



Document B2

Comprehensive Report on EUR-ACE Trial Accreditations

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1. Background

Stage 4 of the EUR-ACE project from May 2005 to October was scheduled as second testing stage and was primarily devoted to a range of trial application of the EUR-ACE standards and procedures, as agreed at the SC and PB meetings in Lisbon in March 2005 after the first testing stage.

The main aims of the trials have been:

- a) to check whether the proposed standards and procedures are satisfactory, applicable and reflected in the already existing national accreditation or evaluation approaches;
- b) to find out where possible adaptations of either the EUR-ACE framework or the national standards and procedures are necessary or need to be introduced in order to be able to automatically award the EUR-ACE label in those countries where compatible national accreditations of programmes are already carried out;
- c) to collect further information about issues which in the context of the EUR-ACE project were still to be resolved or had not been stressed explicitly, such as e.g. the necessity for standards of different profiles in the first as well as in the second cycle level, or the gender-mainstreaming issue;

The trial accreditation did not aim at awarding the EUR-ACE label at this stage to the programmes tested but to contribute to the improvement of the standards and procedures, and to clarify the feasibility of accreditations based on the EUR-ACE framework. The Steering Committee sought programmes for trials in all countries where project partners are already carrying out accreditations of engineering programmes. In addition it was proposed that a few trials should be executed in countries where programme accreditation is not yet a required or common approach.

The limited time scale of stage 4 from May to October 2005 was a serious constraint and did not enable the selection of programmes for trial accreditations using only the EUR-ACE framework, as these procedures normally require a period of not less than 6 to 12 months. Instead, it was decided to use the existing programmes of accreditations of the EUR-ACE member agencies, which were already under way during summer 2005, and would have evaluation team visits in autumn 2005. In these cases the EUR-ACE project nominated one or at maximum two external international observers, who were as far as possible experienced members from the EUR-ACE Steering Committee or the Project Board.

For trials in countries where programme accreditations are not yet officially required the EUR-ACE project tried to carry out a full accreditation procedure under the leadership of one of its member agencies based on the EUR-ACE standards and procedures. In these cases a complete evaluation team of three or four members with at least two international members was nominated. But for these cases it was necessary to identify countries and HEIs where material for providing the self-assessment report had been already collected in recent quality assurance activities such as external evaluations or procedures checking “substantial equivalency” to certain quality standards. Eventually four HEIs from three countries agreed to collaborate with altogether 12 first and second cycle programmes:

- Kaunas University of Technology, Lithuania
- Kaunas University of Agriculture, Lithuania
- Bilkent University, Ankara, Turkey
- University of Zagreb, Croatia

Together with the trials where EUR-ACE participated with observers 10 countries with 14 HEIs and 23 programmes have been involved in the trials. The following table shows the details:

EUR-ACE Trial Accreditation visits carried out during the Second Testing Stage

<u>Country</u>	<u>Responsible Partner</u>	<u>University-Programme</u>	<u>EUR-ACE Observer</u>	<u>Date</u>
Germany	ASIIN	Fachhochschule Nürnberg – Mechanical Engineering (Master)	K. Hernaut	11/10/05
France	CTI	ESTP Paris	I. Manoliu (UAICR)	04-05/10/05
Ireland	IEI	NUI, Galway – Information Technology (BSc)	I. Freeston (EC ^{UK})	03-04/10/05
		Cork Institute of Technology – Electronic Engineering (BEng)	Y. Pivoravov (RAEE)	17-18/10/05
Italy	CoPI	University of Florence - Telecommunications Engineering (FC)	I. Freeston (EC ^{UK})	17-18/10/05
Portugal	OE-PT	Catholic University – Environment Engineering	No external observer	29/09/05
		Polytechnic Institute of Lisbon – Mechanical Engineering	No external observer	29/11/05
Russia	RAEE	Tomsk Polytechnic University – Geology and mineral prospecting (FC)	I. Manoliu (UAICR), G. Inglebert(CTI)	17-19/10/05

United Kingdom	EC ^{UK}	Imperial College London – Medical Engineering	I. Freeston (EC ^{UK})	12-13/05/05
		University of Edinburgh – Electronics and Electrical Engineering (BEng/ MEng)	P. Bot (CTI)	30/11- 01/12/05
Lithuania	CoPI	Kaunas University of Technology – Electronics Engineering (FC) Automation and control (FC) Control Engineering (SC)	A. Squarzoni (CoPI), K-J. Wilhelm (ASIIN)	24-26/10/05
		Kaunas University of Agriculture – Agricultural Machinery (FC)	A. Squarzoni (CoPI), K-J. Wilhelm (ASIIN)	27-28/10/05
Turkey	RAEE/IEI	Bilkent University in Ankara – Electrical and Electronics Engineering (FC and SC) Computer Engineering (FC)	C. Burkley (IEI), S. Gerasimov (RAEE)	14-18/11/05
Croatia	ASIIN	University of Zagreb – Electrical Engineering and Information Technology (Ba/Ma) Computing (Ba/Ma) Information and Communication Technology (Ma)	K. Hernaut	28-29/11/05

In order to harmonise the investigations of the observers an “observer guide” with a set of 10 questions or topics, plus the possibility to comment on additional issues of importance or to deliver proposals derived from the observations, was handed out as a basis for the reports. Whereas the questions of the observer guide were mainly focused on the standards and criteria and their achievement and assessment, the report should also include the description and evaluation of the procedures in place and their compatibility with the EUR-ACE framework.

In the three cases of full trial accreditations the draft of the EUR-ACE standards and procedures formed the basis of the evaluation and the report, enhanced by issues raised by the administrative and procedural expertise of the appointed agencies in charge of the trials. The results of the two types of trials are summarized in the following sections.

2. National Programme Accreditation with EUR-ACE observers

2.1 Results regarding procedures

The observer activities covered accreditations of 22 programmes including a cluster accreditation of 7 BEng and 7 MEng programmes at the University of Edinburgh. All six EUR-ACE member countries where programme accreditation in engineering education is in place have been involved, and so provided an immediate opportunity to compare the EUR-ACE framework with existing national standards and procedures.

Some of the national agencies or bodies in charge have already quite recently developed or adapted their standards and procedures taking the proposals and discussions of the EUR-ACE project into account. This applies in particular to OE / Portugal, RAEE / Russia and ASIIN / Germany. Other countries have experienced changes towards outcomes based accreditation standards prior to the EUR-ACE discussions, which contributed favourably to the draft of the EUR-ACE framework, in particular the UK, Ireland and

France. But these countries still are characterized by some peculiarities due to national traditions or law. Ireland is focusing its programme accreditations on first cycle degrees, whereas France at the Grandes Ecoles continues to award degrees on second cycle level based on programmes of five years duration, usually including two years of “classes préparatoires” and with no first cycle degree in between. The UK focuses on programmes with first or second cycle qualifications including the Meng, which is at Second Cycle level and is awarded on successful completion of an integrated programme of study of four years duration. In all these countries stand-alone post-graduate master programs of one to two years duration corresponding to the Bologna Higher Education reference structure and qualifications framework are not accredited as is the case in Germany or Russia. In Italy, where programme accreditations by external bodies are not yet required, pilot applications under the auspices of the Italian Rectors Conference (CRUI) and the Conference of the Engineering Deans (CoPI) are under way, they appear to conform mainly to national or regional law or directives.

Regarding the procedures in place the same basic structure is generally followed. Following the application for an accreditation assessment the HEI or programme provider has to deliver a comprehensive self-assessment report following a list of criteria and topics raised by the respective external accreditation body. The report is then checked by a team of evaluators appointed by the accreditation agency or unit, which can lead to additional requests. Based on the report and material delivered an on-site visit of the evaluation team follows. In all cases checked the team consisted of 4 to 5 national members from academia, industry and professional associations or institutions. Only in Germany are students members of the evaluation teams.

The duration of the visit ranges from 1 ½ to 3 days (Russia) and includes talks with the various authorities, the teaching staff and the students, visits to classrooms and laboratories, a check of resources and equipment, and reviewing assessed student work. In most cases an initial feedback is given to the programme providers at the end of the visit. The evaluation team produces a report and a recommendation to the respective accreditation commission, which is in charge of the final decision. Usually, and complying with the EUR-ACE procedures, the recommendations and the final decision can vary between 3 alternatives:

- Full accreditation for a period of time – mostly 5 to 6 years,
- Accreditation with prescription, mostly combined with a preliminary accreditation of shorter duration e.g. 1 year, and the request to prove that recommended changes have been initiated or prescriptions have been fulfilled in order to receive full accreditation;
- No accreditation.

The trials did not provide data on the final decisions as due to time limitations they ended with the participation at the on-site visits of the evaluation teams. For the future development and application of EUR-ACE it would be helpful if the national patterns of accreditation with prescription and of rejection were investigated and thereby provide information about the rigour with which criteria and quality standards are applied.

2.2 Results regarding criteria and standards

The main results of the trials will be described following the questions of the “observer guide”:

- 1) *Are the existing standards and procedures in accordance with the EUR-ACE Standards and procedures, or must they in the future be adapted to ensure the automatic EUR-ACE label? Do national patterns and regulations allow the application of the EUR-ACE procedures and standards be applicable in the future?*

As already mentioned the accreditation bodies or agencies in Portugal, Russia and Germany have just recently adapted their criteria and standards as far as possible to the EUR-ACE framework. In particular they changed the focus with regard to criteria and standards towards an outcomes based approach. Similar changes had taken place in the UK, Ireland and France even earlier. Italy seems to be at the beginning of this process. Therefore not surprisingly it turned out from the observed accreditation procedures that in general the national criteria and standards are in accordance with the EUR-ACE proposals for criteria and standards. National patterns and regulations in these countries thus would cover the EUR-ACE framework requirements.

In some countries, the number of criteria exceed the EUR-ACE ones due to more detailed specifications or national regulations and prescriptions. This is partly caused by the fact that accreditation of programmes or HEIs in some countries is compulsory and partly regulated by government frameworks (Germany, France), whereas other countries are providing accreditation of programmes as a voluntary process which is mainly specified and executed by professional institutions (Ireland, Portugal, UK and Russia). In Germany, due to the strong commitment of the German Federal Government and the States to the Bologna Process, special requirements are in place, e.g. for the introduction of the ECTS and the Diploma Supplement, for the extent to which employability at each of the two levels has to be addressed and achieved, for the need to differentiate between two profiles in second cycle programmes, and for the definition of degrees to be awarded. These requirements have to be inserted in criteria and standards specified by the agencies in charge of the accreditation procedures otherwise they will not be authorised to continue and award the label of the German Accreditation Council. Furthermore in Germany integrated programmes leading directly to a second cycle degree are no longer allowed in engineering education, as is still possible in other European countries. Nevertheless, these regulations do not prevent the application of the less rigid EUR-ACE framework.

- 2) *In the light of national standards and application experience, do the EUR-ACE standards need to be changed or adapted in terms of criteria, procedural aspects peers/conditions and their qualifications etc?*

From the observer reports there are no indications that the EUR-ACE framework as finally adopted needs to be changed due to national standards and regulations. On the contrary, in some countries it may happen that the EUR-ACE framework is more demanding regarding criteria and standards than the national requirements. In these cases it needs to be decided whether the application for a EUR-ACE label would at least require a self- assessment report in line with the EUR-ACE framework, if national law or accreditation procedures have not been adapted to require a report. This applies for example to the emphasis on learning outcomes, or the requirements for learning outcomes assessment, or for a continuous quality assurance process.

3) Are the generic Learning outcomes (LOs) present in the national standards and are they reflected in branch specific and subject / course specific LOs?

As the EUR-ACE learning outcomes are generic ones they need to be reflected in the branch, subject, programme and course related specifications. This was obviously the case in all the accreditation procedures observed. From the available observer reports it is however not possible to investigate in detail the approaches in use.

From the EUR-ACE documentation of the national accreditation and evaluation systems, and the information provided from the accreditation bodies, the specific requirements of the different branches and programmes seem to be quite different in terms of detail and terminology and with regard to the bodies or institutions in charge of the specification of these requirements. In some cases fairly detailed requirements or recommendations are given, not always phrased in an outcomes based terminology but in terms of input of subjects, courses and contact hours. In other cases it is left to the peers to assess how the generic outcomes are reflected in branch and programme specific learning objectives and teaching and learning provisions. To ensure a comparable quality of branch specific learning outcomes it may be helpful to investigate different approaches in more detail and take the results into account for future amendments of standards or self-assessment reports, and for the qualification of evaluators.

4) Are additional LOs stated and accredited?

As already mentioned additional learning outcomes compared to the EUR-ACE ones may be required or stated by programme providers in order to achieve a certain profile or a different level of competence. From the reports of the observer there was no indication that substantial generic outcomes are missing in the EUR-ACE framework and need to be added.

5) Are LOs for specific profiles determined and applied in the accreditation process? How far must they be taken into account in a revision of EUR-ACE standards?

The question whether standards for different profiles for the two levels and cycles should be defined in the EUR-ACE framework was intensively discussed within the EUR-ACE project. The decision finally taken does not opt for different profiles, but provides generic outcome standards only for the two levels according to the Framework of Qualifications for European Higher Education. This decision should not prevent HEIs and programme providers using the EUR-ACE standards to specify different profiles and go beyond the required generic outcome standards. In some European countries this is even required by national regulations. Germany asks for a distinction between more application oriented and more research oriented profiles in second cycle programmes and degrees, other countries connect such profiling with the mission of different Higher Education Institutions and require a distinction even at first cycle, manifested in different programme requirements. This sharp distinction between two profiles is not made in all countries. Profiling beyond the achievement of certain generic outcomes, which are required as entry qualification into the profession of engineers, can take a much wider variety of forms.

From the observed accreditation procedures no need was stated or proposal delivered to change the EUR-ACE approach and introduce a definition of specific profiles. The EUR-ACE framework appears to be flexible enough to ensure a satisfactory and comparable professional quality for the first as well as for the second degree level and at the same time allow the differentiation necessary to maintain and develop the diversity of different demands and missions within Europe.

6) *Do the LOs and the procedures enable the 1st and 2nd levels to be satisfactory determined?*

The EUR-ACE framework provides the opportunity for the accreditation of programmes on two different levels according to the Bologna process and the Framework for Qualifications of European Higher Education. This is unique, as many other countries and programme accreditation schemes in engineering education, such as that used by ABET in USA and the Washington Accord focus in general on the first cycle degree and qualification.

The programme accreditations observed in the trials included first cycle as well as second cycle programmes or at least degrees of both levels. The observations proved that the EUR-ACE generic learning outcomes seem to discriminate satisfactorily between the two levels. On the other hand most of the trial accreditation did not concern consecutive programmes with degrees on the first and second level but stand alone first or second cycle programmes or integrated ones. With regard to these programmes it was only possible to reflect whether the stated outcomes apply to the respective objectives and levels, which obviously was the case. No serious deviations from the required outcomes have been reported.

In one visit where it was possible to compare directly the outcomes at the two different levels the observer commented on the need to ensure that the aims and objectives of the two levels are clearly differentiated. This applies particularly in the UK where generally first cycle BEng(Hons) degrees are of three years duration, and integrated programmes designed to achieve an output level equivalent to a second cycle degree (MEng) are of four years duration.

7) *What kind of assessment of LOs takes place, is it appropriate, and can the approaches used establish that the intended LOs have been achieved?*

It is not the definition of appropriate learning outcomes corresponding to the EUR-ACE framework that is the crucial issue of programme accreditation, but the proof that the stated and intended learning outcomes are really achieved by the graduates, and that they will also be achieved in the future. Thus appropriate learning outcome assessment and sustainable quality assurance and management are of utmost importance.

From the reports of the observers it became obvious that a wide range of surveys, documentation and assessment approaches are employed to make evident that intended outcomes have been achieved. Even if most of the observers got the impression that assessments and documents provided allowed the conclusion that the intended outcomes have been achieved, the need for further investigation into this issue and the search for comparable, valid and reliable approaches of outcomes assessment seems to still be there. In one case the appropriate assessment of learning outcomes was originally not even addressed and only tackled because of the EUR-ACE requirements.

8) *Is the topic of gender mainstreaming (i.e. the promotion of gender balance) addressed, or in which way could it be addressed?*

The gender mainstreaming issue was not explicitly addressed in the EUR-ACE standards and procedures, partly due to the fact that for many countries in Europe this does not seem to be a specific problem in engineering education, at least as far as gender balance

among students is concerned. However there are other European countries where gender mainstreaming is reflected in measures to increase the number of female students and staff e.g. by taking it into account in quality evaluation or accreditation procedures. In Germany a special E-Quality label was proposed and can be awarded to HEIs or programmes, which satisfy special criteria and standards. Observers of the trial accreditations have in three cases reported that gender aspects have been discussed during the visits but do not propose to address this topic in the criteria and standards. Nevertheless it could be integrated into some of the criteria, and as a specific issue in the self-assessment reports, and the visit reports could comment on the situation in a particular country or in the mission statement of a programme provider or HEI.

9) How do the national standards and accreditation procedures deal with the European and international aspects and with joint degrees?

The trial accreditations unfortunately did not cover programmes leading to joint or double degrees or with a special international profile. From the documentation about the national systems of programme accreditation it became however clear that internationalisation of programmes is encouraged and that study abroad phases should be fully recognized. The specifications of required transferable skills often explicitly address foreign language abilities, intercultural competences and the ability to work in international teams and environments. These skills can be achieved by various means. In cases where phases of study abroad cover significant parts of the curricula, or where joint degree programmes are developed and implemented, special accreditation procedures are applied involving at least evaluators from the partner countries or the foreign accreditation agencies to make sure that study abroad parts of a programme also achieve the necessary quality. Outcome based standards and procedures, such as those of EUR-ACE, which are shared and applied by the countries involved, will facilitate respective accreditation processes.

Another aspect of the European dimension is the implementation of ECTS and the delivery of the Diploma Supplement. Some European countries require the modularisation of programmes and the implementation of ECTS and expect that accreditation procedures address this issue, e.g. Germany. From the observation in the trials it is obvious that this is not the case in many other European countries and even that different credit systems are in place, e.g. in the UK. So far the EUR-ACE framework – concerned mainly with specified outcomes and the proof that they are achieved - does not explicitly deal with aspects of curriculum structures and with the various approaches to achieve the required outcomes, including the existence of a certain credit and grading system. Arising from the report of one observer it could nevertheless be asked if the award of a European Accreditation label should not insist to require a common credit system, such as ECTS, in order to facilitate comparability, recognition and mobility.

10) In programmes which combine different disciplines or branches of Engineering, which standards are employed, what is the composition of the audit team, and who is in charge of the procedure?

The few trials, which represented this situation, were treated by mixed audit teams composed by evaluators from the involved branches or institutions. Normally the process is run and chaired by the branch or institutions, which is primarily addressed by the major subject or branch dominating the profile of a certain programme, which then should also be authorized to award the EUR-ACE label. Referring to a common set of generic outcomes will facilitate the collaboration.

3. Trial Accreditations based on EUR-ACE standards and procedures

Three countries which are not represented in EUR-ACE by any kind of association or accreditation unit have been involved in trial accreditations based on EUR-ACE standards and procedures: Croatia, Lithuania and Turkey. In Lithuania and Turkey the trials were carried out by international teams of 3 or 4 members, appointed by the EUR-ACE project. However in Croatia the accreditation of five programmes in electrical engineering and computing at the University of Zagreb was part of the German ASIIN accreditation programme, and so was conducted using ASIIN standards and procedures. The accreditation team consisted of six, including two EUR-ACE observers, who did not observe during the accreditation visit any inconsistency or incompatibility between the ASIIN and EUR-ACE standards.

The conditions of quality assurance approaches and experiences with external evaluations were however quite different in the Universities and countries involved, which is reflected in the results of the trials. Croatia in 2005 was promoting a comprehensive quality evaluation approach at its Universities, inviting international peers to take part, but there is however no programme accreditation system in place yet. Lithuania has established a quality assurance unit for higher education, which seems to work based on an approval approach, checking whether state regulations concerning objectives, contents and curricula are applied in the universities. In Turkey at some universities, including the Bilkent University, the American Accreditation Board of Engineering and Technology (ABET) has carried out external evaluations aiming to check “substantial equivalency” with the new outcomes based ABET criteria and standards. On a voluntary basis the Turkish body in charge of the accreditation of engineering programmes, MÜDEK, continues to accredit programmes using standards very much in line with ABET, but at the same time quite compatible with the EUR-ACE framework.

The EUR-ACE trials were conducted there to collect additional feedback about the applicability of the standards and procedures, and the feasibility of “international accreditations” based on the EUR-ACE framework under the leadership of one EUR-ACE member agency. The trials thus required a lot of work at the Universities involved in preparing the self-assessment reports for the visits and providing supplementary material in a very short time, without on the other hand achieving a special award or label. The EUR-ACE project therefore has to thank these Universities for their collaboration and hospitality and the perfect organization of the visits.

The trials concerning four programmes in Kaunas and three programmes in Ankara were based on the EUR-ACE standards and procedures and therefore focused on the 5 areas with 14 different criteria to be assessed, and the 6 main programme outcomes. Without going into details of the process it can be summarized that the EUR-ACE framework appears to be satisfactory to ensure a certain quality of engineering programmes and qualifications, and to carry out accreditation or “substantial equivalency” operations internationally. No special recommendations to change or adapt the EUR-ACE framework have been derived from these trials.

On the other hand it turned out that these kinds of “international accreditations” need careful preparation in relation to the framework conditions in the respective countries and Universities, which was not possible in all of the trials, due to time and other constraints. Following the usual procedures of a EUR-ACE member agency in charge of the process may not be sufficient. Programme providers not familiar with outcome based approaches of accreditation and evaluation need to get additional advice to prepare the self-assessment reports, and to provide material that make evident that programme objectives correspond to the EUR-ACE outcome standards and how they are achieved and

assessed. Two day visits without satisfactory documentation and self-assessment reports in advance may otherwise be too short to check on site whether the criteria and standards are sufficiently fulfilled. In cases with comprehensive material in advance the team visits should rely on this material and be very focused. Preparing international observers, peers and visiting teams for their evaluation activities should also be taken into consideration.

In a few cases the trials generated a range of recommendations, some of which would have resulted in accreditation decisions “acceptable with prescriptions”. For future applications of the EUR-ACE framework outside the member countries and agencies it will be necessary to clarify how to deal with such prescriptions and provisional or time limited accreditation.

4. Conclusions

The trials provided valuable feed back to the EUR-ACE project regarding the comprehensiveness and applicability of the standards and procedures. Despite the limited number of trials and the empirical data it seems that the EUR-ACE framework can be used to arrive at shared and high European quality standards of engineering programmes of the first as well as the second cycle according to the Framework of Qualifications for European Higher Education. It therefore should be possible to award a respective European label either through the accreditation activities of recognized national agencies or units, or through the evaluation of “substantial equivalency” or an “international accreditation” conducted by an international team of evaluators under the leadership of an appointed or requested member agency of for instance the recently founded European Network for the Accreditation of Engineering Education (ENAE).

From the documentations and observer reports it turned out that procedures and required programme outcomes already show a remarkable similarity among the EUR-ACE member agencies or accreditation bodies dealing with the accreditation of engineering programmes. The harmonisation of approaches to outcome assessment and the proof that standards and criteria are satisfactorily fulfilled and deserve accreditation without prescription and the award of the envisaged EUR-ACE label seem to need further investigations and activities. Procedures for future application of the EUR-ACE framework in countries and at HEIs where accreditation of programmes is not yet a common feature need some more clarification and should be well prepared.