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Advanced Curriculum on Energy Efficient Buildings in Extreme Continental and Sunny Climate in Mongolia / CEBEC

WP3 QUALITY PLAN
Quality Assurance Report

Partners:

P1. LU	Lund University
P2. TalTech	Tallinn University of Technology
P3. MUST	Mongolian University of Science and Technology
P4. MULS	Mongolian University of Life Sciences
P5. GMIT	The German-Mongolian Institute for Resources and Technology

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PROJECT OVERVIEW

The project aims to address the critical issue of environmental pollution in Mongolia, primarily due to poor urban planning and a lack of thermal energy in a continental climate. It seeks to achieve this by enhancing the capabilities of Mongolian higher education institutions (HEIs) through knowledge transfer from European HEIs, focusing on the fields of environment and engineering. The ultimate goal is to contribute to the development of Mongolia by building the capacity of its HEIs to produce skilled professionals capable of addressing pollution problems.

Here are the key components of the project:

1. Develop/revise and enhance new Higher Education programs (Master and Bachelor)/existing courses on Energy Efficient Building and Renewable Energy.
2. Develop the relevant didactics methods, instructional documents and tools, including possibly digital teaching-learning tools/methods
3. Support faculty development and establish faculty cooperation and knowledge sharing network amongst the partner HEI's
4. Establish faculty/student exchange programs to support internationalization of the partner HEI's
5. Develop of laboratory facilities amongst the Partner universities
6. Develop training programs for engineers already working in the industry (building design, construction, and maintenance).

Therefore, this project is a collaborative effort between European and Mongolian higher education institutions to address the pressing issue of environmental pollution in Mongolia. By enhancing the capacity of Mongolian HEIs in the area of energy-efficient buildings and related environmental engineering, the project aims to contribute to the well-being of the Mongolian population and support the country's development in a sustainable and environmentally responsible manner.

QUALITY ASSURANCE PLAN AND AUDIT REPORT OF CEBEC

	Quality plan	Quality report
1.	Key quality assurance elements encompass academic quality management, program development, admissions, teaching, learning, and support processes. Quality is maintained through consistent assessment of academic performance and implementing necessary improvements.	Each partner university has its own quality assurance system, with specifics for MUST, for MULS, and for GMIT. These systems align with the Mongolian National Council for Education Accreditation (MNCEA), which oversees quality assurance in higher and technical-vocational education.
2.	The Quality Assurance Principles have been drawn up in compliance with the Standards and Guidelines for Quality Assurance in the Higher Education Area in Mongolia and legislation regulating academic activities at University.	Each partner university has quality assurance principles based on the goals of teaching, learning, and performance indicators outlined in the strategic plan. The plan's effectiveness is assessed periodically through implementation analysis.
3.	Quality assurance ensures satisfaction of both internal and external stakeholders regarding teaching quality, study organization, and performance at the university. Study programs are designed by considering labor market and societal needs, Higher Education Standards, national/international guidelines, professional standards, evaluator input, and stakeholder feedback. Collaborative development involves university units and other institutions, promoting interdisciplinary approaches, internationalization, and efficient resource utilization.	Both internal and external stakeholders, along with university units and other higher education institutions, participated in: • Analysing the necessity and content of developed courses (MC) in Energy Efficient Building (EEB) programs. • Assessing the demand for future EEB specialists. • Examining labour market, societal, national, and international guideline requirements. • Considering potential structures and principles for MCs in EEBD within Partner countries. • Reviewing current programs/courses to avoid duplication. Surveys and seminars were conducted to analyse future EEB specialist needs.

	Quality plan	Quality report
4.	Quality assurance is an ongoing process adaptable to changes and Mongolia's Higher Education Area demands. The study programme committee holds responsibility for maintaining content and organization quality at the degree level.	Quality assurance is designed as a continuous process with the following components: • Each master course has a study programme committee, responsible for maintaining quality. • Annual quality assurance meetings involving stakeholders. • Continuous evaluation of master courses through feedback questionnaires filled out by students after each course, with analysis of responses, addressing critical comments if necessary. • Ongoing evaluation of the master program via feedback questionnaires completed by students upon graduation, with analysis and necessary actions for critical feedback. • Industry input considered through feedback questionnaires after internships or practical experience.
5.	Management of the teaching and learning process shall be carried out in compliance with management of other core processes (research and development, provision of services to the society) of the university.	The teaching and learning process will integrate research, development, and societal services. Master thesis and internships will primarily draw from governmental, academic, or private/industry sectors.
6.	Graduation thesis requirements must be clear and accessible, with a focus on providing high-quality supervision.	Each university distinctly outlines graduation thesis requirements and assessment criteria.
7.	Legislation, forms, and online platforms linked to teaching and learning must remain current.	Each partner university maintains an updated web environment showcasing comprehensive information about teaching and learning.
8.	Study program and subject goals, along with learning outcomes, must be well-defined. Assessment criteria for learning outcomes should be clear and accessible, listed in program	The study program's goals and learning outcomes are distinctly stated in the course descriptions

	Quality plan	Quality report
	information. Study and subject organization should align with achieving learning outcomes. Current, goal-supportive work placement, developed with employer collaboration, is essential.	
9.	Student admissions must align with Education Policy goals and societal needs while considering university capacity. Trained personnel should organize admissions to ensure quality and align with university capabilities.	Each partner university implements a student admissions procedure to ensure selection of motivated and capable students using specific criteria. Trained staff manage the admissions process.
10.	Academic staff's research and teaching efforts should complement each other. Lecturers must possess necessary qualifications and teaching skills. External experts may contribute to teaching. Ongoing education, including teacher training, should be available for professional development.	During the CEBEC project, trainer courses were conducted in Tallinn. Presently, it's observed that: • Students can have external supervisors from outside the university. • Defence committees include external members from other universities or local industry. • Teaching staff consistently engage in research and maintain the necessary qualifications.
11.	Teaching should prioritize students and maintain a current standard using diverse and suitable methods. Modern digital technologies should supplement traditional instruction for an enhanced learning experience.	Course enrolment will range from 4 to 20 students to ensure a focused and manageable teaching approach. Student progress and learning will be supported via frequent interaction and feedback on the Virtual Learning Environment (VLE) by module tutors. Lab facilities will be equipped with necessary tools and updated experiment manuals, including procedures, maintenance schedules, and equipment details. Procurement aligns with the developed courses.
12.	An annual teaching and learning report will assess goal achievement from the Quality Plan. Continuing education outcomes will be evaluated in yearly reports. To plan future teaching, feedback from stakeholders and	Universities conduct continuous monitoring and improvement of academic programs through Annual Programme Monitoring (APM) and periodic reviews, ensuring program quality enhancement.

	Quality plan	Quality report
	internal/external evaluations will be considered. Institutions will have access to feedback survey results and improvement activity summaries. The feedback system will be developed with integrity and functionality principles, enhancing its implementation and functionality.	

REFERENCES

1. The quality assurance requirements and evaluation procedure by the Mongolian National Council for Education Accreditation for the higher education - http://mncea.edu.mn/introduction/
2. Law of Mongolia on higher education - https://www.legalinfo.mn/law/details/251 (in Mongolian) (unofficial translation) http://mncea.edu.mn/media/magadlan/content/2016/Huuli/Law_of_Mongolia_on_Higher_Education_amendment0823.pdf)
3. Quality Assurance Mechanisms in Mongolian Higher Education https://www.academia.edu/67151672/Quality_Assurance_Mechanisms_in_Mongolian_Higher_Education
4. Student Admission Procedure, Order of the Minister of Education, Culture, Science and Sports no. A/87 of 2016 and no. A/194 of 2018: https://www.legalinfo.mn/annex/details/5815?lawid=9113 (In Mongolian)
5. Vision 2050 Long-Term Development Goal of Mongolia: https://www.legalinfo.mn/law/details/15406 (In Mongolian)

ANNUAL QUALITY AUDIT

The shift to virtual meetings via platforms like Zoom, prompted by COVID-19 restrictions, introduced several challenges that had potentially impacted on the quality of Erasmus+ projects.

There were some possible quality issues associated with virtual meetings:
- lack of face-to-face interaction hindered effective communication,
- some misunderstandings due to non-verbal cues being limited in virtual settings,
- participants from different regions faced challenges with time zone variations,
- unreliable internet connections lead to disruptions in meetings,
- virtual fatigue lead to reduced engagement during meetings,
- building personal connections and relationships was challenging in a virtual space,
- virtual meetings made it challenging to ensure inclusivity in decision-making,
- assessing project progress and milestones was more challenging in a virtual setting,
- the lack of physical presence impacted the ability to observe and address potential issues promptly.

Workplan for project year 1

WORKPLAN for project year 1

Activities		Total duration (number of weeks)	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
Ref.nr/ Sub-ref nr	Title													
1.1	Needs of higher education on EEB and RE	3= 7X	1= 1X	1= 1X	1= 1X	1X	1X	2X						
1.2	Suggestions for higher education programs on EEB	2= 8X				1= 1X	1X	2X	2X	1= 2X				
1.3	Language training	8X				1X	1X	1X	1X		1X	1X	1X	1X
2.1	Proposed new Higher Education Programs, courses and equipment for laboratory and teaching facilities	6= 24X						1= 4X	1= 4X		1= 4X	1= 4X	1= 4X	1= 4X
2.2	Approved course materials	4= 5X					1= 2X		1= 1X		1= 1X		1= 1X	
2.3	Developed laboratory facilities	11= 16X									2= 4X	3= 4X	3= 4X	3= 4X
3.1	An elaborated quality assurance plan	7= 2X	2= 1X	1=	1=	1=	1=	1= 1X						
3.2	Quality assurance report	6= 8X											2= 4X	4= 4X

In the first year of our Erasmus+ project, which centers on enhancing higher education in Mongolia with a focus on energy-efficient buildings and renewable energy, our primary goal was to gather in-depth insights into the specific needs of Mongolia's higher education sector. Collaboratively, we designed and distributed a questionnaire among project partners and relevant companies to identify key challenges, requirements, and potential areas for development in Mongolian higher education.

I am delighted to report that this task was successfully completed within the allocated timeframe, resulting in a comprehensive and insightful report. The cooperative efforts of all partners ensured the smooth progression of this foundational phase, establishing a positive trajectory for the subsequent years of the project.

Workplan for project year 2

WORKPLAN for project year 2

Activities		Total duration (number of weeks)	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
Ref.nr/ Sub-ref nr	Title													
2.2	Approved course materials	8= 23X	1= 2X	2X	1= 2X	2X	1= 2X	2X	1= 2X		1= 2X	2X	1= 2X	2= 3X
2.3	Developed laboratory facilities	9= 21X	2= 4X	2= 4X	2X	2X	2X		1= 2X		1= 1X		2= 2X	1= 2X
2.4	Approved new higher education programs on EEB and RE (ongoing courses)	2= 16X									1= 4X	1= 4X	4X	4X
2.5	Collaboration with EU universities (training courses for staff)	6= 12X	2= 4X	2= 4X	2= 4X									
3.2	Quality assurance report	6= 8X											2= 4X	4= 4X
4.1	Web-site	6= 8X	1=		1=		1=	4X	1= 1X	1X	1= 1X		1= 1X	
4.2	Dissemination information days	2= 6X						1= 2X	1= 4X					
5.2	Follow up of activities during project time	17= 4X	1= 1X	1=	1=	1=	4=	4= 1X	1=		1=	1=	2= 2X	1=

In the second year of our Erasmus+ project, the primary focus shifted towards the development of comprehensive courses, encompassing key aspects such as structure, admission procedures, course content, and graduation requirements. A significant milestone during this phase was the development of experimental tools, a crucial element in advancing our project's objectives. This task was accomplished through close collaboration with our EU partners, leveraging their expertise and support. The collaborative effort not only facilitated the creation of well-structured courses but also ensured that the experimental tools were meticulously designed and aligned with the project's overarching goals. The collaborative efforts improved the quality and applicability of the courses, signifying a noteworthy progress in the fields of energy-efficient buildings and renewable energy. Regrettably, the implementation of training courses for staff became unfeasible due to the prevailing COVID-19 restrictions. The global pandemic and associated safety measures, including lockdowns and social distancing guidelines, hindered our ability to conduct in-person training sessions as originally planned. Most affected were the elements in the project that were linked to laboratory equipment, laboratory elements in developed courses as well as information meetings and workshops in order to disseminate information about the new courses and educations.

Request for extension of project time was applied and plan for completion of the project was introduced. The proposed revised work plan for year 3 and year 4 were as follows.

The focus of second half in year 3 will be:

- Get equipment in place in and establish the new laboratories at each partner university
- Continue the process to get the new and updated courses approved at each partner university.
- Training of staff.
- Information to students and society.

Revised work plan year 3

Ref.nr.	Activity	Total weeks	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
2.2	Approved course materials	6= 11X	1= 2X	2X	1= 2X	1X	1X			1= 1X		1= 2X	1= 2X	1= 2X
2.3	Developed laboratory facilities	5= 9X	1= 1X			1= 1X				1X	1= 2X	1= 2X	1= 2X	
2.4	Approved new higher education programs on EEB and RE												1= 4X	1= 4X
2.5	Collaboration with EU universities (training staff)	4= 12X		1= 2X		1= 2X							1= 4X	1= 4X
3.2	Quality assurance report	4= 8X											2= 4X	2= 4X
4.1	Web-site	7= 8X	1=		1=		1=		1= 2X		1= 2X		1= 2X	1= 2X
4.2	Dissemination information days	1= 2X										1= 2X		
5.2	Follow up of activities during project		1= 1X		1=		1=	2= 1X			1=		1= 1X	

The most critical challenge faced during our project was the procurement and delivery of some laboratory equipment. Initially, the lack of interest from companies to bid on the required equipment posed a significant hurdle. Subsequently, the situation exacerbated due to the unprecedented impact of the COVID-19 pandemic, leading to closed borders and logistical disruptions. These complications resulted in the equipment being stuck at customs, further delaying the procurement process. Navigating these multifaceted issues demanded a strategic and adaptive approach to ensure the successful procurement and delivery of the essential laboratory equipment. Despite these challenges, our commitment to overcoming obstacles has been unwavering, reflecting our dedication to the successful realization of our Erasmus+ project goals.

In the third year of our Erasmus+ project, we successfully overcame previous challenges, making it possible to arrange both staff training sessions and student study visits. Overcoming the constraints imposed by the COVID-19 pandemic and associated restrictions, we were able to create opportunities for professional development among staff. Additionally, we facilitated enriching study visits for students, providing them with valuable practical insights and exposure to real-world applications in the field of energy-efficient buildings and renewable energy. This achievement signifies not only the resilience of our project but also the adaptability and determination of our team to deliver a comprehensive and impactful Erasmus+ experience, even in the face of unprecedented global challenges.

The focus of year 4 will be:

- Continue to establish the new laboratories at each partner university
- Synchronize the laboratory parts into the new and upgraded courses.
- Develop lab instructions and textbooks.
- Finalize the process to get the new and updated courses approved at each partner university.
- Information to students and society.
- Final report of the project.

Revised work plan year 4

Ref.nr.	Activity	Total weeks	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
2.2	Approved course materials	3= 7X	1= 2X		1= 2X		1= 2X		1X					
2.3	Developed laboratory facilities	3= 15X	1= 2X	1= 2X	2X	2X	2X		2X	1= 2X	1X			
2.4	Approved new higher education programs on EEB and RE	2= 24X	2X		1= 4X	4X		4X	4X		1= 4X	4X		
2.5	Collaboration with EU universities (training staff)	4= 8X	2= 4X	2= 4X										
2.5	Collaboration with EU universities (training students)	5= 12X								2= 4X	2= 4X	1= 4X		
3.2	Quality assurance report	6= 8X											2= 4X	4= 4X
4.1	Web-site	5= 4X	1=		1=		1=	2X			1= 1X		1= 1X	
4.2	Dissemination information days	1= 4X					1= 2X	1= 4X						
5.2	Follow up of activities during project	18= 8X	1= 1X		1=		1=	2= 1X			1=	4= 2X	4= 2X	4= 2X

The fourth year of our Erasmus+ project marked a significant turning point, offering the opportunity to successfully conclude the equipment procurement process. With the labs fully equipped and operational, students actively utilized these resources in their studies. The newly developed courses seamlessly integrated into curriculums and were well-received by students, evident in the positive feedback and high evaluations received. Beyond the academic setting, we extended the impact of our labs and courses by introducing them to practicing engineers. Short-term courses were conducted for engineers, providing valuable insights and practical knowledge. The labs, in particular, garnered admiration from engineers and companies, who found them exceptionally practical and beneficial for educating company staff. This successful integration and positive reception underscore the impactful outcomes achieved during the fourth year, further solidifying the success of our Erasmus+ project.

In conclusion, extending the project timeline by one year was a decision aimed at navigating the challenges posed by the ongoing pandemic, ensuring the success and quality of the Erasmus+ project, and maintaining alignment with program requirements. This approach underscores the commitment to overcoming obstacles and delivering meaningful outcomes despite the unprecedented circumstances faced by project stakeholders.