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## **FINAL REVIEW REPORT**

Electrical and Electronic Engineering Diploma

**The Lebanese University  
Beirut – Lebanon**

October, 2008



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**ENHANCEMENT OF QUALITY ASSURANCE AND INSTITUTIONAL PLANNING IN ARAB UNIVERSITIES**

مشروع تطوير الأداء النوعي ورفع كفاءة التخطيط المؤسسي في الجامعات العربية

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## I. Academic Subject Review

The Project, "Enhancement of Quality Assurance and Institutional Planning at Arab Universities" is sponsored and funded by the Regional Bureau of Arab States of the United Nations Development Programme. The Project works in partnership with Arab universities to introduce independent systems of quality assessment of programmes, with reference to internationally accepted criteria, procedures and benchmarks.

The cycle of review in 2007-2008 addresses selected academic programmes in the field of Engineering and follows earlier successful cycles of review organized by the Project. In addition to this individual review report on the nominated programme of study, there are 18 other individual review reports which feed into an overview report that highlights areas of regional strength, weakness and needed reform for the higher education sector in the Arab region. The Project organized and implemented training workshops on self-evaluation and peer evaluation for representatives of participating universities, and also orientation workshops for reviewers recruited from the UK and Germany.

The method used for review is a modified version of Academic Subject Review as developed for implementation in 2000 by the Quality Assurance Agency for Higher Education (the QAA) in the United Kingdom. This method, adapted and developed by the Project over several years, shares many features with the European Framework for Quality Assurance in Higher Education and with emerging international practice. Full details of the process of subject review can be found in the Project's *Handbook for Academic Subject Review* (Publications: [www.undp-equaip.org](http://www.undp-equaip.org)). The main features of the method can be summarized as follows:

Academic subject review takes place according to the published *Handbook*. The review process includes a framework for evaluation and reporting, a method incorporating internal and external review and protocols for the site-visit and reporting to the participating university. The framework, described in the *Handbook*, includes the articulation of academic standards in terms of intended learning outcomes (ILO's) and the selection of an appropriate external subject reference to verify the subject's development of intended learning outcomes within the chosen educational programme.

The Academic Subject Review process starts when institutions select a programme of study, evaluate it in a self-evaluation document (SED) and prepare a programme specification for the selected degree-awarding programme. The SED and the programme specification are submitted to the Project for use by an international team of peer reviewers. These reviewers are academics and practitioners trained and experienced in external scrutiny and review processes, drawn from the UK, Germany and Project-trained representatives of participating universities. They read the documents and visit the university to gather evidence to enable them to form and report on their evidence-based judgements on the academic standards, the quality of learning opportunities and the internal arrangements of the university to assure and enhance the quality of the reviewed programme.

Review activities include, among others, the examination of a wide range of evidence based on meetings with the teaching and administrative staff, external examiners, students and other stakeholders. Evidence is based also on scrutinising documents such as: subject handbooks; unit guides; samples of student work; internal review documents; minutes of meetings; progression data. Also examined are physical learning resources such as: labs and workshops; lecture rooms; ITC labs; libraries; offices and other facilities and equipment.



At the end of the on-site review visit, and before drafting the review report, a meeting is organized between the review team and the programme providers where an oral briefing on the main outcomes of the review visit and the main judgments reached is presented by the review team coordinator. The briefing provides an opportunity for the hosts to give their feedback on the factual aspects of the review outcomes. The main outcomes and judgments are further reviewed by the Project Editing Team in dialogue with the review team coordinator, where these are checked against provided evidence to ensure consistency with the review method. Final moderation of the outcomes and judgments is undertaken during a day-long coordination meeting that is convened by the Project Team for all international reviewers to ensure consistency of method application for each programme and across the region. (The coordination meeting for the Engineering review cycle was held in Oxford, UK on July 18, 2008).

### **I.1 Academic Standards**

Reviewers make one of the following judgements on academic standards:

**Good**  
**Satisfactory**  
**Unsatisfactory**

To reach this judgement, reviewers evaluate:

- Intended learning outcomes (ILO's)
- Curricula
- Student assessment
- Student achievement.

An explicit judgment is made on each of the last three of the above four elements, but no judgment is made on the intended learning outcomes. For the overall judgment on academic standards to be **Good**, at least two of the three elements have to be judged to be Good. On the other hand, if the arrangements are judged to be **Unsatisfactory** in anyone of the last three elements that comprise the section of academic standards, the overall threshold judgement on academic standards is **Unsatisfactory**.

### **I.2 Quality of Learning Opportunities**

Reviewers make one of the following judgements on the three elements of learning opportunities:

**Good**  
**Satisfactory**  
**Unsatisfactory**

The three elements of quality of learning opportunities are:

- Teaching and learning
- Student progression
- Learning resources

### **I.3 Quality Assurance and Enhancement**

Reviewers also report the degree of confidence they have in the provision's internal arrangements to assure and enhance quality and academic standards in the subject under review. They make one of the following judgements:

**Good**  
**Satisfactory**  
**Unsatisfactory**



## I.4 Special Indicators

As an extension to complying with the Project's requirements of narrative reporting following the template outlined in Annex D of the *Handbook*, the peer reviewers also make explicit assessment on a set of special indicators (SIs). This list of semi-quantified judgments (**Good**, **Satisfactory** or **Unsatisfactory**) covers a number of special indicators related to academic aspects, learning resources and quality assurance and enhancement. These indicators are considered by the peer reviewers to be of special significance in determining the quality of academic programs in general and academic programs of engineering in particular. The main outcomes of each of the review element are set out in the first table below, while the grade given for each SI is in the table that follows:

## II. Main Review Outcomes

The **Electrical and Electronic Engineering Diploma** at **The Lebanese University** was reviewed in June 2008. Judgements were made about the academic standards achieved, the quality of learning opportunities provided and the mechanisms for quality assurance and enhancement.

The main outcomes reached by the reviewers are as follows:

### II.1 Graded Judgements

Judgements	U	S	G
<b>Academic Standards</b>		✓	
Curricula		✓	
Student Assessment		✓	
Student Achievement		✓	
<b>Quality of Learning Opportunities</b>			
Teaching and Learning		✓	
Student Progression		✓	
Learning Resources			✓
<b>Quality Assurance and Enhancement</b>	✓		

### II.2 Special Indicators

Academic	U	S	G
Appropriate external references in terms of standards and relevance	✓		
Final year "capstone" or equivalent project		✓	
Placement for industrial practice		✓	
Internal/external moderation of student assessment		✓	
Assessment of practical skills and applications to real situations		✓	
Range and effectiveness of teaching and learning approaches to address design skills and competence		✓	
Strategies for independent learning		✓	
Impact of staff research / scholarly studies/ professional practice on teaching		✓	
Competence in a relevant foreign language		✓	



<b>Learning Resources</b>	<b>U</b>	<b>S</b>	<b>G</b>
Sufficiency of academic staff numbers			✓
Adequacy of academic staff qualifications and experience including professional practice		✓	
Appropriateness of staff (rank) structure to underpin academic standards		✓	
Sufficiency and standards of support staff		✓	
Adequacy of labs and workshops including guidelines and teaching material			✓
Adequacy of safety arrangements, precautions, and manuals		✓	
Adequacy of computer –based learning facilities, PCs, and application software			✓
Adequacy of departmental and university facilities for internet access and use			✓
Appropriateness of library holdings in the languages of instruction			✓
Adequacy of library space, organization and uses			✓

<b>Quality Assurance and Enhancement</b>	<b>U</b>	<b>S</b>	<b>G</b>
Quality of SED and supporting documents including programme and course specification		✓	
International relations including knowledge exchange and professional recognition		✓	
Development of internal systems for monitoring and reporting of the quality education	✓		
Development of systems to ensure continuous improvement (including improvement plans in place)	✓		



### III. Academic Subject Review Report

#### III.1 Introduction

1. The **diploma programme in Electrical & Electronic Engineering** at **The Lebanese University** was reviewed in June 2008. Judgements were made about the academic standards achieved, the quality of learning opportunities provided and the mechanisms for quality assurance and enhancement.
2. The University is the sole public university in Lebanon with 43 branches distributed throughout the country. It was founded in 1953. It has around 65000 students within its 17 faculties. The Faculty of Engineering, which includes the Electrical and Electronic Engineering Department, was established in 1974 by presidential decree. At the time of the review, the Department situated at Hadath, Beirut, has 178 full-time undergraduate students enrolled in the Electrical & Electronic Engineering diploma programme of which 40 are female. There are 19 academic staff (11 tenured and eight with annually renewable contracts), two of whom are female, six part-time staff of whom one is female and nine laboratory assistants of whom three are female. In addition, there are 36 technical and administrative staff who support the programme. All of the staff make a contribution to the programme.
3. The structure of the engineering programme in the University includes two years of common core courses followed by three years of electrical and electronic engineering courses with specializations in Power and in Telecommunications. The programme is delivered and assessed using a mixture of French and English languages.
4. The programme specification (PS) states that the aims of the provision are as follows:
  - To produce graduate engineers who are:
    - Multidisciplinary in the electrical, electronic and IT domains
    - Capable of meeting the demands of the local and regional (Arab countries) market for engineers
    - Able to follow-up recent technical developments.
  - Provide necessary skills to enable intellectually-capable students to pursue postgraduate studies.

The SED states in more detail that the overall aims of the Electrical & Electronic Engineering programme are to graduate engineers who are:

- multidisciplinary in the electrical, electronic and IT domains;
- equipped with a broad general profile in addition to specialist knowledge and skills in electric power or telecommunications;
- able to establish the relationships between theoretical and practical aspects of a problem;
- able to follow up on their own recent technical developments;
- able to use appropriate ICT tools during any design, maintenance or analysis of an engineering project;
- equipped with intellectual skills enabling them to set numeric models, analyze measurement results, solve technical problems and integrate different technologies in their design;
- able to collaborate efficiently in team work and to execute accurately tasks allocated to them within their team;
- able to meet the demands of the local and regional (Arab countries) market;
- Equipped with the necessary skills to enable the high achieving students to pursue postgraduate studies.



## III.2 Academic Standards

### III.2.a Intended Learning Outcomes

5. The programme aims are listed in the Self-Evaluation document (SED) and in a more compact statement in the programme specification (PS). The intended learning outcomes (ILOs) are listed in Part B of the PS, under the headings of Knowledge and Understanding, Subject-specific skills, Intellectual or Cognitive skills and General skills. The Department has chosen to specify ILOs only for the final three years of the five year programme during which electrical and electronic engineering topics are developed. The first two years comprise a common engineering core programme (CECP) as preparation for entry to any of the programmes offered in the Faculty of Engineering. Courses in that programme include Mathematics, Physics, Chemistry, ICT and some general topics including Language Teaching. The concept of ILOs is new to the Department and those listed have been derived by staff mainly from an analysis of the objectives given in the existing course descriptions. The diploma programme was originally modeled on the structure and content of Grande École programmes in France and has maintained parity with those programmes. No other external references or benchmarks have been used by the Department. Other valuable sources of external reference that could be considered are the international benchmark statements for engineering such as ABET, UKSPEC and EUR-ACE. The programme has not been submitted for accreditation to any professional engineering body and ETS Major Field Tests have not been used to assess the standards or to influence the aims or ILOs of the programme.
6. The programme aims are stated clearly and concisely in the programme specification and in more detail in the Self-Evaluation document. They emphasise the goals of providing graduates with multidisciplinary general knowledge and skills and with additional specialist knowledge and skills in either of the specialist fields of electrical power or telecommunications to prepare them for employment in local and regional industries or to pursue postgraduate studies. The ILOs are spread across the main curriculum areas of study. These include the fundamental principles and applications of electrical and electronic engineering which all students study along with specialist courses in either electrical power or telecommunications they may elect to take to complete the programme. The programme specification contains a cross-reference grid linking specific ILOs with the courses in which they are addressed. The ILOs show a broad relationship with the programme aims and the aims are appropriate for an electrical and electronic engineering programme. However, the Department should also develop a corresponding set of ILOs for the CECP programme so that the output levels achieved for Mathematics, Physics and Chemistry are seen to be suitable for entry to the Electrical and Electronic engineering programme and also appropriate as preparation for postgraduate study.
7. The ILOs for knowledge and understanding are addressed in a wide range of the common and specialist courses. The curriculum structure enables knowledge and understanding to develop progressively, and facilitates achievement of the stated ILOs. The ILOs reflecting skills development are also addressed in a range of courses. The acquisition of ILOs in subject-specific and intellectual skills is supported by directed work (Travaux Dirigés), mini-projects, laboratory classes and a final year project. The ILOs for general skills of communication, teamwork, written and oral reports and presentations are also supported in mini-projects, seminars, laboratory courses and the final year project. The samples of student work seen by the review team provided evidence that these mechanisms were contributing to achievement of the stated ILOs.



8. The programme specification and the programme ILOs were developed only very recently in preparation for the UNDP review of the programme. At present, course objectives are generally described to students at the first lecture in a course. Replacing this introduction to course objectives with programme and specific course ILOs will require a much better understanding of ILOs by academic staff. In addition, the academic staff need to understand fully the concept of ILOs to facilitate discussion of curriculum design changes and assessment design in terms of ILOs. This is recognized by the Department and there are plans to publish a programme handbook in the near future that will explain ILOs and include the programme specification. This will be made available to staff and to students. The review team strongly supports this plan and suggests that an electronic version of the handbook should also be made available on the University intranet.
9. The Department has successfully developed an initial set of ILOs that are appropriate for the electrical and electronic engineering programme under review. The ILOs are consistent with the stated aims of the programme. However, it is recommended that the set of ILOs is extended to include the courses in the common engineering core programme since these courses, and particularly Mathematics, contribute to the aims of the electrical and electronic engineering programme.

**Strengths:**

- The ILOs show a broad relationship with the programme aims and the aims are appropriate for an electrical and electronic engineering programme.
- The curriculum structure enables knowledge and understanding to develop progressively, and facilitates achievement of the stated ILOs.
- Scrutiny of samples of student work showed evidence of different mechanisms being used to demonstrate achievement of the ILOs.

**Recommendations for Improvement:**

- The Department should develop a set of ILOs for the CECP programme so that the output levels achieved for Mathematics, Physics and Chemistry are seen to be suitable for entry to the Electrical and Electronic Engineering programme and also appropriate as preparation for postgraduate study.
- Academic staff need to develop an understanding of the concept of programme ILOs, their relationships to the course objectives and how they are used to reflect the aims of the diploma programme.
- The ILO concept should be explained to students enrolled in the programme so they understand the relationships between aims, programme outcomes and course objectives.
- The review team strongly supports the publication of a programme handbook and suggests that an electronic version of the handbook should also be made available on the University intranet.

**III.2.b Curricula**

10. The Electrical and Electronic Engineering diploma programme was originally modelled on the structure and content of Grande École programmes in France, and the Department has continued to maintain parity with those programmes. No other external references or benchmarks have been used for programme design. The curriculum is delivered in a mixture of French and English over a period of five years with two semesters of study in each year. A common engineering core programme (CECP) is presented during the first two years (four semesters), which provides a range of fundamental science, mathematics, ICT and language courses. This is followed by three years (six semesters) of study of electrical and electronic engineering courses. The first three of these six semesters contain common core courses in electrical and electronic engineering



that all students take while the following two semesters provide courses reflecting greater specialization in either electrical power or telecommunications. The last semester in the programme is devoted exclusively to a final year project. Apart from students electing to follow one of the two specialization paths, all of the programme courses are mandatory. The schedule of courses requires around 32 hours/week of direct staff/student contact time. The programme contains a small number of non-engineering topics. In the CECP there is a foreign language course involving English for French-speaking students or French for English-speaking students. This is taken over the four semesters of the CECP programme. Courses in sociology, communication, economics, law and project management are taken during the final three years of the programme. There are four courses which are project-based, including the final year project. All of these project courses occur in the last two years of the programme. The final year project may be carried out in the Department's laboratories, in a local industrial company or, for selected students, at a Grande École in France. Students are also expected to undertake a period of four weeks of engineering training at a local or foreign industrial company.

11. The design of the curriculum strongly reflects the structure and philosophy used in Grande Écoles in France. This is the only external reference used by the Department and the programme has not yet been offered for accreditation by a professional engineering body. The review team was unable to find any formal procedure whereby the needs of local and regional companies can be reflected in the curriculum, even though the Department has strong links with industries, such as National Instruments, which provide training opportunities for students and for staff. This is considered a weakness that should be addressed. The Department may wish to consider setting up an Industrial Advisory Board of senior industrialists and programme graduates for facilitating knowledge exchange and keeping the curriculum relevant and up-to-date. Also, the continuing development of the curriculum would benefit from comparison with the international benchmark statements for engineering published by ABET, UKSPEC and EUR-ACE.
12. The curriculum is designed to provide graduates with a wide general knowledge of electrical and electronic engineering and ICT along with some deep specialist knowledge and skills in electrical power or telecommunications. The laboratory courses in the programme provide effective support for student learning and enable students to develop subject-specific skills through using specialist laboratory equipment. The programme is succeeding in its aim to provide a multidisciplinary engineering education with good support for the development of associated skills. However, it is clear from the programme specification and confirmed in meetings with staff and with students that the heavy loading on students is a factor limiting their available time to develop and apply effective independent learning skills. The teaching hours in the programme are considerable (between 30 and 34 hours per week per semester) and these are not reduced in the later years when normally students would be expected to take greater responsibility for their own learning. This may affect the achievement of some ILOs and programme aims.
13. The development of independent learning skills is encouraged in the mini-projects course in the eighth semester and in the final year project in the tenth semester. The mini-projects course is primarily intended to provide open-ended project experience to students working in small teams, and enable them to develop some skills pertinent to the much larger final year project. While this is a very positive aspect of the curriculum design which contributes to progression in learning, students confirmed in their meeting with reviewers that they have difficulty engaging in independent learning because of the very full timetable.



Also, all of the Mathematics topics are concentrated into the first two years of the programme where their relevance and application are likely to be minimal. The Department may wish to reconsider the balance and structure of the curriculum and its delivery with respect to teaching time and opportunities for independent learning development. In particular, many of the in-course and mini-projects could readily support the development of independent learning skills with some redesign and redirection.

14. The electrical and electronic engineering curriculum achieves academic and intellectual progression with many topics clearly building on earlier topics as the programme proceeds. It is a technically-oriented curriculum with an emphasis on achieving deep technical knowledge. There are some non-engineering courses included that address business topics but they do little more than introduce the topics in a series of separate courses. This minimal attention to the business aspects of industry would not satisfy many of the international engineering benchmarks. Employers' representatives also raised this as an issue in a meeting with the reviewers.
15. In addition to the practical training obtained in laboratory courses, the programme also contains a further compulsory training period in industry. This is normally taken in the summertime at the end of the eighth semester for a period of four weeks. Students have to arrange this placement themselves and, at the end of the placement, they write a report on their training experience for the employing company. The company in turn confirm to the University that the work experience has been completed. The industrial training provides important support for the ILOs and programme aims in relation to work experience and general skills development. While the industrial experience is beneficial for the student, it would help to further improve general skills if the student's report were also submitted to the University and formally assessed with feedback to the student.
16. The final year project in the final semester is one of the key opportunities for independent learning in the programme. It provides an opportunity for students to demonstrate their knowledge, understanding and skills developed during the whole programme. Most projects are performed by pairs of students, enabling them to further develop and demonstrate group-working skills in support of the ILOs.
17. The present curriculum is up-to-date and appropriate for the programme aims and ILOs. Research and other industrial activities of academic staff provide useful sources of current material for student projects or topics for discussion in courses. Individual academic staff regularly review their own courses to ensure the content remains relevant. These reviews are informal and voluntary but they help to maintain the currency of the curriculum. There are no formal annual reviews of either the courses or the programme. However, when new developments in the programme are proposed requiring more significant changes to the curriculum, a formal proposal for curriculum changes is presented in a Departmental meeting for approval. The proposal is then further considered by a Faculty committee for approval before being submitted to a University committee. If approved at this level, the changes are finally submitted to the government for approval and implementation. At the present time, this process of programme changes is underway to bring the programme more into line with the European LMD degree structure.
18. On the basis of the above evidence, the reviewers judge that the Curriculum is **Satisfactory**.



### **Strengths:**

- The curriculum is up-to-date and appropriate for the programme aims and ILOs.
- The programme is succeeding in its aim to provide a multidisciplinary engineering education with good support for the development of associated skills.
- There is evidence of strong links with industries such as National Instruments.

### **Recommendations for Improvement:**

- The Department may wish to consider an appropriate mechanism such as an Industrial Advisory Board of senior industrialists and programme graduates for facilitating knowledge exchange and keeping the curriculum relevant and up-to-date.
- The continuing development of the curriculum would benefit from comparison with the international benchmark statements for engineering published by ABET, UKSPEC and EUR-ACE.
- The Department should reconsider the balance and structure of the curriculum and its delivery with respect to teaching time and opportunities for independent learning.
- In-course and mini- projects could readily support the early development of independent learning skills with some redesign and redirection.
- While the industrial experience of the summer training period is beneficial for the student, it would help to further improve general skills if the student's report to the company was also submitted to the University and formally assessed with feedback to the student.
- The Department may wish to consider the scope and integration of the non-engineering business courses in the programme with a view to a better preparation of graduates for the business aspects of industry.

### **III.2.c Student Assessment**

19. There is a well-defined assessment policy used in the Department. This employs a range of assessment methods including written examinations, in-course projects and mini-projects, laboratory reports and the final year project. With the exception of the laboratory courses and the final year project, all other courses have both mid-term and end-of-term written examinations with a teacher-prescribed distribution of marks where projects also form part of the course assessment. Double-marking of examinations is performed to enhance objectivity and fairness in marking. A second faculty member with appropriate specialist knowledge does the marking and a jointly-agreed mark is used for the assessment. However, there is no external moderation of assessment results. Assessment of laboratory courses is based on a series of reports submitted by each student.

20. A prescribed formula set by Faculty decree is used to determine the final grade for each course. These assessment criteria are given to students during the first lecture in a course. The final year project is assessed separately by a jury of faculty members and including external personnel if the work was carried out in an external institution. Although projects are normally carried out by two or more students, they are assessed on their individual contribution to the work. Up to 25 per cent of the marks is awarded by the project supervisor while the remaining marks are distributed in terms of originality of the results (20 per cent), quality of the written dissertation (20 per cent), oral presentation (15 per cent) and defense of the dissertation (20 per cent). The different methods of assessment enable students to demonstrate achievement of ILOs in terms of



knowledge and understanding and intellectual, subject-specific and general skills.

21. Written examinations are the main method used to test knowledge and understanding of a subject and to demonstrate intellectual skills through analysis and numerical calculation. The assessment strategy uses both mid-semester and end-of-semester examinations to encourage students to work throughout the semester. Both examination results contribute to the final course result. Scrutiny of samples of examination papers showed a mixture of questions, many requiring recall of lecture material but also some more challenging questions requiring a deeper understanding of the subject material. In addition, descriptive parts of questions tested understanding of the fundamental concepts of the subject.
22. Each semester includes a laboratory course containing experiments reflecting the subject matter of the semester lecture courses. The laboratory work is carried out by groups of students, offering the opportunity to develop group-working skills as well as practical skills and helping to reinforce understanding of the underlying theoretical material. In addition, writing the laboratory reports facilitates the development of general skills. Many of these features were observed in the sampled student work.
23. The in-course and mini-projects are carried out either by individuals or small groups of students under close supervision of the instructor. The work is assessed by a report or, in some cases, a practical product. This project work is more closely directed than is the case for the final year project, involving discussions with the instructor typically twice a week with strong guidance given to the student. This enables a sound evaluation of individual student contributions but it also limits the opportunities for independent learning by the student. However, it enables students to develop group-working skills and time-management skills. The project mark also makes a predefined contribution to the final course result. The range of assessment methods used provides adequate measures to assess the achievement of the ILOs. The majority of students (~70 per cent) met by the review team felt that in general the assessments made of their work are fair.
24. The final year project is usually undertaken by pairs of students and it brings together all the knowledge and skills learned by the students in the programme to solve an original problem. The results of the work are presented in a comprehensive thesis. Final year projects are assessed by a jury set up by the Head of Department. The jury's task is to evaluate individual student contributions in terms of project results, report writing, oral presentation and defense of the dissertation. However, a sample of project evaluation forms seen by the reviewers showed identical marks awarded for different students in a project group in all marking categories. There were no examples of evaluations in which the marks differed. Unfortunately, the sample of project reports seen by the reviewers did not include separate reports written by each student in a project group to allow comparisons to be made. However, it is most unlikely that exactly equal contributions across a range of marking criteria would be made by the students in a project group. The review team urges the Department to ensure that each individual student contribution to projects is properly judged and assigned to reflect the work done.
25. Formative feedback of coursework and examination results to students is not required by the Department and is provided by academic staff in only a few courses. Sometimes feedback may be given to a whole class group when common difficulties have been encountered but not all staff do this. Also, a



student can seek advice about his/her performance by visiting the staff member during stated office hours. In contrast, project reports are usually returned to students along with comments made by the instructor. However, the majority of students learns little about their own individual performance and receives no advice on how to improve. In such a regime, poorly performing but diffident students tend not to seek the advice they need. Formative feedback is commonly used in most universities and students benefit from the personalized advice available. The reviewers strongly recommend that the Department should implement a compulsory formative feedback system as part of a developed assessment policy that ensures that students gain the maximum benefit from their courses in preparation for summative assessments.

26. The Department operates an informal appeals process. Students may approach individual teaching staff members to query an assessment result and sometimes the appeal is successful. However, students met by the reviewers suggested that the outcome depends on the individual staff member involved. An application for an appeal can be filed with Student Affairs and this usually results in clerical checking of the marks awarded. However, reviewers were unable to determine if any system of re-marking is applied and, if so, what form this takes. It is important that the assessment policy should be transparent and be seen to be fair and equitable. Hence, the Department should give serious consideration to implementing a formal appeals process that includes, if necessary, re-marking of assessments by different academic staff with the student formally notified of the outcome. The appeals process should also be published in the proposed new programme handbook and on the University intranet.

27. The Department does not use any external scrutiny of the programme and the assessment decisions it makes. The use of double marking provides a useful internal moderation of the assessment process for written examinations. However, the Department should consider introducing external moderation of the programme to obtain an independent view of the standards of the programme and ensure fairness and transparency of the assessment process.

28. On the basis of the above evidence, the reviewers judge that Assessment is **Satisfactory**.

**Strengths:**

- The assessment policy with its simple and effective set of assessment criteria for examinations and projects provides the basis for further development.
- The majority of students met by the review team felt that the assessments made of their work are fair.
- There is good support from staff for project guidance and report writing.

**Recommendations for Improvement:**

- The review team urges the Department to ensure that individual student contributions to projects is properly judged and assigned to reflect the work done.
- The reviewers strongly recommend that the Department should implement a compulsory formative feedback system that ensures that students gain the maximum benefit from their courses in preparation for summative assessments.
- There is a need for a formal and transparent student appeals process that is well documented.
- The Department should introduce external moderation of the programme to obtain an independent view of the standards of the programme and ensure fairness and transparency of the assessment process.



### III.2.d Student Achievement

29. The majority of applicants to study engineering at the Lebanese University are highly ranked in the national scientific baccalaureate examinations. However, applicants are also required to sit an entrance examination to qualify for entry to the Faculty of Engineering's two year common engineering core programme. In recent years, the average success rate in this examination has been 19 per cent. Successful students from this programme select the engineering subject they wish to study in the remaining three years of the five year overall programme. For the three most recent cohorts starting third year in the Electrical and Electronic engineering programme for which statistics are available (2002/03 to 2004/05), the average completion rate to graduation is 87 per cent which is good. However, this completion rate estimate is distorted by the inclusion of failed students repeating parts of the electrical and electronic programme. There are no supplementary examinations available for failing students. Instead all courses in a semester in which failed marks are achieved have to be retaken. The diploma is not classified although the passing grades achieved by students are recorded in a transcript and this can be made available to prospective employers.
30. Neither the University nor the Department collects employment statistics of graduates. However, the academic staff feel that the multidisciplinary nature of the programme helps graduates to gain employment. It is believed, without actual data, that most graduates find employment within three months of graduation. A sample of student work was scrutinized by the review team. This included mini-project reports, laboratory reports and final year projects along with some examination papers but not the student scripts. Marks awarded were generally high and the sample contained no reports with fail marks.
31. Scrutiny of student work showed an acceptable level of achievement of the programme ILOs. Project reports demonstrated a good theoretical knowledge and understanding of the subject material, effective application of intellectual skills in analysis and satisfactory general skills in written communication. However, in spite of the numerous project opportunities in the programme, there was little evidence of the development of independent learning skills by students as they progress through the programme. The sample of laboratory reports also showed evidence of practical skills development.
32. The programme offers a similar standard to those in Grande Écoles in France. Some of the better-achieving students completing the fourth year of studies are given the opportunity to transfer to one of several Grande Écoles in France to complete their studies for the diploma and also study in parallel for a separate Masters degree. Most of these students remain in France after graduation to pursue a higher degree in a doctoral programme. Completion rates and the profile of final awards indicate an appropriate level of achievement for the most recent student cohorts in the programme. The student work examined provides confidence that student achievement is appropriate for the level and title of the award.
33. The statistics provided by the Department are based on the numbers of students enrolled in each year of the programme. While most of these are students progressing normally from year to year, they also include repeating students who have failed at least one course in a semester. This makes it impossible to determine accurate completion rates for defined student cohorts. The reviewers recommend that the Department compile statistics for cohorts of students that start the third year at the same time to provide them with more detailed and relevant data for analysis of progression and completion rates in the



programme. The Department should also try to assemble first destination employment statistics for graduates to provide useful information on the job market and also be reassured that graduates of the programme are able to compete successfully with graduates from other universities. This data collection can often be readily achieved through a graduate website.

34. The review team met with representatives from employers, some having started their own business and others who hold senior positions in national and international companies. Most of the representatives were graduates of the programme. They all spoke highly of the University and its graduate engineers. In most of the companies represented, around 50 per cent of company engineers have graduated from this programme, and they compete well with graduates from other universities. They are generally thought to be well organized and dependable employees. The representatives agreed that the engineering graduates from the programme are technically well qualified and are able to cope with advancing technology but often lack communication, management skills and knowledge. This conclusion is in agreement with some of the expected learning outcomes proposed in international benchmarks for engineering programmes. The Department may wish to reflect on the balance in the programme between technical and managerial knowledge and skills.

35. On the basis of the above evidence, the reviewers judge that Student Achievement is **Satisfactory**.

#### **Strengths:**

- The majority of applicants for engineering at the Lebanese University are highly ranked in the national scientific baccalaureate examinations.
- The three most recent cohorts starting third year in the Electrical and Electronic engineering programme had an average completion rate to graduation of 87 per cent, which is good.
- Scrutiny of student work showed an acceptable level of achievement of the programme ILOs.

#### **Recommendations for Improvement:**

- The Department should compile statistics for cohorts of students who start the third year at the same time to provide more detailed and relevant data for analysis of progression and completion rates in the programme.
- The Department may wish to reflect on the balance in the programme between technical and managerial knowledge and skills.
- The Department should try to assemble first destination employment statistics for graduates of the programme.

#### **Academic Standards**

Overall, the reviewers judge that Academic Standards are **Satisfactory**. This overall judgement is based on the following profile of judgments for each contributing aspect:

<b>Curricula:</b>	<b>Satisfactory</b>
<b>Student Assessment:</b>	<b>Satisfactory</b>
<b>Student Achievement:</b>	<b>Satisfactory</b>



### III.3 Quality of Learning Opportunities

#### III.3.a Teaching and Learning

36. The teaching and learning methods used in the programmes include lectures, Travaux Dirigés (directed problem solving), laboratories and a variety of project work. Theoretical topics are presented in lectures using white boards (75 per cent of classes) and multimedia projectors in amphitheatres or lecture rooms (25 per cent of classes). Some staff provide hand-out notes to accompany lectures while others either dictate notes or display them on an OHP for students to copy. The quality of hand-outs varies between teaching staff. Other sources of learning support include laboratory sheets and instrument manuals in laboratories, libraries and ICT provision. Staff members have started using ICT to support their teaching while most ensure the availability of relevant text books in the library for their courses. A variety of software packages are available for students to use in project work. The primary opportunity for independent learning by students occurs during the final year project. Students in the Electrical and Electronic engineering programme are expected to be able to follow courses given in French or English and the teacher selects the language used in lectures. Language courses form part of the common engineering core programme (CECP) in the first two years with the aim of achieving an adequate level of fluency with both languages. Class sizes of between 100 and 200 students occur in the CECP. Most courses delivered in the Department have class sizes that range between 30 and 70 students. The overall average student/staff ratio for the electrical and electronic engineering programme in 2007/08 is 9:1.
37. The range of teaching and learning methods used is appropriate for achievement of the programme ILOs. Theoretical knowledge is delivered to students along the programme path in lectures while exercise classes (Travaux Dirigés) are used to apply the theory to practical problems. In laboratory courses, the experimental application of theoretical material from all of the semester's lecture courses is used to improve understanding and develop practical skills, with groups of two or three students performing all of the scheduled experiments during the course. Students expressed the view that an additional strength of the laboratory courses is the development of group skills. In the ninth semester, weekly seminars are given by external specialists, discussing current developments and applications of relevant technology and expanding subject knowledge. In-course and mini-projects are used to reinforce understanding of theory and allow students to solve more demanding problems using computer software support.
38. The final semester of the programme is devoted entirely to the final year project. This novel approach enables the students to concentrate on applying their accumulated knowledge and skills to the project topic. There is regular contact with the project supervisor throughout the semester to assess individual student contributions and to receive guidance and advice. Students met by the reviewers were very complementary about the quality of supervision and guidance given and this was generally reflected in the project reports seen by the reviewers. However, because of the limited information available in the project assessments seen by the reviewers, it was not clear the degree to which independent learning by students contributes to the project.
39. There is a potential language problem in the delivery of the programme arising from the background of the students at entry. About 50 per cent of students on the programme come from English schools and the other 50 per cent come from French schools. In the common engineering core programme this difference is accommodated by having the programme delivered in two parallel streams



using French and English as the teaching languages. However, in the third and subsequent years, the language used for teaching and assessment is either French or English and the choice of language is made by the academic staff member. Students commented that up to 90 per cent of the teaching staff speak only one of the languages, leaving up to 50 per cent of the students with possible language problems. While support for learning a foreign language is provided in the common core programme, students confirmed that it is generally not taken very seriously, leading to poor language skills in the later years. Most teaching staff are sympathetic to such problems and will often resort to using Arabic to help explain concepts that are not understood in the chosen teaching language. Also, some staff have assessments printed in both languages to avoid problems of interpretation by students. However, it would be helpful if the Faculty of Engineering were able to find ways to encourage students to take seriously the learning of a foreign language in the common core programme. This would enable students to consult textbooks and other publications written in either language as well as prepare them for the engineering courses in the programme. It would also ensure that graduates leave the programme with a very valuable range of language skills.

40. Some of the teaching staff also engage in research and the reviewers were given examples of how their teaching is informed by research. This includes reference to research results when discussing relevant topics in a course, as in the Microelectronics course and also using their research to identify mini- and final year project topics. Some of the final year project reports seen by the reviewers were clearly based on recent research work.
41. Neither the University nor the Department offer staff training to new staff or experienced staff. As a result, the development of effective teaching techniques, the stimulation and support for independent learning by students, the selection of appropriate assessment methods including formative assessments with student feedback, and the controlled engagement of students in lectures are all left to chance, with support and advice available only from teaching colleagues. Peer review of teaching is not commonly used, and class observation for new staff is only performed when students in the class complain. In addition, there is no staff appraisal system in place to identify and support staff development needs. The reviewers believe the present teaching expertise in the Department is adequate for the technical needs of the programme although most teaching staff will require training to adapt to the use of ILOs for course and programme descriptions. Also, the absence of a uniform structure of formative assessment in courses is regretted. However, without a formal staff training and development programme, it is unlikely that any enhancement of teaching will occur. The reviewers strongly recommend to the Department that a staff training and development programme should be introduced at the earliest opportunity.
42. On the basis of the above evidence, the reviewers judge that the Quality of Teaching and Learning is **Satisfactory**.

**Strengths:**

- Staff members have started using ICT in teaching support.
- The range of teaching and learning methods used is appropriate for achievement of the programme ILOs.
- Students expressed the view that a strength of the laboratory courses is the development of group skills.
- Staff research informs teaching.



### **Recommendations for Improvement:**

- It would be helpful to the later engineering studies for the Faculty of Engineering to find ways to encourage students to take seriously the learning of a foreign language in the common engineering core programme.
- A staff training and development programme should be introduced at the earliest opportunity.
- A formal peer review of teaching for all staff should be considered by the Department.

### **III.3.b Student Progression**

43. The demand for entry to the engineering programmes of the Faculty of Engineering is high with 1186 applicants for 264 places in 2007/08. The majority of applicants are highly ranked in the national scientific baccalaureate. However, acceptance into the common engineering core programme (CECP) is conditional upon success in a written entrance examination available nationally, which is specific to the Faculty of Engineering of the Lebanese University. The average success rate in the entrance examination over the past eight years is 19 per cent. There are no formal induction arrangements for new students accepted into the programme. Insufficient statistical data was made available to assess the completion rates in the common core programme. However, the limited data available showed an average failure rate of about 27 per cent at the end of the first year of the programme for the three academic years 2002/03 to 2004/05. At the end of the two-year common core programme, successful students select the Faculty programme they wish to pursue for the following three years. For the Electrical and Electronic engineering diploma the average number of students entering third year between 2000 and 2006 was about 57 per year. For those students the average failure rate in third year is around 10 per cent, in fourth year is around 8 per cent, and there were no failures in the fifth year. The average completion rate for the three most recent cohorts of students starting third year in the Electrical and Electronic engineering programme is 87 per cent.
44. The requirements for admission to the programme are made available to Lebanese schools and are well understood by the prospective students. An entrance examination for the Faculty of Engineering is held at centres across the country and applications to sit the examination far exceed the number of places available. The examination is available in both French and English. The current success rate is around 19 per cent. There are no induction arrangements available to students who enrol in the common engineering core programme in the Faculty of Engineering. Students met by the reviewers felt such arrangements are unnecessary. However, induction provides an effective way to introduce new students to the University campus and its facilities and enables the Department to give a copy of the programme handbook to each student and explain details of the curriculum, assessment regulations and student support arrangements in a friendly and constructive way before the programme begins. The Faculty of Engineering has plans to introduce an induction process in the near future and the reviewers endorse such a development. At the end of the two year common core programme when students need to choose one of the three engineering programmes offered in the Faculty, the Heads of Department make presentations about their respective programmes to inform students before they make their decisions.
45. The Department does not operate a formal academic support system although staff have a system of office hours which is currently effective. In part, this is helped by the very favorable student/staff ratio of 9:1. If this ratio were to increase in the future, or the programme were to develop a more proactive approach to supporting the academic progression of students together with



structured independent learning and improved feedback, it may become necessary to implement a formal support system, for example by nominating staff as Personal Tutors.

46. The criteria for progression in the programme are clearly stated in the Programme Specification. In order to proceed to the next year, a student must pass all courses and achieve an overall average passing grade of at least 58 per cent in each semester. Failing only one course will prevent progression and all of the courses in the semester in which the fail occurs have to be retaken. Failing two or more courses in the same year will lead to exclusion from the programme. This is a demanding requirement which is harsher than that found in most other universities. However, judging by the progression statistics for the Electrical and Electronic Engineering programme (10 per cent fail rate, or less, per year), the majority of students are able to satisfy the requirements and proceed. However, the situation in the common engineering core programme is rather different with around 27 per cent of students failing in the first year. An effective academic support in the form of a Personal Tutor system could help failing students to remain in the programme. Also, the introduction of supplementary examinations, if not already available, could enable weak students to progress more quickly.
47. There are no formal arrangements in the Department or the University for providing careers advice. Instead, students tend to seek advice from individual staff members, many of whom have good relations with industrial companies. Seminars are sometimes used to describe job opportunities. Also, some students are able to explore career prospects during their industrial training period at the end of the eighth semester. Many of the students who complete the programme in a Grande École in France enroll in masters or doctoral programmes there. The Faculty of Engineering also recruits a few of its own graduates each year to work as laboratory assistants. In general, graduates are successful in securing employment particularly in Arab countries where their language skills in Arabic, French and English greatly enhance their multidisciplinary engineering education.
48. On the basis of the above evidence, the reviewers judge that the quality of Student Progression is **Satisfactory**.

**Strengths:**

- The majority of applicants are highly ranked in the national scientific baccalaureate.
- Student progression rates in the Electrical and Electronic engineering programme are good.

**Recommendation for Improvement:**

- The Faculty of Engineering should introduce an induction process for new students.
- Effective academic support in the form of a Personal Tutor system could help failing students in the common engineering core programme to remain in the programme.
- Introduction of a system of supplementary examinations would enable weaker students to progress more quickly.



### III.3.c Learning Resources

49. The Department of Electrical and Electronic engineering has 19 academic staff, comprising 11 in tenured posts and 8 with annually renewable contracts, six part-time teaching staff and nine laboratory assistants. In addition, there are 36 technical and administrative staff to support the programme. The qualifications, specialisms and expertise of the academic staff are appropriate for the delivery of the programme. The average teaching load for academic staff is six hours per week and 2.4 hours per week for part-time staff. The laboratory assistants provide 19 hours per week. All of the part-time staff have similar qualifications to those of the full-time staff.
50. The number and quality of academic staff available to deliver the programme is very satisfactory and the current overall student/staff ratio of 9:1 is particularly favorable. However, this student/staff ratio does not take account of additional teaching duties that some staff undertake in other programmes in the Faculty. Also, it includes the need to have enough staff expertise available to provide the range of specialisms offered in the programme. The qualifications and areas of expertise of the staff are also appropriate. Some academic staff engage in research that reflects the specialisms of the programme through local, regional or international projects. Most of the research is essentially practical in nature and has been used by staff to enhance their teaching. The reviewers were given several examples of this in lecture material and project topics. However, the combination of a full teaching timetable and additional teaching outside the programme puts severe strain on staff maintaining research activity. Part-time teaching staff are employed to help address this problem. Also, three additional staff with annually renewable contracts have been appointed for the next academic year.
51. The number of laboratory assistants is adequate for the current needs of the programme. Most of the laboratory assistants are graduates of the programme and already have a useful familiarity with the programme aims and the laboratory facilities. However, when all of the new laboratory equipment is operational and with laboratory assistants expected to help to maintain it, laboratory staffing may become an issue in the future.
52. Three years ago, the Faculty of Engineering moved into a spacious and modern campus which accommodates all of the Departments in the Faculty including the Department of Electrical and Electronic Engineering. The campus contains a good selection of lecture and seminar rooms and excellent laboratory space that easily accommodates the current student population in the Faculty. Recently, the Electrical and Electronic Engineering Department received a grant to reequip their laboratories. This has resulted in the delivery of a wide range of up-to-date electrical, electronic and computing equipment of very high quality, and installation is currently in progress to integrate the new equipment into the lecture and laboratory courses in the programme. When completed, the laboratory resource will provide a state-of-the-art experimental experience for students in the programme.
53. The new laboratory facilities includes well-equipped and supervised computer rooms to support the courses and, in particular, the final year projects. Some of these rooms are also available for unscheduled use by students. When all of the new equipment has been deployed, there will be an ample supply of computers for the present student numbers. All academic staff have laptop computers and staff offices have desktop computers. All computers have access to the University intranet and the internet.



54. The Faculty library on the campus is situated in a three-story building and contains more than 15,000 textbooks and reference books in both French and English covering the subjects of the Faculty programmes. A generous budget of \$60,000 was allocated to relocate the library to the new campus site. In addition, an annual library budget of around \$15,000 is assigned for the purchase of books recommended by academic staff to support the courses. There are no subscriptions to online journals. The library is open from 8 am to 4 pm except on Sundays and holidays.
55. The library resource for the programme is mainly located in the Faculty of Engineering library. It provides a comfortable workspace for users and contains a large number of engineering textbooks and reference books published in English and French and also some in Arabic. The quality and currency of the books are impressive; they are available in sufficient numbers to enable students to consult the recommended textbook for a course or alternative books on the same subject. Students met by the reviewers approve of the library, considering it to be well equipped with good work spaces and a quiet environment. The catalogue system used in the library is a manual system that has been in use for a long time. The library staff recognise that it is difficult for students to use it effectively, while a modern software-based system is considered too expensive to purchase. However, the library staff are close to completing a new computer-based system of their own design which should greatly improve the ability to search and access the book stock. The reviewers believe the library accommodation and its book stock are appropriate to support the current diploma programme.
56. With the recent equipment upgrading of the laboratories, the number of PCs available in the Department is more than sufficient for the educational and administrative needs of the programme. All staff have access to a computer, and the teaching laboratories will provide almost one computer per student in the programme. All the computers have intranet and internet access. A wide range of appropriate software is also available to support laboratory and project needs. This includes CAD, electrical and electronic design and simulation software in addition to the more common word processing, spreadsheet and presentation software. Students receive a significant amount of ICT training in the common engineering core programme during the first two years of their total five year period of study. They are also introduced to the more specialist software packages for electrical and electronic design and simulation in courses in the later years of the programme. Overall, the ICT provision is excellent with convenient access to the University intranet, the internet and a range of modern, professional software relevant to the programme.
57. The teaching and laboratory accommodation in the Department at the new Faculty campus offers an excellent environment for student learning in the programme. The numbers and sizes of classrooms and laboratories are sufficient to support the programme and its present student complement. That is likely to remain the case for some time even if student numbers increase in the future. The new laboratory equipment adds substantially to the quality of the learning resource and will enable students to develop up-to-date and relevant practical skills. However, having been fortunate to receive a grant for the purchase of new equipment, it will be necessary for the Department to find a further source of funds to continue to support and maintain the resource. That situation will become more urgent during the next few years when warranty cover for the new equipment begins to expire. The Department would do well to anticipate that situation and make what plans it can to maintain its valuable engineering and educational resource.



58. On the basis of the above evidence, the reviewers judge that the quality of Learning Resources is **Good**.

**Strengths:**

- The programme is delivered by well qualified, motivated and experienced teaching staff.
- There is a modern and spacious campus environment.
- The library facilities are satisfactory with a good range of textbooks and reference books in English and French.
- The ICT provision is excellent with convenient access to the University intranet, the internet and a wide range of modern, professional software relevant to the programme.
- The laboratories are well equipped with up-to-date specialist equipment.

**Recommendations for Improvement:**

- The Department will need to find a source of funds in future years to maintain its valuable engineering and educational equipment resource.

### **III.4 Quality Assurance and Enhancement**

59. At the time of the UNDP review, the University did not have a Quality Assurance and Enhancement system in place although it has expressed the intention of introducing one in the future based on one of the European quality assurance models. Also, neither the Faculty of Engineering nor the Department operates formal monitoring and review procedures for programmes. The Electrical and Electronic Engineering programme was first introduced into the new Department of the University on its creation in 1974 as a close copy of similar programmes in Grande Écoles in France. In 1993/94 the first changes were made to the curriculum design which also mirrored similar changes in the chosen comparator programmes in France. These changes, which produced the current programme, introduced two specialization streams into the programme. In 2004 a process of making further changes to the programme was started to bring it into line with the European LMD system of degree programmes. These changes require the agreement of all of the branches of the University that offer the Electrical and Electronic Engineering programme (three sites) and the process of securing that agreement is ongoing at the time of the review. There is no student input to the programme changes although the Department intends to make a presentation to students of the final agreed proposal for comment. There are no formal external inputs to the current programme. The SED points to relations between the Department and the local branch of the Association of Lebanese Industrialists as a source of external input through joint activities with the Association. Also, there is a national annual 'projects fair' at which universities offer final year projects in competition. Staff claim that involvement in this activity has resulted in unspecified improvements to the mini-projects course. The programme has not been submitted to any professional engineering institution for accreditation.

60. There are no formal arrangements for quality assurance and enhancement in the Department for the Electrical and Electronic Engineering programme and quality assurance is not yet part of the educational culture of the Lebanese University. The University has stated that it intends to develop a Quality Assurance and Enhancement system that will help to safeguard the quality and standards of all of its academic programmes. The reviewers strongly support this proposed development since any quality assurance measures implemented at the programme level will become most effective when they are part of a university-wide structure in which reflection and self-evaluation are embedded in a culture of systematic monitoring and review. While formal processes are not currently



used for the programme, the Department does encourage a range of activities that could form part of a formal system. Thus, academic staff are encouraged to 'continuously improve' their courses. Examples given by staff where this has occurred include increasing the numbers of design projects in courses to increase the opportunities for achieving the ILOs for knowledge and understanding and intellectual skills, and revising and updating the laboratory courses to exploit the excellent new laboratory equipment. These developments are to be commended. However, there is no requirement on staff to make such improvements and it was not clear to the reviewers how many staff engage in improvement activities. Also, uncoordinated changes to a programme at course level can often distort the provision in terms of aims and ILOs unless there is deliberate monitoring of the effects of such changes on the programme as a whole.

61. The reviewers believe there is an urgent need for staff to develop a culture of self-evaluation and reflection at both course and programme levels. The Department should develop a monitoring procedure for the programme in which each course is self-evaluated and monitored annually in terms of its effectiveness for achieving the programme aims, and the success of students in achieving the intended learning outcomes. The outcomes of such monitoring will provide an evidence-based approach for continuing improvement. The Department should also introduce a periodic review of the programme, say every four or five years, and secure an external assessor to critically assess the programme as part of the review. A useful reference guide for programme monitoring and review is available in the UK QAA 'Code of Practice for the assurance of academic quality and standards in higher education'. The data collected through monitoring and review should be analyzed and formally presented to a meeting of the departmental staff for discussion. This will provide a forum for agreeing changes to the programme and enable formal proposals for change to be presented to the Faculty of Engineering for approval. An added benefit of monitoring is the opportunity to disseminate good practice among the academic staff and across the Faculty.
62. A serious shortcoming of the current informal monitoring arrangements is the absence of deliberate and coordinated student input to the process. Student questionnaires are not used for course evaluation since the Department believes that in the past responses were influenced by political views of the student representatives. Instead, students can report concerns to individual staff members during office hours or through a meeting with the Head of Department. The reviewers were unable to establish how often this occurs and, where it does occur, how such inputs are recorded and utilized. The reviewers recommend the reintroduction of student questionnaires issued to all students in a course to obtain feedback on teaching and learning. Careful design of the questions to be addressed coupled with issuing and collecting the questionnaires within a class by the teacher should help to avoid unwanted political influence. Also, it is important to make clear to the students that the process will provide essential feedback information for monitoring and improving the learning opportunities for students.
63. An important aspect for the assurance of quality and standards of an academic programme is the collection of evidence from relevant external sources. At the present time, there are no formal inputs to the programme from external sources. The Department and its staff have contact with local, national and regional industrial companies but there is no systematic procedure used to seek feedback from them on the programme or to collect suggestions for change. One mechanism used by many universities is to establish an Industrial Advisory Board of senior industrial representatives and hold formal meetings to discuss



and seek feedback on the programme's aims, learning outcomes and curriculum content. Such a committee would help the Department to obtain essential knowledge about the needs of local, national and regional industries and identify how well the programme prepares graduates for industrial careers. Another effective source of external input comes with the appointment of one or more external examiners for the programme. External examiners can help to secure the national and regional reputation of the programme by confirming the academic standards and quality and by providing advice when changes to the programme are required. Also, in addition to making reference to the general specification for a Grande École programme, and building on its present international connections, the Department should refer to the several international benchmarks defined for the education of professional engineers including ABET, QAA, UK-SPEC and EUR-ACE. These benchmarks have been adopted by many international engineering degree programmes and they reflect well the knowledge and skills expected from graduate engineers.

64. All of these measures will go some way towards providing assurance on the quality and standards of the programme and enabling enhancement to be delivered. However, the overall management of quality and academic standards, supporting continuing improvement, will become even more effective and coherent if they are integrated into the University quality assurance system when this becomes available. The development and publication of a University Quality Manual describing all of the monitoring and review procedures available in the integrated system will keep staff and students informed of the ways in which the quality of programmes are assured and enhanced in the University.

65. On the basis above evidence, the reviewers judge that Quality Assurance and Enhancement is **Unsatisfactory**.

**Strengths:**

- The University intends to develop a Quality Assurance and Enhancement system that will help to safeguard the quality and standards of all of its academic programmes.
- Programme improvements have been accomplished on an informal basis.

**Recommendations for Improvement:**

- There is an urgent need for staff to develop a culture of self-evaluation and reflection at both course and programme levels.
- The Department should develop an annual monitoring procedure for the courses in the programme.
- The Department should introduce a periodic review of the programme with formal reviews every four or five years.
- The reviewers recommend the reintroduction of student questionnaires issued to all students in a course to obtain feedback on teaching and learning.
- The Department should refer to the several international benchmarks defined for the education of professional engineers including ABET, QAA, UK-SPEC and EUR-ACE when considering enhancements to the programme.