



ASIAX**IS**

The Asiaxis Project

PROJECT QUALITY ASSURANCE PLAN

2019

Introduction

This manual provides an outline of good practice in the assurance of quality and its contribution to the promotion of quality enhancement. Importantly, it provides details of good practice derived from the EU to serve as a reference for the assurance of programme quality, and shall continue to serve as a benchmark for good practice in programme delivery and continuous improvement for all stakeholders.

This document is to be used as both a reference resource and as a guideline. It has been informed by sources which include the Framework for Qualifications of the European Higher Education Area, Standards and Guidelines for Quality Assurance in the European Higher Education Area and the UK Quality Code for Higher Education. It is written to compliment existing National or Institutional practice in programme design, delivery and review to provide high quality graduates who are able to meet the needs of industry or research institutes in the ICE sector.

It is intended that this manual be utilised as a guideline and reference tool for both course development and ongoing program improvement as the ASIAXIS project evolves. One of the roles of quality assurance within Higher Education is to provide a process for setting, describing and assuring academic standards and the learning experience of the student. Within this process the contribution of other stakeholders such as employers are recognised for their contribution to establishing standards of attainment and experiences derived during learning to meet student expectations of employability.

The outcome of this quality assurance process is to instil confidence within the student that they will receive and appropriate quality education and within an employer confidence in the attributes, competencies and potential of the graduate entering employment.

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Part 1. Observations on the existing QA methods in Partner Universities

The aims in teaching and learning the courses

The aim of educational programmes taught at Partner Universities, is very similar to that of EU Universities. The students should have demonstrated during the study the following attributes:

- a systematic understanding of knowledge, and a critical awareness of current problems and/or new insights, much of which is at, or informed by, the forefront of their academic discipline, field of study or area of professional practice
- a comprehensive understanding of techniques applicable to their own research or advanced scholarship
- originality in the application of knowledge, together with a practical understanding of how established techniques of research and enquiry are used to create and interpret knowledge in the discipline
- conceptual understanding that enables the student:
 - to evaluate critically current research and advanced scholarship in the discipline
 - to evaluate methodologies and develop critiques of them and, where appropriate, to propose new hypotheses. Typically, holders of the qualification will be able to:
 - deal with complex issues both systematically and creatively, make sound judgements in the absence of complete data, and communicate their conclusions clearly to specialist and non-specialist audiences
 - demonstrate self-direction and originality in tackling and solving problems, and act autonomously in planning and implementing tasks at a professional or equivalent level
 - continue to advance their knowledge and understanding, and to develop new skills to a high level.

And holders will have:

- the qualities and transferable skills necessary for employment requiring:
- the exercise of initiative and personal responsibility
- decision-making in complex and unpredictable situations
- the independent learning ability required for continuing professional development.

Teaching and learning Methods

The current teaching and learning methods deployed at Partner Universities include all or any of the following modes of delivery:

- lectures
- seminars
- practical work in a laboratory
- the use of textbooks, journal papers, electronic databases and other self-study and e-learning materials
- project work
- learning through case studies
- work-based learning

Assessment Methods

Assessment methods used in Partner Universities are as follows:

- essay assignments
- practical reports
- a dissertation or other output from research/project work
- oral examinations
- problem-solving exercises
- oral presentations
- posters
- placement reports

The current practices at Partner Universities

The feature of the programmes in the specialised department in all Chinese, Kazakhstan and Russian Universities is that there is a high level of centralisation. The programmes of study and contents of didactic materials is, to a major extent, predetermined by corresponding Ministries of High Education in order to ensure the quality of teaching and preparation of specialists in a given area.

University Departments have some flexibility (to a smaller extent) to adapt teaching materials to a local specific demands from industry on preparation of students but these should be approved first at Departmental level, followed by scrutiny by Faculty and University Boards.

Every five years Departments are exposed to external inspections by a group of specialists appointed by corresponding Ministries of High Education. A visit by such the commission, in fact, is very similar to an accreditation visit by Professional bodies in the UK. This is the main and very often the only form of external inspection of teaching and learning methods in all Partner Universities.

Quality of teaching and leaning is maintained by means of annual Departmental reviews of examination results and teaching materials.

Examination processes are predominantly not anonymous since exams are mainly carried out in oral form, when the teaching staff (examination) questions a student to evaluate the level of his knowledge in the corresponding course.

It is not common practice at Partner Universities to seek feedback from students on their satisfaction on the content and teaching methods used by module tutors.

Finally, all partner Universities have good research facilities (excellent facilities in Chinese Universities) but most of teaching equipment used in laboratory works needs renewing (especially in Kazakhstan and Russian Universities).

Part 2. EU Context: Quality Assurance in Higher Education

This section sets out the underlying principles of quality assurance within a framework for good practice which may be contextualised for application over a wide range of circumstances.

It is recognised that local conditions, custom and practice might differ widely as will the understanding or interpretation of the words employed within quality assurance.

As a framework, detailed procedures are not described as local autonomy is required for the spirit of quality assurance to flourish and foster mutual trust and transparency of educational process and achievement. In addition to the localisation of quality assurance, there are discipline-specific expectations and stakeholder requirements. For example, there may be requirements derived from opportunities or obligation of professional registration.

To assist in developing procedures specifically for the ASIAXIS courses, a summary of standards for quality assurance drawn from the European standard are listed below:

1. Policy and procedures for quality assurance: Institutions should have a policy and associated procedures for the assurance of the quality and standards of their programmes and awards. They should also commit themselves explicitly to the development of culture, which recognises the importance of quality, and quality assurance, in their work. To achieve this, institutions should develop and implement a strategy for the continuous enhancement of

quality. The strategy, policy and procedures should have a formal status and be publicly available. They should also include a role for students and other stakeholders.

2. Approval, monitoring and periodic review of programmes and awards: Institutions should have formal mechanisms for the approval, periodic review and monitoring of their programmes and awards.
3. Assessment of students: Students should be assessed using published criteria, regulations and procedures, which are applied consistently.
4. Quality assurance of teaching staff: Institutions should have ways of satisfying themselves that staff involved with the teaching of students are qualified and competent to do so. They should be available to those undertaking external reviews and commented upon in reports.
5. Learning resources and student support: Institutions should ensure that the resources available for the support of student learning are adequate and appropriate for each programme offered.
6. Information systems: Institutions should ensure that they collect, analyse and use relevant information for the effective management of their programmes of study and other activities.
7. Public information: Institutions should regularly publish up to date, impartial and objective information, both quantitative and qualitative, about the programmes and awards they are offering.

The Partner University QA policies are mainly in line with the above EU requirements to maintaining high quality of education but some of the listed guidelines will be contextualised within the following section to support their application to the ASIAXIS Programmes. This contextualisation will also be informed by drawing on good practice from a wider base of engineering pedagogy and field of discipline practice, exercised at EU Universities.

Part 3. Proposed QA of Project Activities

Quality Assurance of project activities should be implemented at two levels: internal and external.

Internal QA procedures and upholding requirement standards are implemented through selecting experienced academics to be a part of Project Executive Committee.

External Evaluation Team is needed to ensure that Quality Assurance of project activities is implemented at the external level. It is proposed that External Evaluation Team is made of

two independent representatives:

Prof. Umberto Desideri

Department of Engineering for Energy, Systems, Territory and Construction
University of Pisa

Prof. Alfredo Squarzoni

Professor of Machine Design
Engineering Faculty
Genoa University

Prof. Francisco Tinaut

Professor of Thermal Engines
Department of Energy Engineering and Fluidmechanics
University of Valladolid

The methodology of Quality Assurance of Project activities is based on regular progress check against the time-table and list of milestones and proposed quantifiable and specific deliverables in each Project task. These are in detail are described in the "Logical Framework Matrix (LFM)", "Workplan for Project" years 1-3 and "Workpackages description".

The results of activities are evaluated and classified as "successfully completed", "partially completed" and "not completed" depending on the level of achieving deliverables. Such evaluation takes place first during communications between the coordinator and the team and then in communications between members of Project Executive Committee. When activities are evaluated and classified as "partially completed" and "not completed" then contingency measures are identified and deployed to resolve the problems.

In the run-up to Project Meetings, the advice and recommendation on the proposed course of actions are sought from External Evaluators of the Project.

Finally, all the above problems are discussed during Project Meetings between members of Project Executive Committee, taking into account the recommendation of the External Evaluators of the Project. Such Project meetings take place every 3-4 months.

For rapid resolving of the problems, the corresponding arrangements should be made by UNIVPM that Coordinator shall visit the Partner University to promptly help them to resolve problems affecting the progress in the project activities and its QA Plan.

Part 4. Application of Quality Assurance and Quality Enhancement to the Project modules

Policy and procedures for quality assurance

The project will adhere to all quality assurance policies in place at the institution of delivery as a minimum requirement. Further requirements as laid out in this manual will be followed unless local conditions make this pedagogically impractical at which point substitution of alternative measures must be given the full consideration.

The academic responsible for the administration of the module will be responsible for day-to-day quality assurance and communication to the Department/Faculty, delivering the corresponding programme.

The quality assurance procedures will stress the value of quality assurance in fostering quality enhancement, which will include all stakeholders, academic, students and employer.

Approval, monitoring and periodic review of modules and awards

The modules will all be subject to the local approval process, Departmental, Facultative prior to implementation.

The approved modules will be described within a Programme Specification Document which will set out all key information relevant to the module/s in a format that is suitable for a reader who may wish to assess this information as a potential student or a potential employer of the graduates of the programme.

The Modules Specification Document will include information under the following headings;

- Full name and level of award and any administrative or institutional registration code
- Mode and location of delivery and mode of attendance
- Date of approval and dates of external review if applicable
- Educational aims of the module
- How students are supported in their learning, skill and professional development
- The module learning outcomes and a mapping of how these are attained
- Module teaching, learning and assessment strategy

- Award criteria including any interim awards
- Module selection procedure
- Log of changes derived from the internal review process

Each module will be subject to periodic review, an internal review for assurance monitoring and to foster enhancement and external review to support assurance and to provide external benchmarking of standards.

The internal review will be performed annually, and the process will consider all aspects of the module against its aims and as a part of the programme and the articulated academic standard of the award.

An annual internal review will be conducted by a programme committee review meeting. The committee will consist of the academic responsible for the administration of the module, all academics leading constituent modules of the programme. The student representation from the current cohort is desirable.

The academic responsible for the administration of the module will seek guidance from actual and potential employers of graduates as to the current performance of the module, its aims and structure.

Outcomes of the Annual Programme Review process will be communicated to all students.

Assessment of students

Assessment approaches must be able to

- demonstrate and evidence the attainment of individual students
- grade or rank students with respect to the pass/fail threshold
- diagnose an individual student's strengths and weaknesses
- provide students with feedback
- provide a profile of what the student has learnt
- align learning activities, assessment tasks and learning outcomes
- enable detection of academic misconduct

The summative assessment of the module will only be concerned with the published learning outcomes of that module, duplication of assessment should be avoided and grading criteria made available to students prior to commencement of the assessment task. The extensive use of formative assessment to support independent learning and the students' self-evaluation is to be encouraged with summative assessment retained for high stakes assessment at the end of modules. The use of Authentic Assessment approaches is to be encouraged to assure a deeper understanding and professional development. To further assist student understanding of attainment and also to facilitate transparency and external review, all assessments will contain a statement to indicate the threshold level for a Bachelor or Masters levels.

Cognitive/Intellectual skills;

Analysis	Honours graduate	for new situations, the student will be able to undertake an appropriate analysis using standard methods of numerical analysis to draw logical conclusions
	Masters graduate	advanced analysis of complex situations possibly employing incomplete or contradictory data by the use of appropriate engineering tools and methodologies will be presented as justifiable outcomes
Synthesis	Honours graduate	from independent research, the student will apply ideas, information and data to unfamiliar engineering problem-solving situations
	Masters graduate	the student will interpret abstract and multidisciplinary information and data to provide a reasoned and critically aware solution to complex engineering problems
Evaluation	Honours graduate	using data from the student's own research the significance, reliability and validity may be critically assessed to support derived conclusions or recommendations
	Masters graduate	based upon a theoretical or conceptual understanding, the student may critically evaluate research, information and data and support an argument within the wider context of science and engineering.
Application	Honours graduate	appropriate knowledge and skills may be applied to complex engineering or design problems
	Masters graduate	complex and ill-defined engineering problems may be solved with initiative and originality with decisions reached in unpredictable situations for justified engineering solutions

Key/Transferable skills

Self-evaluation	Honours graduate	may, through self-reflection, identify actions required to overcome weaknesses and complement strengths
	Masters graduate	self-reflection may be applied to plan their own learning needs for personal and professional liability
use of information and resources	Honours graduate	is able to select and source own learning and research materials with limited guidance

	Masters graduate	able to undertake comprehensive research tasks with minimal guidance in a timely manner for both directed and independent study
Honours graduate	Honours graduate	complex problems are solved through the critical application of appropriate methods in stages to reach original solutions
	Masters graduate	complex problems which may contain incomplete or ambiguous information are solved independently through the application of advanced methods and tools
Communication	Honours graduate	complex technical information is presented in an effective and professional manner which may support a detailed and coherent debate
	Masters graduate	complex technical information and numerical data are presented for academic and professional debate with confidence
Learner skills	Honours graduate	working effectively in a range of situations through self-review and able to undertake a range of roles within a group under a range of constraints
	Masters graduate	able to undertake complex tasks independently as a self-learner and whilst working effectively in a group to show an understanding and ability for working with others including constructive negotiation and conflict resolution

All assessment practices must be published, equitable and subject to review beyond the academics conducting the assessment.

Assessment loading and scheduling must be laid out for students in a document prepared by the academic responsible for the administration of the programme to support the student in taking responsibility for planning their own learning.

Practical recommendations on assessment procurers

*If possible to introduce **Written Exam**, marked anonymously*

Examination paper preparation

In accordance with the agreed time-table, the call for papers to be set by the examiners will be issued. Examiners preparing individual papers will have the following roles:

Module Tutor is responsible for coordinating the preparation of the whole module exam paper. The examination should be arranged in such a way that it assesses identified learning outcomes of the module. Jointly with the other examiners for the module paper, the Module Tutor establishes the form, balance and the division of questions between topic areas, the wording of the exam paper rubric.

All examiners are responsible for the setting and marking of individual questions, as agreed with the Module Tutor. The examiner will prepare question/s and answer/s with indication of the marking scheme both on the question and on the answer sheets.

Upon completion, the Module Tutor will supply the administrator responsible for the programme the completed paper whereupon the administrator will send all programme examination papers to the External Assessor for approval.

Marking procedures

Marking should be anonymous. Providing written qualitative comments in answer books should be avoided as the script may be seen by the candidate and an appeal launched. These include comments such as "superb answer" or "fails to understand the question" etc. Numeric marks should be provided only.

Script Preparation

The Module Examiner for a paper shall arrange a meeting with the other examiners before the exam date to agree on a rota for first and second marking over the given dates. At this meeting, it should be ensured that each examiner clearly understands the marking procedures to be followed.

First Marking round

For each candidate, the first marker shall for each question attempted:

- a) indicate in the margin of each page of the answer submitted has been seen and read.
- b) write in distinctive ink (e.g. red) those marks that have been awarded for sections of the answer according to the marking scheme.
- c) where appropriate indicate the main sources of error;
- d) at the foot of the final page of the answer, total the marks awarded in accordance with the total available mark as indicated on the mark sheet and circle it.
- e) transfer the total mark to the front cover of the script.

Second Marking

This should normally be carried out by another examiner of the paper and he/she should;

- a) check the marking for consistency with the model answer and marking scheme. The marker should ensure that the marks awarded range from 0 to the maximum mark available for the part of the question.
- b) check that all work relating to the question has been seen and marked by the first examiner.
- c) check that all pages of all the scripts relevant to the question or questions being checked carry marginal marks to indicate that they have been seen and checked with a colour not previously used (e.g. green).
- d) check the addition of marks by the first marker, referring any apparent errors to the first marker for correction.
- e) check the transfer of the marks to the front of the script are correct.

When all questions have been first and second marked, the scripts should be returned to the paper's Module Examiner, who will complete the finalisation of the marks.

Coursework Assignments

The Assignment Developer will provide the Moderator with a draft of the assignment and its marking scheme for approval. The Moderator will check that asks in the assignment are well balanced, can be clearly understood and that marks allocated to sections of the assignment are appropriate. The assignment can only be issued to students after it has been approved by the Moderator.

- a) All students taking the course will be notified of arrangements to incorporate marks for coursework at the start of the course. This will normally be done during the first session of the course. This notification will include information on the number of assignments to be undertaken and the percentage allocation of marks to each assignment. Additionally, an approximate indication of the timing of the assignments will be given at the first session of the course.
- b) Each assignment shall normally be distributed at one of the course sessions.
- c) The paperwork for each assignment will clearly indicate:
 - i. The course to which it relates;
 - ii. The deadline for submission;
 - iii. The procedure of submission (place, time, person);
 - iv. The form of the submission, including advice regarding the regulations for academic misconduct
 - v. An estimate of the time required to complete the assignment;

- vi. A warning that late submissions will not be accepted;
- vii. A statement indicating the penalties for non-compliance with the stated requirements, e.g. on page limits;
- viii. The date on which the marked work will be returned to the students;

Usually, electronic receipts are issued, indicating work has been submitted.

d) The work submitted assignment is marked by the first examiner, and then the is checked by the Module Moderator who will sample a minimum of 6 assignments. The second examiner will ensure that the work has been fairly and consistently marked and that the feedback given to the student is of good quality and useful

Thesis assessment

At the prescribed time, each student is required to submit two hard copies of their thesis plus an electronic copy of his/her work in pdf format and a progress log book.

The pdf file should be checked using plagiarism software.

Each project shall be assessed in an oral examination which shall normally take about 45 minutes. The oral examination shall be conducted by two examiners with an oral examination Chair being present to oversee the examination. The first examiner is the project supervisor, and the other is another member of staff. The assessment is based on the module Learning Outcomes typified by several elements such as Planning; Demonstrating initiative and bringing Ideas; Understanding of the elements of research work conducted; Oral Performance during the exam and achievement.

Procedures for oral examination chairmen/women

- a) The Chair is responsible for ensuring that the student is treated fairly and that the oral examination runs to time.
- b) The Chair, if the examiners' grading is significantly different from the Chair's view, he/she shall ensure that the examiners are aware of the difference and that they can justify the marks awarded.
- c) If there is a serious disagreement between the examiners such that the Chair may have to rule that the supervisor's assessment must take precedence, then before doing so, the Chair shall suggest an adjournment to give the examiners time to reflect on the matter. When the report form is completed, the nature of the disagreement should be described.
- d) If there is an adjournment for any reason, the examiners must not discuss the examination with anyone else, or even between themselves in the absence of the Chair.

Procedures for supervisor and second examiner before and during an oral examination

After dissertations have been submitted, copies will be distributed to both examiners.

- a) Prior to the oral examination, the second examiner should read the dissertation carefully and award a grade for the quality of the report. Additionally, the second examiner should prepare a list of questions to ask the candidate during the oral examination, to test the candidate's understanding of the work and of its relevance and value, and to identify the achievements. The examiner should mark any errors in the dissertation and note whether all instructions given to the student have been observed. The second examiner will reveal their grade to the supervisor after the oral examination is completed.
- b) The second examiner should not discuss the work with the supervisor before the examination.
- c) Prior to the oral examination, the first examiner (supervisor) should award a grade for the degree of planning and the initiatives and ideas made by the candidate. Additionally, the supervisor should read the dissertation and prepare a set of his questions for the oral examination, to test a deeper understanding of the candidate. The supervisor also should mark any errors. The supervisor shall not reveal his grades to the second examiner until the oral examination is completed.
- d) Before the oral examination, the Chair will collect the grades from both examiners and ask if there were any special or mitigating circumstances during the project work.
- e) During the oral exam, each examiner will have 20 minutes to test the knowledge of the candidate. After the detailed questions, the Chair will ask the candidate if the work has been covered adequately during the discussions. After completion of the oral exam, the Chair will ask the candidate to leave.
- f) After the oral examination, both examiners comment on the quality of dissertation, understanding and oral performance of the candidate. The supervisor and second examiner then should move towards consensus grades for the dissertation, the understanding, the oral performance and the achievements and work out the final mark.

Quality assurance of teaching staff

The academic responsible for the administration of the programme will ensure that all teaching staff are qualified and competent to deliver the programme. All staff will engage with internal and external review processes as part of their self-evaluation and quality enhancement. All staff will share good practice and seek to employ and evaluate up-to-date approaches to learning and teaching through a range of activities which will be expected to include;

- workshops, seminars and training courses
- Peer observation

- pedagogic conferences and dissemination of engineering education research journal findings

All faculty will be involved in the module and programme review process, which will include student consultation.

Learning resources and student support

To support learning faculty and students need access to appropriate and up-to-date resources, both physical and electronic.

Physical resources include;

- teaching, lecture and seminar rooms of size and layout which support the approaches to teaching being employed
- laboratories (including computer laboratories) and workshops to underpin taught classes and projects work
- dedicated space for dissertation projects, suitably located for collaboration with staff research activity
- library and learning support facilities
- student support facilities

Electronic resources include;

- Virtual Learning Environment, or equivalent system preferably integrated with electronic library materials and learning support software
- specialist engineering design and analysis software tools preferably recognised commercial packages
- general software for producing text, diagrams and graphs
- electronic library resources such as e-books and journals

Student support should seek to meet the pastoral and spiritual needs of the students.

Information systems

The academic and administrator responsible for the administration of the programme will maintain all programme documents, including a record of the internal review process and all revisions. The administrator responsible for the administration of the programme will maintain all student records from the point of application to award and derive appropriate

data formatted for the internal review of the effectiveness of the programme.

Research-informed teaching

Students should have an opportunity to access the benefits of exposure to teaching informed by research. Such teaching can take many forms, including the fundamental and applied research feeding curriculum development. An understanding of the research process – asking the right questions in the right way; conducting theoretical investigations and experiments, and collating and evaluating information – must be a key part of the curriculum.

As the elements of Research-Informed Teaching, the following activities will be incorporated into teaching:

- The active involvement of high-level researchers in curriculum development;
- The curriculum will provide students with research training and knowledge;
- The curriculum will emphasise students undertaking inquiry-based learning;
- The curriculum will emphasise learning which incorporates students writing and discussing papers, essays and research case studies around subject content;
- The curriculum will emphasise teaching processes of knowledge construction in the subject;
- The curriculum will emphasise the research-oriented module, namely R &D project with dissertation, in which student will take part in independent research guided by staff;
- The curriculum will emphasise active self-learning process through the use of library resources (subject journal publications) and participation in research seminars, research poster presentations and conferences as a part of developing research presentation skills.

Introduction of assessment of courses by students

Assessment of courses by students will be a part of ASIAXIS. The special course questioner will be developed to reflect the students feedback on the quality of teaching materials, content and professional usefulness of didactic materials with a section provided for students suggestions on improving the course and/or its components.

The preference would be to provide students with an opportunity to fill in such the questioner using ITS facilities.

The major principle in gathering students feedback is the provision of anonymity.

Questioners will be issued to students after examinations are completed on the course.

Part 5. Organisation of Seminars for Partner University Staff by QA Departments of EU Universities

To share good practices in education between partner and EU universities special 2- hour seminars will be organised by the staff of QA Departments of EU Universities.

Such the seminars will be planned as a part of every meeting, held at EU Universities.