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ΣΤΗΝ ΑΝΩΤΑΤΗ ΕΚΠΑΙΔΕΥΣΗ

HELLENIC REPUBLIC

H.Q.A.

HELLENIC QUALITY ASSURANCE AND
ACCREDITATION AGENCY

EXTERNAL EVALUATION REPORT

Department of Automation

Technical Education Institute of Stereas Elladas

OPERATIONAL PROGRAMME
EDUCATION AND LIFELONG LEARNING
investing in knowledge society
MINISTRY OF EDUCATION & RELIGIOUS AFFAIRS, CULTURE & SPORTS
MANAGING AUTHORITY

European Union
European Social Fund

NSRF
2007-2013
programme for development
EUROPEAN SOCIAL FUND

Co-financed by Greece and the European Union

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External Evaluation Committee

The Committee responsible for the External Evaluation of the Department of Automation of the Technical Institution of Stereas Elladas consisted of the following three (3) expert evaluators drawn from the Registry constituted by the HQAA in accordance with Law 3374/2005 :

1. Dr. Sotiris Skevoulis (President)

   Professor, Department of Computer Science and Information Systems, Pace University, New York, USA

2. Dr. Christos-Savvas Bouganis

   Senior Lecturer, Imperial College, London, UK

3. Dr. Michael P. Theodoridis

   Lecturer, Brunel Institute of Power Systems, Brunel University London, Uxbridge, UK

Introduction

I. The External Evaluation Procedure

On Tuesday 17 December at 9:00 AM, the External Evaluation Committee (EEC) met at the headquarters of the Hellenic Quality Assurance and Accreditation Agency for a briefing by Dr. Vasilis Tsiantos on the organization and operation of the agency. After the meeting, the committee departed for the trip to campus of the Technological Education Institute of Stereas Elladas located in Chalkida. The Committee was received by the Chairperson of the Department of Automation Associate Professor Dr. Maria Tzamtzi, the Chairman of OM.E.A Dr. Haralambos Tsitouras and member Dr. Fotis Koumboulis who gave a brief overview of the structure and operation of the department.

Subsequent to the introductory meeting, the committee along with the above mentioned professors met with the President of the Institute, Professor Anastasiou who reviewed the very brief history of the Technological Institute of Stereas Elladas. He emphasized the recent efforts of the merger between TEI Lamias and TEI Chalkidas. He also outlined his philosophy for the mission of the Institute. Present in the meeting were also the Deputy Presidents TEI Stereas Elladas Professors Mertzanis, Kontogeorgos and Manasis.

On Wednesday 18 December, the committee convened at 9:00 am at the Paliria Hotel, where preparatory discussions took place. The committee was transferred on site at 10:00am, where a meeting with the administrative (ΔΠ) and technical

staff (ETΠ) took place in one of the department's labs. During this meeting the procedures relating to the department's main administration office ("Grammateia") and technical operations/support were discussed.

Next the EEC had a chance to visit some of the department's laboratory facilities, in particular: Automatic Control Systems II; Industrial Control; Mechatronics & Robotics; Electrical and Electronic Measurements; Computing lab. The code names for those laboratories were: Δ3, Γ211, B201, B203 and B209. Short presentations of the lab scope, facility and approach together with a review of available facilities took place. During the visit of one of the labs, the Committee decided to hold an unplanned meeting with about 30 students who were to attend a lab session on that day, in the absence of faculty. The meeting lasted over 40 minutes and it was focused on the quality of teaching, the administrative support that students receive and other organizational matters. The Committee was pleased with the openness of the students and received valuable and insightful information.

In the afternoon, the EEC requested to interview senior members of academic staff (i.e. Professors and Associate Professors) separately from the rest members of staff (Assistant Professors) and clinical professors. With the former group, the EEC discussed views on the department's distinctive features and strategy as well as role of postgraduate programs and research. The EEC asked the group of more junior staff whether they are satisfied with the department, the degree of opportunities for growth and again the role of postgraduate programs and research.

EEC also had a scheduled meeting with a sample of students identified by the Department, other than the ones the Committee had already met. EEC had the opportunity to discuss with them in the absence of faculty on the students' perspective on the functioning of the department. Students from across the various years of the study program were already selected by the department. Subsequently the EEC met a sample of the department's alumni, some of whom were working within the TEI while others in the industry. The day closed with the EEC requesting a series of information missing from and additional to the internal evaluation report to be prepared for the following day.

On Thursday 19 December, the committee convened at 9:00 am at the Paliria Hotel, where in depth discussions about the department took place. At 1:30pm the Committee was transferred to campus. Next the EEC visited the institutional library where a guided tour to the services and facilities was offered by library's staff.

The visit closed with a discussion with faculty members, including the O.M.E.A, of the department in a meeting where the committee asked for further information and supporting evidence, as well as discussed key issues that were identified during the 3-day visit.

Documents examined

In advance of the visit, the Committee had reviewed the Internal Evaluation Report for the year 2009 and we received the reports for 2010-2011, 2011-2012 and 2012-2013 when we visited the Department.

During the visit the Committee requested supplemental information that was either missing from the reports or was deemed necessary to clarify statements in the reports. During the visit, the Committee was provided with

- The curriculum sheet for the Automation curriculum
- Course files for the courses in the curriculum
- A table showing the regular faculty by rank
- List of contract faculty showing their degrees and areas of specialization
- Past exam papers and marked scripts
- Internal course evaluation forms
- List of research projects both completed and underway
- Online services that students are provided with
- List of departments classrooms, laboratories and other spaces
- Detailed list of goals for both undergraduate and graduate programs
- Detailed account of student movement through the ERASMUS program

Persons interviewed

Members of the faculty

- Most of the regular faculty members of the department. There were met in two groups: Junior and Senior members of staff
- Four members of the supporting staff of the Department.

Around 45 undergraduate students

Five Institute alumni half of which one was associated with the Institute on a contract basis and the other were/had been employed in the private sector.

Facilities visited

The Committee visited the following facilities:

- Two classrooms
- Laboratories
  - o Automatic Control Systems II

- o Electrical and electronic measurements
- o Data Collection Systems
- o Industrial Controllers
- o Mechatronics and Robotics
- Library

II. The Internal Evaluation Procedure

Appropriateness of information

The written information provided to the committee in the form of the self-study as well as that made available to the Committee during the site visit were directly related to the objectives of the visit and sufficient to allow the Committee to reach its conclusions with a high level of confidence.

Quality and completeness of information

During the meetings on Tuesday and Wednesday the External Evaluation Committee identified a number of omissions and ambiguities in the Internal Evaluation Report. By the end of the site visit on Thursday, most of the requested information was provided and some remained to be provided in the following days. Everything that EEC requested was finally submitted after the Christmas and New Year Holidays on January 15, 2014.

Achievement of internal evaluation objectives

To a large extend, the information contained in the internal evaluation report supports the conclusions reached in Chapter 9 of the report. The observations and comments of the External Evaluation Committee on the basis of the internal evaluation report, the additional documents provided and the interviews conducted during the site visit are contained in the concluding section of this report.

A. Curriculum

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

APPROACH

Although there is no explicit written statement identifying the goals and objectives of the automation curriculum, these can be deduced from the Internal Evaluation Report and discussions with the officers of the Institute and the members of the faculty. The Internal Evaluation report indicates that the program of studies provides the students with high quality education with the objective to produce graduates with detailed knowledge and training in the subject of automatic control as well as in the disciplines of informatics and hardware design.

In the discussions with the officers and the faculty of the institute, the objectives of the program were more clearly articulated as aiming to produce graduates who would satisfy the current needs of the Greek economy. The current curriculum is responsive to those needs, given that the Greek industry is in need of medium complexity technology with emphasis on applied skills and few, if any, positions requiring advanced concepts and training in automatic control.

The curriculum places heavy emphasis on the practical applications of control theory by exposing the students to extensive laboratory experience. The Internal Evaluation report indicates that out of the 170 contact hours, 50% is devoted to lectures whereas the other 50% is devoted to classes (i.e. exercises) at 15% and Laboratories at 35%. Such break down is considered by the Committee to be in line with the objectives of the department. The laboratories are designed and developed in accordance to the curriculum and are well aligned with the theoretical modules. Examination of the course descriptions of the laboratory courses and examples of projects contained in the course files reveal the applied nature of these courses.

There is a written statement describing the procedures for revising the curriculum on the basis of identified needs. According to the Internal Evaluation report, the curriculum is assessed on its delivery by utilizing data on the employment of the department's graduates. This data is collected through various mechanisms such as the faculty members and the Career Office. Although this procedure in place seems to be effective, it may be beneficial for the department to document it.

Moreover, it seems that there is in place a flexible internal procedure within TEI boundaries that allows the development of new courses and expanding the laboratories content. This allows the fast adaptation of the curriculum to the current needs of the Greek economy.

The Committee noticed that there is no direct input from other stakeholders (i.e. automation companies and students) in the revision of the curriculum, but that this is rather performed by input from the faculty members. As such, the Committee has concerns on the efficacy of the revision process as the main stakeholders do not provide direct input in the above process.

In discussions with the faculty members of the Department, the Committee was informed that a proposal had been prepared for offering a graduate program in automation. As this proposal is at an early stage and has not been accepted and implemented yet, the Committee only proceeded to informal discussions with the faculty members regarding the proposal's objectives and impact to the department.

IMPLEMENTATION

The contents and structure of the curriculum are well-documented both in electronic format as well as hard copy. These records describe the courses and their contents as well as the sequence in which they must be taken to ensure that a student seeking to

enrol in a course has satisfied stated prerequisites for the course. The topics and contents of the courses are comparable to those in similar programs elsewhere. The Department has claimed that a formal procedure is in place to ensure that prerequisites are satisfied. The Committee was able to verify the claim, but it has concerns that the procedure might not be effective. Based on the data provided by the Department and from the interviews of the students, it became evident that very few students complete their program of studies in four years and many repeat a course many times. Some students matriculate for more than ten years. Over the past ten years the number of students who graduated within the nominal four years of matriculation is in the order of 1% (even lower for many cohorts). Those students who graduate take about five to nine years to do so. In such an environment it would be difficult to ensure compliance with the requirements for course sequencing, not to mention the fact that for a student matriculating for ten years, the curriculum in effect at the time of the initial registration would have changed by the tenth year.

The Committee was made aware that a priority system is in place when the students declare the labs that want to register for. The system gives priority to the more senior students (i.e. students that need to re-take the lab) on the selection procedure aiming to reduce the extra time that is needed for graduation. This is a distortion of the system, as the normal practice is that priority is given to junior students (for whom the lab session appears on their timetable for the first time). The distorted practice is implemented to relieve the senior students who risk getting deleted by the system – which is a new measure -, and should stop being implemented after the students have become familiar with the new measure, which could take 1-2 years.

The Committee examined in detail syllabi and reference materials for the courses, examination questions with their solutions and graded examination papers for each course on file. In addition the Committee reviewed statistics of grade distributions for representative courses at the first as well as the fourth year of the program. The average grade for graduation was approximately 6.7. In some courses in the first year, the average class grade was about 3.5.

The Committee discussed the above results with the faculty members extensively. It was concluded that, in many cases, the reported average class grade was biased as it does not take into account the fact that many students take part in an examination without adequate preparation as there is no limit on how many times they can be examined on a specific subject. As such, no clear conclusion can be drawn from the current gathered statistics and actions should be taken towards this. Furthermore, it was evident that the faculty members were aware of the low average graduation grade and long graduation time issues and they were actively tried to address them through extra classes. Moreover, the committee was informed that in many cases there are economic reasons that prevent the students from attending the courses

leading to such low-grade averages and long graduation times.

A problem detrimental to the effective implementation of the curriculum is the lack of teaching and lab space. Specially, in later years' laboratories the number of students per work-station can be up to five. Although the materials provided are appropriate, such conditions are unfavourable for effective implementation of the curriculum. Moreover, most of the labs had little lab equipment available and that was not enough for the number of groups in a lab session.

In order to counteract these deficiencies, the department has introduced the Virtual Labs, where the students can use simulators of the devices instead of interacting with the actual equipment. Even though this allows the design and exploration of more challenging lab experiments, which adds extra value on the education of the students, it prevents the students from interacting with the actual hardware. The Committee is concerned by the above approach as it results to graduates with limited experience on actual hardware, a key advantage of TEI. Nevertheless, the Committee acknowledges the necessity of such action, as the department does not have the necessary funds to equip it laboratories to the appropriate level.

The Department is aware of these deficiencies, but it is constrained by the lack of sufficient personnel, space, and funds to equip the laboratories.

RESULTS

The structure of the curriculum and the contents of the courses are in consent with the goals and objectives of the Department. At a superficial level, the testimonials of the primary constituents of the program and the employment data provided by the Department indicating that the unemployment rate of the graduates in automation is low are prima facie evidence that the program achieves its goals. However, a detailed analysis of the data indicates that emphasis should be given on the low graduation average grades and long graduation times. Only a few percentage of the students graduate within the nominal matriculation period, which implies that there is a mismatch between the curriculum and the majority of the enrolling student body and the goals of the Department are achieved only for a few percentage of the students. The department is aware of the source of these problems and has already taken actions to address them with various degree of success. It should be noted that many of the reasons that lead to the above problem are not within the department's control (i.e. student financial situation).

IMPROVEMENT

The Committee apprised the Department of the consents concerning the curriculum and its implementation. The deficiencies with respect to the overcrowding of the students in the laboratory benches and the very low ratio of graduating students to the number of registered students are beyond the control of the Department.

Funding for facilities is controlled by the central government. Also, until recently, by law a student could not be terminated from a program, regardless of the time of matriculation. The Committee was told that the law has been changed and this problem should eventually be solved.

Regarding the poor performance of the students, it is to a substantial degree within the purview of the department to take mitigating actions. Traditionally, the academic standing of students entering the Technical Educational Institutes is lower than those entering university engineering programs. To improve the graduation rate, the Department needs to make extra effort to help the entering student improve their knowledge of mathematics. It is recommended that the TEI Stereas Elladas initiate a formal program of tutoring to help the incoming students compensate for their deficiencies. This could perhaps be at School (STEF) level if similar studies in other departments corroborate the conclusion that the main difficulties are identified in modules offered during the first years that are common across the School.

B. Teaching

APPROACH:

The Committee assessed the Teaching aspect of the Department of Automation throughout the duration of its visit. The following comments in this section are based on:
1. the Internal Evaluation Report provided by the department to the Committee,
2. discussions with members of the staff and undergraduate students that took place during the Committee's visit (17/12/2013 and 19/12/2013),
3. inspection of a couple of classrooms for teaching, and the inspection of three laboratories (Mechatronics & Robotics, Industrial Control, Automatic Control Systems II, Data Collection Systems, Computing lab, Electrical and Electronic Measurements) (17/12/2013 and 19/12/2013),
4. a sample of the teaching evaluation reports submitted by the students on the taught courses,
5. the visit/tour to the central library (19/12/2013),
6. examining the details on the offered courses, regarding their structure, organization, syllabus, samples of exam questions, samples of exam answer-books, samples of lab questions and students' lab reports,
7. a sample of Dissertations.

The Committee confirmed that the main teaching methods employed by the department are lectures and laboratories. By the inspection of the curriculum, it is evident that there is extra emphasis on the laboratory component, where the students' attendance is compulsory, something that reflects well the focus of the

department on the application of automation. However, the current number of permanent teaching staff is 15 and cannot adequately cover the required teaching load. Thus, the department needs to be supported by a number of external people employed in a fixed-term contract in a per year basis, in order to cover the required teaching load. However, the Committee was informed that the department's ability to employ extra personnel has been diminished in the recent years significantly. The resulting student to staff ratio is approximately 1 member of staff to 40 students. This number explodes to 1-to-48 when all undergraduates, regardless of the actual term of study, are taken into consideration. However, the Committee is aware that only a small number of students actually attend the lecture courses, effectively leading to a better and acceptable staff to student ratio as reported by the members of staff and the students.

Even though the members of staff have high teaching load, they maintain a good collaboration with the students, as it has been pointed out by themselves and been concluded by talking to the representatives of the students. From the Committee's discussion with the undergraduate students, it was evident that the students feel members of the staff are very approachable, except from one member of the faculty who has been claimed to not deliver lectures/labs. Moreover, the students reported that they would like to see more support on the labs, which currently is difficult to deliver by the low number of staff members.

On the basis of our visit to the laboratories and the lecture theatres, the Committee has concluded that infrastructure and equipment are not well suited to the topics and contents of the related laboratory courses. It was evident that the provided space and number of staff are not adequate to serve the number of students currently studying in the department. The combination of the small number of workstations in each lab, with the low number of supporting staff, leads to the formation of large number of students per experiment and to the repetition of the same experiment many times which is detrimental to the operation of the department and its educational goals.

Most of the classrooms were equipped with old and broken furniture and old black boards, as well as with evident mould on the walls that create concerns about the safety of faculty and students using the electrical outlets on the walls. It has come to the attention of the Committee that most of these classrooms are shared by all departments and managed by the central administration of the TEI Stereas Elladas. On top of that, the committee observed that the classrooms were cold and in most cases students and faculty were working using jackets and scarfs. Despite that, most of the classrooms and labs managed by the department of Automation do have heat and more comfortable working conditions.

The classrooms seem to have enough capacity to support the regular students. However, usually at the start of each term, students from other years attend initially the first few lectures leading to have overcrowded classes. This problem fades away after the first few weeks, as some students stop attending classes. In addition to the normal attrition, another explanation provided by the facultybut not verified by the Committee, is the large number of students who come from low income families that have to work during their studies while others enter the institute not being well prepared due to their background (i.e. coming from a professional college).

The teaching in the department is not adequately supported by modern tools of Information Technology. The local area network and WiFi are inadequate and most of the computer workstations are old and out-dated. In contrast, Software packages such as the mathematical tool MATLAB and the simulation tools of MULTISIM and LabView are easily available. Most members of staff use the web to provide information to the students regarding a range of activities that take place in the labs or to provide information on their courses, whereas the lectures are supported by PowerPoint presentations.

A central TEI library also supports the teaching in the department. There is no individual library within the department, which is considered by the Committee as a reasonable and cost efficient approach. The central library provides electronic methods for searching books and magazines as well as access to electronic libraries. The library also provides space where the students can study, however it should be pointed out that the existing available terminals are old and out-dated and can only be used for searching books and magazines. Moreover, it was noticed that the subscription to IEEE library was interrupted, as no required funds where available to renew it. However, the responsibility is with the Ministry of Education and not with the Technological Educational Institute of Stereas Elladas.

The examination system is of good quality, and in-line with other Higher Education Institutes. The lecture courses are examined through written examinations; for laboratories the students' performance is assessed through continuous assessment. The Committee advises that a common template for the layout of all exam papers and a unified process that ensures the high quality of the examination procedure is put in place. It is further advised that a set of solutions with a detailed breakdown of the marks be produced along with the exam questions in order to assist with the marking and its uniformity. Moreover, the exam papers should reflect the above breakdown where it is possible, and should avoid questions that contribute a very high percentage to the overall mark without having sub-questions with a mark breakdown. Finally, the committee noticed that in some cases the same or similar questions appear in exams, something that needs to be avoided.

IMPLEMENTATION

The Committee assessed the quality of the teaching and it was concluded that the procedures in the organisation of the courses follow best practices. For each course/lab, a description of its syllabus is in place that contains the title of the course, learning objectives, the expected learning outcomes, the topic outline of the course and the relevant bibliography. The course material is well organised, comprehensive and up-to-date, covering all relevant topics.

Overall, members of staff and students reported to the Committee that the quality of the teaching procedures was high. It was clear that faculty members are highly motivated in their teaching and in providing support to the students, something that came across during the whole duration of the Committee's visit.

Moreover, the Committee understands that many aspects of the members of staff's research activities are linked to teaching. Novel and interesting platforms have been developed by the relevant staff and with the help of students through the use of several dissertations. The research activity in the department is attributed to the fact that the department enjoys academic staff that hold a PhD degree (with one exception), who continue to perform research alongside to their teaching responsibilities, and thus translating their research results to topics of dissertations. As such, the Committee deems the link of research and teaching to be strong. The department seek to publicise its activities/strengths/personnel and members of academic staff present their work in academic conferences.

The students take advantage of similar opportunities (like ERASMUS) and visit other departments for few months, as shown by the statistics provided by the department in its Internal Evaluation Report. However, only a limited number of students (6) have used this opportunity in the last 5 years.

Recently, TEI Stereas Elladas has introduced the student evaluation of the teaching staff, the course content and study material/resources, supporting lab, and other aspects of the teaching. By inspecting a sample of the raw data, the Committee saw that the majority of the students were mainly satisfied by the courses and labs. However, during the interview with the students, it was claimed by the latter that they have never handed or completed such an evaluation form. The Committee did not have the means to explore this further, but the Committee believes that the department needs to raise the awareness of the students regarding the student evaluation process.

RESULTS

In order to assess the efficacy of teaching, the Committee took into consideration the following aspects:

1. The fact that a large number of graduate students find relevant work in industry. That was confirmed by talking to the alumni students that already work in industry. The Committee was provided with some data, which could not independently check, where the unemployment rate of the graduates of the department of automation is reported to be low.

2. The quality of the dissertations. A number of dissertations were sampled and the Committee assessed that that their quality was high following in-line with best practice nationally and internationally. From the dissertations, it was evident that the students showed appreciation of the given problem, suggesting and implementing a good solution in the course of the dissertation.

3. Conclusions based on examining the "Book of Progress", which needs to be filled by the employer during the industrial placement and assesses the student's performance.

4. Statistics on the exam results. The statistics initially show a rather bad view of the performance of the students, indicating that a large percentage of the students failing the exam. By investigating this further, the Committee concluded that there is a large number of students that take the exams without any proper preparation leading to many answer-books that are blank or indicate limited effort by the student. Such data are taken into account in the derivation of the statistics, creating a misleading image that most of the students fail the exams.

In view of the above, the Committee concluded that the efficacy of the teaching is satisfactory. However, the Committee acknowledges that there are external reasons to the department that contribute to students' poor performance, and prevent the teaching staff to perform their role. The Committee understands that the existing education system at the time of writing this report allows students to be part of the academic community without imposing any constraint on the duration of the studies. This has led to the problem of students dropping off the course and taking many years to finish. Moreover, there is no limit on how many times a student can be examined in a course. As a result it is difficult to reach a clear conclusion on the actual failure rates of the "active" students. The Committee has understood that a new law is now in place in order to address the above problem by limiting the number of years allowing to a student to complete his/her studies. Also, the Committee believes that the department can have a better view of the performance of the students by applying some pre-processing of the data aiming to exclude the pathological cases that twist the statistics.

The distribution of the final grades is limited to a small range (mostly between 5.0 to 6.9), with only a few students achieving marks above 8.5 (only 4 between 2004 to 2012). Through discussions with members of staff, it became apparent that the

department attributes this to the difficulty of the exams, to the poor knowledge of the students, the low entry criteria and sometimes to their financial difficulties that they may have over the duration of the course. Overall, the Committee believes that the department has a good understanding of the reasons behind the above issues, and has taken actions to address some of these problems.

IMPROVEMENT

The department has identified the majority of the above problems but has not documented detailed enough ways for improvement in the Internal Evaluation Report document.

Two of the main problems identified by the department, is the high failure rates of the students in the written exams and the long time that is needed for graduation.

In the future, the department aims to introduce independent MSc course and independent laboratory in order to perform high quality research and be able to attract high quality students. The Committee is aware that the department has already submitted a proposal to the Greek State on the planned MSc course and this is actively pursued.

Overall, the Committee feels that even though the department has compiled a set of objectives that would improve the performance of the department, a more detailed description of the suggested methods needs to be provided, along with a plan of action, methods to assess the progress of the plan, and a description of the metrics of success. The above will help the department to focus and successfully implement its Strategic Plan.

C. Research

APPROACH

During the visit, the EEC discussed with the head of the Department and senior staff their views on the Department's research role and strategy and elaborated on research practices. We further discussed with a broader group of academic members of staff their views on the support they receive from the Department towards conducting research, the role of legislation as well as the research strategy the Department should follow. We visited a number of laboratories, which although are primarily used for teaching and training, are also being used for the execution of some research projects.

We visited the University's library where we were guided by staff and had the opportunity to ask them questions in terms of available resources.

It is noted that the law setting, the framework within which the Department operates, does not include provision for supervision and award of doctorate degrees (i.e. PhD, DSc, etc). Likewise, the law describes that academic members of staff teach a minimum of 16/14/12/10 hours per week for the levels of Lecturer/Senior lecturer/Associate Professor/Professor respectively irrespective of any other

research or administration workload. It is our understanding from discussions with the staff that the law for research laboratories in the Department has not been fully implemented yet despite the requests from a number of departments.

Being part of a Technological Educational Institute (TEI), the main focus of the Department is the training on applied automation skills primarily at undergraduate level. There is evidence that over the past decade research is increasingly on the agenda of the Department.

The internal standards and policies for assessing research are commensurate with the Department's limited heritage in R&D and the lack of an established national framework for evaluation of research excellence. International and peer-reviewed journals and conferences are preferred, while an accepted oral contribution by a member of staff is a requirement for permission of attendance.

Looking at the available research base, the key research focus of the Department is on applied research in the field of automation and robotics.

The Department's research policy is aligned with the teaching directions of the Department and focuses on the design of automation systems, especially industrial automation and control with artificial intelligence techniques, towards a wealth of applications, ranging from industrial production lines to medical automation, described in detail in 5.1.1 in the internal evaluation report.

The internal standards set by Department for assessing research are based on the number and quality of research papers of the staff, the number of the research programmes they run or participate in, and the funding sources from those programmes.

IMPLEMENTATION

The culture for promotion and support of research is commensurate with the limited R&D heritage in the Department as well as the restrictive legal framework and therefore relatively limited. The teaching load described above is heavy therefore limits the time staff can dedicate on research.

The key institutional mechanism for promoting research is through setting the recruitment and promotion requirements; the latter to a significant extend are based on their research output. It is noted that criteria in this respect are identical to equivalent posts at National Engineering Schools (AEIs), although a significant difference is that industrial experience is essential for the posts of Professor and Associate Professor in this Department.

Following discussions with staff, it is understood that, the day to day activity of research projects is normally being undertaken by members of staff; this is in contrast with the usual practice in Universities and research centers in Greece and abroad, where typically research students and/or fixed-term research staff (e.g. post-doctoral research associates) are recruited for this purpose. In view of the above, a further motivation offered to academic members of staff to engage with funded R&D

activities is reflected in financial benefits.

We did not identify any mechanism that considers the level and success of R&D engagement (e.g. in terms of grant income and research output) within the overall staff workload. It is common practice in various other Universities to reduce the teaching and/or administration load of academic members of staff who excel in research (in addition to accelerating promotion), so that they can contribute to the improvement of the Departmental research profile. The committee recognises that the rigid legal framework, which defines heavy teaching workloads regardless of research engagement, reduces the Department's flexibility in this respect. There seems to be no budget strictly allocated for conferences in the Department, so the staff mainly rely on research projects for the funding of this activity. The staff can relatively easily be granted permission of absence to attend a conference.

In terms of access to bibliography, during our visit to the library it was explained that the library normally maintains subscription to key electronic journals that would provide to the staff access to latest state-of-the-art. We were advised that presently the of education has not made their central contributions towards electronic journals and as a result some key libraries, such as the IEEExplore, are not available to members of staff. However, we were told by the staff of the Department that the majority of themselves are registered with IEEE and therefore are entitled to access to a good number of IEEE publications.

Laboratories are equipped with focus on learning and teaching. The capacity of laboratory facilities to support research activities is therefore somehow limited. The research equipment currently within the Department is used at 100% and is claimed to cover the full range of research activities. What seems to be the challenge is the volume of the equipment, in terms of operator capacity, as the Department has grown recently and is therefore in need of more equipment in this sense. A list of equipment can be found in 5.3.3 of the internal evaluation report, which includes equipment used for educational purposes, something which reflects the fact that the research activities are in the same direction as the teaching. The equipment is usually bought via the annual governmental budget allocated for the Department, via research projects or via European development funds.

According to the internal evaluation report, 92% of the permanent staff are research active, while 65% of the yearly-contracted staff are also research active. Graduates of the Department's MSc also participate in the research activities.

RESULTS

There are indications that the research output of the Department is increasing over the past few years, albeit it remains at moderate levels.

The internal evaluation report provides a list with 14 grant awards during the last 5 years. They are funded by both Greek and European sources. Two of them are cross-discipline grants with other departments of the institution.

- 10 projects funded through Greek and European sources, including 5 projects through 'Archimedes' I, II and III, which specifically focus TEIs.

- 1 project funded from the European Community

- 2 projects funded by the Institute

External collaborations are being actively pursued for the purpose of securing and executing research activities. This to a large extent is a result of the existing legislation, which does not include provision for research laboratories and award of doctorate degrees from the Department. Key collaborations, in the frame of the above listed projects, with other institutions and companies include: TEI of Stereas Elladas/Department of Electrical Engineering, University of Thessaly, ScientAct, TEI of Piraeus, University of Patras, Algosystems Ltd, Atcom Ltd, Akkat Ltd., Academic Research Institute of IT, Slovenian Institute of Hop Research and Brewing, PIA d.o.o, Act Gmbh, University of the West of England, Centre National des Recherches Scientifiques.

The staff of the Department are members of Research teams, within which they have published journal and conference papers, which teams include the following institutions: National Technical University of Athens, University of Thessaly, University of Patras, Democritus University of Thrace, Technical University of Crete.

In terms of the scientific publications, the internal evaluation report presents 38 journal publications, 12 proceeding publications, 85 conference publications for the period 2009-13, with a total of 714 citations – all figures are per academic member of staff and summed for all the academics, meaning that many of those publications are not unique for the Department but shared between the staff of the Department, also revealing a strong research bond between the staff. Among those publications, some are published by internationally leading publishers such as the IEEE, Elsevier, Springer, the IET.

The Department provided a detailed analysis on the research output of the members of staff. The analysis shows good research activity in the department with strong collaborations with people internal and external to the department. Also, the report indicated that the produced results are acknowledged by the research community as it shows by the number of citations that they have received.

Over the past decade the Department staff have attended many conferences, which substantially aids their external visibility. Section 5.7.1 of the internal evaluation report lists a large number of awards and other external visibility activities, of which, however, only a very small percentage was achieved within the evaluation period of 2008-2013.

IMPROVEMENT

The Department has not identified areas amenable to improvement very clearly as

regards research. It is envisaged that incentives will be given to staff in order to contribute to the research activities but there are no details as to how this will be implemented apart from a brief mention that research scholarships will be provided. Despite the figures found in the internal evaluation report, the EEC formed an image of a little lower percentage of research active members of staff, however highly capable and with strong personal vision. The EEC recommends that a more concrete plan to be forward for promoting research activities which may lead to a significant increase of the Department's research capacity.

The Department has taken a good initiative as regards one of the objectives, by submitting a proposal to the Ministry of Education for the establishment of a research laboratory on 'advanced control and robotic systems'.

D. All Other Services

APPROACH

The Department staff strongly feel that there is shortage in teaching, administrative and technical support staff. They have also commented on the poor reliability/speed of the internet connection service, which also has an impact on the daily operations of the Department. They have indicated the lack of office space and student workstations that may be used out of hours.

The Department is now putting in place a new online system for the students so that they can book their lab slots more effectively – lab booking is of great importance for the operation of the Department and has been an area burdened with difficulties and receiving critique from the students. This, as well as other actions (relating to developing/implementing various online services for the students), have been delayed due to the rearrangement of the structure of the Institution (from TEI of Halkida to TEI of Stereas Elladas).

The Department tries to increase the presence of students on Campus by organizing seminars, however the EEC feel that more effective/smarter measures might have to be taken, as the low attendance of students is likely due to problems in infrastructure and possibly the lack of inspiration.

IMPLEMENTATION

The main administration office is staffed by two administrators, out of which one is employed on a part-time basis. Tables outside the office are provided to communicate examination marks outside working hours. The office is open to the public/students between 10am - 12 pm three days per week. In many circumstances the office accepts students outside these times.

An E-class platform is available for students, as described in a previous section. The

platform can be used to provide a number of services to the students, such as registering with classes, getting exam results, requesting books and notes and accessing journal databases; the EEC could not access it as it is currently out of duty, due to the change from TEI Chalkidas to TEI of Stereas Elladas and the relevant administrative issues this has caused.

Two Departmental members of technical staff support laboratory facilities. Members of the academic staff are based in laboratories and have an immediate interaction with the latter. Access to people with disability is not provided in many areas of the Department/Institution. Restroom facilities are available, which however are not well-maintained and do not provide access for disabled people.

The Department does not provide dedicated PC workstations for the students. The students have access to a small number of rather outdated PC workstations in the Library, which the EEC strongly believe are unsuitable. Wireless web access is also available to staff and students in a large part of the University area but was claimed to be slow, unreliable and experiences frequent down times.

The Institution houses halls of residence on Campus. The Department sustains an Erasmus office with an average mobility of 2 student exchanges per year. There is no mentoring provision for the students, although staff claimed to practise mentorship on a personal basis.

RESULTS

According to the students' complaints and the EEC's observations, the halls of residence, web access, and restroom facilities seem to not be suitable. Some classes might be suffering from lack of heating. The EEC received conflicting information as about the level of administrative support offered to the students, from interviews with the staff and the students. Complaints have been expressed as regards the delay in receiving their exam results, a problem which cannot be attributed to a specific group, academics or administration, without further investigation. Complaints have been expressed as regards the state of the halls and the low level of maintenance. The lab equipment is not appropriate for all conducted experiments. In some cases it is non-existent and has been replaced by virtual labs, which is seen to not help with certain topics. Some students even complaint that not all lab sessions are conducted, but theory is taught instead.

IMPROVEMENTS

It is understood that the situation regarding the services to students reflects the available budget, which is beyond the remit of the Department. Problems with the Halls of residence are also related to the financial state of the Institution, but have

been worsened due to the administrational change (rebranding to TEI of Stereas Elladas), which has left the Halls without Chalkida-based staff responsible for it which is beyond the control of the Department. The person responsible is based in Lamia and that makes supervision of the Halls very difficult. Taking into account that the Halls of residence are provided free of charge and that the only source of funding is the financially burdened state, there is not much room for improvement.

The internal evaluation report does not indicate in Chapter 10, how the various services provided to the students might be enhanced, regardless of financial issues. It seems that some problems may be the product of inefficient procedures, one such being the delay in announcing exam results, and can be dealt with by modifying the Department's procedures.

The staff have been making great effort to rectify the situation, regarding all the mentioned challenges, with any limited means they might have and at the cost of extra workload.

Due to the limited resources and increasing intake of students the Department had to resort to building virtual labs on PC. However, students are deprived of the opportunity to get in touch with the physical objects of their studies. Some excellent virtual labs have been presented to the committee. While virtual labs are useful and help students to practice in a controlled environment, the Committee would like to emphasize that the Department should promote and actively seek funding for labs which provide the students with the physical aspect of their topic of study. Certain lab exercises, such as, for example, ones on electrical motors, are judged not to build up the students' engineering insight as much as with the engagement with a real experimental prototype. With TEIs designed to deliver good technical knowledge and bring students close to the physical object of their studies, certain laboratories must be kept in their traditional form. For example, lab exercises on motor control with the absence of a real, physical electrical motor will deprive the students of essential appreciation of the process and limit their engineering insight. Therefore the Department would be advised to proceed very carefully if more virtual labs are to be made, and even to try and replace some of those with traditional practical experiments. This is definitely a practice that requires healthy funding, but still, a number of low-budget steps can be made to help realise this over time. For example, since many practical experiment setups cannot be purchased, maybe only one can be used for a demonstration along with a virtual exercise on PC. Rotation of the students around a number of unique experimental setups can be used – and it is in fact practised in one of the labs of the Department, but should be expanded where possible.

Collaboration with social, cultural and production organizations

According to the internal evaluation report, the Department seems to have some substantial range of collaboration with Social, Cultural and Production (SCP) organizations, however, the impact of the Department on these organizations and the society has not been apparent in either the report or via the discussions that took place during the evaluation.

The Department has collaborated with foreign and national organizations, various companies and the community in the frame of relevant projects, seminars and student placements. There is also good link with the Department's graduates, with some of those employed by SCP organizations while also recruited as part-time lecturers in the Department. There does not seem to be a clear plan in place to strengthen these collaborations – there is expectation that these collaborations are sustainable due to the fact that there is some continuation over the years. It should be taken into account that in the current financial climate there is certain difficulty in working in partnership with the various societal groups and making an impact. Yet, it would be constructive for the Department to have a long-term plan of making an impact on society, culture and economy, thereby, forming a vision that will strengthen its structure. That is not to say that no such vision exists, as the EEC have recognised the willingness of a certain number of academics to move the Department forward. However a more clear statement of this may be formed and gradually be embedded in the activities of the Department.

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.

Most, if not all, of the above refer directly to the State law. It is the view of this committee that the aforementioned inhibiting factors are significant and lie beyond the remit of the department or the institution. In view of this, we believe that a clearer strategy from the State relating to the TEIs future could clarify some contradicting features that have emerged since the transition from "higher" to "highest" educational institution status ("Anotatopoiish"). Some further societal inhibiting factors identified is the financial situation of the average student, which pushes a large fraction of the cohort to work in parallel during their studies

The internal evaluation report suggests that the department's views on strategy are fully aligned with those of the institution. In this direction, the introduction of an electronic registration/enrolment platform is being developed as means to simplify procedures.

Overall, the Committee feels that even though the department has compiled a set of

objectives that would improve the performance of the department, a more detailed description of the suggested methods needs to be provided, along with a plan of action, methods to assess the progress of the plan, and a description of the metrics of success. It is the view of the EEC that the department will benefit from a positive engagement with a regular evaluation procedure as at present, despite the significant efforts placed by the staff and the overall good picture of the department, there appears to be a lack of strategic planning. We believe that the latter would underpin the growth of the department.

The department has undergone three internal evaluation cycles in the last three years and the curriculum has been reviewed and updated accordingly. EEC is pleased with this fact because it is seen as a critical factor in order to maintain the relevance of the curriculum with the needs of the industry. More detailed internal exercises could perhaps identify additional actions towards maintaining and enhancing the department's profile within the available resources. From our discussions, we understand that some of these changes in the legislative framework are closer to implementation than others. These include the introduction of pre-requisite courses to proceed to further modules (a measure which the department could pioneer through internal regulations), the maximum duration of the studies. Once permitted, we understand that the department will initiate a taught postgraduate course; The Head of the Department suggested that the application for this has been prepared and submitted. It is unclear to what extend provision for research degrees and laboratories will be made in future legislation. Likewise, it is difficult to predict the timescales and outcome of negotiations surrounding the professional rights of engineers graduating TEIs. Given the current financial circumstances, it is difficult to foresee the release of substantial State funds towards recruiting and equipping Universities. In view of that, the department and institute would benefit from a plan that focuses on existing as well as resources from third parties. It is noted that the establishment of taught and research postgraduate programs as well as enhanced interaction with the industry could attract further funds in this direction.

F. Final Conclusions and recommendations of the EEC

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

An important observation of the Committee that applies to both faculty and staff is their deep concerns about the merger with TEI Lamias. EEC members received many comments that the process was not carried out fairly for TEI Chalkidas. They believe that the decision making process has been moved to Lamia and they feel "second-class" citizens. While they recognize that this decision was made by the Greek Government, they believe that the distance from the center of the decision

making process impedes their day to day professional activities.

The overall picture of the department as formed through this evaluation procedure is positive in that the department is rather well organized and delivers high quality applied engineering skills to its graduates. The department maintains a well-developed curriculum which is published and easily accessible. The curriculum addresses well the requirements of the marketplace, as evidenced by the low unemployment level of its graduated.

The overall student experience appears to be positive with relatively simple procedures for administering student matters (such as enrolment, registrations, dissemination of marks etc.). To a large extend, this is also attributed to the attitude of the staff, who show high level of commitment to the learning and teaching process and on average maintain high level of motivation for research. Despite that, students mentioned to the EEC that they would appreciate better communication procedures with the department to notify them about last minute changes to a course or class. As they indicated, most of them, travel to Psachna, where the institution is located, from Athens to realize that their class that day had been cancelled. During our visit we further identified evidence of collegiality among the faculty and commitment to the common task of promoting the department's profile.

EEC did not identify any mechanism that considers the level and success of R&D engagement (e.g. in terms of grant income and research output) within the overall staff workload. The committee recognises that the rigid legal framework, which defines heavy teaching workloads regardless of research engagement, reduces the Department's flexibility in this respect. The faculty is active in outreach activities with the view of establishing links with other institutions in order to underpin teaching and research.

Recommendations

The department has developed a document describing their strategy for the period 2010-15. In this document, the strategic focus of the department on emerging technologies is described. Priorities are identified in participation on individual or departmental basis in events and activities that promote automation, including conferences, standardization and publications. Emphasis is also placed on knowledge transfer with the industry base and collaboration with other automation departments in Greece and abroad. It is the view of this committee that the initiative to produce a document describing the department's mission and strategy is a significant step towards identifying key policies, aims and objectives in research from which coherent internal standards and procedures will be derived. We note that the current document could benefit from increased focused and a more detailed implementation strategy.

Given the current economic climate, the department would benefit from a strategic

review on potential areas of research growth. Developing niche areas and collaboration based on such a strategy could increase the research funding that the department can attract from governmental, European as well as industrial sources. The focus on application-driven research based on cross-fertilization of the available expertise in the department with end-users' requirements can provide growth opportunities.

- Identify the uniqueness of the graduate program they wish to develop, namely what they want to achieve, which is the target audience and what would the relationship be between this degree and degrees in a similar subject area from other institutions (e.g. AEIs).

- Put in place a mechanism for updating the curriculum based on the development in the technical field, the feedback from the performance of the students in the classes as well as feedback from the industry. Presently this is taking place on an ad-hoc basis and we believe it will be beneficial if this is formalized. The Committee noticed that there is no direct input from other stakeholders (i.e. automation companies and students) in the revision of the curriculum, but that this is rather performed by input from the faculty members.

- Some modules have very low average marks, and the graduation rate within the nominal 4 years duration of studies is very low (in the order of 1%). This could perhaps be addressed by developing a more formalized structure of a tutoring system in order to support the students to address difficulties due to the poor preparation of the incoming classes of students.

- There are indications that the department maintains good links with their graduates. We believe that the department will benefit from developing and expanding upon the links with their alumni in order to both receive feedback of how their graduates are doing in the workplace and further increase the visibility of the department in order to attract better students. Enhancing the web presence can further benefit the department's profile.

- In order to promote research in the department the current system of allocating teaching loads to the faculty needs to be changed and give more time to the junior levels of the faculty to engage in research by commensurate reduction of the teaching load. It is recommended that there is a close link between research performance and reduction in teaching load. We realize this is not within the purview of the department's authority, nevertheless if the objective is to increase the quality of the highest technical education in Greece those changes are essential.

- By inspecting a sample of the raw data, the Committee saw that the majority of the students were mainly satisfied by the courses and labs. However, during the interview with the students, it was claimed by the latter that they have never handed or completed such an evaluation form. The Committee did

not have the means to explore this further, but the Committee believes that the department needs to raise the awareness of the students regarding the student evaluation process.

- The internal evaluation report does not indicate in Chapter 10, how the various services provided to the students might be enhanced, regardless of financial issues. It seems that some problems may be the product of inefficient procedures, one such being the delay in announcing exam results, and can be dealt with by modifying the Department's procedures.

- The learning and training of graduates could be greatly improved by better equipped laboratories. The outdated computer hardware needs to be replaced in order for the department to succeed in its educational mission and provide practical experience to their graduates. Virtual labs may help but students need to have access to actual hardware. It was also evident that the provided space and number of staff are not adequate to serve the number of students currently studying in the department. The Department is aware of these deficiencies, but it is constrained by the lack of sufficient personnel, space, and funds to equip the laboratories.

- If the intention is to promote research at the TEIs then the distinction between AEIs and TEIs with respect to postgraduate work must be eliminated, particularly given the fact that the education and research requirements and criteria for hiring and promotion are identical between these two branches of higher education.

- The department needs to develop and publish a faculty handbook describing its internal procedures, operations and functions.

There may well be a strategic opportunity relating to the links with the industry as basis for further R&D activities and enhancing the profile of the department.