020)

Taking into account the additional information and the comments given by MUST, 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 Electrical Power Supply	ASIIN	EUR-ACE	30.09.2026
Ma Electrical Power Supply	ASIIN	EUR-ACE	30.09.2026

Requirements

For both programmes

A 1. (ASIIN 2.1) The "Work Agreement" for the development of the English language skills of students and the teaching staff must be demonstrated as a strategic and sustainable quality measure of the PES (duration of contract). In addition, it needs to be ensured that students are offered the training at no charge (Annexes of contract).

A 2. (ASIIN 2.2) Implement a regular monitoring instrument for the student workload in order to adapt either the content or the scheduled credit hours (ECTS) of courses according to the actual workload in case of significant discrepancies.

A 3. (ASIIN 4.1) Provide evidence that appropriate measures have been taken to increase the number of (full and associate) professors with teaching obligations in the programmes under review and that these programmes can be managed without any structural overload.

For the Bachelor's programme (shortened version)

A 4. (ASIIN 2.2) Ensure a more balanced ECTS distribution per semester in order to facilitate a completion of study within the standard period.

For the Master's programme

A 5. (ASIIN 3) A Master' thesis or capstone project must be a mandatory part of all versions of a Master's programme that are offered. The size of the Master's thesis must reflect the Master level it is aimed for.

Recommendations

For both programmes

E 1. (ASIIN 3) It is strongly recommended to tailor the assessment methods of the mid-term and final exams more suitably according to the intended learning outcomes. The variety of assessment methods – besides multiple choice testing and written examinations – should thus be raised.

E 2. (ASIIN 6) It is recommended to further develop the quality assurance system with a focus on the systematic collection, analysis, documentation and following up of its results.

E 3. (ASIIN 1.3) It is recommended to integrate courses into the programme dealing with future developments in the area of Electrical Power Supply.

For the Bachelor's programme

E 4. (ASIIN 1.1) It is recommended to further differentiate the learning objectives on programme level in such manner that they more concisely reflect the subject-specific qualifications of graduates at the Bachelor's level sought for.

In addition, the peers recommend that MUST shall be visited for a closer inspection of the laboratory facilities in the course of the fulfilment of the requirements. They propose a team of at least one the professors together with an ASIIN coordinator. The team shall have the task to confirm the impression that the labs and lab equipment meet international standards.

G Comment of the Technical Committee 02 – Electrical Engineering / Information Technology (13.11.2020)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure. It agrees with the recommendations of the peers without any changes.

Assessment and analysis for the award of the EUR-ACE® Label:

The Technical Committee deems that the intended learning outcomes of the degree programmes do comply with the engineering specific part of Subject-Specific Criteria of the Technical Committee 02.

The Technical Committee 02 – Electrical Engineering and Information Technology recommends the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Electrical Power Supply	With requirements for one year	EUR-ACE	30.09.2026
Ma Electrical Power Supply	With requirements for one year	EUR-ACE	30.09.2026

Vote: unanimous

H Decision of the Accreditation Commission (03.12.2020)

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

The Accreditation Commission discusses the procedure. The Accreditation Commission makes some editorial changes within the requirements and recommendations. Moreover, it changes the former requirement A 4 regarding the ECTS distribution of the shortened version of the bachelor programme into a recommendation. Finally, the Accreditation Commission adds another requirement regarding the inspection of the university's laboratory facilities.

Assessment and analysis for the award of the EUR-ACE® Label:

The Accreditation Commission deems that the intended learning outcomes of the degree programmes do comply with the engineering specific parts of Subject-Specific Criteria of the Technical Committee 02 – Electrical Engineering/Information Technology.

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

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Electrical Power Supply	With requirements for one year	EUR-ACE	30.09.2026
Ma Electrical Power Supply	With requirements for one year	EUR-ACE	30.09.2026

Requirements

For both programmes

A 1. (ASIIN 2.1) The "Work Agreement" for the development of the English language skills of students and the teaching staff must be demonstrated as a strategic and sustainable quality measure of the PES (duration of contract). In addition, it needs to be ensured that students are offered the training at no charge (Annexes of contract).

A 2. (ASIIN 2.2) Implement a regular monitoring instrument for the student workload in order to adapt either the content or the scheduled credit hours (ECTS) of courses according to the actual workload in case of significant discrepancies.

A 3. (ASIIN 4.1) Provide evidence that appropriate measures have been taken to increase the number of (full and associate) professors with teaching obligations in the programmes under review and that these programmes can be managed without any structural overload.

A 4. (ASIIN 4.3) Confirm that the laboratory facilities meet international standards during an on-site visit in the course of the fulfilment of requirements.

For the Master's programme

A 5. (ASIIN 3) A Master's thesis or capstone project must be a mandatory part of all versions of a Master's programme. The scope of the Master's thesis must reflect the Master level it is aimed for.

Recommendations

For both programmes

E 1. (ASIIN 3) It is strongly recommended to tailor the assessment methods of the midterm and final exams more suitably according to the intended learning outcomes. The variety of assessment methods – besides multiple choice testing and written examinations – should thus be raised.

E 2. (ASIIN 6) It is recommended to further develop the quality assurance system with a focus on the systematic collection, analysis, documentation and following up of its results and including a feedback to the students.

E 3. (ASIIN 1.3) It is recommended to integrate courses into the programme dealing with future developments in the area of Electrical Power Supply.

For the Bachelor's programme

E 4. (ASIIN 1.1) It is recommended to further differentiate the learning objectives on programme level in such manner that they more concisely reflect the subject-specific qualifications of graduates at the Bachelor's level sought for.

For the Bachelor's programme (shortened version)

E 5. (ASIIN 2.2) It is recommended to ensure a more balanced ECTS distribution per semester in order to facilitate a completion of study within the standard period.

Appendix: Programme Learning Outcomes and Curricula

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

"Engineering Science has the following Course Learning Outcomes"

	Course Learning Outcomes
1	Demonstrate broad and coherent conceptual understanding of the mathematical, information science, physical and natural science disciplines that underpin engineering, as well as a sound knowledge of fundamental engineering principles and of the theory and practice of one of the disciplines of Chemical, Civil, Electrical and Electronics or Mechanical Engineering;
2	Analyze complex engineering problems and fluently apply appropriate engineering techniques and design processes
3	Develop creative problem solutions and conceive innovative approaches in developing and designing engineering systems;
4	Prepare high quality engineering documents and present a clear and coherent presentation of these to a range of technical and nontechnical audiences;
5	Acquire and evaluate research regarding new knowledge development within the engineering discipline and its social, cultural, environmental and legal context;
6	Exercise initiative, judgment, and autonomy in contributing as a member of an engineering team
7	Competently and confidently contribute to the development of society and the engineering profession, with a special emphasis on Northern Territory issues
8	Demonstrate a responsible, ethical and professional attitude regarding the role of engineers in society, including situations involving potentially adverse environmental and cultural impacts.
9	Work collaboratively to plan and execute project work or research to advance the scientific basis, technologies or practices within the engineering discipline broadly.

In its statement to the report, the MUST added the following programme-specific learning outcomes (Appendix 1):

"The aim of Bachelor degree programme on Electrical power supply is to prepare the electrical engineering specialist in internationally recognized level, who had gained the theo-

retical and practical knowledge of installation and optimal operation of electrical and energy facilities / equipment which are necessary for electrical supplying the consumers with distributed generators. Undergraduate students are: to have certain knowledge on the computer applications, automation of technology and business administration, able to continue next step of higher education – master degree study in foreign language –, to have a passion for self-advancement, and to have the academic and technical higher education level of which general qualification profiles laid down at national and international level, meeting the European higher education requirements (EUR-ACE label-3)."

The following **curriculum** is presented:

Table for EuroCredit calculation

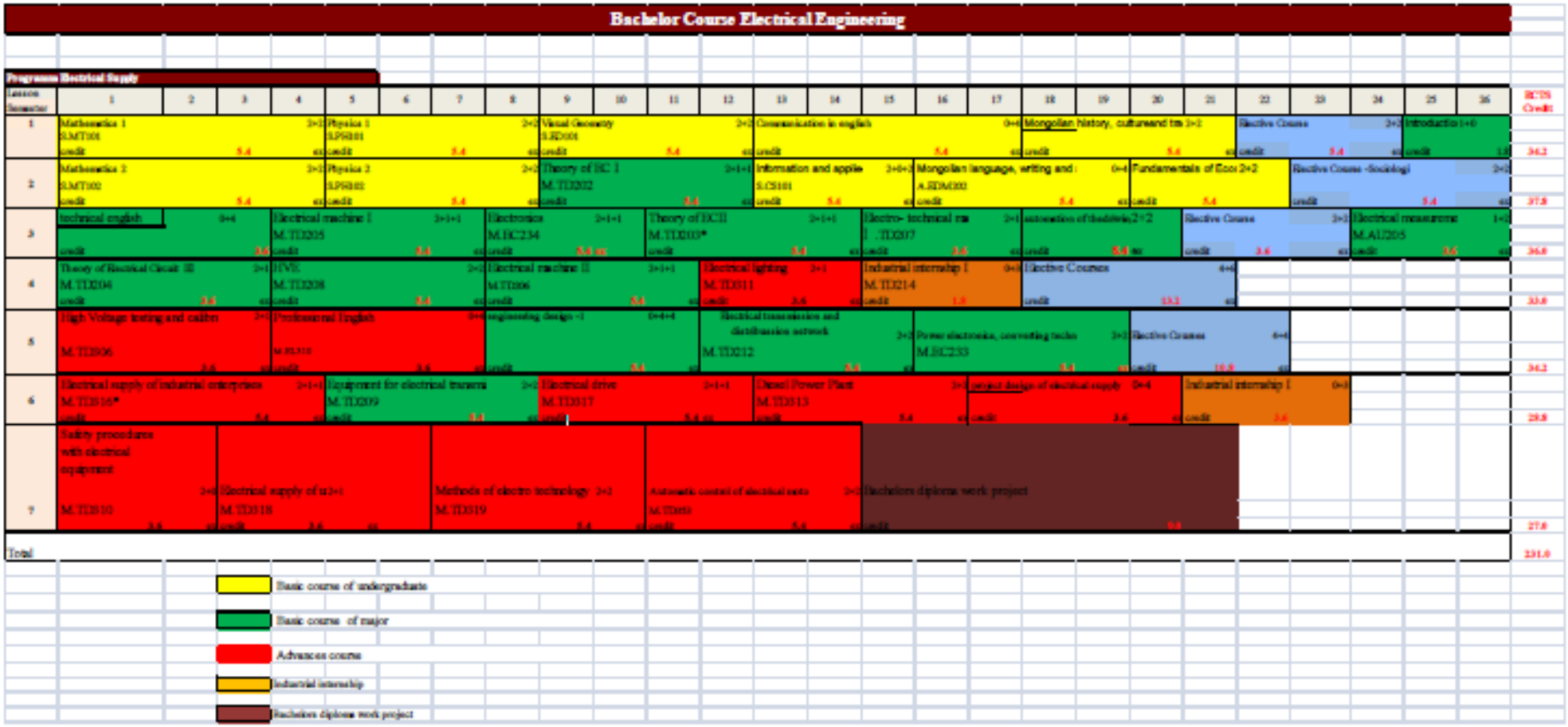
Bachelor PROGRAM: El.Pow. Supply

Term	Course	Type	Lect	Sem	Lab	Comp	Self	End	Con	HCP	HCB	HE	HS	Hex	SH	ECTS
1	Mathematics 1	CP	2	2			5	ex	4	9	0	0	144	0	144	5.4
	Physics 1	CP	2	1	1		5	ex	4	9	0	0	144	0	144	5.4
	Descriptive Geometry	CP	2	2			5	ex	4	9	0	0	144	0	144	5.4
	Introduction to profession	PP	1				2	ex	1	0	0	0	48	0	48	1.8
	Mongolian history, cultureand	CP	2	2			5	ex	4	9	0	0	144	0	144	5.4
	Communication in english	CP		4			5		4	9	0	0	144	0	144	5.4
	Elective course	E	2	2			5	ex	4	0	0	9	144	0	144	5.4
									0	0	0	0	0	0	0	0.0
	Suma		*11*	*13*	*1*	*0*	*32*	*57*	*25*	*45*	*0*	*9*	*suma*		*912*	*34.209*
2	Mathematics 2	CP	2	2			5	ex	4	9	0	0	144	0	144	5.4
	Physics 2	CP	2	1	1		5	ex	4	9	0	0	144	0	144	5.4
	Theory of Electrical Circuit I	PP	2	1	1		5	ex	9	9	0	0	144	0	144	5.4
	Fundamentals of Economic t	CP	2	2			5	ex	4	9	0	0	144	0	144	5.4
	Mongolian language, writing	CP		4			5	ex	4	9	0	0	144	0	144	5.4
	Elective course	E	2	2			5	ex	4	0	0	9	144	0	144	5.4
	Information and applied techn	CP	2			2	5	ex	4	9	0	0	144	0	144	5.4
	Suma		*12*	*12*	*2*	*2*	*35*	*63*	*33*	*54*	*0*	*9*	*suma*		*1008*	*37.809*
3	technical english	CP		4			2	ex	4	0	0	0	96	0	96	3.6
	Electrical machine I	PP	2	1	1		5	ex	9	9	0	0	144	0	144	5.4
	Theory of Electrical Circuit II	PP	2	1	1		5	ex	9	9	0	0	144	0	144	5.4
	Electronics	PP	2	1	1		5	ex	9	9	0	0	144	0	144	5.4
	Electro- technical materials	PP	1.5	1			3.5	ex	2.5	6	0	0	96	0	96	3.6
	automation of thedriwings of el	CP	2	2			5	ex	4	0	0	0	144	0	144	5.4
	Electrical measurement techniqu	PP	1		2		3	ex	3	6	0	0	96	0	96	3.6
	Elective course	PP	1	2			3	ex	3	6	0	0	96	0	96	3.6
	Suma		*11.5*	*12*	*5*	*0*	*32*	*60*	*40.5*	*39*	*0*	*0*	*suma*		*864*	*36.0*
4	Theory of Electrical Circuit III	PP	1	1	1		3	ex	3	6	0	0	96	0	96	3.6
	High voltage engineering	PP	2	2			5	ex	4	9	0	0	144	0	144	5.4
	Electrical machine II	PP	2	1	1		5	ex	4	9	0	0	144	0	144	5.4
	Electrical lighting	PP	1.5	1			3	ex	2.5	5.5	0	0	88	0	88	3.3
	Industrial internship I	PP					3		0	3	0	0	48	0	48	1.8
	Elective course	PP	4	6			12	ex	10	3	0	0	352	0	352	13.2
	Suma		*31.5*	*30*	*11*	*0*	*87*	*160*	*94.5*	*111*	*0*	*0*	*suma*		*872*	*32.7*
5	High Voltage testing and calibra	PP	1.5		1		3.5	ex	2.5	6	0	0	96	0	96	3.6
	engineering design-1	PP		4	4		1		8	9	0	0	144	0	144	5.4
	Electrical transmission and distribussion network	PP	2	2			5	ex	4	9	0	0	144	0	144	5.4
	Power electrical, converting tec	PP	2	1	1		5	ex	4	9	0	0	144	0	144	5.4
	Professional English	PP		4			2	ex	4	6	0	0	96	0	96	3.6
	Elective course	PP	4	4			10	ex	8	18	0	0	288	0	288	10.8
	Suma		*51.5*	*56*	*19*	*0*	*145*	*271*	*149*	*203*	*0*	*0*	*suma*		*912*	*34.2*
6	Electrical supply of industrial en	PP	2	1	1		5	ex	9	9	0	0	144	0	144	5.4
	Equipment for electrical transmi	PP	2		2		5	ex	4	9	0	0	144	0	144	5.4
	Electrical drive	PP	2	1	1		5	ex	4	9	0	0	144	0	144	5.4
	Diesel Power Plant	PP	2	2			5	ex	4	9	0	0	144	0	144	5.4
	project design of electrical supp	PP		4			2		4	6	0	0	96	0	96	3.6
	Industrial internship II						6	ex	0	0	0	0	96	0	96	3.6
	Suma		*8*	*8*	*4*	*0*	*28*	*48*	*25*	*42*	*0*	*0*	*suma*		*768*	*28.8*
7	Automatic control of electrical s	PP	2		2		5	ex	4	9	0	0	144	0	144	5.4
	Electrical supply of urban and s	PP	1.5	1			3.5	ex	2.5	6	0	0	96	0	96	3.6
	Methods of electro technology	PP	2	2			5	ex	4	9	0	0	144	0	144	5.4
	Safety procedures with electrica	PP	2				4	ex	2	6	0	0	96	0	96	3.6
	Bachelor Work	PP					15		0	15	0	0	240		240	9.0
								ex	0	0	0	0	0	0	0	0.0
	Suma		*122*	*127*	*46*	*0*	*365*	*650*	*349*	*511*	*0*	*0*	*suma*		*720*	*27.0*

Total hours in semester with different type	PP	PO	V	Total
Hours	1004.5	0	18	1022.5
Percent	98.2	0.0	1.8	100.0

Sum of hours per study	*6050*
ECTS	230.8

Constatns		
	Number of weeks per term	16
	ECTS credits per term	30
	Number of hours per credit	26.66


Bachelor Course Electrical Engineering
Programme Electrical Supply
Lesson Semester
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
ECTS Credit
1
Mathematics 1 S.MT101 3+0 credit 5.4 cr
Physics 1 S.PS101 2+2 credit 5.4 cr
Visual Geometry S.ZD101 2+2 credit 5.4 cr
Communication in english 0+6 credit 5.4 cr
Mongolian history, culture and tra 3+2 credit 5.4 cr
Elective Course 2+2 credit 5.4 cr
Introductio 1+0 credit 1.5
34.2
2
Mathematics 2 S.MT102 3+0 credit 5.4 cr
Physics 2 S.PS102 2+2 credit 5.4 cr
Theory of EC 1 M.TE202 2+1+1 credit 5.4 cr
Information and applie 3+0+3 S.CS101 credit 5.4 cr
Mongolian language, writing and : 0+4 A.SDM000 credit 5.4 cr
Fundamentals of Eco 2+2 credit 5.4
Elective Course -Sociology 2+2 credit 5.4 cr
37.8
3
technical english 0+4 credit 3.6 cr
Electrical machine I M.TE205 3+1+1 credit 5.4 cr
Electronics M.EC234 2+1+1 credit 5.4 cr
Theory of ECII M.TE203* 2+1+1 credit 5.4 cr
Electro- technical ma I . TE207 2+1 credit 3.6 cr
automation of the electric 2+2 credit 5.4 cr
Elective Course 3+1 credit 3.6 cr
Electrical measureme 1+1 M.AU205 credit 2.5 cr
36.0
4
Theory of Electrical Circuit III M.TE204 2+1 credit 3.6 cr
HVE M.TE208 2+2 credit 5.4 cr
Electrical machine II M.TE006 3+1+1 credit 5.4 cr
Electrical lighting M.TE011 2+1 credit 3.6 cr
Industrial internship I M.TE214 0+3 credit 1.9
Elective Courses 4+6 credit 13.2 cr
33.8
5
High Voltage testing and calibra M.TE206 2+1 credit 3.6 cr
Professional English M.EL110 0+4 credit 3.6 cr
engineering design -1 0+4+4 credit 5.4 cr
Electrical transmission and distribution network M.TE212 2+2 credit 5.4 cr
Power electronics, converting techn M.EC233 3+1 credit 5.4 cr
Elective Courses 6+6 credit 10.8 cr
34.2
6
Electrical supply of industrial enterprises M.TE316* 2+1+1 credit 5.4 cr
Equipment for electrical transm M.TE209 2+1 credit 3.6 cr
Electrical drive M.TE017 2+1+1 credit 5.4 cr
Diesel Power Plant M.TE013 3+1 credit 5.4 cr
project design of electrical supply 0+4 credit 3.6 cr
Industrial internship I 0+3 credit 2.6
29.8
7
Safety procedures with electrical equipment M.TE310 2+0 credit 3.6 cr
Electrical supply of u 2+1 M.TE018 credit 3.6 cr
Methods of electro technology 2+2 M.TE019 credit 5.4 cr
Automatic control of electrical syste 2+2 M.TE016 credit 5.4 cr
Bachelors diploma work project credit 10.8
27.8
Total
231.0
Basic course of undergraduate
Basic course of major
Advances course
Industrial internship
Bachelors diploma work project

According to Website of the Power Engineering School, there are no specific **objectives** and **learning outcomes (intended qualifications profile)** for the Master degree programme Electrical Power Supply different from those for the Bachelor's programme, which is why those are related here.

"Engineering Science has the following Course Learning Outcomes"

	Course Learning Outcomes
1	Demonstrate broad and coherent conceptual understanding of the mathematical, information science, physical and natural science disciplines that underpin engineering, as well as a sound knowledge of fundamental engineering principles and of the theory and practice of one of the disciplines of Chemical, Civil, Electrical and Electronics or Mechanical Engineering;
2	Analyze complex engineering problems and fluently apply appropriate engineering techniques and design processes
3	Develop creative problem solutions and conceive innovative approaches in developing and designing engineering systems;
4	Prepare high quality engineering documents and present a clear and coherent presentation of these to a range of technical and nontechnical audiences;
5	Acquire and evaluate research regarding new knowledge development within the engineering discipline and its social, cultural, environmental and legal context;
6	Exercise initiative, judgment, and autonomy in contributing as a member of an engineering team
7	Competently and confidently contribute to the development of society and the engineering profession, with a special emphasis on Northern Territory issues
8	Demonstrate a responsible, ethical and professional attitude regarding the role of engineers in society, including situations involving potentially adverse environmental and cultural impacts.
9	Work collaboratively to plan and execute project work or research to advance the scientific basis, technologies or practices within the engineering discipline broadly.

In its statement to the report, the MUST added the following programme-specific learning outcomes (Appendix 1):

"The Master's Program aims to provide students with the professional skills that will empower them: to recognize specialized electrical power supply engineering, advanced application of high voltage technology, electric vehicles, electric motor drive and other related topics; to plan and choose the most appropriate and relevant method used to solve complex problems of electrical engineering independently and systematically; to cooperate and contribute to inter-sectoral joint projects and programs; to have the ability to contribute to the process of innovation and innovation; to have the ability to prepare research articles and reports; to assess and evaluate the social impact of projects; and, to commit to the work ethic and fully meet the requirements of national, international and European Union universities (EUR-ACE Label 3) in terms of the level of higher education and technical education that can contribute to sustainability and social development."

The following **curriculum** is presented:

"ELECTRICAL POWER SUPPLY"
PROFESSIONAL MASTER'S DEGREE PROGRAMME SYLLABUS

This syllabus is followed from 2015 to 2016 academic

1 SEASON:			
	S.PS710	Methodology of research project	1
	S.CS701	Software for engineering simulations	2
	S.IP710	Patent Studies	1
	M.PS703	Research Methodology for Power Engineering	3
	M.TD715	Seminar for Research Work I	1
	Elective subjects		0
	Total credit		**8**

2 SEASON:			
	M.TD704	Automatic Control of Technological Processes	3
	M.TD705	Application of High Voltage Equipment	3
	M.TD716	Seminar for Research Work II	1
	Elective subjects		3
	Total credit		**10**

3 SEASON:			
	M.TD717	Seminar for Research Work III	1
	S.FL711	Final Examination of Foreign Language	1
	Elective subjects		6
	Total credit		**8**

4 SEASON:			
	M.TD730	Seminar for Research and theory	3
	M.TD792	Final Professional Examination	1
	Elective subjects		6
	Total credit		**10**

"ELECTRICAL POWER SUPPLY"
RESEARCH MASTER'S DEGREE PROGRAMME SYLLABUS

This syllabus is followed from 2015 to 2016 academic

1 SEASON:			
	S.PS710	Research Methodology	1
	S.CS710	Engineering Simulations	2
	S.IP710	Patent Studies	1
	M.PS703	Research Methodology for Power Energy	3
	M.TD715	Seminar for Research Project I	1
	Elective subjects		0
	Total credit		**8**

2 SEASON:			
	M.TD704	Automatic Control of Technological Processes	3
	M.TD705	Application of High Voltage Equipment	3
	M.TD716	Seminar for Research Project II	1
	Elective subjects		3
	Total credit		**10**

3 SEASON:			
	M.TD717	Seminar for Research Project III	1
	S.FL711	Final Examination of Foreign Language	1
	Elective subjects		6
	Total credit		**8**

4 SEASON:			
	M.TD746	Seminar for Research	3
	M.TD791	Master's Graduation Project	5
	Elective subjects		0
	Total credit		**8**