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Quality Management Plan

Project “Euro-Mongolian Cooperation for Modernisation of Engineering Education”

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Definitions

The following are the meanings of terms, abbreviations and acronyms used in this document.

Term	Meaning
mClouds	Micro-Electronics Clouds
QMP	Quality Management Plan
QCCC	Quality Control Criteria
QCCA	Quality Control Activities
QAC	Quality Assurance Criteria
QAA	Quality Assurance Activities
QMT	Quality Management Tools
HE	Higher Education
OER	Open Educational Resources
CCL	Creative Commons License
IER	Intermediate Evaluation Report
FER	Final Evaluation Report
MoU	Memorandum of Understanding
DBRD	Design-Based Research and Development
PC	Project' Coordinator
PMB	Project's Management Board
SWOT	Strengths, Weaknesses, Opportunities and Threats
GCM	Group Concept Mapping

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1. Quality Management Approach

Quality management includes planned and systematic processes, activities and outcomes to build confidence among project's partners that they do the right things at the right time and in the right way.

More specifically, the purpose for managing quality is to validate that the project deliverables are completed with an acceptable level of quality. Quality management assures the quality of the project deliverables and the quality of the processes used to manage and create the deliverables.

This document follows a template recommended by the European Committee for Standardisation (CEN) and was applied successfully in European projects on using information and communication technologies for education and training purposes. The plan considers also the recommendations of Spector and Yen for educational technology program and project evaluation.

The quality management plan identifies the following key components:

Objects of quality review	Quality Measure	Quality Evaluation Methods
Project Deliverables	Deliverable Quality Criteria	Quality Control Activities
Project Processes	Process Quality Criteria Stakeholder Expectations	Quality Assurance Activities

The following is a brief explanation of each of the components of the quality management plan.

Project Deliverables and Processes	The key project deliverables and processes subject to quality review.
Deliverable Quality Criteria	The quality criteria that are the "measures" used to determine a successful outcome for a deliverable. Deliverables are evaluated against these criteria before they are formally approved.
Process Quality Criteria and Stakeholder Expectations	The quality criteria that are the "measures" used to determine if project work processes are being followed. Stakeholder expectations describe when a project process is effective as defined by the project stakeholders.
Quality Control Activities	The quality control activities that monitor and verify that the project deliverables meet defined quality criteria.
Quality Assurance Activities	The quality assurance activities that monitor and verify that the processes used to manage and create the deliverables are followed and are effective.

2. Quality Management Objectives

The following are the project's quality objectives that reflect the overall intentions to be applied with regard to quality throughout the project.

Analysis of educational needs in electrical engineering through problem and job analysis, meeting the requirement of the enterprises in the sector and definition of the necessary knowledge, skills and competencies of engineers in the sector in terms of learning outcomes.

Design of syllabi and course content and assessment for compulsory and elective courses in electrical engineering to meet the user needs.

Adaptation/development of e-learning courses with modular structure for the innovated curricula of partner universities and establishment of a platform and procedures for knowledge sharing inside Mongolian and European academy and students.

Performing a pilot test and starting the implementation of the joint modules/courses delivery during the last project year.

3. Project Quality Control

The focus of quality control is on the deliverables of the project. Quality control monitors project deliverables to verify that the deliverables are of acceptable quality and are complete and correct.

The following table identifies:

- The major deliverables of the project that will be tested for satisfactory quality level.
- The quality criteria established for the project deliverable.
- The quality control activities that will be executed to monitor the quality of the deliverables.
- How often or when the quality control activity will be performed.

Project Deliverable	Deliverable Quality Criteria	Quality Control Activity	Time interval
Needs analysis report	<p>QCC 1 Comprehensiveness (sampling including different <i>target groups</i> – teachers, students, trainers; different <i>data collection methods</i> e.g. survey through questionnaire, interview, technical check-lists for cloud infrastructure; <i>review documentation</i>; <i>identify trends</i>; different <i>data analysis methods</i> both quantitative and qualitative)</p> <p>QCC 2. Organisation/ structure</p> <p>QCC 3. Clarity</p>	<p>Provide brief description of proposed courses</p> <p>Develop measurement instruments for the Needs Analysis (interviews, questionnaires, checklists)</p> <p>Peer review the measurement instruments for the Needs Analysis (interviews, questionnaires, checklists)</p> <p>Peer reviewing the deliverable</p>	M 1 – M 5

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Definition of learning outcomes	<p>QCC 4. Comprehensiveness (correspondence with the definitions of knowledge, skills and competences of EC and the template for competence matrix)</p> <p>QCC 5. Learning outcomes defined using action verbs reflecting (a) the reference job situation and (b) taxonomy levels</p> <p>QCC 6. Organisation/ structure</p> <p>QCC 7. Clarity</p> <p>QCC 8. Elaboration to a conference paper</p>	<p>Critical reflection on the results of the needs analysis study</p> <p>Organising a short internal workshop on defining learning outcomes and structuring learning content</p> <p>Peer reviewing the conference/journal paper</p> <p>Peer review the deliverable</p>	M 5 – M 9
Syllabi and course content	<p>QCC 9. Development of 22 syllabi and contents courses (both for domain specific and domain-independent competences)</p> <p>QCC 10. Correspondence between the needs analysis and content and structure of the courses</p> <p>QCC 11. Correspondence between learning outcomes, teaching strategy and assessment</p> <p>QCC 12. Accreditation of courses/curricula</p>	<p>Peer reviewing of the courses' content</p> <p>Preparing and applying valid and reliable performance tests</p> <p>Conducting necessary steps for accreditation of new courses</p> <p>Peer review the deliverable</p>	M 9 – M 15
e-learning materials	<p>QCC 13. Implement a common e-learning environment</p> <p>QCC 14. Usability of e-learning environment</p> <p>QCC 15. Well-structured instruction and learning activities for course developers training</p> <p>QCC 16. Creating at least 22 open OER</p> <p>QCC 16. Organisation/ structure</p> <p>QCC 17. Clarity</p>	<p>Preparing questionnaire for usability evaluation</p> <p>Peer review of usability questionnaire</p> <p>Carry out usability test of the e-learning environment</p> <p>Training of courses developers on development of e-learning materials</p> <p>Pilot implementation of the courses as OER</p> <p>Peer review of e-learning courses</p>	M 9 – M 20
Training seminars for teachers and, system officers for the use of the e-learning environment	<p>QCC 18. Clearly formulated operational objectives of the seminar</p> <p>QCC 19. Well-structured instruction and learning activities</p> <p>QCC 20. Satisfaction of the participants</p>	<p>Develop a common design blueprint of the seminars</p> <p>Peer-reviewing the design blueprint</p>	M 21 – M 28

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Pilot test	<p>QCC 21. Pilot test script (detailed description of all activities included)</p> <p>QCC 22. At least 5 students per institution involved (95 % of all issues detected)</p> <p>QCC 23. Comprehensiveness of the report</p> <p>QCC 24. Good organisation/ structure of the report</p>	<p>Check good practices for writing pilot test scripts</p> <p>Provide incentive for participation in the pilot (if possible)</p> <p>Peer reviewing the report</p> <p>Peer reviewing the conference/journal paper</p>	M 21 – M 28
Plan for the field trial	<p>QCC 25. Comprehensiveness (research design, participants, measurement instruments)</p> <p>QCC 26. Partners' consensus on the plan</p> <p>QCC 27. Involving at least 25 students from each Mongolian university in the field trial</p>	<p>Make a draft plan</p> <p>Plan open for a discussion by all partners (peer reviewing the plan)</p> <p>Make sure all partners involved in the WP 6 are committed to successfully executing the evaluation plan</p>	M 28 – M 36
Quality Management Plan (QMP)	<p>QCC 28. Comprehensiveness (scope, context, quality control criteria (QCCC), quality control activities (QCCA), quality assurance criteria (QAC), quality assurance activities (QAA; quality management tools - QMT).</p> <p>QCC 29. Partners' agreement on QMP</p> <p>QCC 30. Partners' commitments on execution of QMP</p>	<p>Check QMP good practices</p> <p>Use recommended templates for describing the quality control and quality assurance criteria and activities</p> <p>Open the plan for a discussion by project's partners</p> <p>Implement the suggestions made</p>	M 1 - M 12
Final Evaluation Report (FER)	<p>QCC 31. Comprehensiveness (scope, context, overall evaluation design, evaluation activities, measurement instruments, final results)</p> <p>QCC 32. Critical review to meet recommendations</p>	<p>Integrate the results from all evaluation activities</p> <p>Cooperate with leaders of the WPs carrying out evaluation activities</p> <p>Open the report for discussion</p>	M 1 – M 36
Project Web Sites	<p>QCC 33. Transparency (clear overview of all activities, public deliverables, templates)</p> <p>QCC 34. Reaching out different target groups (project partners, electronics industry, HE institutions, Erasmus+ projects consortiums)</p> <p>QCC 35. Used various media (text, audio video)</p>	<p>Use previous experience from other EU projects (i.e. selecting the technical platform and structure information in such a way as to be useful and easy to use).</p> <p>Pilot the web site prototypes with potential users</p> <p>Constantly updating the partners' web sites</p>	M 1 – M 36

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	(partners web sites) QCC 36. Usability (useful and easy to use) QCC 37. Visibility of the web sites (information about the project on the top of search engines suggestions, if possible)		
Project Leaflet	QCC 38. Brief, informative and appealing for different target groups QCC 39. Written in all project's partners languages	Use previous experience from other EU projects Peer reviewing the draft Translate the leaflet in all project's partners languages	M 24 – M 36
Publications	QCC 40. Write and present conference papers (20% acceptance rate) QCC 41. Write journal articles QCC 42. Organise or participate in workshops within the framework of conferences QCC 43. Present conference posters	Cooperative writing of conference and journal papers Conference reviewers' assessment of the papers quality Journal reviewers' assessment of the manuscripts quality	M 1 - M 36
Open Dissemination Workshop	QCC 44. Reaching out different target groups QCC 45. Representativeness of all partners' institutions	Prepare the workshop in detail Involved all partners' institutions in the preparation of the workshop	M 28 – M 36
Social media channels	QCC 46. Use different social media channels (LinkedIn, Facebook, Youtube, Twitter) QCC 47. High number visitors of the project's social media sites	Follow good practices and tips for preparing good social media pages Use social media monitoring tools	M 1 – M 36
Exploitation plan	QCC 48. Comprehensiveness (includes all indicators for impact namely: (a) at least 100 students involved in the field trial; (b) at least 25 certified students per course; (c) minimum 50% of the participants in the field trial with positive attitudes to the courses; (d) minimum 50% of the participants in the field trial believing that the courses will provide them better opportunities for employment; (e) minimum 50% of the answers in the final questionnaire from the SMEs representatives positive to the extent to which the course address the needs of enterprises;	Make a draft of the Exploitation Plan Share the draft for contribution by project's partners	M 21 – M 28

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	(f) at least 16 courses in the multidisciplinary area of microelectronics design and microelectronics technologies)		
Exploitation report	<p>QCC 49. Comprehensiveness (addresses all impact indicators as described in the Exploitation Plan (see QCC 48)</p> <p>QCC 50. Partnership with enterprises</p> <p>QCC 51. Multiplication of the project effect on education of other engineering disciplines</p>	<p>Make a draft of the Exploitation report</p> <p>Share the draft for contribution by project's partners.</p> <p>Peer review of the exploitation report</p>	M 28 – M 36
Exploitation agreement	<p>QCC 52. Comprehensiveness (e.g. updating the courses as OERs; conducting the delivery of innovated curricula after the project end, maintaining the project web site after the project's life; strengthening links to industry; collaborating at MSc level – exchanging teachers and students)</p> <p>QCC 53. Commitment of all partners (the agreement signed by all)</p>	<p>Prepare an exploitation agreement draft with a plan for sustainability of project results</p> <p>Share the exploitation agreement draft for contribution by project's partners</p>	M 33 – M 36

4. Project Quality Assurance

The focus of quality assurance is on the processes used in the project. Quality assurance ensures that project processes are used effectively to produce quality project deliverables.

The following table identifies:

- The project processes subject to quality assurance.
- The quality criteria and stakeholder expectations¹ for that process.
- The quality assurance activity – such as a quality audit or reviews - that will be executed to monitor that project processes are properly followed.

Project Process	Process Quality Criteria	Quality Assurance Activity
Design-Based Research and Development (DBRD) (a) Curriculum development (b) Instructional Design (c) Software design	QAC1. Progressive, spiral refinement through a cyclical prototype development QAC 2. Stakeholders involvement in the design and evaluation of the project's products QAC 3. European reference frameworks such as Qualifications of the European Higher Education Area and Standards and Guidelines for Quality Assurance in the European Higher Education Area; QAC 4. Recent development in the domain of curriculum development for high quality QAC 5. Software engineering methodologies including qualitative standards such as (a) ISO/IEC 9126-1 and Software Quality Assurance within Capability Maturity Model Integration); and (d) PRINCE 2 (PR ojects IN C ontrolled E nvironments) QAC 6. Evaluation considered not a single phase but cutting across other phases of the process	Supervision and review by WPs leaders Review by the working groups Supervision by the WPs 7 and 8 leader Audit by the project's coordinator (PC) Audit by the Project's Management Board (PMB) Audit by European Commission project reviewers Audit by European Commission officers
Reviewing, monitoring and controlling the project's activities	QAC 7. Tasks assigned QAC 8. Deliverables deadlines QAC 9. Communication of the results from reviewing, monitoring and controlling QAC 10. Recommended measures for improvement	Supervision by the Project's Coordinator (PC) Audit by the Project's Management Board (PMB) Audit by the European Commission project's reviewers Audit by the European Commission

¹ The project's partners expectations and concerns will be determined by carrying out a GCM study

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		officers
Coordination of the project's activities	<p>QAC 11. Tasks assigned</p> <p>QAC 12. Deliverables deadlines</p> <p>QAC 13. Communication of the results from reviewing, monitoring and controlling</p> <p>QAC 14. Recommended measures for improvement</p>	<p>Supervision by the Project's Coordinator</p> <p>Audit by the Project's Management Board (PMB)</p> <p>Audit by European Commission project reviewers</p> <p>Audit by European Commission officers</p>
Different levels of decision-making.	<p>QAC 15. WP leader, working groups, Audit by the Project's Management Board (PMB), the Project Coordinator, European Commission project's reviewers, European Commission officers (in that ascending order).</p>	<p>Supervision and Review by WPs leaders</p> <p>Review by the working groups</p> <p>Audit by the Project' Coordinator (PC)</p> <p>Audit by the Project's Management Board (PMB)</p> <p>Audit by European Commission project reviewers</p> <p>Audit by European Commission officers</p>
Developing a Conflict Resolution Procedure	<p>QAC 16. Transparency</p> <p>QAC 17. Fairness</p> <p>QAC 18. Instrumental (actionable)</p>	<p>Supervision by the Project' Coordinator (PC)</p> <p>Peer reviews by the project's partners</p> <p>Audit by the Project's Steering Committee (PSC)</p> <p>Audit by European Commission project reviewers</p> <p>Audit by European Commission officers</p>
Report on the process and outcomes of the projects	<p>QAC 19. Comprehensiveness (content, management, finance)</p> <p>QAC 20. Transparency</p>	<p>Supervision by the Project' Coordinator (PC)</p> <p>Peer review by the project partners</p> <p>Audit by the Project's Management Board (PMB)</p> <p>Audit by European Commission project reviewers</p> <p>Audit by European Commission officers</p>

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Project's meetings	QAC 22. Agenda shared in advanced QAC 23. A good preparation for the meeting by everyone QAC 24. Constructive discussion QAC 25. A list with tasks 'to-do' and responsibility	Supervision by the Project Coordinator Audit by European Commission project's reviewers Audit by European Commission officers
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5. Quality Tools

The following lists the tools to be used to support quality management implementation and the purpose or use of the tool.

Tool Name	Tool Purpose/Use
Quality Management Template	Supports writing the EU-Mong Quality Management Plan
EU-Mong project's web site	Informs about activities and outcomes of the EU-Mong Quality Management Plan
Group Concept Mapping methodology	Pictures the expectations and concerns of the project's partners about quality aspects of the EU-Mong Quality Management Plan
Communication tools (Flash meeting, Skype Google Hangouts)	Facilitates communication between project's partners on quality control and quality assurance issues.

6. Quality Control and Assurance Problem Reporting Plan

The following logs will be used to itemize, document and track to closure items reported through quality management activities.

Quality Control Log

Exception ID Number	Review Date	Deliverable Reviewed	Findings	Resolution	Resolution Date

Quality Assurance Log

Exception ID Number	Review Date	Process Reviewed	Findings	Resolution	Resolution Date