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HELLENIC REPUBLIC
H.Q.A.
 HELLENIC QUALITY ASSURANCE AND
 ACCREDITATION AGENCY

EXTERNAL EVALUATION REPORT

DEPARTMENT OF ELECTRONIC ENGINEERING

TEI of PIRAEUS



European Union
 European Social Fund



MINISTRY OF EDUCATION & RELIGIOUS AFFAIRS, CULTURE & SPORTS
 M A N A G I N G A U T H O R I T Y

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External Evaluation Committee

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

1. Dr. Nicholas E. Buris _____ (committee president)
(Title) (Name and Surname)

NEBENS USA _____
(Institution of origin)

2. Prof. Elias Pimenidis _____
(Title) (Name and Surname)

University of East London, U.K. _____
(Institution of origin)

3. Prof. Christos Politis _____
(Title) (Name and Surname)

Kingston University, U.K. _____
(Institution of origin)

4. Mr. ManolisStratakis _____
(Title) (Name and Surname)

Forthnet S.A. Heraklion, Greece _____
(Institution of origin)

5. Prof. Costas Xydeas _____
(Title) (Name and Surname)

Lancaster University, U.K. _____
(Institution of origin)

Introduction

External Evaluation Committee (EEC)

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

1. Dr. Nicholas E. Buris, president and chief executive officer , Nebens, USA, Coordinator
2. Prof. Elias Pimenidis, Senior Lecturer and Programme Leader, University of East London, UK.
3. Prof. Christos Politis, Reader, Department of Computing and Information Systems , Kingston University, UK.
4. Mr. Manolis Stratakis, Director of Innovation, Forthnet S.A., Heraklio, Crete , GR.
5. Prof. Costas Xydeas, School of Computing and Communications, Lancaster University, UK.

The EEC visited the TEI of Piraeus Department of Electronic Engineering on Monday 16th to Wednesday, 18th of September 2013. Upon arrival, they were welcomed by professors Stefanos Tsitomenas, Maria Rangoussi and Savvas Vasiliadis, the Head of the Department. Subsequently, a meeting was held with the TEI President, professor Lazaros Vrizides, as well as Vice President of TEI and Head of MODIP, professor Dimitri Tseles , professor Apostolos Kokosis and the president of the TEI Board of Governors, professor emeritus George Kalkanis. During this meeting the scope of the visit was discussed as well as challenges and other topics of general interest to the entire TEI and the department of Electronic Engineering.

All departmental academic staff, one secretary and some technical staff as well as a number of undergraduate students and recent alumni were made available during the three day visit.

EEC members visited all departmental teaching and research laboratory facilities, some lecture theatres, the cafeteria, a snack bar as well as other spaces used by students.

Unfortunately, the University Library and Sports Centre were not accessible due to strikes and building lock-down undertaken by the administrative staff. A number of detailed presentations were given to the committee, commencing with an overview by the Head of Department of the structure, activities and general goals of the Department. In addition, teaching activities, at undergraduate and MSc level, were highlighted, procedural rules explained, and information on topics such as student admission and achievements were provided.

Presentations were made of the activities of various Laboratories with emphasis on both teaching and research and on available equipment. EEC members interacted with staff throughout the visit and their questions and requests for further information were promptly

addressed.

Thus this Quality Assurance evaluation visit to the department of Electronic Engineering of the TEI of PIRAEUS included the following activities:

i) Meetings with:

- Head of Department
- Dean of STEF (School of Tech. Applications Σχολή Τεχνολογικών Εφαρμογών)
- Vice president of TEI Piraeus;
- Members of the TEI MODIP (Μονάδα Διασφάλισης Ποιότητας -ΜΟΔΙΠ);
- Academics responsible for the internal assessment report (Ομάδα Εσωτερικής Αξιολόγησης -ΟΜΕΑ)
- Section Leaders and members of Research Laboratories
- entire staff (23)
- lecturers and assistant professors only (14)
- Laboratory assistants
- Undergraduate students and alumni
- Administration personnel.

ii) Visits to all teaching and research Laboratories

The EEC examined documentation which included the following:

- Internal Evaluation report of 2008-2009 (original) and its supplement(April 2013),
- Program of Undergraduate Studies 2012-13,
- Examples of examination scripts,
- Examples of textbooks produced by departmental staff and also other “external” recommended books,
- Examples of diploma theses, (final year project reports)
- Student module evaluation questionnaires and aggregate module evaluation results,
- Staff advancement/movement as well as Staff to Student Ratio and other related statistics,
- Research Group information and list of funding activities
- Examples of Intra Research Group Collaboration Activities,
- Graduate employment/career information,
- Erasmus and International collaboration activities.

The aforementioned documentation was of good quality and much of it was made available to the EEC prior to the evaluation visit. Further information and presentations that were requested just prior and during the visit were satisfactorily provided along with appropriate explanations. Missing details related to quality assurance procedures and strategy were raised and also discussed during the visit. Some further information was requested at times following the visit and was promptly provided by the Department.

The EEC’s impression on the acceptance of academic staff and belief in Quality Assurance procedures was overall very positive. All academic staff were available and present at certain times during this three day Quality Assurance visit.

A. Curriculum

To be filled separately for each undergraduate, graduate and doctoral programme.

The department currently runs a single undergraduate programme of studies as dictated by the legal framework that defines the operation of programmes offered by departments at T.E.I. and Universities in Greece.

The department also operates a postgraduate course (i.e. MSc Networking and Data Communications) franchised from Kingston University in the United Kingdom. All modules on this programme are taught and assessed by the department's staff according to the materials provided by the awarding institution in the United Kingdom. Kingston University quality assurance procedures are applied in this MSc course. Furthermore, the Department cooperates by contributing into the teaching of the MSc in "ICT for Education" offered by the University of Athens. Neither the MSc programme with Kingston University nor the one with the University of Athens were evaluated by the EEC.

This section of the report focuses on the curriculum of the undergraduate programme offered by the Department.

APPROACH

The undergraduate programme structure is dictated by the regulations of the Ministry of Education of the Hellenic Republic. The minimum term of studies is eight semesters and students are required to successfully complete 40 modules before they are awarded a degree. Out of those, 35 are core modules while the students can choose 4 out of 8 optional modules offered during semesters 6 and 7 of their studies. The diploma thesis project and the Industrial Placement elements are in the core (compulsory) part of the programme of studies and are undertaken during semester eight of the programme. Programme content is based on main themes within the subject area and depth of knowledge progresses over the semesters. Note that Industrial placement is a ECTS credit contributing module (European Credit Transfer and Accumulation System), but is a pass/fail compulsory element of the programme of studies. Students need to have completed this successfully before they are awarded their degree.

IMPLEMENTATION

The aims, objectives, learning outcomes and indicative content are clearly defined in module specifications that amply reflect the overall aims of the programme of studies and the expertise amongst the teaching staff of the Department. The programme of studies is also available on the department's web site and easily accessible. The restrictions imposed by the rather rigid structure of the programme though do not allow the Department to offer optional modules that could expose students to more state of the art knowledge as this emerges from the scientific community and the Department's own research laboratories. The EEC strongly agrees with the Department that this is a limiting factor, as it prevents the department from preparing its students for work in organizations operating on the cutting edge of the technological evolution.

In an era of rapidly evolving electronic technologies, there is a real need for continuous evaluation and revision of the curriculum. It appears that the Department has its own

approach to revising the content of modules and most of the module specifications appear to be in accordance with present trends. However, the EEC could not identify a specific formal method for reviewing the curriculum in general, and one which involves all stakeholders, including Industry, in particular. Although the Department maintains a healthy relationship with Industry, this is currently based primarily on personal contacts as opposed to a systematic approach.

The EEC felt that the Department could benefit from establishing an Advisory Board, comprising of external stakeholders, which could provide valuable input on a variety of topics of interest to the department including research and curriculum. Industrial members of the Advisory Board could offer feedback on the needs of the industry and help the department adjust its curriculum and research projects accordingly. The Department should also proceed with the establishment of formal curriculum review (CR) procedures and thus the formation of an internal Curriculum and Teaching Committee (CTC), which provides a formal, transparent and consistent curriculum review practice.

Finally the EEC proposes that the CTC consult, within its CR process, the various curriculum standards proposed in the subject matter by international professional institutions such as the Institute of Electrical and Electronics Engineers (IEEE) and the Institute of Engineering and Technology (IET).

RESULTS

Having met and discussed with members of the academic staff, current students and past graduates, the EEC believes that the programme of studies offered by the Department produces graduates with sound knowledge and relevant skills that are highly valued by the Industry. Furthermore, the TEI/Department's contacts with the Industry provide very good opportunities for students to enter the workplace and thus earn valuable experience during the Industrial Placement part of their studies. In the past, this was elaborately corroborated by the successful further employment of students at very prestigious industrial and research organizations both in Greece and abroad. The recent economic crisis may have a negative effect in the professional placement and careers of current graduates and the department is urged to intensify its efforts toward a smoother transition of its graduates into the local as well as international workforce.

Despite the above positive general picture, the EEC noticed the department's data indicating that students exceed the normal duration of studies (four years) by a considerable amount of time. The reasons are numerous and include the structure of the programme and personal circumstances which necessitates students to seek employment during the course of their studies. Furthermore and perhaps more importantly, up to recent times, there was no limit to the number of semesters that a student could attend classes and to the number of examination opportunities available for each module. Similar to other TEI, this has led to a considerable backlog of registered students in the Department and thus to contention for and bottlenecks in the use of Departmental facilities in general and laboratory facilities in particular. This in turn increased considerably the cost of studies per student incurred by the State. The passage of recent law aims at reducing, if not eliminating, this backlog by capping the total length of time required for the completion of the program of studies.

A further area that the EEC finds of crucial importance is that of students acquiring Professional and Entrepreneurship Skills(P&ES). Depending on the flexibility allowed by the State for the Department to redefine its undergraduate programme structure, modules should be revised to include elements that would allow students to develop P&ES skills before they embark on their Industrial Placement part of the programme.

IMPROVEMENT

The rate of completion, student progression as well as the level (marks/grades) of the awarded degree are universally accepted key criteria in assessing the effectiveness and efficiency of the delivery of educational programmes. As mentioned earlier, it is expected that the recently introduced law, which enforces a limit of 50% above the normal 8 semesters as the maximum duration of studies, would help to i) clear the backlog of registered students, ii) yield better utilization of physical resources and iii) enhance student experience and results. To further enhance the effectiveness of the delivery of the programme the Department's academic staff have proposed that a limit to the number of examination opportunities available to students should be set to three, with marks (grades) capped at pass level following the second unsuccessful attempt. This should motivate students to attempt to pass module first time without any procrastination. The EEC concurs with this and believes that the above should influence programme delivery efficiency and student educational experience in a very positive manner.

One challenge of the TEI and the Department is that its student population, upon graduation, is called to staff positions of great breadth when it comes to industrial applications. Some students end up staffing general engineering positions that are not merely "electronic" in nature, but they require more general engineering knowledge. On the other hand, and as determined by law, the programme of studies is currently rather rigid. The department does not have the usual flexibility in running its own affairs as is the case seen in similar Institutions abroad. A long term solution would allow the Department greater flexibility in its offerings with a concomitant accountability based on performance to prevent frivolous decisions and destructive moves. To address the issue of student preparedness for the workforce in the interim, the EEC recommends that a general engineering module be devised which would consist of a few self contained smaller sections. Each such small section could be added or dropped based on student interest, inputs from the CRC and the Advisory Board.

Another challenge of the curriculum is the very broad range in the educational preparedness and background of the students. The 2012-2013 number of students entering the department was 130. However, the total number of students enrolled in all 8 semesters is more than 1000. Some Professors lamented that the level of several students is low for advanced work in some modules. In fact, a couple of the Professors who said they require a relatively high threshold before a student be given a diploma thesis project, end up offering no such projects to seniors. While the EEC recognizes that this may indeed be the case, it urges the Department to handle the situation better. Currently, for example, to avoid dilution of effort and overwhelming a Professor's time, there is a maximum number of diploma theses that each Professor can supervise at any given time. However, there is no minimum. The EEC recommends that a minimum of 2 diploma theses per Professor per year be instituted. Such an action could better balance the workload among staff and, eventually, even increase the level and quality of diploma theses and graduate preparedness.

B. Teaching

Typically, a student can study 5-6 modules per semester. Modules are split into theoretical parts (lectures) and laboratory exercises which are assessed separately by a combination of essays and examinations. Student class contact time is on average 26 hours per week, while the overall student effort time is at 780 hours per semester on average, yielding an overall 6240 hours for the four year normal duration of studies. These translate to an equivalent of 240 ECTS (European Credit Transfer and Accumulation System).

Staff teaching load varies between 10-16 hours per week from full Professor to the Lecturer grade. What, however, is proving a challenging and restricting point is the rigidity of the staff workload. For example, supervision of diploma projects/theses does not count as a teaching duty. As a result, teaching loads from semester to semester and from staff to staff are not well balanced. For example, and excluding the Department Head, aggregating over the most recent 5 semesters, there are staff that had no diploma theses supervision at all. This is to be contrasted to staff with supervision duties of 24 theses/projects. The EEC recommends that diploma project supervision be accounted correctly and measures to be devised that would force a more realistic view of the teaching load and importance of such supervision. The Department may want to consider instituting the minimum number of 2 thesis supervisions per academic staff per year, as suggested earlier in the Curriculum section of this report.

One potentially damaging aspect of the way the programme of studies is delivered is that, following completion of the normal duration of studies (eight semesters), students can enroll in up to 50% of their pending modules in one semester. A "pending" module is a module that the student has yet to pass. This situation, for students having a large number of pending modules and who have struggled in the past to demonstrate satisfactory progression, is an insurmountable task and a recipe for failure. The waste of resources due to repeated failed attempts on modules drains the department of valuable staff time and laboratory hours and increases the cost of studies per student. Clearly a revised code of practice for the academic management of studies is required to be approved urgently in order to remedy this situation. The Department and the TEI are urged to conceive of ways, within the applicable law, of combating the issue.

Another important tool to remove the backlog and ensure smoother flow of students through the programme in the future is that of the Academic Advisor. While the concept exists in the Department, it is not utilized properly. Students, unless they seek it directly, do not get prevailing guidance through their programme. Perhaps a student should not be allowed to enroll in any classes without the explicit agreement and signature of his/her Academic Advisor. The role of the advisor should include things like guidance on course loading, course relevance to workplace needs, judicious choice of electives, remedies for lack of background in certain areas and, in general, a 4-year plan for the student to graduate on time with a fulfilled experience.

Yet another possible tool to correct part of the backlog may be a more careful treatment of "part-time" students. The EEC talked to a number of students who were struggling to meet their academic obligations while working in parallel. Policies should be put in place to acknowledge and accommodate such part-time students. Within reason, employment should

be considered a justified reason for an extended period of programme completion. Working students should be allowed to enroll in fewer modules per semester to better balance their demanding schedules.

APPROACH:

Teaching members of staff use a variety of means at delivering lectures and laboratory sessions. Most modules are competently supported by well-presented sets of notes, relevant sets of PowerPoint slides and, in most cases, accompanying textbooks that support the need of further work by the student.

Laboratory sessions are conducted in appropriately dedicated laboratory space under the supervision of teaching members of staff and adjunct professors hired to support such activities. Clear instructions for laboratory exercises are given to the students for each session.

Cohorts of students joining the programme each year come from a variety of origins and educational backgrounds, making the smooth delivery of programmes rather challenging. In particular, students that join the programme from vocational education schools have consistently over the past years demonstrated a weakness in their mathematical background. The Department feels and the EEC agrees that such students could benefit from exposure to short induction type modules that would help them bridge the gap of knowledge required to seemly progress with their studies. The introduction of such teaching though might prove challenging as the rigidity of the programme structure might prove too difficult to fit it in as compulsory modules, while if they were to be offered as optional this might defeat the objective due to poor student attendance. In short, the EEC thinks that the level of the students need to be elevated which requires that the Department have more flexibility in its handling of the curriculum.

IMPLEMENTATION

The academic staff have demonstrated a very impressive commitment to their role as educators and module folders inspected by the EEC contained material that is indicative of very competent module delivery and management practices. However, and despite this commendable effort and commitment of the academic staff, the failure rates of many modules are quite high. Thus student progression is slow and adversely affects degree completion rates.

The EEC feels that there are a number of teaching related areas and practices to be carefully considered and applied in order to enhance module delivery and staff student interaction. A Teaching Peer-Review system should, for example, be instigated to allow staff to observe teaching amongst peers, provide collegiate feedback and reflect on issues of good practice identified from observing each other's teaching. Perhaps this should be done through the internal Curriculum and Teaching Committee (CTC) mentioned and suggested by the EEC in the curriculum section of this report. This should be used to identify areas of potential development of staff and thus allow the Department's management to support in a meaningful manner staff career development. This teaching peer-review system should also be considered in conjunction with the currently adopted module evaluation scheme that is based on a student questionnaire template(module evaluation form) provided by ADIP. The

use of the module evaluation forms/questionnaires should be revised to allow for true benefits to be obtained. Currently questionnaires remain underutilized. Their value is not explained adequately and the answers obtained are often representing a small percentage of students, if filled in at all. Moreover, the EEC noticed that several questions pertaining to student feedback on the instructor's quality of teaching have been removed from the latest version of the course evaluation form. The EEC strongly believes that these questions are very valuable to the Department and help improving teaching quality. Therefore, the EEC strongly suggests that the course evaluation forms be appropriately revised.

Another observation by the EEC concerns the grade distribution of the Department's graduates. Consistently, from the 2006-07 through the 2011-12 academic years, the Grade Point Average (GPA) of the graduates has been between 6,28 and 6,38 out of a perfect score of 10,00 and, consistently, during the same period there have not been any graduates who received a GPA in the 8,50-10,00 bracket. Yet, the average grade of diploma theses is above 9,50 with the vast majority of them getting a perfect score. The EEC could not resolve the reasons for this phenomenon. Is something wrong with the grading system? Are there no students who absorb the material of the entire program well enough to get a GPA larger than 8,50? Are the grades of the diploma theses more lenient than course work? The GPA reflects a long term metric, albeit imperfect, of sustained performance by students as well as staff effectiveness in delivering knowledge. Therefore the EEC urges the Department to identify the reasons behind this observation and take meaningful action to address it and harmonize grading, as appropriate.

RESULTS

The rather slow rate of student progression and unnecessarily long completion period of studies should improve considerably with the maximum duration of studies limitations of the newly passed law. The Curriculum and Teaching Committee suggested earlier, and equipped with the relevant set of procedures, should be tasked to manage effectively the teaching affairs of the Department. The programme structure and modules will need to be reviewed frequently. It should definitely benefit the Department if they are authorized to formulate programme structures, so that more optional modules can be offered and sharing of modules between Departments within STEF are allowed.

The Industrial Placement part of the programme is an excellent opportunity for students to develop practical and professional skills. Although this is monitored by the Department, this is done as a mostly personal initiative of members of staff. The EEC feels that a more systematic method of monitoring, recording and assessing this part of the programme should be provided. To this effect, a more flexible workload allocation model is needed for academic staff, in order to allow their time to be more fairly spent between teaching, administration, research, project supervision and placement monitoring duties. As suggested earlier with the supervision of diploma theses, some credit should be given to staff for guiding and monitoring the progress of students during their industrial placement. There were some anecdotal stories of the industrial placement been very inhomogeneous. That is, of the industrial placement of one student being significantly more demanding than that of another. Academic staff should guide the students properly on the negative ramifications and consequences of an irrelevant Industrial Placement which only on paper fulfils a graduation requirement but does little for a long term successful career.

The diploma thesis shows strong results with the majority of the students achieving very high grades. As mentioned earlier, this is difficult to correlate with the results of the regular modules and the achieved overall GPA. Several diploma theses had more than one authors. The EEC noticed that several diploma theses had not used proper referencing of the material inserted in them. As an example, there were theses with images copied from the world wide web and their source was not properly identified. Students should be given proper guidelines of style and international norms in writing scientific publications.

Several advertisements were posted in the hallways of commercial outfits that offer assistance to students in various capacities. Discussions with students revealed anecdotal cases of students being helped by such outfits in their diploma theses. The EEC did not dwell on the issue but urges the Department to maintain a strict policy on related academic integrity matters. The verbal examination of diploma theses should be used as a mechanism to identify possible cases of plagiarism. Additionally, the Department should also invest in software systems that could help identify, control and reduce plagiarism cases. Finally, and in order to fairly and effectively assess final year projects undertaken by individual students or group of students, a grade breakdown into a few components should be adopted. These components could include marks for documentation, scientific content, presentation, technical novelty, etc.

C. Research

For each particular matter, please distinguish between under- and post-graduate level, if necessary.

APPROACH

Research is seen as a key part of the Department's strategy and activities. The Department devotes considerable effort to sustain existing research activities and develop new ones. Research is motivated by the recognition of its contribution to the professional development of the members of academic and research staff, as well as the external visibility and reputation of the Department and the Institution as a whole. The interest in research reflects also the recognition of its role in advancing the subject areas covered by the Department to the scientific community at large.

The research direction of the Department is shaped by the interests and expertise of its academic staff. Research is structured into three main groups spanning across the two sectors of the Department (see Implementation section below). These groups become hosts to graduate students of the Department who wish to advance their studies and develop knowledge and skills at a postgraduate level. Research groups also employ external researchers.

The Department sees the formal provision of postgraduate studies as a strategic means for enhancing its research activities and, to this end, it has requested the approval of relevant M.Sc. programmes organised and hosted autonomously by the Institution.

Currently, the Department has no formal framework for assessing its research. However, there is informal recognition of the research efforts undertaken by individual members of staff and research groups as well as the research outcomes of their activities (e.g. publications, awards of research grants, etc.).

IMPLEMENTATION

According to its website, the Department reached staff wide consensus and support from the TEI Board of Governors (διοικητικό συμβούλιο) to establish three research laboratories in 2010

(http://www.electronics.teipir.gr/index.php?option=com_content&view=article&id=316&Itemid=139&lang=el). These laboratories are:

- Communications and Networks (ΕΠΙΚΟΙΝΩΝΙΩΝ & ΔΙΚΤΥΩΝ)
- Electronics and Computing Technologies (ΤΕΧΝΟΛΟΓΙΩΝ ΗΛΕΚΤΡΟΝΙΚΗΣ ΚΑΙ ΥΠΟΛΟΓΙΣΤΩΝ)
- Measurements, Renewable Energy Sources and Quality (ΜΕΤΡΗΣΕΩΝ, Α.Π.Ε. & ΠΟΙΟΤΗΤΑΣ).

However, information on these laboratories and their activities is very thin on the aforementioned website. In the supplement of the Internal Evaluation Report, released in April of 2013, the Department states that a formal application for the approval of these laboratories was submitted to the State in 2010, but the State has not responded to date. Accordingly, the TEI has initiated formal action against the State to affect the establishment of these laboratories. Until these three research laboratories are approved and certified by the MoE, research in the Department is taking place in several smaller research teams across a wide range of technical areas. Some of these smaller laboratories have adequate

infrastructure and equipment that has been primarily funded by European and National research grants. The National funding of these laboratories is very limited. These laboratories offer opportunities for engagement in research to the students of the Department who reach the final semesters of their studies (as part of final year projects/ dissertations).

The Department has also developed several collaborations with external institutions (see Results section below for further details). These collaborations offer further opportunities for engagement in research to both academic/research staff and students. In the case of academic/research staff, they provide opportunities for research visits, collaborative research, bidding for research funds, and joint supervision of PhD research students. In the case of students, they offer opportunities for involvement in International or National research projects, and, eventually, pursuing research studies at the Ph.D. level. Hence, they constitute a means for addressing a key limitation that arises due to the current legal framework of the operation of TEIs, notably their inability to award Ph.D. degrees and offer research-based education at this level. Furthermore, if the above three research laboratories were certified and operated in a professional manner, they could over time make significant contributions and address key limitations in the current inability of the Department to offer Ph.D. programmes.

RESULTS

The EEC believes that the department's research is commendable given i) the existing infrastructure, ii) the limited resources available at the departmental and institutional level and iii) the existing administrative and teaching load of the permanent academic staff of the Department,. To this effect, it helps that the department has a cohesive staff. The EEC was given brief presentations of projects on flexible wearable electronics and elements of optical networking infrastructure. The EEC observed that the number of students working on these projects and/or selecting them as topics for diploma theses was very small. It is conjectured that more research progress could have been made, had the number of students been larger.

Scientific publications

The table at the bottom of this section provides a summary of the Department's publications including conferences, journals, books, patents and the individual academic H-index. The full list of selected publications can be found in the Department's internal evaluation report. It should be noted that the list of publications includes internationally reputable journals (e.g., IEEE Transactions on Instrumentation and Measurements).

Research projects and Strategy

As documented in the available internal evaluation report, the Department has been awarded National and International (EU-funded) research grants of a total value that exceeds 1.5MEuros within 2011-13. Most academic members of staff of the Department have participated as scientific investigators in the projects funded by these grants. This is a noteworthy achievement given the increased competition for public research funding over the same period.

However, the EEC strongly believes that the long term viability of high quality Departmental research must be underpinned by Strategy and associated actions. . In this way the various

research teams would benefit from each other's strengths by targeting funding in complimentary and interrelated topics. Such vision, when manifested by demonstrable interrelations, will not only help the Department to focus, but it is could also be instrumental in attracting national and international sponsors.

This lack of a central research strategy was identified as the No.1 missing element of research in the Department's 2008-09 internal evaluation report (page 82). Thus the EEC urges the Department to move forward with the creation of a Strategic Plan for its research activities. The existence and execution of such a Departmental plan, even before the formal establishment of its three laboratories, would be highly beneficial.

Research collaborations

The Department has developed several research collaborations with external institutions at the National and International level. As documented in the internal evaluation report for 2008-09 and the supplementary appendices for the period 2009-13, the National external research collaborators include the universities of Thessaloniki (Aristotle), Aegean, Patras, Crete and TEI of Athens. The Department has also collaborated with the Technical University of Crete, the National Technical University of Athens, the National Centre for Scientific Research "Demokritos" and the Technical Education Institute of Larisa and Lamia, as well as other departments within TEI of Crete. External collaborators include Kingston University London (UK), Cranfield University (UK), University of Bolton (UK), University of Ghent (Belgium), Georgian Technical University (Georgia), Istanbul Technical University (Turkey), Mid-Sweden University (Sweden), Purdue University (USA) and University of Lorraine (France).

Applications of Research

There is evidence of applicability of the results of the research of members of the Department, notably the creation of a microwave guide for high power applications and some ideas for wearable antennas and electronics. Moreover, a quick demonstration was made to the EEC of inductive heating for industrial applications.

However, in discussions with the researchers, the concept of securing intellectual property rights for their work exhibiting possible industrial and commercialization applications was an afterthought. The Department, and the TEI in general, did not have a formal mechanism to investigate and assess the commercial value of its research output. Not only is this a financial necessity in most Universities these days, it also helps guide the research programmes and better secures success in research landing zones. It also helps the career of the Department's graduates. The Department should consider the creation of a Departmental Research Committee (DRC) as better explained below in the "Improvement" part of this section.

Acknowledgement and visibility of research

Within the period 2008-13, members of the Department have been involved in the organisation of a series of international conferences (International Scientific Conference eRA – at its 8th Series), workshops and symposiums. Within the same period, there is also evidence of significant participation of members of the Department in the programme/technical/steering committees of international conferences and workshops, and

participation in the capacity of reviewer in international journals, conferences, and workshops.

The publications of the Department's members have also enjoyed an increasing number of non-self citations between 2003 and 2013 (citation data for earlier years were either not available or incomplete).

IMPROVEMENT

The Department has intensified its effort to obtain further research funding. Evidence presented during the visit indicates that most of the academic staff submits at least one research proposal per academic year. This figure brings the Department to the forefront of its School. Overall, it has also been clear that there is continuous effort to improve the equipment of the main three research Departmental laboratories and to offer opportunities for involvement in research work to undergraduate students reaching the final semesters of their studies.

The Department's performance in research would benefit from the creation of a Departmental Research Committee (DRC), which will develop a clear and structured research strategy, the identification of areas of strategic importance for research development, and the subsequent allocation of available resources to such areas. Furthermore, the establishment of a framework for assessing research performance at the departmental, group (laboratory) and individual level would enable staff to focus better their efforts and achieve the full potential that seems to be available. This DRC should also get regular feedback from the Department's Advisory Board mentioned earlier. The DRC should also work with ΔΑΣΤΑ to formalize Intellectual Property Right (IPR) generation and licensing procedures. This would greatly benefit the Department, and the careers of its promising staff and its self-driven graduates.

In addition, the TEI should further support ELKE (ΕΛΚΕ: Ειδικός Λογαριασμός Κονδυλίων Έρευνας), in order to allow the Principal Investigator (PI) and other related staff to efficiently manage research projects and similar activities. The EEC recommends that ELKE should return back to the Department, a percentage of the overhead identified in the budget of research projects and postgraduate programmes. This percentage of the overhead should be devolved down to Departmental and Investigator levels. It is worth noting that this is already the norm in several Universities in Greece and abroad.

It is also worth noting, that there seem to be opportunities for increasing the research income of the Department based on research-enabled consultancy and private sector work both in Greece and abroad, which are not fully explored at the moment or are offered on a free of charge basis.

PUBLICATIONS COUNT & AVERAGES - LAST TEN YEARS (2003 - 2013)	Journal Papers	Intern. Conf.	National Conf.	Books / Chapters	Patents	H-index
Associate Professor 1	18	67	3	3		3
Professor (part-time) 1			2			0
Assistant Professor 1	10	28	12			3
Lecturer 1	51	54	8	3	5	12
Professor 1	3			3		1
Professor 2	1	1				4
Lecturer 2	1	6	8			0
Associate Professor 2	8	16		2		6
Lecturer 3	17	10	5			6
Lecturer 4	5	8	4	1		3
Lecturer 5	28	18	2	3	2	8
Professor 3	8	7		1		7
Assistant Professor 2	30	58	5	23		4
Assistant Professor 3	21	55	4	2	2	4
Lecturer 6	2	14	14	2	1	0
Professor 4	17	41	16	3		6
Associate Professor 3	17	15	5	1		7
Lecturer 7	28	12		1		8
Professor 5	22	11	7	2		5
Lecturer 8	9	24	7	1		2
Assistant Professor 4	72	19	3			35
Assistant Professor 5	18	3		3		5
Assistant Professor 6	10			1		3
Emeritus Professor	2	5	3	2		2
TOTALS	398	472	108	57	10	134
AVERAGES PER STAFF PERSON	1.66	1.97	0.45	0.24	0.04	

D. All Other Services

For each particular matter, please distinguish between under- and post-graduate level, if necessary.

APPROACH

The Department operates within the School of Applied Technology of TEI Piraeus, sharing with other departments many supporting facilities such as library, liaison office, refectory, child-care and sports services. All buildings visited, teaching rooms, laboratories and public areas were clean, tidy, ordered and functional.

The importance and contribution of administrative services in achieving its goals and aims is well understood by the Department. The Secretariat is located in an office of adequate size and serves the needs of students and partially of the academic staff. There are three (3) very well qualified (i.e. two with BSc/MSc and one with BSc degrees) full-time employees performing with enthusiasm tasks as required by the Department in a well-mannered, friendly and productive environment. Tasks and services offered are well documented and were explained clearly to the EEC. This office is fully supported by all required hardware and software infrastructure. Administrative procedure reviews take place as required between the secretariat and Department with the main aim of efficiency and quality of service performance.

The Secretariat uses an academic infrastructure software system (ILYDA), while dealing with requests and activities related to students and staff (e.g. student registration to courses, efficient provision of academic certificates, newsletters, provision of marks, provision syllabus and other related information).

It must be stated that administrative staff was on strike during our visit and as a consequence the EEC had no access to a wider range of TEI facilities. It was particularly unfortunate that the EEC could not visit the Library. The fact that administrative staff was available to the EEC is indicative of their enthusiasm, professionalism and dedication towards their work and the Department. The perceived relationship between Departmental administrative staff, academic staff and students is judged to be satisfactory. Responsibilities are allocated and tasks are executed efficiently. It has to be noted that the administrative staff dedicated to the department's needs does not report directly to the Department. Rather, it reports into a TEI wide central organization. And if, for example, an administrative staff goes on vacation, it is through personal initiative that the Department is notified. Even though this reporting structure has the advantages of efficiency and uniformity of processes TEI wide, closer attention should be paid to the needs of the Department and a somewhat better coordination, as appropriate per the needs of the Department should be attempted.

Students benefit from the support activities offered by ΔΑΣΤΑ, an outplacement and career office covering liaison with industrial activities for student employment (career services), industrial placements and general advice/help in the areas of entrepreneurship and commercialization. A ΔΑΣΤΑ department also offers professional psychological advice and support for students and TEI staff in general. In discussions with students, not all services of ΔΑΣΤΑ were well known.

The Department takes care for the accessibility of students with special needs. Most buildings have suitable access infrastructure for students with special needs in order to attend lectures and laboratories.

The Department is encouraging students to participate in other activities (e.g. cultural, sports) and events in general, taking place within and in conjunction with the local community.

General IT support is provided by Departmental technical staff and centrally by the institution and includes the management and running of the IT networks.

A newly constructed, three-level library building serves the whole TEI Institute. A modern, brand new Conference Centre of exceptional quality has been established by the Institution.

The Department operates a social network approach to enable students to interact and establish forums. It also offers advisory services to students, as part of their formal involvement with the IET (UK) and IEEE (USA) professional Institutions. Finally the Department expressed to the EEC the view that all supporting services provided to stakeholders are satisfactory. Some academic staff noted that the Library subscriptions to standard literature databases, e.g. IEEE xplore, is currently restricted due to unpaid subscriptions. An effort was being negotiated at a higher level and such access would eventually come to all TEI and Universities, perhaps centrally, from the Ministry of Education.

IMPLEMENTATION

It seems that important student centred issues under the aegis of ΔΑΣΤΑ activities, particularly with respect to links and liaison with companies and also student career advice, will benefit from further strengthening with companies located outside Greece.

In conjunction with the infrastructure of services discussed above, staff commented on the lack of recurring operational budget for maintenance in general and the purchase of software/hardware tools.

There is no Departmental PC cluster for general use by students, excluding clusters and PC facilities available in various teaching and research laboratories. In addition there is no adequate departmental WiFi coverage, and lack of WiFi provision across the TEI campus (hotspots).

RESULTS

The current administrative infrastructure performs well and has attracted positive comments from EEC members. The same can be said with the other services discussed above and offered to students, TEI staff and local community.

IMPROVEMENTS

There is need for improvement in the way ILYDA provides service in general and the automatic provision of certificates/letters to students without the need of them to be collected in person from the Department.

The EEC has observed the availability of significant size of unused spaces within the Department. These should be deployed as reading rooms, local library and PC cluster support spaces and thus allow students to be productive in between lectures and laboratory periods.

The EEC considers the provision of e-literature as a cornerstone of the TEI academic operation and that lack of this provision is a major limiting factor in student education. To this end, the EEC recommends that the TEI web page be looked at again and improved. There are several links with antiquated information, pages under construction, non-functional links and crucial information seems difficult to find, if it exists at all. The Department's web page is better as it was revamped in the 2010-2012 time frame. But it may be useful that it, too, be looked at again and refreshed. For example, instead of having dry pdf files describing research projects, more interesting pages should be crafted with useful information on the research projects and pictorials of research results, contributors, etc. Students that have contributed significantly in a laboratory or through their diploma theses could be portrayed on the Department's web site to increase exposure, instil pride and motivate aspiration to new students.

For a smoother operation, it is imperative that the Head of the Department be formally consulted in the management and appraisal of Departmental administrative staff. For example, administrative staff must always get the approval of the Head of Department for their leaves or day-offs.

Collaboration with social, cultural and production organizations

The Department offers advisory services on technology and technology driven applications and related issues to several local government organizations and public bodies. In addition informative presentations and demonstrations on technological topics are made available to the wider local community.

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

For each particular matter, please distinguish between under- and post-graduate level, if necessary.

The department has done many things right in its recent past. The overall quality of its staff is commendable. The skills, enthusiasm and commitment of the Department's staff is quite homogeneous and spread across its ranks. As a result, this Department does not suffer from the single or double "points of failure" syndrome. Advanced research and postgraduate programs cannot afford to be decimated by the departure of just one or two of their scientific staff. The TEI of Piraeus Department of Electronics Engineering has achieved a critical mass of active and indeed enthusiastic staff. It can well withstand and recover from the departure of a few people without a severe or permanent penalty to its overall program. From a managerial point of view, this is an essential characteristic as it ensures the well-being and normal educational progress of the Department's students.

The TEI and the Department have shown a strong desire to undergo internal and external evaluations for a long time. The Internal Evaluation Report (IER) was completed in 2008-2009 driven mainly by a 3-member committee in collaboration with other staff assisting in the collection of course evaluation data. While this 2008-2009 report had arrived at a number of recommendations, one of the most important one was stated as being the desire by the TEI and the Department to pursue and award Ph.D. degrees. Other areas of desired improvements had been identified as:

- a) lack of funding for acquisition and maintenance of research equipment
- b) lack of a strategic plan for academic development
- c) excessive restrictions on the development of programs of study
- d) high drop-out rates, low student success rates and long delays in degree completion
- e) reliance on too large a number of temporary laboratory personnel
- f) inadequate secretarial support

The 2008-2009 IER had also identified specific short and long term action items that could address the aforementioned improvements. In particular, the Department had focused on the creation and submission of program of study leading to a Master's of Science (M.Sc.) degree. This M.Sc. program and degree would be driven by the Department, would not require the involvement of an external university and would facilitate the goal of the Department to ultimately pursue Ph.D. programs and issue Ph.D. degrees. Such a M.Sc. program would be catalytic to the eventual creation of a Ph.D. program. This action item was taken seriously by the Department which created and submitted its plan for a M.Sc. in *Internetworked Electronic Systems*. However, the consideration and approval of this plan by the TEI and its Board of Governors cannot be completed until permission is obtained from the Ministry of Education.

However, the academic staff is to be commented in that they have continued to be engaged in M.Sc. programs driven by other institutions and research centers. In fact, the Department intensified such activities by co-supervising four Ph.D. theses pursued at external institutions, two in Greece and two abroad.

Additionally, the Department identified the opportunity and proposed the creation of three laboratories based on the N.3794 / 4-9-2009 law. These laboratories would play a threefold role. They would strengthen research in key focus areas, they would streamline the management of research operations and they would also, albeit by osmosis, eventually enhance teaching through more advanced laboratory sessions. These laboratory proposals were approved by the TEI Board of Governors and were submitted to the Ministry of Education. However, the law has not been applied and the TEI has pursued legal action to force the applicability of the law. One additional benefit of these laboratories would be their potential certification. Such a certification, albeit monetarily expensive, could contribute financially to the Department and the TEI through the delivery of services to industrial and commercial interests.

Other steps to incrementally improve the position and operation of the Department were started in the time period since the 2008-2009 IER. These included the establishment of the "academic advisor", an academic staff member assigned to each student who could be used for all academic matters facing the student such as choice of courses, TEI and Department policies, etc. While the academic advisor policy has been implemented, it is not yet being fully taken advantage of by the students. The Department posts on its web site the advisor for each incoming student. However, perhaps the academic advisor's formal agreement to a student's enrollment every semester may be useful in aiding the students in their programme and reducing the backlog.

In the 2010-2012 period, the Department also revamped its web site. It also implemented the AΔIII suggestion of establishing course evaluations by the students. Most, if not all the important information on the Department, its staff and resources is now available on the web. Additionally, social network "blogs" have been created on theoretical and laboratory courses where students could login and discuss various topics of interest.

Last but not least, the Department staff has stayed active in research, responded to several requests for proposals and secured funding with a considerable level of success, as outlined in section C (Research) of this report.

All the activities mentioned above indicate a strong desire by the Department to propel itself into higher levels of research and teaching, consistent with their stated goal of establishing a Ph.D. program. It did not go unnoticed by the EEC that the department possessed considerable enthusiasm and cohesiveness toward these goals. However, the EEC notes that there are significant elements of this plan that are missing and have not been thought through carefully, if at all. In what follows we expand on some areas which the EEC suggests that the Department consider seriously.

The TEI and the Department, while aiming toward the establishment of a Ph.D. program, should significantly elevate both their research and teaching strengths. The quality of staff and the incoming students has to increase for worldwide competition and preparedness. Because this is a continuous improvement process, mechanisms need to be put in place to measure key performance indicators. Equally important, processes need to be established and institutionalized to correct mistakes and improve performance.

F. Final Conclusions and recommendations of the EEC

For each particular matter, please distinguish between under- and post-graduate level, if necessary.

The Department has achieved a respectable critical mass of active and enthusiastic academic staff which is eager to do the right thing and propel its programs to a higher level. The EEC believes that the Department should proceed with the establishment of their own M.Sc. programs, per applicable law.

However, the EEC also believes that the Department and its circumstances are not yet in the position to entertain the question of establishing a rigorous Ph.D. program. Certain changes in policies, processes and results have to be achieved before the Department can deliver its own Ph.D. program. For a Ph.D. program to be effective the Department will have to achieve maturity in running its own M.Sc. programs, freedom of adjusting its curriculum and programs of study in an agile manner and as it sees fit. The Department also must have flexibility to control the quality of its incoming and outgoing students. These seemingly simple goals are not easy to achieve and require a lot of planning, hard work and long term consistency. At present, researchers at the Department and respective laboratories are not properly rewarded for their efforts. Teaching staff is not yet properly evaluated and there are no mechanisms of correcting teaching anomalies or rewarding exceptional performance. Additionally, the Department does not have much, if any, funding from its awarded research programs or technical services to invest in the start-up efforts of its junior faculty. As a result, there is a risk that part of its enthusiastic staff may become disenchanting in the future.

The EEC recognizes that the Department operates in a system of strict and often constraining policies to pursue its goals. The EEC believes that it is imperative the Department be allowed to operate more freely. In order to ensure that the Department maintains a high level of quality and performance, concomitant mechanisms should be put in place to establish accountability and effective corrective actions.

Given the uncertainty surrounding the outcome of the effort to establish three certified laboratories, the EEC urges the Department to proceed with the establishment of a Departmental Research Committee (DRC) and create and execute a strategic plan of research. At the beginning, this plan should shine light in areas of focus so that research undertaken by staff is complimentary and interrelated for maximum impact.

Research and teaching are integral parts of the overall educational effort. Therefore, the EEC recommends the creation of a Curriculum and Teaching Committee (CTC) which would coordinate/refresh the curriculum, monitor the quality of teaching and suggest rewards and mitigation schemes, as appropriate.

Moreover, since the Department does not operate in isolation, but its students have to find positions in industry, or other educational institutions, the EEC suggest that the Department establish an Advisory Board (AB) from external members. The Department should brief the AB once or twice a year, or on special occasions as they see fit, and seek advice and feedback on various educational and research issues.

Recommendations to the Ministry of Education and the State:

- Develop clear targets, roles and consistent definitions and differentiations of the various grades of Educational Institutions.
- Clarify issues and rights regarding the Professional recognition of TEI graduates.
- Do not change the laws governing the Educational system too often.
- Carefully estimate the needs of the State in various technological areas and better assign the appropriate educational resources. It may be argued that it would be better for Greece to have fewer but higher quality TEI and Universities.
- Allow the TEIs some self-governance. Currently, it appears that the State micromanages the TEI operations introducing unnecessary bureaucracy and unproductive limitations in their programmes of study.
- Promote agility and freedom of operation of the Educational Institutions so that they can ultimately enable their students to excel and succeed in the inevitably increasing worldwide competition. In parallel, promote and establish meaningful accountability as a means of preventing freedom from being abused.

Recommendations to the TEI:

- Return part of the overhead of externally funded research to the Department, the principal investigator and his/her laboratory. This helps defray equipment maintenance costs and support travel to scientific conferences and other research meetings/events.
- Create a TEI Intellectual Property Rights (IPR) office, perhaps within ΔΑΣΤΑ, which will be responsible for TEI wide IPR (creation, securing rights and licensing to third parties).
 - Work by TEI scientific staff shall be evaluated for possible IPR and proper protection of such rights should be ensured before sensitive information is made public.
 - TEI template Nondisclosure Agreements (NDAs) and contracts should be created for various classes of its industrial research customers.
 - The staff should get trained on worldwide elements of IPR.
- Revise the student course evaluations so that meaningful and adequate instructor quality questions appear for both, theory and laboratory modules. Even if not perfect, such student feedback is very valuable.
 - Identify academics whose teaching skills need to be improved and pursue plans for such improvements. This will increase the level of student achievement and their suitability for research.
 - Improve the collection of good data, by choosing timing, method, ease of use, etc.

Summary recommendations to the Department. Lesser suggestions can be found dispersed in the various sections of the report. More details of the recommendations below can also be found in the body of the report.

- Create a Curriculum and Teaching Committee (CTC).
- Create a Departmental Research Committee (DRC).
- Create an Advisory Board (AB).
- Harmonize the grading system.
- Introduce a "general engineering" module in the curriculum to accommodate varying career needs of the students.
- Proceed with the creation of a M.Sc. autonomous program, when given permission by the State and/or the Ministry of Education.
- Defer consideration of a Ph.D. program until at least 10 students have successfully graduated from an autonomous Departmental M.Sc. program.

The Members of the Committee

Name and Surname	Signature
1.	_____
2.	_____
3.	_____
4.	_____
5.	_____