

Accreditation processes in Electronic and Information Engineering

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Abstract

The aim of the SOCRATES EIE-Surveyor project is to be a reference point for Electrical and Information Engineering in Europe. The project brings together representatives from 27 out of 31 eligible countries. One of the tasks of the project is the evaluation of the accreditation processes in the participating countries. A questionnaire about the accreditation process was developed and sent to project partners in each participating country. The main areas investigated the nature of the accreditation body, the criteria, which are evaluated, the structure of the visit and the decision formulation.

A first analysis shows that some countries have not yet introduced a formal accreditation process. These countries are generally in a transition situation in relation to introducing the Bologna process. In some other countries several accreditation bodies exist depending on the region or the nature of the institution. It also appears that the accreditation for masters degrees is not yet compulsory everywhere.

Other issues regarding the accreditation process that are also being considered relate to who pays the expenses in relation to the accreditation process, what is the relationship between the ECTS and the actual content and level of the courses and whether or not industrial placement is a compulsory component of the programme.

Keywords: accreditation, evaluation, electrical engineering

1. INTRODUCTION

EIE-Surveyor is a SOCRATES project whose objectives are:

- Identification of the generic competences and subject-specific competences in Electrical and Information Engineering (EIE).
- Implementation of quality assessment methodologies on some educational resources available in EIE.
- Evaluation of the existing accreditation processes and the proposition of a standard methodology for accreditation, in order to enhance comparability and common certification procedures.
- Compilation of the existing curricula in EIE in Europe, the multinational degrees, and the situation of the implementation of Bologna process in EIE, at the bachelor, master and PhD levels.

The main activities of the project are:

- The application of the tuning methodology to EIE to identify competences.
- The compilation of a list of the degrees available in EIE in Europe, and the state of the implementation of the Bologna process.
- The quality assessment of some resources in EIE available through the Internet.
- The analysis of existing accreditation procedures and the proposition of a standard accreditation methodology.

The expected outputs are:

- The update of a monograph on the degrees and international degrees in EIE in Europe that was published in a previous project (THEIERE project).
- Guidelines for the generic competences and subject specific competences content in EIE programmes
- Proposal for a standard accreditation methodology, together with a census on existing accreditation boards and methodologies.

- Library of selected pedagogical resources available in EIE with a quality assessment.

The project involves 94 partners from 27 countries (out of 31 eligible countries). This reports on the accreditation task of the project.

The starting point of the accreditation task in Surveyor project was the EUR-ACE project (European accreditation of European Engineering and graduates) [1], which was a consortium of 14 partners, supported by the European Commission. The objectives of the EUR-ACE project were (i) to ensure consistency between existing national engineering accreditation systems, (ii) establish a European “quality label” for accredited programmes and (iii) assist with the establishment of accreditation in European countries where it does not yet exist, thus improving the quality of engineering education, facilitating transnational recognition and mobility of engineering graduates.

The aim of the EIE Surveyor task was to see how the EUR-ACE results could apply to the field of electrical and communication engineering.

2. MAIN POINTS TO BE CONSIDERED

The EUR-ACE project evaluated the various factors that should be taken into consideration when assessing an engineering programme. These have been used as the guideline for constructing the questionnaire. They are gathered into six domains.

2.1. General information and curriculum

The general points concerning the curriculum are:

- Identification of educational goals
- Profile of the programme
- Duration, workload, ECTS

A difference must be made between the duration of courses, tutorials and practical works and the actual workload which includes the personal unsupervised study time of the students.

- Teaching methods
- Programme structure
- Programme content
- Number and duration of internships or workplacements

The internships may be in academic laboratories or in industry.

2.2. Professors and academic staff

- Teaching staff (number, specialisation, qualification)

The ratio between professors and other academic staff is considered. Their area of specialisation must be close to the topic of the curriculum.

- Academic staff – student ratio
- Technical and support staff

Qualifications of the technical and support staff are also important.

- Research activities of staff

The research activity should inform the development of the curricula.

- Professional activities and consultancy

2.3. Admission and educational standards

- Admission requirements

Students may be admitted to the programme on the basis of a general national or state examination or by a selective entrance examination.

- Assessments of demand for the programme
- Assessments of student performance

This relates to the different ways of assessing the student performances (grading, oral assessment, practical results of a device).

- Student performance

The performance must be evaluated according to ECTS criteria. The distributions of the results among the different grades may be evaluated.

- Graduate employment opportunities

2.4. Quality assurance measures and development

- Quality assurance measures
- Plans for the future development of the programme

2.5. Institutional context

- General requirements (organizing, management,...)
This point relates to how the institution operates and is managed.
- Cooperation with Higher Educational Institutions
- Industry cooperation
The industrial cooperation is important for technical fields. It can be at different levels (internships, Teaching engineers, facilities)
- Finances
- Facilities
Many facilities are required for technical fields (laboratories, computers) but also for general needs (library, duplicated notes,...)

2.6. Internationalisation

- Study abroad opportunities
Most of institutions propose studies abroad for their students. It can be a simple semester or a whole academic year with validation by the home institution. Many double diplomas are proposed.
- International co-operations
The international co-operations between two institutions consist of student and teachers mobility. They generally precede the organisation of study abroad opportunities. They are often initiated by research activities.
- Foreign language requirements and education
For non-English speaking people, a knowledge of the English language is very desirable.
- Subject or specific classes taught in foreign languages
Many institutions propose some courses in English and a few have a full curriculum in English.

3. QUESTIONNAIRE

It was considered important that the questionnaire evaluated how the EUR-ACE criteria are considered by the institutions during the accreditation process. The goal was to have some complementary information specific to EIE field.

The questionnaire was constructed so that it could be completed in a quick and straight forward manner. It was sent to one partner in each participating country. Where a country has several accreditation bodies, several questionnaires were sent. The questions were divided into four sections.

3.1. Accreditation body

- Is accreditation compulsory to deliver engineering degrees in EIE?
- Is the accreditation awarded by the government, the university, a professional body or some other agency?
- Is the accreditation awarded to a programme, a department or the whole institution?
- Does the accreditation body include faculty, employers, engineers in industry?
- Does the accreditation process include quality assurance measures?

3.2. Parameters Measured

A number of different parameters can be considered during the accreditation process. For each of them the questionnaire asked whether it is evaluated and if documentation is provided in advance or during the visit. The parameters listed in the questionnaire were:

- Curricula
- Examination papers
- Student examination scripts
- Projects reports and thesis

- Students' performance
- Employment of graduates
- Academic staff
- Recruitment
- Research activities
- Collaboration with industry
- Facilities

3.3. Evaluation visit

In general the accreditation body sends a visiting panel in the institution to be reviewed. In order to evaluate the visiting process, the following questions were asked:

- What is the frequency of the visits?
- What is the size of the visiting panel?
- What is the composition of the visiting panel (academics, industrial, others)?
- What is the duration of the visit?
- Whom does the panel meet during the visit?
 - students
 - academic staff
 - technical staff
 - administrative staff
 - employers
 - graduates

3.4. Conclusions

On the completion of the visit, the visiting panel in general gives a verbal presentation of their findings to the staff in the institution visited. Subsequently a report is written which includes a recommendation on the accreditation. In order to evaluate how the conclusions are processed the following questions were asked.

- To whom do the review panel report (government, university, professional body, agency)?
- Who makes the final decision (government, university, professional body, agency)?
- What are the different possible decisions?
 - full accreditation
 - accreditation for reduced period of time
 - no accreditation
 - additional non-compulsory recommendations

At the end of the questionnaire, the participants were also invited to add any further comments they may wish to make.

4. RESULTS

Twenty two completed questionnaires were received from partners in eighteen different countries. Some countries have several accreditation bodies – for example there are six different accreditation bodies in Germany and three in France. In the questionnaire many of the answers were not mutually exclusive so several answers were possible with the result that the total percentage may add to more than 100%.

64% of the respondents said that the accreditation is compulsory and in some cases accreditation can be given simultaneously by several entities. In 64% of the cases the government awards the accreditation while an independent agency does so in 45% of the cases. In the majority of cases (73%) the programme itself is accredited and the whole institution is evaluated 56% of the time. The accreditation body is constituted by faculty (65%), member of specific accreditation bodies (59%) and employers (45%). Engineers in industry are present in only 14% of the accreditation bodies. The accreditation process includes quality assurance measures (77%).

The most important criteria that have been considered during the accreditation process are the curriculum (95%), the academic staff (91%), the collaboration with industry (86%), the facilities (86%), the research activities (82%) and the employment of graduates (77%). In most cases documentation related to these items was provided in advance. Other criteria evaluated include the projects reports and thesis (68%), the recruitment (59%) and the student examination scripts (45%). These items are generally evaluated during the visit. The examination papers are considered in only a minority of cases (32%).

On average, the frequency of the visits is 5 years and the size of the visiting panel is 4 persons. It is mainly composed of academics (86%) and industrial representatives (55%). The visit lasts between 2 and 3 days. The panel meets mainly students (91%), academic staff (95%) and administrative staff (82%). Technical staff (50%), employers (36%) and graduates (41%) are interviewed less frequently.

The final report is sent to the government in (50%) of the cases, the university in (32%) and an independent agency in (41%). The final decision is made by the government (55%) of the time and an independent agency (36%) of the time. They decide on full accreditation or an accreditation for a reduced period of time or a non-accreditation. In 41% of the cases, additional non-compulsory recommendations can be given.

5. CONCLUSION

A first analysis shows that some countries have not yet introduced a formal accreditation process. These countries are generally in a transition situation in relation to introducing the Bologna process. The accreditation process, ECTS and the quality assurance measures will probably be introduced at the same time.

In some other countries several accreditation bodies exist depending on the region (in Germany according to the Länder) or the nature of the institution (in France between universities and Grandes Ecoles). It also appears that the accreditation for masters and PhD degrees is not yet compulsory everywhere.

Other issues regarding the accreditation process that are also being considered include the payment of the expenses in relation to the accreditation process. This point is important in the countries where the accreditation process is not paid by government. Also, the relation between the ECTS and the actual content and level of the courses is being considered. This issue is larger than the goal of this task, but it is a very important question for the mutual recognition of the curricula. Finally the issue of whether industrial placement is compulsory and for how long must it last is being reviewed.

Reference

[1] http://www.feani.org/EUR_ACE/EUR_ACE1_Main_Page.htm