



SEM-SEM



Smart Control Systems for Energy Management

Erasmus + #: 561703-EPP-1-2015-1-UK-EPPKA2-CBHE-JP

Quality Plan



| | |
|-------------------------------------|---|
| Project Acronym: | SEM-SEM |
| Full Project Title: | Smart Control Systems for Energy Management |
| Project No.: | 561703-EPP-1-2015-1-UK-EPPKA2-CBHE-JP |
| Funding Scheme: | ERASMUS+ |
| Project Coordinator: | STAFFORDSHIRE UNIVERSITY (SU) |
| Project Quality Coordinator: | Eurotraining |

| | |
|------------------------------|--|
| Title of Work Package | Monitoring and Quality Control |
| Work Package | WP12 |
| Work Package Leader | Eurotraining |
| Target Group | <ul style="list-style-type: none">✓ All project partners✓ Students, teachers, engineers and industry management |
| Starting Date | 15-10-2015 |
| Activity Duration | 3 years |
| Document Compiled by | Eurotraining |
| Document Version | Final |
| Dissemination Level | Institution |



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1. Purpose of this document

The purpose of the Project Quality Plan is to define the quality expectations related with the SEM-SEM project and detail how results achievement will be monitored and thus the quality of the project activities and results will be enhanced. The content of the document includes content related to both internal and external quality measures.

2. Project Objective and main focus

SEM-SEM project will deliver three main outcomes. First, MSc program of energy management system between Egyptian and Jordanian partners along with the European Universities partners. Second, launching of a new training program for smart energy management systems. Third, establishing a technology transfer center between the EG, JOR universities and Staffordshire University (SU).

More specifically, the innovative elements of SEM-SEM project are concluded in four main points:

First, this project seeks to build a new MSc program of energy management system between Egyptian and Jordanian along with European Universities partners. The MSc program is divided into two modules:

1. Management and Control Systems, which will develop graduate engineers with knowledge of different aspects of control systems such as: Intelligent control, automatic control, behavior modeling and behavior fusion,
2. Industrial Mechanical Systems, which will deliver graduates with the skills of evaluating the performance and efficiency of current and future energy systems.

Second, the project will establish a technology transfer center (TTC) which supports research and training cooperation between the Egyptian and Jordanian partners with the well-established research group in SU. The main objective of the center is to target other EG/JOR Universities, industrial societies, governmental entities such as the ministry of electricity and renewable energy as well as ministry of trade and industry. The technology center is not only intended to target engineers in its scope of work, but also other community entities.



Third, the project will establish new laboratories serving the master degree and the training courses. These laboratories are new for EG and JOR, which will be concerned with managing and saving energy, as well as optimizing the operation of smart industrial systems. New innovative equipment will be installed, which are recently used in developing educational system in EG and JOR, such as Super computer for green computing and Green cloud computing. E-learning educational system will be used for training courses.

Fourth, the project will introduce a total of 26 courses, 17 of which are new. The newly added courses will reflect the essence of energy saving in different perspectives such as green computing, smart facilities and building management systems, energy quality and waste water recovery. Having such courses will promote the idea of optimized use of energy sources in power stations design, environmentally sustainable computing and intelligent systems, and energy saving in the automated industrial world.

3. Actors involved

The project management infrastructure will deliver essential management and organization services throughout the full life-cycle of the project to provide deliverables in time. There are 13 partners; 11 of which are educational and 2 non-educational partners. The educational partners are divided into: EU universities (SU as main applicant, UNIOVI, IST and UCY), EG universities (AASTMT, NU, ASU and HU) and JOR universities (UJ, MU and JUST). The non-educational institutes consist of EURO training center in Greece and Industrial organization from EG.

QCM will be coordinated by Eurotraining with the support of WP leaders for specific issues related to quality standards for the concrete activities. Each project activity will be evaluated with the corresponding survey/questionnaire or other tools depending on the nature of each task. The result of this will be a report, developed by each WP leader, in which the outcomes obtained will be analyzed and possible suggestions for improving weaknesses will be formulated.

The project manager will be the grant holder **Staffordshire University (SU)** whom will be responsible for:

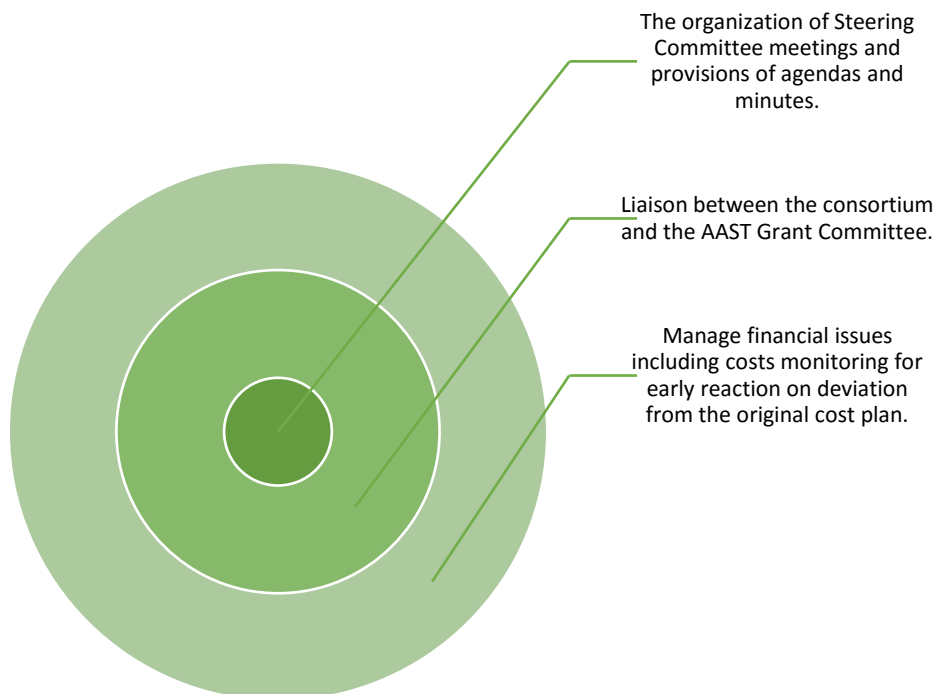


Figure 1: Responsibilities of project manager



The grant holder will establish a project legal agreement serving as a formal guide for the whole project. The agreement contains the required information about the organizational, ethical, legal and administrative issues and will be binding for all members of the project consortium.



Figure 2: Responsibilities of EU, EG & JOR partners

The AASTMT will be responsible for communication and data gathering from the EG partners. The UJ takes the same responsibility for JOR partners.

4. Project Timetable of the Deliverables by Work Package

| WP | Due date | Title | Type of deliv. | Language | Deliv. N° |
|----|------------|--|----------------------------|----------|-----------|
| 1 | 14-12-2015 | Survey on similar MSc programmes in Europe | Report | English | 1.1 |
| 1 | 15-12-2015 | Survey of similar postgraduate in North America and Africa regions | Report | English | 1.2 |
| 1 | 14-12-2015 | Survey of similar programmes in South America and ASIA regions | Report | English | 1.3 |
| 1 | 14-01-2016 | A final report with concluding recommendations | Report | English | 1.4 |
| 2 | 14-01-2016 | Survey on regional professional training needs | Report | English | 2.1 |
| 2 | 14-01-2016 | Survey of similar regional training programs | Report | English | 2.2 |
| 2 | 14-02-2016 | A final report with concluding recommendations | Report | English | 2.3 |
| 3 | 14-12-2016 | Establish phase 1 of the developed M.Sc. courses | Teaching/Learning Material | English | 3.1 |
| 3 | 14-12-2016 | Establish phase 2 of the new MSc courses | Teaching/Learning Material | English | 3.2 |
| 3 | 14-12-2016 | Synergetic to omit redundancies between courses | Teaching/Learning Material | English | 3.3 |
| 4 | 14-03-2018 | The developed training materials | Teaching Material | English | 4.1 |
| 4 | 14-03-2018 | The new training material | Teaching Material | English | 4.2 |
| 4 | 14-04-2018 | The distance-learning training material | Teaching Material | English | 4.3 |
| 5 | 14-08-2016 | Preparation of Laboratories | Learning/Training Material | English | 5.1 |
| 5 | 14-01-2017 | Mounting of experimental rigs and lab development | Learning/Training Material | AR, EN | 5.2 |



| | | | | | |
|----|------------|---|----------------------------|---------|------|
| 5 | 14-04-2017 | Development of the training setup | Learning/Training Material | AR, EN | 5.3 |
| 5 | 14-04-2017 | Development of the training documentation | Teaching Material | English | 5.4 |
| 5 | 14-10-2017 | Development of e-learning training docs courses | Teaching Material | English | 5.5 |
| 6 | 14-12-2016 | Attend advanced short courses at EU | Training Material | English | 6.1 |
| 6 | 14-11-2017 | Training in Egypt and Jordan by EU staff | Training Material | English | 6.2 |
| 7 | 14-06-2017 | Attend training courses in EU | Training Material | English | 7.1 |
| 7 | 14-11-2017 | Training in Egypt and Jordan by EU trainers | Training Material | English | 7.2 |
| 8 | 14-11-2017 | Preparing documentation for accreditation | Service/Product | English | 8.1 |
| 8 | 14-11-2017 | Applying for accreditation of new master with ECTS | Service/Product | English | 8.2 |
| 9 | 14-08-2018 | Preparing necessary doc for double degree | Service/Product | English | 9.1 |
| 9 | 14-10-2018 | Official Meetings between AASTMT and IST Double Deg | Service/Product | English | 9.2 |
| 9 | 14-10-2018 | Official Meetings between MU and IST Double Deg | Service/Product | English | 9.3 |
| 9 | 14-10-2018 | Signing the agreement | Service/Product | English | 9.4 |
| 10 | 14-10-2018 | Advertising Campaign | Service/Product | AR, EN | 10.1 |
| 10 | 14-10-2018 | Workshops and Conferences | Event | AR, EN | 10.2 |
| 11 | 14-10-2018 | Strengthening relationships with industry | Service/Product | AR, EN | 11.1 |
| 11 | 14-10-2018 | Marketing of the program to ensure sustainability | Service/Product | AR, EN | 11.2 |
| 12 | 14-10-2018 | Monitoring by Eurotraining on EG/JOR partner's management | Report | English | 12.1 |
| 12 | 14-10-2018 | Monitoring by Eurotraining on EU partner's management | Report | English | 12.2 |
| 13 | 14-10-2018 | Regional and International Coordination Meetings. | Report | English | 13.1 |
| 13 | 14-10-2018 | EG/JOR Institutional Management | Report | English | 13.2 |
| 13 | 14-10-2018 | Coordination Meetings with group leaders | Report | English | 13.3 |

5. Methodology

The following flowchart summarizes the idea behind the proposed QCM methodology procedures: continuous improvement. Nevertheless, it is imperative to read the SEM-SEM description of work in order to understand and capture all details that will/could intervene in the project deployment.

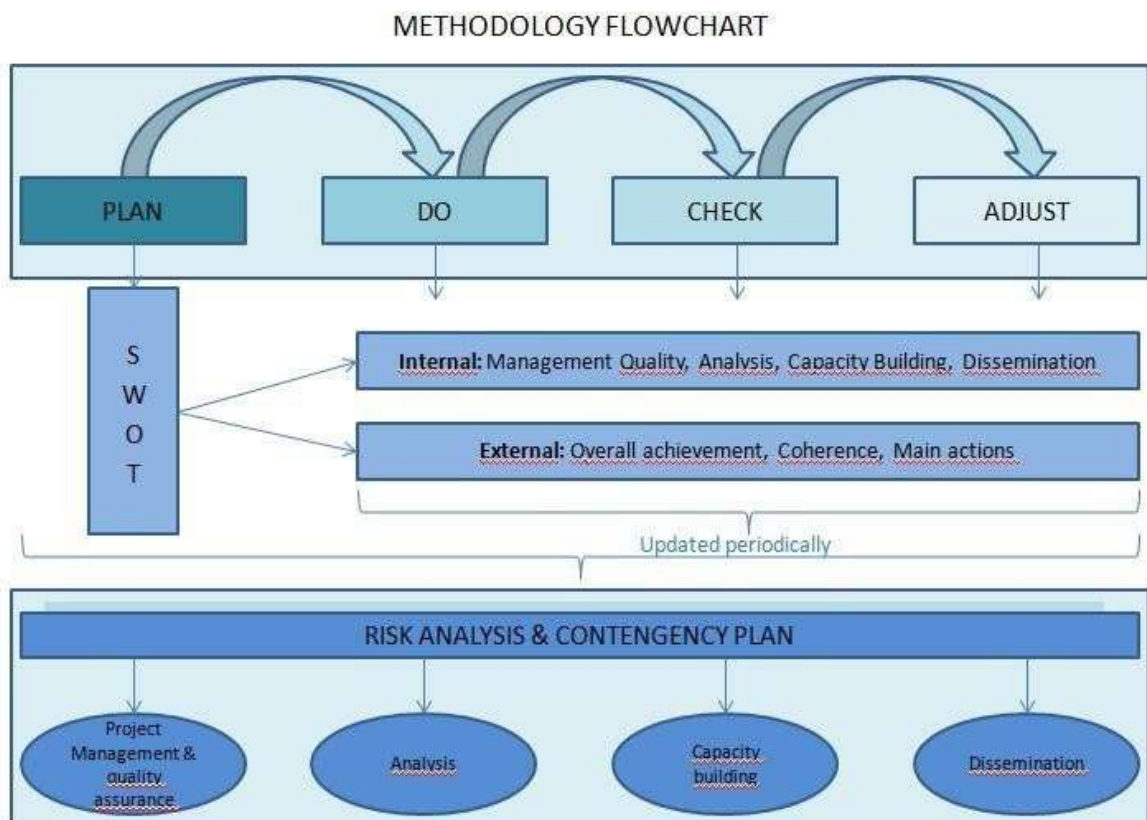


Figure 3: Continuous quality enhancement flowchart.

The QCM will be based on the principle of Plan-Do-Check-Act (PDCA) cycle as follows:

- **PLAN** means to establish the objectives we want to achieve and processes needed to deliver results keeping in mind our target and goal. By planning our short/mid/long term objectives and results we would need to achieve, we can better allocate efforts and resources and establish a working methodology and also the responsible partner. A test period would be recommendable for activities with a special level of complexity.



- **DO** means to implement the foreseen activities (the plan), execute the activities and thus produce the desired results. In our case examples of results could be a workshop delivered, a round table held, a report on needs analysis prepared, etc.
- **CHECK** means analyses the results achieved in comparison to the expected outcomes detailed in the Description of Work document. In this phase, it is important to detect any deviation or area for improving the next similar activity, but also strong points to replicate.
- **ACT/ADJUST**: In case of detecting weaknesses, the formulation of corrective measures is crucial in order to bring the project back onto the right track towards the achievement of the expected outcomes. This analysis should also focus on finding the root causes of the problems encountered for the refinement of the next activities.

6. Risk Analysis and Mitigation Plan

A risk analysis is a process used to understand the possible unwanted negative circumstances that can affect the proper project development and identify options for preventing low quality outputs.

The table below summarizes the risk analysis for the SEM-SEM project and the contingency plan that will be activated if needed.

| 0. Project Management & Quality Assurance | |
|--|--|
| Assumption | Internal & external measures will keep the project on track, time, budget and the outcomes, produced with a high quality, as useful and tangible as possible will be widely disseminated. |
| Risks | <ul style="list-style-type: none"> - Lack of information from partners to successfully keep track of activities progress outputs. - Unforeseen circumstances affecting the ability of the consortium to deliver as planned. - Difficulties for the communications among the partners and with the project coordinator. - Potential challenges in electronic communication. |



Potential risks will be offset by means of regular updates on the activities others are carrying out, establishing strong personal and working relationships among Partner Institutions and by a devoted management based on the experience of all partners. The project management structure will be set up clearly from the beginning. The Steering Committee is in charge of the SEM-SEM project and has the overall responsibility. It is, as such the relevant decision making structure of the project and responsible for:

- ✓ Overall legal and financial administration,
- ✓ Overseeing scientific and societal issues related to the research activities,
- ✓ Execution of the time and cost plan,
- ✓ Quality management based on a plan specifying standards and benchmarks on the quality of results (e.g. deliverables),
- ✓ Ensuring the research’s compliance with ethical rules and good practices.

The Steering Committee will be informed about any meeting related to the project and will receive a copy of the minutes from the respective WP leader. Minutes will be taken of all project meetings and filed appropriately. Decisions and results of the meetings are documented in a decision protocol. Each work package team has its own list of pending issues.

In case of decision making conflicts during the committee meetings, a voting will take place. Each partner will have only one vote and decision will be taken with the majority votes. In case of equal votes, the head of the steering committee (SU) vote will be counted as two votes instead of one.

1. Analysis

| | |
|-------------------|---|
| Assumption | Virtual and face-to-face meetings will assure an in-depth dialogue. Good language skills. The documents related to the SEM-SEM project will be shared with all partners through online platform. The replication of the documents will be ensured. Good leadership of each WP by the corresponding institution/partner. |
| | High interest of the partners. Each partner will provide complete and updated information. In each activity/work package the proper staff will be involved from each partner/institution. |
| Risks | Low commitment from staff. Lack of interest from high-level staff. Language barriers. Low or no use of the online platform. Low or no replication of the materials. Low update and incomplete information provided by each partner/institution. |



Coordinator will be responsible for fostering discussion among the partners. In case of low commitment by the high-level staff, P1 (STAFFORDSHIRE UNIVERSITY) will organize phone calls/videoconferences to detect the problems they are encountering or to understand if there is a special reason for that. P1 (STAFFORDSHIRE UNIVERSITY) will underline to them the benefit of actively participating in such action. Concerning the low involvement of the academic staff, P1 will make use of free electronic means (e.g., Skype, Google hangout, etc.) in order to have virtual meetings with them and explain how to correctly carry out the activities. In extreme cases, P1 will organize a face-to-face meeting with them to find a solution to ensure the correct implementation of the activities with high quality and on time.

2. Capacity Building/Institutional Strengthening

| | |
|-------------------|--|
| Assumption | <ul style="list-style-type: none"> ❖ Online availability of background documents on time ❖ Questionnaires will be completed on time ❖ Training/teaching materials for trainings prepared on time ❖ Good background on the topic of teachers and trainers leading the events ❖ High quality of the organization of training events ❖ Experienced trainers |
| Risks | <ul style="list-style-type: none"> ❖ Delays in completion of expected results ❖ Low participation in the trainings |

Risks will be offset through a strong leadership of each WP leader and a well in advance organization of trainings that will include agenda definition, selection of trainers and trainees. Training delivery will be distributed equally among the partners in charge.

3. Dissemination

| | |
|-------------------|---|
| Assumption | Active and continuous project dissemination and high participation of target groups in dissemination events and meetings. Constant involvement of higher education authorities to foster the acceptance of the project activities and ensure the results' sustainability. |
| Risks | <ul style="list-style-type: none"> ❖ Low participation in the seminars, workshops and practical training and the meetings surveys. ❖ Low commitment for agreements and joint cooperation. ❖ Low involvement of high level government authorities. ❖ Lack of understanding of the mutual benefit of establishing links. ❖ Reluctance on Regional and International cooperation. |

The risks of this WP will be minimized by a regular effort in communication and dissemination of the results under the project umbrella. Each actor involved in the dissemination activities will be invited by WP leader and also by the project coordinator to join the events planned explaining the usefulness and the importance of their participation for further improvement of their sector. National, Regional & International cooperation.



7. External evaluators

It is not envisaged that external evaluators will be required for the SEM-SEM project. However, the UK National Agency will be kept informed of all project activities and progress as an external interest group. If there is a need for an external project evaluator, the UK National Agency will fulfil that role.

8. Quality Assurance tools

The following flowchart summarizes the quality assurance steps:

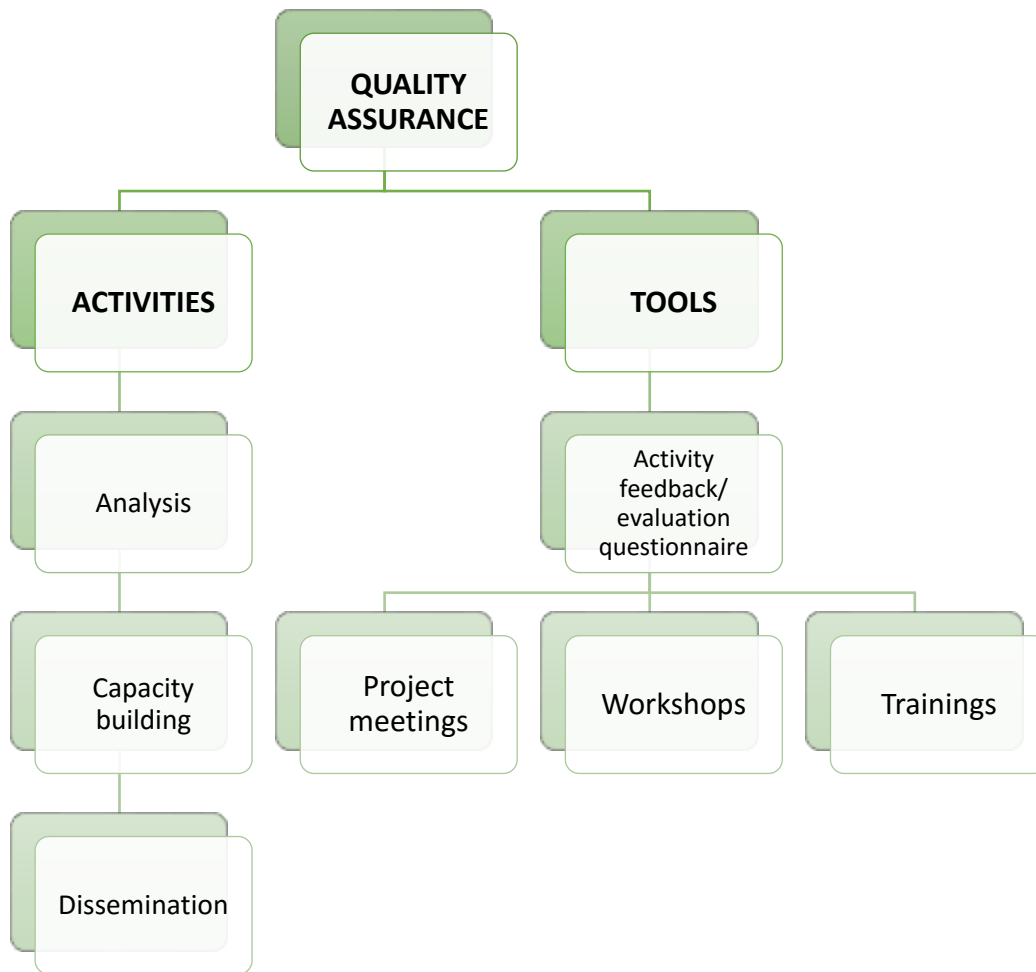


Figure 4: SEM-SEM quality assurance steps.

In addition to the above, the following diagram explains the quality control procedure:

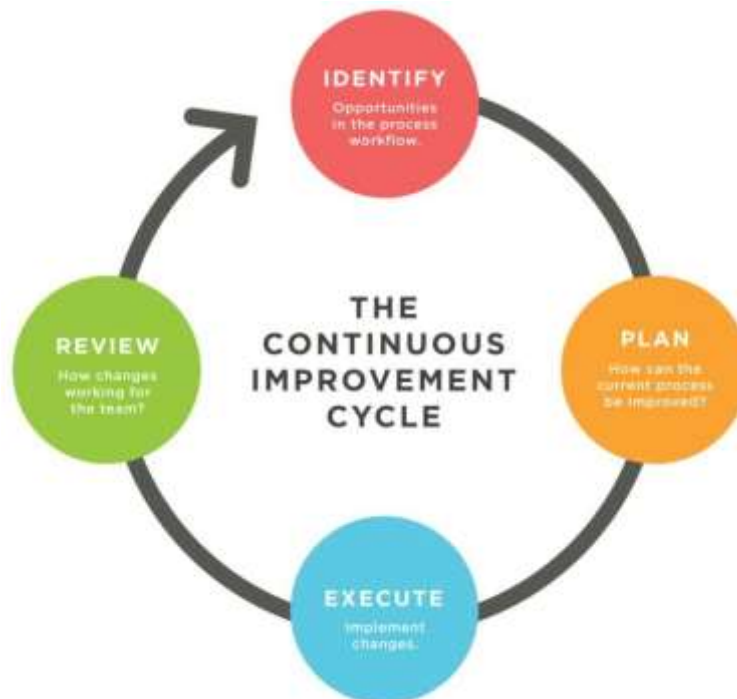


Figure 5: SEM-SEM PDCA procedures applied to SEM-SEM

Taking into account the QCM context of the SEM-SEM project, this section provides templates for quality assurance tools for the different types of activities that will be carried out during the lifetime of the SEM-SEM project. For each specific activity or event, the Quality Coordinator will work together with the activity coordinator/organizer to adapt one of the templates in order to provide a quality evaluation document that best fits the requirements of that activity. Additionally, the host institution of each activity/event, in close collaboration with the corresponding WP leader, will develop the reports and facilitate the feedback to the Quality Control work package leader. Each quality document produced for an activity must include a header with the SEM-SEM and ERASMUS+ logos, as well as the project title: “*Smart Control Systems for Energy Management*”.

The individual quality documents for each activity will be provided in English (and Arabic if necessary). Each activity coordinator is responsible for making sure they have been completed by the participants in the activity, and then for sending them back to the Quality Coordinator for evaluation.



a. Evaluation Questionnaires

i. Example of Project Meetings' Survey

| | |
|----------------|---|
| PURPOSE | <ul style="list-style-type: none"> - To meet all Project partners - To clarify activities and responsibilities - To discuss about the next 6 months activities |
| TARGET | Project partners |
| SUCCESS | <ul style="list-style-type: none"> - Activities clarified and their replication - Partners' responsibilities clarified - Next 6 months action plan clarified |

This feedback form has been prepared to understand better your satisfaction level of each project meeting carried out in order to understand which where the very positive aspects, but also the aspects for improvement and thus, to prepare you the next activity better according to your needs.

| QUESTIONS | | LEVEL OF THE AGREEMENT (scale 1-5) (1=worst, 3= fair, 5=best) |
|------------------|---|---|
| Q1 | Name & Surname (optional) | Short answer |
| Q2 | Organization's name * | Short answer |
| Q3 | Overall, how would you rate the meeting? * | 1=poor, 5=excellent |
| Q4 | The objectives of the meeting were clear to the partners. * | 1=not at all, 5=very clear |
| Q5 | The meeting was useful for helping our organization to carry out the expected project activities. * | 1= Not at all useful, 5=very useful |
| Q6 | The meeting was useful for establishing communication among partners. * | 1= Not at all useful, 5=very useful |
| Q7 | After the meeting, work plan and deadlines for each result were clear. * | 1=not at all, 5=very clear |
| Q8 | After the meeting, my role and responsibility within the next project activities were clear. * | 1=not at all, 5=very clear |
| Q9 | What is your opinion about the project meeting in terms of issues discussed, social interactions, problem resolution, etc? * | 1= Not at all useful, 5=very useful |
| Q10 | Are you satisfied with the presentations made by the partners in the meeting (timing, content, quality of content, connection with the project tasks, etc)? * | 1= Not at all satisfied, 5=very satisfied |
| Q11 | Were you satisfied with the meeting venue? * | 1= Not at all satisfied, 5=very satisfied |



| | | |
|------------|---|---|
| Q12 | How do you rate the duration, date and timing of the meeting? * | 1= very poor, 5=very good |
| Q13 | Was the information provided sufficient for this meeting (e.g. quantity and quality of information flow before the meeting; communication management from promoter and/or hotel etc.) * | 1= Not at all sufficient, 5=very sufficient |
| Q14 | Were meeting activities organized in an efficient manner?* | 1= Not at all, 5=very efficient |
| Q15 | What should be improved for the next meeting? Which difficulties detected must be solved? How? Please explain. * | Paragraph text |
| Q16 | Any additional comments? (optional) | Paragraph text |

*required

ii. Example of Workshop' survey

| | |
|----------------|--|
| PURPOSE | <ul style="list-style-type: none"> - Train staff on certain topics - Strengthen the relations between Academia-industry |
| TARGET | Engineers, students, companies, Teaching staff, Faculty and Teaching assistants |
| SUCCESS | <ul style="list-style-type: none"> - Promotion for the program on the national/regional level - Increase of the awareness of the new program - Expertise created in the target topics |

This feedback form has been prepared to understand better your satisfaction level of the workshop carried out in order to understand which where the very positive aspects but also the aspects for improvement and thus, to prepare you the next workshop better according to your needs.

| QUESTIONS | | LEVEL OF THE AGREEMENT (scale 1-5) (1=worst, 3= fair, 5=best) |
|------------------|--|---|
| Q1 | Name & Surname (optional) | Short answer |
| Q2 | Profession/Status (optional) | Short answer |
| Q3 | Overall, how would you rate the Master's program? * | 1=poor, 5=excellent |
| Q4 | The objectives of the Master's program are clear? * | 1=not at all, 5=very clear |
| Q5 | Are you generally satisfied with the content of the Master's Program? * | 1= Not at all satisfied, 5=very satisfied |
| Q6 | Are you generally satisfied with the core courses of the Master's program? * | 1= Not at all satisfied, 5=very satisfied |
| Q6a | If not, can you propose areas of improvement? Which module do you find that is not relevant or useful? * | Paragraph text |



| | | |
|------------|--|---|
| Q7 | Are you generally satisfied with the Elective Package I-for the Management and Control systems subject area? * | 1= Not at all satisfied, 5=very satisfied |
| Q7a | If not, can you propose areas of improvement? Which module do you find that is not relevant or useful? * | Paragraph text |
| Q8 | Are you generally satisfied with the Elective Package II-for the Automated Industrial Systems subject area? * | 1= Not at all satisfied, 5=very satisfied |
| Q8a | If not, can you propose areas of improvement? Which module do you find that is not relevant or useful? * | Paragraph text |
| Q9 | Do you think that the structure of the Master's program responds to the needs of the students? * | 1= Not at all, 5=very much |
| Q9a | Please further explain. * | Paragraph text |
| Q10 | How do you find the quality of the courses? * | 1=poor, 5=excellent |
| Q11 | The Master's program can respond to the academic needs in Jordan. * | 1= Not at all, 5=very much |
| Q12 | The Master's program can cover industrial needs in Jordan. * | 1= Not at all, 5=very much |
| Q13 | The Master's program can have an impact on energy performance in the region. * | 1= Not at all, 5=very much |
| Q14 | The Master's program can qualify students to respond to the market needs in energy sector in the region. * | 1= Not at all, 5=very much |
| Q15 | What should be improved? Please elaborate. * | Paragraph text |
| Q16 | Any additional comments? (optional) | Paragraph text |

*required

iii. Example of Trainings' survey

| | |
|----------------|---|
| PURPOSE | <ul style="list-style-type: none"> - Train staff on certain topics. - Strengthen the relations between Academia-Industrial sectors. |
| TARGET | Teaching staff, students and technicians |
| SUCCESS | <ul style="list-style-type: none"> - Awareness for energy saving purposes, - Fulfillment of the job market requirements, - Collaboration between the academic/research sectors and the industrial sector, - Expertise created in the target topics. |

This feedback form has been prepared to understand better your satisfaction level of the training carried out in order to understand which where the very positive aspects but also the aspects for improvement and thus, to prepare you the next training better according to your needs.



LEVEL OF THE AGREEMENT (scale 1-6)

1: I totally disagree // 2: I disagree // 3: I rather disagree // 4: I rather agree // 5: I agree // 6: I totally agree

| QUESTIONS | | 1 | 2 | 3 | 4 | 5 | 6 |
|------------|--|----------------|---|---|---|---|---|
| Q1 | The objectives of the training were clearly defined. * | | | | | | |
| Q2 | Selection and topics were appropriate to my role and responsibilities. * | | | | | | |
| Q3 | The training improved my understanding of the subject. * | | | | | | |
| Q4 | I will be able to apply the knowledge acquired. * | | | | | | |
| Q5 | Visual and supporting material were useful and easy to follow. * | | | | | | |
| Q6 | Participation and interaction were encouraged. * | | | | | | |
| Q7 | There was a correct balance between theoretical, exercises and discussion? * | | | | | | |
| Q8 | The trainers were well prepared.* | | | | | | |
| Q9 | The training objectives were met.* | | | | | | |
| Q10 | How do you rate the duration, date and timing of the training? * | | | | | | |
| Q11 | Overall evaluation of the training.* | | | | | | |
| Q12 | Which topics would you suggest for future training sessions? (optional) | Paragraph text | | | | | |
| Q13 | Which aspects do you think could be improved for the next training sessions? Any additional comments? (optional) | Paragraph text | | | | | |

* required