



WP4 – Quality Plan for the Implementation of the Project

Quality Control and Monitoring Plan

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ERASMUS+ CBHE PROJECT

Curriculum Development of Master's Degree Program in Industrial Engineering for Thailand Sustainable Smart Industry

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REVISION SHEET

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1 Executive Summary

In the scope of the MSIE 4.0 project, and particularly according to what is foreseen in the WP4 Project assurance and efficiency, the consortium decided that it is to the benefit of the satisfaction of its quality objectives to prepare a Quality Control and Monitoring Plan (QCMP), to ensure the production of concrete and high-quality results in line with the project plans.

In this context, the main purpose of the QCMP is to define:

- the evaluation criteria and evaluation mechanisms for internal and external QCM as well as the number and structure of QCM reports
- the list of the methods that will be used to ensure the required level of quality, project quality policies and procedures, project standards/checklists for reviews, project metrics to measure deliverable or process quality and project quality goal.

2 Introduction

Quality control and monitoring is essential to ensure that project objectives and results defined in the project proposal can be achieved and delivered within the project implementation period at a high-quality level. Therefore, it is of utmost importance for the quality of the project as a whole, to set up quality control mechanisms and procedures to be followed throughout the whole project implementation and by all partners.

The WP leader, as defined in the project proposal, University POLITEHNICA of Bucharest (UPB), is responsible for outlining the first draft of the QCMP in cooperation with the Co-Work Package Leader Prince of Songkla University (PSU). After consultation with the Project Coordinator and other partners responsible for specific deliverables, additional procedures will be defined in the revised version of the QCMP.

The QCMP:

- defines the quality expectations for project deliverables (outcomes and outputs)
- defines the internal monitoring and quality management
- defines the content, format, review and approval process of the project deliverables;
- defines the responsibilities of the project partners regarding those deliverables.
- identifies all the different tools and means to be applied throughout the project duration
- provides guidelines for adequate implementation and thereby assure that certain quality standards in the performance of our tasks are fulfilled.
- define the quality requirements that must be obtained throughout the project lifecycle, those that the deliverables, actions and results must conform to.

The QCMP constitutes a working document which can be adapted and revised throughout the implementation of the project upon agreement by all parties. This may apply in cases such as where e.g. the procedures laid out in the QCMP turn out to be not feasible for their purpose.

3 Quality Control Monitoring Board (QCMB)

In order to achieve the quality objectives of the project, a Quality Control and Monitoring Board (QCMB) will be established during the Kick-off Meeting, which will consist of persons from consortium universities: 6 from the Kingdom of Thailand (PSU, AIT, CMU, KMUTNB, TU, KKU) and 3 from UE (UPB, Uminho, CUT). UPB will chair the QCMB as WP4 Leader.

The duty of the QCMB is to monitor and evaluate the progress of the project and to ensure that all its activities are carried out properly according to European Standards and Guidelines for Quality Assurance and ensuring proper execution of the project to achieve its objective. The QCMB will design a proper evaluation process and be responsible for creating a set of indicators.

As such, the QCMB, through the QCMP, will define the following milestones:

- reports from partners on the quality of the implementation of work packages.
- each 2 months, QCM reports of the QCMB based on individual reports by consortium members who are responsible for internal monitoring and quality control of the implementation status of tangible results including recommendations and corrective measures related to the strategic project achievements and overall management of the grant.
- bi-annual QCM reports with achieved/planned outcomes, based on evaluation of partner QCM reports. The QCMB will also report to the PMB the outcome of the evaluation, the identification of deficiencies, and delays so that appropriate countermeasures can be taken.
- an impact report, as a part of final project report, on the broader impact and the relevance of the project in the national context towards the needs of major stakeholders, adopted at the end of the project life by the consortium members.

The QCMB will monitor the project at different points using different types of evaluation practices and tools, such as report analyses, surveys, questionnaires, checklists and QCM visits, devised to assess on an ongoing basis project relevance, efficiency and impact, to measure progress throughout its life cycle, to determine if the project responds to main target groups' needs, to measure the level of satisfaction of beneficiaries of project activities, and to evaluate unexpected results and control all processes. QCM activities will include evaluation of offered new courses, improved teaching and lab facilities, training of teaching staff, student feedback, achievement of objectives, and impact of the project at the single universities and at national level.

The monitoring and evaluation procedures will monitor the project execution through monitoring reports which will be edited every 6 months. Additional to the two annual internal QCM reports elaborated by the QCMB, there will be two external reports delivered by sub-contracted external expert.

4 Project Quality Assurance

4.1 Quality of the project processes

The aim of the evaluation is to support project coordinator and WP leaders in ensuring highest quality of project outputs, activities and results, as well as in improving project performance. It should support decision making by delivering necessary evidence to introduce any significant changes, should they be needed. The evaluation will increase the quality of project activities and outputs and measures to what extent they reach the short-term project goals and results set in the application.

The quality of the project processes evaluation will be done through self-evaluation of the consortium by the project partners themselves through persons assigned by the QCMB, using the Project Quality Assessment Form QF-PQA. The evaluation result, must be sent to QCMB two weeks prior to the 6 months report. For the evaluation of the project as a whole, a set of indicators have been established, which can be measured on a scale from 1 to 5 or Non-applicable, where 5 is very positive and 1 is very negative. The indicators are generally relevant to the quality of the project management, coordination, structure, support mechanisms, content, and resources.

The evaluation is primarily done by each partner, who must answer each question with an assessment of the performance of the consortium. The WP4 Leader will collect all the answers from the partners and integrate them into a report, using the technique and the approval limit described in 4.2.1.3, which will reflect the views of the consortium on its progress. In case the WP4 Leader, upon processing the results, finds that one or more are below the expected performance, notifies the PC in order to set forth problem-solving procedures.

The evaluation will be performed twice a year, every year, during the lifecycle of the project.

Besides this evaluation, each WPL takes also into consideration the indicators and respective objectives that are described in the Logical Framework Matrix (LFM) as well as the qualitative and quantitative indicators listed in the chapter “Overview of short and long-term impact indicators” of the approved proposal. The result of this evaluation that is maintained by the WPL according to QF-IER – Indicators Evaluation Results.

4.2 Quality of deliverables

The deliverables of MSIE 4.0 project consist of the results of the 6 Work Packages: 1 – Gap Analysis, 2- Curriculum Development I: Curriculum Structure and Courses, 3 – Curriculum Development II: Modernization of Teaching Methods and Tools for Msc Programmes, 4 – Quality Plan for the implementation of the Project, 5 – Dissemination and Exploitation of Project Results, 6 – Project Management. Each WP may contain one or more subtasks.

The following table presents the project's work package leaders:

Work Package No.	Type of Work Package	Title of Work Package	WP Leader
WP1	Preparation	Gap Analysis	P2-CMU (Activities in Thailand), P8-UMinho (Activities in Europe)
WP2	Development	Curriculum Development I: Curriculum Structure And Courses	P9-CUT (Leader) P1-AIT (Co-Leader)
WP3	Development	Curriculum Development II: Modernisation of Teaching Methods and Tools for Msc Programmes	P1-AIT (Leader) P8-UMinho (Co-Leader)
WP4	Quality Plan	Quality Plan for The Implementation of The Project	P7-UPB (Leader) P6-PSU (Co-Leader)
WP5	Dissemination & Exploitation	Dissemination And Exploitation Of Project Results	P5-KKU (Leader) P7-UPB (Co-Leader)
WP6	Management	Project Management	P1-AIT

In order to assure a high level of quality regarding the results of the project, each deliverable is evaluated for its completion in due time as well as for its completeness, clarity and comprehensiveness.

Regarding the on-time completion and the monitoring of the WPs, the PC uses the QF-WPM: Work packages monitoring form.

Having in mind the structure and objectives of the MAIN project, the main deliverables to be produced during its lifetime are:

- for WP1:
 - Gap Analysis working plan (at the end of M1)
 - Comprehensive analysis of MSIE curricula in Thailand and in EU partner countries (M6)



- Assessment of learning and teaching tools and methods in Thailand and in EU partner countries (M6)
- Analysis of needs of industry and students (M9)
- Gaps between the needs and graduates' competences (M10)
- Competitive factors for the curriculum (M11)
- Recommendations for specifications and areas of specialization for the curriculum (M12)
- for WP2:
 - A modernized curriculum for Master's degree in IE (M30)
 - Syllabuses for all courses in the curriculum (M18)
 - Pilot teaching in modernized MSc at partner universities (M21-M29)
 - Assessment of pilot test of the key courses and improved courses (M30)
 - Accreditation of the curriculum submitted (M31)
- for WP3:
 - Teaching materials for instructors (M29)
 - Learning materials for students (M29)
 - A platform for online learning (M11)
 - Trained Instructors and Staffs on New Teaching Tools and Methods
 - Online Learning Materials (M29)
 - Installed Hardware and Software (M24)
 - Laboratory equipped with online remote access from partner locations (M29)
- for WP4:
 - Quality control & monitoring system (M4)
 - Internal quality control & monitoring conducted (on a regular basis until the end of the project)
 - External quality control & monitoring (M18 and M35)
 - External financial audit (M36)
- for WP5:
 - A Dissemination, Exploitation and Sustainable Plan (M3)
 - A project website (M2)
 - Dissemination materials (M6)
 - Publications in professional journals, newspapers, magazines, brochures and social media (every six months after M18)
 - Short-term courses in the field of Industrial Engineering for professionals (offered in the third year)
 - Dissemination events organized (after the completions of key activities for preparation and development phases and more often during the last six months)
 - A dissemination-sustainability conference (M35)
 - Sustainable network between project partners & IE enterprise (M35)
- for WP6:
 - Project Management & Communication Plan (M1)
 - Kick-off & regular consortium meetings (M1, M6, M12, M18, M24, M30, and M35)
 - Documents on daily project administration and coordination (between the meetings)
 - Project reports (every six months)
 - Documentation for mid-term reporting and project closing (M18 and M36)

General expectations for all deliverables regarding their quality are their relevance to the achievement of main and specific objectives of the project as well as the compliance with the time framework set in the main project Application Form.

Specific requirements are described in more details in the following sub-sections.

4.2.1 Quality evaluation

Depending on the nature of the activity implemented, for each WP and its subtask(s), the evaluation can be of two kinds: a. Internal or b. external. "Internal" means that responsible for the review of the document is one/ more than one of the members of the consortium and associated partners, while "external" means that the persons other than the partners and/or associated partners of the project (the public, participants, trainees, beneficiaries etc.) evaluate the result. The evaluation is made with the aid of specific documents that are included as annexes to this QCMP. Some WPs may include inherent evaluation tools, that are used for the evaluation instead of the specific documents included in the QCMP.

Besides this evaluation, each deliverable report will include information regarding the indicators and respective objectives that refer to, according to QF-IER – Indicators Evaluation Results.

In case the deliverable/QF-IER result is not considered as accepted, necessary corrective actions are initiated by the WPL according to the results of the evaluation.

4.2.1.1 Internal evaluation

Many of the deliverables of MSIE 4.0, like the analyzing for the identification of industry and students needs or the preparatory phases for the development of the curriculum structure, courses etc., are addressed to the partners of the consortium.

These deliverables of the WPs and subtasks undergo an internal evaluation. The specifics of the internal evaluation, as regards to the tools/forms used, the reviewer, the date of review, indicator(s) etc., are described in the QF-WPM.

When a deliverable is finished, the WPL sends the "draft version" of the relevant deliverable to the Project Coordinator (PC) for an initial, more formal evaluation. The PC examines the deliverable for its compliance the general objectives of the project, for its completeness, clarity and comprehensiveness. The evaluation, depending on the nature of the deliverable is made primarily with the use of QF-DES document or other means as minutes of the meetings, contracts, lists of equipment, proof of purchase etc. (as described at the QF-WPM spreadsheet). When the QF-DES document is used, it is filled in and sent by PC to the WPL, who is then responsible for amending the document according to the review results, if needed. The time for this amendment is agreed between the WPL and the PC. The final improvement of the deliverable comes from the PMB, by e-mail or minutes of the meetings.

Once the deliverable is amended (if needed) it is uploaded on the intranet of the project website by the WPL, that also have the responsibility to inform all the involved members of the consortium. This procedure can last two weeks maximum and the WPL is responsible for any changes or additions to the document.

In case the WPL considers the suggested improvements as not relevant he has to present his reasons and ask for the agreement.

If the deliverable is a document that is finally approved, it takes the status of "final version/version 1" and it is included by WP4 Leader in Master List of QCMP Documents, and further, by the PC in the formal progress report/s of the project.

4.2.1.2 External evaluation

MSIE 4.0 project includes several deliverables that are addressed to people out of the core of the consortium. These deliverables of the WPs and subtasks undergo an external evaluation. The specifics of the external evaluation, regarding to the tools used, the reviewer, the dates of review, the indicator(s) etc., are described in the QF-WPM.



The evaluators of these activities are: staff that will be trained, that will participate in the consultation activities, teaching staff, users of the project website, the developed web-portal for online learning and the new equipped laboratory. In general, the evaluation is done by beneficiaries of the activities, which are asked to evaluate them by answering specific questions using the forms which are attached as annexes to this QCMP or other project document (i.e. QF-TCE, QF-EVE, QF-STE, and QF-WEB).

4.2.1.3 Elaboration of the questionnaires

The questionnaires consist mostly of questions that can be answered with the aid of:

- a) 5 points rating scale where 1 is poor and 5 is very good and
- b) 4 points rating scale (1 strongly disagree, 2 disagree, 3 agree, 4 strongly agree)

The elaboration of the answers to the questionnaires is made by the WP/subtask leader and circulated to the members of the consortium.

The formula for the evaluation of results rated with the 5 points scale is the following

$$\frac{\sum_{i=1}^5 (N_{Ri} \times p_i)}{N_R}$$

Where:

N_{Ri} - number of responses for i ($i=1 \div 5$)

p_i – i weight

N_R – total number of responses

The activity is considered successful if the percentage of satisfaction is more than 75%. In case the percentage of satisfaction is less than 75%, the WPL proposes proper corrective actions (repetition of activity, distribution of more training or informative material, improvements of the database and the website etc.) which should be agreed with the PC.

Regarding questions that are rated with 4 points rating scale, the threshold for a successful evaluation is 70% of answers with score ≥ 3 . Scores less than this will require corrective actions as above.

5 General Quality Issues

5.1 Document Control

This section describes the control system for preparing, reviewing, approving, distributing, revising and updating documents that are required for the QCMP of MSIE 4.0 project. These documents include but are not limited to the following:

1. Quality Control and Monitoring Plan
2. Quality forms (as annexed to the Quality Control and Monitoring Plan) (QF-DES, QF-TCE etc.)
3. Minutes of the meetings
4. Reports on deliverables of WPs
5. Progress reports
6. External documents like the Erasmus plus program guide or other instructions by the European Commission, the partnership agreements (PA) between the PC and the partners, The European



Standards & Guidelines (ESG) - standards and guidelines for quality assurance in the European Higher Education Area (EHEA) etc.

The WP4 Leader with the contribution of the Quality Control and Monitoring Board is responsible for drafting and issuing the Quality Control and Monitoring Plan. The WPLs that draft and issue an internal document, must comply to QF-DTM (plan, procedure, work instruction etc.) or QF-QFT (forms).

Draft versions are numbered with 0.1, 0.2 ... in order to be distinguished from the released versions which are numbered with 1, 2

The last approved version (controlled copy) of MSIE 4.0 documents is uploaded to the intranet of the project website by the WPL who is also responsible for its substitution in case of revision (new version) for informing all the involved members of the consortium by e-mail.

A single copy of the obsolete internal documents withdrawn, is maintained in a different location identified as "Obsolete documents", under control of WP4 Leader.

External documents that are not available on the intranet of the project website shall be properly collected and maintained by the Management team.

5.1.1 Revision of documents

Regarding the changes of a document, the following rules apply:

- Any change in the document leads to increasing the version number by one unit (in the document footer and revision sheet).
- The modified text will be highlighted in yellow.
- The revision date, the reviewer and details about the revision will be mentioned in the revision sheet of the document (for itself and/or its annexes).

5.1.2 Document Archiving

The documents will be grouped according to the work package to which they belong.

Separate document groups will be created for:

- The application phase;
- The contractual phase;
- Project's results;
- Different reports.

If a document belongs to more than one group, for example a result belonging both to a work package and to the results group, copies of the document will be created in all the respective groups.

All the documents will be maintained by the partners for a 5 year period after the project completion.

5.1.3 Abbreviation System for the naming of documents

The abbreviation system for the naming of Quality Control and Monitoring Plan documentation is as follows:

1. Quality Control and Monitoring Plan: QCMP
2. Quality Form: QF-three initial capital letters of the form (e.g. QF-DES)
3. Quality Document: QD- three initial capital letters of the form

All the documents of MSIE 4.0 are elaborated in MS Word™ format (or equivalent) for documents, MS Excel™ format (or equivalent) for spreadsheets and MS Power Point™ (or equivalent) format for presentations.

5.1.4 Documents for public use

Documents or other material that is addressed to the public (informative material, brochures, leaflets, posters, presentations, DVDs etc.) must bear:

- The logo of MSIE 4.0 project
- The logo of ERASMUS PLUS
- The title and reference number of the project
- The following disclaimer:
"This project has been funded by the Erasmus+ Program of the European Union.

The information and views set out in this publication are those of the author(s) and do not necessarily reflect the official opinion of the European Union. Neither the European Union institutions and bodies nor any person acting on their behalf may be held responsible for the use which may be made of the information contained therein".

The same logos and disclaimer shall be also mentioned in the website of the project.

5.1.5 Master List of QCMP Documents

The templates of the Quality forms that are described in the following table are annexed to this QCMP.

Abbreviation	Full name of document	
QCMP	Quality Control and Monitoring Plan	-
QF-DTM	Deriverable template	Annex I
QF-QFT	Quality Form Template	Annex II
QF-WPM	Work packages monitoring	Annex III
QF-DES	Deliverable evaluation	Annex IV
QF-PQA	Project Quality Assessment	Annex V
QF-TCE	Training-Consultation Session Evaluation	Annex VI
QF-EVE	Event evaluation	Annex VII
QF-STE	Staff evaluation of UE host	Annex VIII
QF-WEB	Website questionnaire	Annex IX
QF-PSM	Partner Slide Master	Annex X
QF-WSM	Work Package Slide Master	Annex XI
QF-REG	Registration Form	Annex XII
QF-IEF	Indicators Evaluation Results	Annex XIII
QF-MME	Minute of the Meeting	Annex XIV
QF-CID	Contact Information Details	Annex XV



5.2 Communication

Communication between the members of the consortium, between the PC and the National Agency for Erasmus+ and between the PC and the European Commission is very crucial for the successful implementation of MSIE 4.0 project.

Day by day communication is conducted by e-mail, telephone conversations and skype meetings when deemed necessary. For the avoidance of any confusion, special attention is paid to the clear drafting of the subject of the e-mail. All the contact details are maintained and updated, if the case, according to Contact Information Details, available on the project intranet.

In general, all information relevant to the project is sent to the PC, who then forwards it to the partners involved in the specific action(s).

Direct partner/partner communications flows will be set up in those cases where an increase in efficiency can be achieved.

If on the proposals made by the project management or WPLs, the partners do not respond within 3 days they are considered to agree with the respective proposal.

If partners are on annual leave or sick they should have a back-up plan in place to ensure queries are dealt with in their absence.

An intranet on the project website is implemented by the WP5 Leader. This facility is secured (access is permitted through user name and password) and enables the consortium to have a very efficient diffusion of the information connected to the release of minutes, deliverables, reports and exchanges between partners.

External communication regarding the European Commission is the responsibility of the PC. This communication takes place mainly by e-mail, telephone conversations and face-to-face discussions when it is needed. For electronic dissemination of the project results, the main channels of communication will be (but not limited to these): the project website - <http://ise-portal.ait.ac.th/> and the Facebook project page <https://www.facebook.com/MSIE4Thailand/>



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Annexes



Annex I: QF-DTM- Deliverable template



Annex II: QF-QFT-Quality Form Template



Annex III: QF-WPM-Work Packages Monitoring



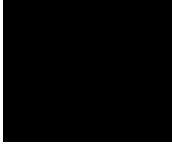
Annex IV: QF-DES Deliverable Evaluation



Annex V: QF-PQA-Project Quality Assessment



Annex VI: QF-TCE-Training -Consultation Session Evaluation



Annex VII: QF-EVE Event Evaluation



Annex VIII: QF-STE Staff evaluation of UE host



Annex IX: QF-WEB-Website Questionnaire



Annex X: QF-PSM-Partner Slide Master



Annex XI: QF- WSM-Work Package Slide Master



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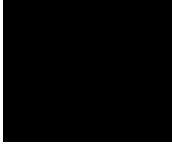
Annex XII: QF- REG- Registration Form



Annex XIII: QF-IER-Indicators Evaluation Results



Annex XIV: QF-MME-Minute of the Meeting



Annex XIV: QF-CID-Contact Information Details