ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
Α.Δ.Ι.Π.
ΑΡΧΗ ΔΙΑΣΦΑΛΙΣΗΣ ΠΟΙΟΤΗΤΑΣ
ΑΝΩΤΑΤΗΣ ΕΚΠΑΙΔΕΥΣΗΣ

HELLENIC REPUBLIC
H.Q.A.A.
HELLENIC QUALITY ASSURANCE AGENCY
FOR HIGHER EDUCATION

EXTERNAL EVALUATION REPORT

DEPARTMENT: Electronic and Computer Engineering

UNIVERSITY : Technical University of Crete

June 3, 2011

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External Evaluation Committee

The Committee responsible for the External Evaluation of the Department of Electronic and Computer Engineering of the Technical University of Crete consisted of the following five (5) expert evaluators drawn from the Registry constituted by the HQAA in accordance with Law 3374/2005 :

1. Professor Petros Ioannou (Chair)
   University of Southern California, USA

2. Professor Nikos Karcanias
   City University London, UK

3. Professor Christos Christopoulos
   Nottingham University, UK

4. Professor George Yadigaroglou
   ETHZ, CH

5. Professor Anthony Ephremides
   University of Maryland, USA

Introduction

I. The External Evaluation Procedure

The External Evaluation Committee (EEC) visited the Department of Electronic and Computer Engineering (referred to as the Department hereafter) at the Technical University of Crete (TUC), Chania, Crete during the period of May 30th to June 1, 2011.

The team arrived in the afternoon of May 30th and met with the Chairman of the Department, the Committee for Internal Evaluation (OMEA) and most of the faculty members (ΔΕΠ) at the Department conference room. The Chairman gave a presentation about the profile of the Department, its activities/achievements in research and teaching as well as problems and concerns. Professor Paterakis (former vice Rector and faculty member of the Department) gave a presentation positioning the Department within the Technical University with respect to support services for research, student affairs and facilities. During and after the presentations, discussions with the EEC focused on the strategic plan of the Department, vision, goals and objectives. The meeting lasted several hours into the evening and the EEC discussed preliminary impressions over dinner.

On Tuesday May 31st the EEC had a brief meeting with the Rector at his downtown office and then returned to the campus where the presentations continued. The presentations were on undergraduate curriculum, graduate studies, laboratory and research activities and the long term vision and plans of the Department. During the presentations there were extensive discussions between EEC, the presenters and participating faculty.

At the end of the presentations the EEC had a dinner meeting with the Rector of the Technical University of Crete.

On Wednesday June 1st the EEC visited the campus and had a tour of the main laboratories and facilities for research and teaching. After the tour, the EEC met with each of the following groups separately:

- Undergraduate students
- Graduate students
- Laboratory support staff of the "ΙΔΑΧ" category
- Laboratory support staff of the "ΕΕΔΙΠ" and "ΕΤΕΠ" categories
- Secretarial and administrative support staff

The meetings were well attended, informative and lively.

The meetings with the students and support staff took place in the absence of the Chairman and faculty members in order to encourage people to discuss candidly all issues.

The EEC also met with the Director and some faculty members of the Institute of Communications and Information Systems (referred to as *the Institute* hereafter) which is affiliated with the University; most of the faculty involved belong to the Department.

All groups were encouraged to communicate any additional comments to EEC via email by June 1st. Several graduate and undergraduate students already responded and sent emails. Their comments have been taken into account.

The EEC had an executive session to discuss and consolidate its first impressions and come up with a preliminary set of observations and conclusions as well as with some recommendations. It then had a short meeting with the internal evaluation group (OMEA) members to brief them on the main preliminary observations and conclusions and get first reactions.

The EEC was assisted by a considerable number of documents in addition to extensive information on the Department website. The documents provided included the following:

- The most recent internal evaluation report
- Undergraduate Program Guide
- Graduate Program Guide
- Information about the Department
- Faculty short CVs
- Copies of all presentations
- Annual Activity Reports
- Statistics and data about the Department
- Samples of Diploma reports
- Samples of PhD dissertations
- Samples of course projects
- Samples of examinations
- Samples of teaching evaluations

The climate of the visit was professional and friendly with all participants expressing their views in an open manner. The Chair was very responsive and cooperative in providing requested information and making adjustments to the original schedule.

The EEC members are unanimous in expressing their appreciation for the cooperation and hospitality provided by the host Department as well as with the HQAA for arranging and supporting the visit.

II. The Internal Evaluation Procedure

The EEC was provided with a comprehensive and factual internal evaluation report (IER) that was supplemented by the voluminous data provided during the visit. Some evidence was provided on the source materials used in preparing the IER, e.g., annual faculty activity reports (a unique feature of this Department), student teaching evaluations, funding levels, number of PhD graduates etc.

The approach and standards used were comparable to those followed in similar evaluations and self-assessment reports in other major Universities. The EEC felt that it would have been useful if the report included specific *measurable* goals in teaching and research.

A. Curriculum

APPROACH

Undergraduate Program

The goals and objectives of the curriculum are to prepare and train engineers through the development of a strong theoretical foundation supplemented with substantial practical training and application-oriented laboratory projects. The Department has an effective internal procedure for reviewing and updating its curriculum to meet international standards and industry trends. The Department has direct access to a wealth of curriculum development ideas due to the experience of numerous young faculty that came from different top Universities abroad. This leads to ambitious benchmarks and standards like:

1. Raising the admissions standards as reflected in the entrance examination scores
2. Shorten the unjustifiably long actual graduation time
3. Increase course attendance rates and reduce failure rates in courses
4. Broaden the curriculum to include energy related topics in response to stakeholder inputs (need for local economic development etc)

With regard to curriculum development there is evidence of external consultations with highly experienced and distinguished experts from Academia as well as use of curriculum material from top Universities posted on websites. In addition, students participate through the Undergraduate Studies Committee and General assembly. There is also evidence of general student satisfaction with the curriculum. The process of updating the curriculum is taking place in most parts of the Department's educational activities despite the lack of formal processes for upgrading programs which is a problem that exists throughout the Greek educational system.

Graduate and Doctoral Program

The goals and objectives of the curriculum are to prepare the graduates for a career in industry and/or academia through advanced courses with a strong research orientation both theoretical and applied. As with the Undergraduate curriculum, the Department has an effective internal procedure for reviewing and updating its curriculum to meet international standards and industry trends. The program has selected areas of concentration in which excellence is pursued. In addition, the Department envisions an expansion in the area of Energy related research that is important to the local and national needs as already mentioned for the undergraduate curriculum. A notable feature of the Masters program is the presence of two alternative streams, one research oriented and the other focused on a broader training via courses and a

project.

With respect to the PhD program, the goal of the Department is to increase the number of quality PhD students.

RESULTS

The Department has managed to achieve most of its goals and objectives with the exception of developing the energy program in teaching and research due to delays in approved appointments.

The introduction of prerequisites, discussed below under Teaching, is a positive measure and appears to be successful.

The goal of increasing the number of PhDs is a long-term goal and will take time to fully materialize.

IMPROVEMENTS

The Department is continuously assessing the curriculum for improvements. Given that most faculty came from top Universities they have the experience to maintain a strong, sound curriculum.

The Department plans to expand teaching and research activities in the energy sector.

Furthermore the Department intends to:

1. Raise the admissions standards as reflected in the entrance examination scores
2. Shorten the unjustifiably long actual graduation time
3. Increase course attendance rates and reduce failure rates in courses

B. Teaching

APPROACH

The Department's policy is to enhance classroom teaching with laboratory work. A large number of well-equipped laboratories provide good support for teaching and research. There is a reasonable teaching staff/student ratio and strong teacher/student interaction and collaboration, especially at the graduate level. The students have praised the accessibility of teaching faculty and support staff.

The Department has an excellent in-house web portal that facilitates teaching management and enhances student-to-student and student-to-teacher communications.

The examination system is dictated by the state imposed regulations.

The final grade is based on a good mix of performance in midterms, projects and final examinations in most of the courses.

The Department has managed to come up with ways to discourage cheating and plagiarism during examinations.

IMPLEMENTATION

The quality of teaching procedures is up to the standards and in accordance with good practice in top Universities.

The books used in courses are mostly selected from the best internationally available textbooks that are also used for teaching in top Universities and are supplemented with instructor's notes. The material is well organized and readily available to students on the Department website.

The in-house-developed, dedicated website and portal used to assist teaching is extremely impressive and very valuable for teaching and communications. Its new version includes video recordings of lectures and multimedia tools which are available to all students.

The Department has managed to successfully integrate research into teaching in most areas both at the undergraduate and graduate levels.

The Department has in place a comprehensive student teaching evaluation for the teacher and the courses. The evaluation criteria appear to be reasonable and similar to those used in top Universities.

The laboratories for teaching are well planned and run.

RESULTS

The students who regularly attend the lectures and met with the EEC, made positive comments regarding the efficacy of teaching. However, a significant

number of student are absent from classes, as unfortunately is the case in most Greek universities. The introduction of prerequisite courses seems to be effective in discouraging this practice.

The faculty has indicated that only in one case the failure rate in courses deviated strongly from the average. The Department chair addressed this issue.

Regarding graduation time, there are delays similar to those endemic in Greek institutions. The reasons are well understood but difficult to overcome within the present educational framework.

The average final degree grades of the graduating students are above 7/10 with a reasonable spread.

IMPROVEMENTS

The Department has recently taken the rather unique (for Greece) initiative to introduce prerequisites for selected courses, hoping to reduce absenteeism and lack of success in the first two years of the program. This is common practice in universities abroad and long overdue in Greece. The very first results are positive.

To strengthen the response of the student body, the Department has introduced the function of Undergraduate Advisers (one per 10 students in the first year, one per year in subsequent years).

The Department has also introduced a first-semester seminar program to familiarize the students with the profession and its challenges.

A regular weakly research seminar is planned to promote interactions within the Department, presentation of the research results, familiarization of students with presentations, etc.

C. Research

APPROACH

The departmental policy is to excel in its present areas of research. Measures of achievement are publications in the internationally best-available journals and the successful acquisition of competitive research funding. The annual publication of research accomplishments plays an important role in promoting excellence in research and setting benchmarks. The detailed individual-level Annual Activity Reports the Department puts out are rather unique for Greek Universities and are commendable.

The presence of the "Special Account for Research Funds" (ΕΛΚΕ) and of the Institute of Communications and Information Systems facilitates the administration of the research activities and encourages further developments.

The Department has not set *formal* internal standards and metrics for assessing research.

IMPLEMENTATION AND RESULTS

The adequacy of the research infrastructure and support are generally good, thanks to the use of a variety of means (proper use of modest internal funding, participation in research programs, etc). The support coming from the Special Account (ΕΛΚΕ) is used efficiently and is decisive.

The level of faculty publications is very good in general. The Committee applauds the practice of publishing primarily in the best available journals. It is also commending the participation of students at all levels in the research and resulting publications, a measure of the quality of the student projects. The network of external collaborations is extensive in most areas. Inter-departmental collaborations with other units of the TUC are to be encouraged.

Research projects funded by a variety of external sources have brought to the Department the necessary resources.

The research of the Department is internationally highly visible and is monitored adequately via citation indices. The Faculty and Staff regularly participate in international conferences and generally participate in the activities of the international research community. A number of patents have been obtained and some of the research results have achieved the state of commercialization by third parties or project partners. There is a good number of awards for "best papers" etc.

IMPROVEMENTS

The major on-going departmental initiative is the introduction of a new teaching and research area in Energy. As noted already, success in this endeavor is hampered by administrative hurdles independent of the University's will.

The Department recognizes that its number of doctoral students is low and is making efforts to increase it.

D. All Other Services

APPROACH, IMPLEMENTATION AND RESULTS

In general, the Department enjoys excellent collaboration of its entire staff, at all levels, in teaching and research. The involvement and participation of students in departmental activities is also very good.

The Distributed Multi-Media Systems and Application laboratory of the Department provided, and is still providing, very valuable services to the University community and beyond in information technology.

The administrative procedures have been simplified and streamlined by the introduction of the rather unique, internally-developed, departmental web portal that centralizes and facilitates all communications. In particular, student discussion forums have been very effective in promoting contacts between students and faculty; both faculty and students have benefited from this. Wireless access to the University portal has been made possible from several locations outside the campus.

The Secretariat staff indicated that their heavy workload is eased by the implementation of the electronic data handling.
The Department provides working space for graduate as well as undergraduate students, increasing student presence on Campus and participation in activities.

IMPROVEMENTS

The continuous improvement of the in house web-based tools will further improve teaching and research activities, as well as administrative services. It appears that the Department is proceeding in the direction of advancing the further development of these tools.

Collaboration with social, cultural and production organizations

The Department has interacted successfully with the municipality of Chania in the areas of health (collaboration with Chania hospital) and established the foundations of a web network for municipality services. The latter is expected to expand with more benefits to the county. The EEC has noted that the Department has also provided the nucleus of staff supporting the information services of the University.

E. Strategic Planning, Perspectives for Improvement and Dealing with Potential Inhibiting Factors

The laboratories have well-thought research plans and goals; however, there is no *formal* overall strategic plan for the Department that outlines strategic research areas and includes short, medium, and long term goals supported by metrics.

Despite the lack of formal strategic plan, the Department aims to continue improvements in hiring top faculty, increasing publication quality and productivity, increasing funding and attracting top PhD students. Such developments rely mainly on individual efforts and small groups. A formal strategic plan will help to draw more people into, better organize this process, exploit better brain storming exercises as well as evaluate and reduce strategic risks.

The rigidity of the State legal and financial framework is a major inhibitor in the operation and development of the Department. Specific examples include the following:

1. The meddling of political groups with the daily operations of the Department and educational system in general.
2. The major concern of faculty and students is the threat of disruption of the operation of the Department by occupations and the subsequent damage to property, threats to personal safety and delays in the completion of studies.
3. Unacceptable delays in the realization of approved faculty appointments
4. Arbitrary division of research and laboratory support personnel into different classes such as EEDIP, ETEP and IDAX enforced by the law creates problems (i.e. uncertainties and low morale) especially in the case of IDAX who are administrative personnel affiliated with the University and not with the Department.
5. The inability to plan academic staff resources according to needs and efficiently manage its resources.
6. The inability to use external funds to support staff positions, e.g., sponsored faculty position chairs.
7. The difficulties in exploiting research results that would lead to successful applications for the benefit of the University and the country.
8. The lack of trust due to the frequently-changing educational framework which creates uncertainty.

F. Final Conclusions and recommendations of the EEC

The Department is staffed by highly enthusiastic, mostly young, top quality, internationally known faculty who came from renowned Universities. The EEC was impressed by the high standards of the Department in its current core areas and the quality of teaching and research. The comments that follow aim at helping the further development of the Department.

Strengths

1. The Department enjoys excellent relations among faculty and support staff.
2. There is close interaction of faculty and students both at the undergraduate and graduate levels; it was evident that the faculty is very eager to help students. These facts have been acknowledged by the students.
3. The undergraduate and graduate programs in the areas of departmental strength are outstanding.
4. In general the faculty are of high quality, educated in top Universities, very enthusiastic and motivated and internationally known.
5. The Department is outward looking for setting international quality standards and is striving to attract top faculty.
6. The Department has excellent facilities for teaching and research.
7. The integration of research into teaching is highly commendable.
8. The introduction of prerequisite courses in the curriculum, despite reactions from some student groups, is a step in the right direction.
9. The Department developed an impressive in-house web portal for teaching and communications at all levels.
10. Some of the research accomplishments have potential for further exploitation and the development of new initiatives.
11. The Departmental faculty retreats and annual reports are highly commendable.
12. The existence of the Institute of Communications and Information Systems is an excellent vehicle to manage research effectively.
13. The EEC supports the efforts of the Department to change the name to Electrical and Computer Engineering provided it goes hand in hand with the hiring of staff in the already approved posts.

Weaknesses

1. There is no *formal* management structure that covers all aspects of departmental operations.

2. Weakness of the overall strategic plan with respect to short, medium, and long term goals with well defined metrics at the Department level.
3. The publicity of academic and research accomplishments could be strengthened.

Threats

1. The stifling effect of the legal framework governing Universities in Greece is a major threat to the development and success of the Department.
2. Political interference in University operational matters and procedures reduces effectiveness and hinders progress.
3. The destructive effect of occupations in the smooth operation of the Department.
4. Possible dilution of the strengths of the Department by externally imposed reorganizations.
5. The impact of the economic crisis on the retention of high quality faculty and supporting staff.
6. The undermining of the strategic plan by not filling the already approved appointments in the energy area.
7. The impact of decreases in the positions of 407/80 that will adversely affect the significant contributions of postgraduate students to the very demanding undergraduate program.

Recommendations

1. Introduce a 'capstone' design project that will facilitate student group interaction and oral presentations by students as well as familiarization with industrial team practices. The capstone design should reflect the complete cycle of product development.
2. Provide the opportunity to the students to get practical, industrial training (e.g. during summer vacations) in Greece or abroad (e.g., via IAESTE).
3. Better coordination of demands on students, such as the requests for project reports and homework returns to avoid overloads at the end of the semester.
4. Establish broad quantitative measures of assessment of performance in teaching and research as part of the strategic plan.
5. Evaluate risks in strategy and create contingency plans.
6. Formalize the Departmental management structure and establish a research committee to deal with research operations and strategies.
7. Encourage the creation of spin-off companies exploiting the research

achievements of the Department.

8. It is highly advisable for the University and the Department to introduce comprehensive internal regulations that cover all academic processes.
9. The EEC believes that more flexible appointments should be made possible for the benefit of the Department.
10. The Department should reconsider carefully the student load during the first two years as it appears to be rather heavy.
11. Improve public relations to publicize research and other achievements more aggressively.
12. Expand external funding by more aggressively reaching out to potential sponsors and funding sources.