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HELLENIC REPUBLIC

H.Q.A.

HELLENIC QUALITY ASSURANCE AND
ACCREDITATION AGENCY

EXTERNAL EVALUATION REPORT

Department of Automation

Technical Education Institute of Piraeus

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External Evaluation Committee

The Committee responsible for the External Evaluation of the Department of Automation of the Technical Institution of Piraeus consisted of the following four (4) expert evaluators drawn from the Registry constituted by the HQAA in accordance with Law 3374/2005 :

1. Dr, Nicholas Kyriakopoulos (President)

   Professor, Department of Electrical and Computer Engineering, The George Washington University, Washington DC, USA

2. Dr. Christos-Savvas Bouganis

   Senior Lecturer, Imperial College, London, UK

3. Dr. George Goussetis

   Reader, School of Electrical, Electronic Engineering & Computer Science Institute of Electronics Communications and Information Technology, Queen's University of Belfast, UK

4. Mr. Nikolaos Marantidis

   Expert, former General Manager, Industrial Automation and Drives Technology Siemens, Greece

Introduction

I. The External Evaluation Procedure

On Monday 17 June at 9:00 AM, the External Evaluation Committee (hereafter referred to as the Committee) met at the headquarters of the Hellenic Quality Assurance and Accreditation Agency for a briefing by Dr. Kleomenis Economou on the organization and operation of the agency. After the meeting, the Committee wasdriven to the campus of the Technological Education Institute of Piraeus (hereafter referred to as the Institute) located in Aigaleo, on a site of an olive tree grove that it is claimed to exist since antiquity. The Committee was received by the Chairman of the Department of Automation (hereafter referred to as the Department) Professor Constantine Alafodimos who gave a brief overview of the structure and operation of the department. He was joined in the meeting with Professor Dimitrios Dimogiannopoulos who had coordinated the drafting of the Supplementary Memorandum to the Internal Evaluation Report. The Supplementary Memorandum written in May 2013 updated the information contained in the Internal Evaluation Report which was written during the academic year 2008-2009. The Internal Evaluation Report and the Supplementary Memorandum are collectively referred to as the Internal Evaluation Report or simply the Report.

Subsequent to the introductory meeting, the Committee along with Professor Alafodimos, Professor Dimogiannopoulos and Professor Dimitrios Tseles, Alternate Director of the Quality Assurance Section, met with the President of the Institute, Professor Lazaros Vryzidis who reviewed the history of the Piraeus Technological Institute from its genesis in the decades of 1980. He emphasized the historical connection of the Institute with its predecessors "Public Technical School of Mid-level Engineering" ("Mikro Polytexneio"), "Higher school of electronics Anastasiadis" and

"Sivitanidio Higher Engineering School" and outlined his philosophy for the mission of the Institute.

Next the Committee met with the vice-president of the Institute and president of the Quality Assurance Unit (MODIP), Prof. Tseles. He discussed with the Committee recent developments and views relating to the professional rights of the institution's graduates. He further described the informal student mentoring mechanisms and how in practice these are implemented. The visit to the campus concluded with the Committee convening with Prof. Alafodimos in his office and the Department's meeting room to discuss the activities of the following days. At the end of the day, the Committee met in the hotel where it reviewed the information collected during the visit to the campus of the Institute. *On Tuesday 18 June*, the Committee convened at 8:30 am in the Acropolis Divani Hotel, where preparatory discussions took place. Afterwards it was driven to the Institute where it met with the administrative and clerical staff. During this meeting the procedures relating to the Department's main administration office were discussed.

Next the Committee was taken to the institution's conference centre where the folders for all modules in the undergraduate program were available for inspection. Following a review of this material, the Committee met faculty members in the main conference centre. Subsequently, it met on its request with the senior members of the faculty (i.e. Professors and Associate Professors) separately from the junior members (Assistant Professors). With the former group, the Committee explored their views on the Department's objectives and strategies on how these could be achieved. These included undergraduate education, graduate education and research. During the meeting with the junior members of the faculty, the Committee explored the same topics particularly on the future directions of the Department. In addition it solicited their views on opportunities for advancement and the support they receive for professional growth.

Following the meetings with the faculty the Committee was given a tour of most of the Department's laboratory facilities.In each laboratory there were short presentations about the laboratory scope, facility and approach together with an inspection of laboratory set-ups.

At the end of the day, the Committee met with some students from all four years of the curriculum without the presence of faculty or other institute staff and solicited their views on the functioning of the Department, their reasons for pursuing the degree in automation, their expectations from the degree they were pursuing and the employment opportunities. Subsequently the Committee met a group of alumni of the Department, some of whom were working within the Institute while others in the industry. This group was able to provide the Committee with first-hand experience about the relevance of the curriculum to their professional endeavors and the employment opportunities offered to holders of such degrees. The second-day visit ended with the Committee requesting a series of additional information to clarify questions that had arisen from the review of the Internal Evaluation Report and the examination of the course files. At the end of the day the Committee met in the hotel where it reviewed the activities of the day and drew some preliminary conclusions about the topics covered during the visit.

On Wednesday 19 June, the Committee convened at 8:30 am in the Acropolis Divani Hotel, where preparatory discussions took place. Afterwards it was driven to the campus of the Institute where it met with with Prof. Alafodimos, Prof. Dimogianopoulos and administrative staff who gave the Committee the previously requested information and provided clarifications on the requested information. .

Next the Committee visited the institutional library where a guided tour to the services and facilities was offered by library's staff. Subsequently the Committee visited the

industrial liaison and career office, the international liaison and Erasmus office and the network organisation centre. In each visit, discussions and in some occasions presentations were offered by the staff. Subsequently the Committee paid a brief visit to the Data Center that maintains and operates a high-speed wide area network for the Institute.

In addition to the Internal Evaluation Report, the Institute has submitted a document describing a Master's Degree program offered jointly with Kingston University in the United Kingdom. The program leads to the degree of Master of Science in Networking and Data Communications awarded by Kingston University. There is close cooperation between the faculty of the Institute and Kingston University regarding the subject matter covered by the courses. The Administration and the faculty of the Institute offered the description of the program as an indicator of the Institute's capability to teach graduate programs. The Committee decided that evaluation of that program was outside the scope of its charge, because the program is under the ultimate control of another university, the degree is awarded by another university, and the Institute is not allowed by law to offered post-graduate programs. Nevertheless, the Committee decided to interview the Institute faculty teaching the courses for the MSc degree. It interviewed three faculty members, one from the Automation Department, two from the Electronics Department and one external collaborator. In this discussion the role and dependency of the program from Kingston University was elaborated.

The last information-gathering meeting of the site visit was with the faculty from the departments that offer core modules common across the Institute, such as mathematics, physics, informatics and languages. The Committee discussed with the faculty their views on the student's background, their academic performance as well as the role of postgraduate and research programs.

The visit closed with a briefing by the External Evaluation Committee to the Chairman and the faculty of the Automation Department conveying its preliminary views about the evaluation.

Documents examined

In advance of the visit, the Committee had reviewed the Internal Evaluation Report and the Supplement to the report. During the meeting with the Professor Alafodimos, the Committee requested supplemental information that was either missing from the reports or was deemed necessary to clarify statements in the reports. All requested information was provided before the end of the site visit. During the visit, the Committee was provided with

- Department of Automation Development Plan for 2010-2015
- The curriculum sheet for the Automation curriculum
- The document titled "Department Identity" which provides details on the number of courses, number of permanent and temporary teaching staff, number of students in the department, etc.
- Course files for the courses in the curriculum containing course descriptions, course outlines, examinations with solutions, samples of graded examinations and project reports, and distributions of grades,
- Samples of teaching evaluation forms completed by students for the courses Probabilities and Statistics 2012-2013, Automatic Control Systems I 2012-2013, Programming III 2012-2013,
- Samples of diploma dissertations,
- A table showing the regular faculty by rank and specialization

- A table showing the average scores of the students taking the entrance examinations in 2012 for all institutions of higher education in Greece.
- List of contract faculty showing their degrees and areas of specialization
- Samples of Curricula Vitae of contract faculty
- Dossier with testimonial letters from companies employing graduates of the Institute
- Literature from the Office of External Relations (Γραφείο Διασύνδεσης)

Persons interviewed

Members of the faculty

- The fourteen regular faculty members of the Department. The Committee was provided with their names, degrees and academic rank.
- Eight faculty members of other departments that teach support courses
  - o Foreign languages
  - o Informatics
  - o Mathematics
  - o Physics
- Four faculty members who tech in the MSc program offered jointly with Kingston University, UK.
- Three members of the staff of the Department.

Fifteen undergraduate students

Eight Institute alumni half of which were associated with the Institute on a contract basis and the other half were employed in the private sector.

Facilities visited

The Committee visited the following facilities:

- Two classrooms (a large and a small one)
- Laboratories
  - o Automatic Control Systems II
  - o Data Collection Systems
  - o Electrical and electronic measurements
  - o Industrial Controllers
  - o Mechatronics and Robotics
- Career Office
- Library
- Network Operations Center

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 meeting on Monday morning the Committee identified a number of

omissions and ambiguities in the Internal Evaluation Report. Some clarifications were also sought for the Supplement to the report. By the end of the site visit on Wednesday, all the requested information was provided and the ambiguities resolved.

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

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 the disciplines of informatics, mathematics and physics (Section 3.1.1). Taking this statement at its face value would imply a program that could not possibly be implemented in four years, because detailed knowledge of the subject of automatic control would require a curriculum that includes a substantial number of graduate courses in control theory and deeper exposure to mathematical concepts.

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. In addition, 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. 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 expected outcome of current-technology-oriented courses is the preparation of the graduates to meet the requirements of any industrial occupation. The curriculum places heavy emphasis on the practical applications of control theory by exposing the students to extensive laboratory experience. The laboratories are designed and developed in accordance to the curriculum and are well integrated with the theory courses. 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. On the basis of interviews with students, the laboratories were considered the most attractive part of the curriculum compared to the theoretical part. The high success rate of the students in the laboratory courses (>80% success in industrial controllers) seems to confirm the positive opinion of such courses.

Although there are no written procedures for revising the curriculum on the basis of identified needs, an informal mechanism seems to be in place. A flexible internal procedure

within Institute boundaries allows the development of new courses and expanding the laboratories content. Every 1-2 years the Department interviews representatives of constituent industries to identify market needs. The Department claims that this feedback mechanism helps it make appropriate modifications to the curriculum. There were no data to support such claim. However, the Department gave the Committee letters from ten private employers attesting to the relevance of the education and the quality of its graduates. These testimonials a good indicator that the curriculum achieves its objectives and satisfies the needs of its primary constituents. Although the informal procedure in place seems to be effective, it would be beneficial for the Department to codify it and document it.

In discussions with the chairman and the faculty of the Department, the Committee was informed that a proposal had been prepared for offering a graduate program in automation. The Committee has not seen any documents related to the details of this proposal; thus it cannot comment on its details. Nevertheless, the Committee sought to gain an understanding of the connection between the existing undergraduate program and the proposed graduate one. The concern is based on the distinction between Universities and Technological Educational Institutes and what would be the relationship between a graduate program in automation at a university and one at a technological institute. The faculty indicated that the program would be for graduates of Universities and Technological Education Institutes. In a display of realism they acknowledged that the historical bias of the university engineering graduates against those of the institutes, the population of the program initially would be drawn from graduates of the Institute and other similar institutes. In other words, they view the undergraduate program as a potential feeder for the proposed graduate programs. Since the objectives of the envisioned graduate programs have not been articulated, it is difficult to evaluate whether or not these additional objectives could be achieved. If that were to be the case, the question would arise about the relationship between the proposed program and undergraduate programs in automation offered by universities. The MSc program in Networking and Data Communication offered jointly with Kingston University in the UK cannot be used to draw such conclusions, because the program is not in the area of automatic controls, the primary responsibility for the program rests primarily with Kingston University and it involves multiple departments at the Technological Education Institute of Piraeus.

IMPLEMENTATION

The contents and structure of the curriculum are well-documented both in electronic format as well as hard copy. These records describe both the courses, their contents and 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.The curriculum includes a sequence of two courses in mathematics for the first year. The topics include differential and integral calculus, linear algebra, differential equations, Fourier transforms, Laplace transforms and Z transforms. The concentration of some many topics in two semesters would constitute a heavy load for any university curriculum. It is more so for those students in the automation program who have graduated from the technical high schools with less exposure to mathematics than the students who graduate from the general high schools. The feedback from the students confirmed the difficulties those students have in keeping up with those courses.

RESULTS

The structure of the curriculum and the contents of the courses are in concert 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 less than 4% are prima facie evidence that the program achieves its goals. A careful examination of the totality of the data provided by the Department paints a disturbing picture. Very few students graduate within the nominal matriculation period. The average grade of the graduating group is about 6.5. In some courses, e.g., Automatic Control Systems I, over the past three years, the average grade for the examinations was less than 4.0 with the majority of the grades falling in the range 0-4.0. Only about 5% of the students received grades 7.0 and higher. These data lead to the conclusion that there is a serious mismatch between the curriculum and the matriculating student body and the goals of the Department are achieved only for a small minority of the registered student body. Whatever the reason might be for the poor performance of the majority of the students, their presence in the program diminishes it effectiveness and does a disservice to the small minority who make the effort to complete the program on time and with relatively good grades.

Another problem detrimental to the effective implementation of the curriculum is the lack of classroom and laboratory space. The students indicated that in classrooms for some first and second year courses there is standing room only. Similarly, in upper level laboratories the number of students per work station can be up to eight. Although the materials provided are appropriate, such conditions are unfavorable for the effective implementation of the curriculum. The Department is aware of these deficiencies, but it is constrained by the lack of sufficient personnel.

In spite of these difficulties, the continuous collaboration of the Department with Greek industrial enterprises provides a positive feedback for ensuring an effective implementation of the curriculum. The final year placement, a compulsory obligation of the curriculum, ensures a straightforward adoption of graduates in any working environment.

IMPROVEMENT

The Committee apprised the Department of the concerns 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 and physics. It is recommended that the Institute initiate a formal program of tutoring to help the incoming students compensate for their deficiencies. For the mathematics course sequence the Department needs to take a critical look and decide whether or not all the material covered in these two courses is necessary for the completeness of the curriculum. If so, the Department should consider options such providing tutoring services to help the students with deficiencies, or removing some of the topics from the mathematics courses and integrating them with the applied courses.

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 and its Supplement,
2. discussions with members of the staff and undergraduate students,
3. inspection of the classrooms and laboratories,
4. the "Identity of the Department" document,
5. the teaching evaluations,
6. the visit/tour to the central library,
7. the course files,
8. diploma dissertations,
9. the staff mobility report,
10. the visit to the Office of European Programs (ERASMUS).

The Committee confirmed that the main teaching methods employed by the Department are lectures and laboratories. of the educational policy of the Department enunciated by the faculty and confirmed by the curriculum is to emphasize 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 number of permanent teaching staff is 14 and cannot cover adequately the required teaching load. Thus, the Department is supported by a number of external people employed on a prefixed-term contract basis. The resulting student to staff ratio is approximately 1 member of staff to 18 students. This number explodes to 1 to 54 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 that members of the staff are approachable and helpful. Moreover, the students reported that they would like to receive more support on certain courses, which is difficult to deliver, because there are not sufficient faculty to cover the teaching needs of the department.

On the basis of our visit to the laboratories and the lecture theatres, the Committee has concluded that the infrastructure and equipment are well suited to the topics and contents of the related laboratory courses. In general, the department laboratory facilities and equipment are comparable to those for similar programs at other institutions and are appropriate for the automation curriculum. However, 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 laboratory, with the low number of supporting staff, leads to the formation of large number of students per experiment.

The classrooms the Committee visited were equipped with modern furniture, white boards and screens for projecting slides and videos. The rooms and the furniture are new and the rooms are air-conditioned and exceptionally clear. This is attributed to the fact that the Institute keeps the classrooms and laboratories locked when classes are not in session. As mentioned previously, the number of students attending classes regularly is much smaller than the total student registrations. Faculty and students have stated that the classroom capacities are adequate for this redueced population size.

The teaching in the Department is adequately supported by modern tools of Information

Technology. This includes local area networks and computer terminals, software packages such as the mathematical tool MATLAB and the simulation tools of OPNET and MULTISIM. The evidence made available to the Committee indicates that the faculty uses the available Information Technologies in the lectures and laboratories , using PowerPoint presentations and PCs when deemed appropriate. Most faculty use the web to provide information to the students regarding a range of activities that take place in the laboratories or to provide information on their courses.

A central Institute library that supports the teaching component by providing the students with access to books and periodicals either locally or through the interlibrary loan service. For the size of the institution, the library is well equipped and organised, providing electronic methods for searching books and magazines as well as access to electronic libraries. The library also provides space where the students can study. It should be pointed out that no wireless access was offered within the library, forcing the students to use the existing available terminals and having to work on a specific space of the library. The Committee discussed the above problem with the library staff and it was pointed out that a request for installing Wi-Fi capabilities in the space of the library was already in place. The examination system is similar to that of other Institutions of Higher Education. The lecture courses are examined through written examinations; for laboratories the students' performance is assessed through continuous assessment that evaluates laboratory reports and quizzes. The Committee noticed that the Department could benefit by putting in place a common template for the layout of all examination papers, and a unified process in order to ensure the high quality of the examination procedure. A set of solutions can be produced along with the examination questions and a detailed breakdown of the marks in each subsection. This would help to make the marking easier and more uniform across all answer-books.

The Committee discussed the teaching aspects of the joint MSc program with Kingston University with the faculty involved in teaching courses in that program. There is close collaboration with Kingston University including periodic reviews of the contents of the courses. The teaching policies and approachesfollow mainly the procedures and policies of the UK institution, which are of high standards. Overall, the Committee feels that the existence of such MSc benefits the department and its undergraduate students, as its academic staff are exposed to the policies and procedures of a UK academic institution, creating means of interaction between the academic staff of the involved academic departments through setting jointly exam papers and supervising/marking jointly dissertations. Moreover, it provides a path for continuation for the undergraduate students of the department in case they feel the need to specialize in the Network Communication domain.

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/laboratory, 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. However, for some of the courses such as Mathematics I and II, the Committee believes that the covered course material is too extensive. Through discussions with the members of staff, it was concluded that such an extensive coverage of the material needs to be in place as students with diverse background come to the department; and due to the 4 year limit imposed by the law for the running of the program, such compression of the material was deemed necessary.

Overall, members of staff and students reported to the Committee that the quality of the

teaching procedures was high. It was clear that the 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. Examples of these are the Mechatronics & Robotics laboratory, and the Data Collection Systems laboratory, where novel and interesting platforms have been developed by the relevant staff and with the help of students through the use of several dissertations. The Committee understands that these developed platforms are now mature enough to support teaching in a number of relevant courses and dissertations. The research activity in the Department is attributed in the fact that most of the fourteen permanent faculty hold doctorates; if one includes the current contract faculty, the ratio becomes 23 out of 40. A substantial number of these degrees were awarded in the not too distant past by institutions abroad placing the research of those faculty in the mainstream of the international research activities. A substantial number of faculty, particularly those in the junior ranks continue to perform research alongside to their teaching responsibilities, and thus translating their research results to teaching platforms and topics of dissertations. As such, the Committee deems the link of research and teaching to be strong.

The department seeks to publicise its activities/strengths/personnel; members of academic staff present their work in academic conferences and take part in committees at national and international level. 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 and the International Liaison Office (ERASMUS).

The recently introduced student evaluations of the courses that include content, presentation, performance evaluation, facilities, accessibility of faculty and student attendance gave the Committee the students' perspective on the effectiveness of teaching.

RESULTS

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

1. The relationship of the program outcomes to the objectives. As it has been discussed previously, the main goal of the program is to provide the graduates with the knowledge and tools to satisfy the needs of the Greek economy in the field of automation. The testimonial letters from industry, the feedback from the students and the feedback from the alumni, by themselves, are sufficient evidence for the Committee to conclude that the program is meeting its educational objectives. Before graduation employers seek students to fill positions for practical training. Upon graduation most students find employment relatively easily. The Department told the Committee that on the basis of data provided by the National Statistical Organization the unemployment rate of the graduates of the department of automation was below of 5%. It was not clear to which year these data referred and the Committee was not able to independently verify that information.

2. The quality of the dissertations. A number of dissertations were sampled and the Committee assessed that that their quality was high in-line with best practices 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. Statistics on the examination results and graduation rates. The data paint a rather dismal picture of the performance of the students. Very few students complete their program of studies in four years and many repeat a course more than ten 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%.

4. 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 6.5. In some courses in the first year, the average class grade was about 3.5 and only about 1% received 8.0 and higher. These low grades indicate a serious problem that can be attributed to a large extent to the poor preparation of the entering classes of students. The cut-off grade of the entrance examinations for 2012 for the students entering the Department of Automation was 11770. By comparison the cut-off grade for those entering the Departments of Electrical and Computer of the Universities in Greece ranged from 16520 to 18914. Even though the focus of the automation program at the TEI Piraeus is less theoretical and more applied the students are still expected to demonstrate sufficient knowledge of mathematics and physics. During the interview, the students, particulary those from the vocational high schools indicated that they had difficulties comprehending the subject matter and that they needed additional help. Over all, about 50% of the students fail the examinations. 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 concludes that the efficacy of the teaching is high. Moreover, through discussions with the faculty, and inspections of the examination results for a number of courses and laboratories, the Committee concludes that there is a discrepancy in the student performance between theory courses and laboratories. The data show that the students perform better in the laboratories compared to the theory courses. This can be attributed to several reasons, some of them already identified in the Internal Evaluation Report, such as the mandatory attendance in the laboratories, the fact that the students have more practical skills than theoretical ones, and the fact that work in groups in the laboratories.

Also, regarding the performance of the students, from the inspection of the raw course evaluations, the Committee saw a variation of the degree of satisfaction by the students across the courses/laboratories. In general, the students reported higher satisfaction from the laboratories compared to the lectures. Having said that, the overall satisfaction of the students seems to be good.

Regarding the long matriculation time of some students, the Committee understands that the root of the problem is the absence of any time limit for completing the program of studies. Consequently, students drop courses and take many years to finish (sometimes even 3 times the actual duration of the programme). 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 can be drawn 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 6.5), with only a few students achieving marks around 8.0. Through discussions with members of staff, it became apparent that the Department attributes this to the difficulty of the examinations, diverse examining processes, to the poor knowledge of the students, and sometimes to their limited commitment to the course. Overall, the Committee believes that the department has a good understanding of the reasons behind the above issue.

IMPROVEMENT

The Department has identified the majority of the above problems and has documented some ways for improvement, in the Internal Evaluation Report document and in "Basic Directions of Progress 2010-2015" document, under the section "Education", which was supplied to the Committee to supplement the Internal Evaluation Report.

One of the main problems is the high failure rates of the students in the written exams. The Committee discussed this issue with the President of the Institute, Professor Lazaros Vryzidis (17/6/2013) and with a committee of the teaching staff (19/6/2013). It was concluded that the majority of the staff in the d

Department believes that the solution is to make the attendance to the lectures compulsory and being in-line with the model that is applied in the laboratories. The Committee encourages the department to explore whether they can assess the number of "active" students taking each examination in order to obtain a clearer picture of the students' performance. In the Internal Evaluation Report and in discussions with the Committee the Department has focused on the small number of teaching staff and its impact on the quality of the teaching. In this case, an initiative has taken place by aiming to attract people on the junior positions and to personnel to support the labs in order to increase the teaching quality.

The students with insufficient preparation would be helped substantially, if the Department were to put in place a formal program of tutoring to help the incoming students overcome their weaknesses in the theoretical courses. It is recommended that a formal program be formulated and published. Such an action would be a tangible evidence of the Department's commitment to offering a high quality program in automation.

C. Research

APPROACH

The information provided prior to our visit relating to the assessment of the research activities, output and strategy was a) the internal evaluation report; b) the update to the internal evaluation report; c) their annex II detailing all the academic publications produced by the Department.

During our visit, we discussed with the head of the department and senior faculty their views on the Department's research role and strategy and elaborated on common research practices. In the evaluation of the research component additional information was sought and received from the following: five laboratories, (Industrial control, SAE II, Robotics and Mechatronics, CAD/CAM, Computer networks), which although are primarily used for teaching and training, are also being used for the execution of some research projects; the Institute library where information was obtained about available resources; the Institute's industry liaison and career office where within a broader discussion with the staff we had the opportunity to explore available support for the faculty for knowledge transfer and commercialisation of their research. In the meeting with the rector, the Committee discussed the legal framework within which research is conducted in the Iniversity and relevant strategic planning at institutional level.

There is no specific document describing a framework for conducting research or the role of research in the overall framework of activities of the Institute, except for a reference to research in Article 4 of the law establishing the structure and operation of the Institutions of Higher Education (Law 4009 modified) stating that one of the missions of the Institutions of

Higher Education the creation and transfer of knowledge through research and teaching. Since Technical Education Institutes are one of the two components of the higher education system, it is expected that they would undertake research activities. The Committee discussed with the Head of the Department of Automation and the faculty members their views on the role of research in the department including the institutional support, if any, for conducting research.

The officers of the Institute including the rector and the majority of the faculty members, especially those in the junior ranks, voiced their support for expanding the research activities. Due to the history of the Technological Education Institutes as training institutions, research had not traditionally been the focus of their activities. Since 2001, when their status was upgraded from intermediate between secondary and tertiary level to tertiary level educational institution, research became part of their mission and it is becoming an important component of the agenda of the Department of Automation. Faculty members are expected to conduct research and most of them do.

The research activities are conducted in two forms, internal to the Institute and collaboration with external partners. The second forum includes other institutions of higher education (universities and technological education institutes) and private sector collaborators. Internally, research is conducted in laboratories that, although are designated by law as teaching laboratories, the faculty uses the space and equipment to undertake research projects when time and space allows.

In keeping with the broad mission of the Institute, collaborative projects with industrial partners place emphasis on applied research with potential industrial applications. Collaborations with other universities is more along the lines of basic research that frequently leads to doctoral degrees awarded by the collaborating university, because TEIs by law are not allowed to award graduate degrees.

Looking at the available research base and from discussions with the faculty it became evident that the key research focus of the department is on applied research in the field of automation and robotics. Cross-disciplinary applications of this field in areas that include agriculture, water treatment and aquaculture, wireless sensor networks as well as intelligent transport and biomedical engineering provide niche areas for potential growth, which to a certain extend have been exploited.

The internal standards and policies for assessing research are commensurate with the Department's 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.

Being part of a Technological Educational Institute , the main focus of the Department is the training on applied automation skills primarily at undergraduate level. A postgraduate degree awarded jointly with Kingston University extends this focus to the training of postgraduate students

IMPLEMENTATION

The legal framework governing the conduct of research at the Technological Education Institutes is schizophrenic. The law expects the Institutes to promote knowledge through research. The qualifications of the candidates for appointment to faculty positions in the Universities and the Institutes are identical. Research activities are conducted at the

graduate level some at the Master's level, but mostly at the doctoral level. The law expects the faculty of the Institutes to engage in research but denies it the tools to engage in it by not allowing the Institutes to offer post-graduate degrees.

Considering such an environment and the constraints imposed by a heavy teaching load, the faculty of the Department of Automation is engaged in substantial research activities.   The teaching load described above is heavy compared to national and international standards in other universities and therefore limits the time the faculty can dedicate to research. In addition, the heavy teaching load of the junior faculty members does not allow them enough time to do their research. Keeping in mind that the most energetic researchers are the junior faculty who have the enthusiasm and the incentive to conduct research in order to establish their reputation, it is counterproductive to burden them with the heaviest teaching load (teaching load for Lecturer/Associate Professor/Professor: 14/12/10 hours per week) irrespective of any other research or administration workload. There is evidence that over the past decade research is increasingly on the agenda of the department; this can perhaps be attributed to 2001 legislation upgrading the Institutes' status from "higher" to "highest" educational institutions and the recruitment of new faculty members who received their doctorates from universities where the culture of research was dominant.

The key institutional mechanism for promoting research is through staff recruitment and promotion requirements, which to a significant extend is based on their research output; 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.

On the basis of discussions with the faculty, it has become clear that all of the research for the research projects is done by the faculty without any student support; this is in contrast to the normal practice in Universities and research centers in Greece and abroad, where typically a faculty member supervises research students and/or fixed-term research staff (e.g. post-doctoral research associates). The common practice for the execution of research projects in the Department is for members of academic staff to receive additional fixed-term contracts, reflecting to salary top-ups, in order to carry-out the day to day research activities. 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. However the Committee notes that this scheme is likely to make inefficient use of faculty's time.

The Committee 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. It is further noted that the legal limit to a maximum salary to levels below twice that of the base salary (as described above) has in some cases disqualified members of staff who have reached this quota from further research grant applications despite availability of relevant calls for proposals. This can also have an adverse effect on the growth of the department's research activity.

Institutional support that staff can receive towards attendance of conferences includes a budget loosely in the range of €600-€1000 towards the attendance of an international conference annually. The contribution covers travelling and accommodation expenses to the extent of the available budget but does not cover conference registration. It is awarded on the condition that the member of staff has a minimum of one oral presentation accepted. Members of staff who have access to funds through a grant award can use those towards

covering conference costs. There are processes in place for requesting permission of absence and funding support towards conference, which have to be initially approved by the department and subsequently at University level. The Committee was left with the impression that the procedures involved in organising conference attendance are relatively time consuming.

In terms of access to bibliography, during the 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. The Committee was advised that presently the Department of Education has not made its central contributions towards electronic journals and as a result some key libraries, such as the IEEExplore, are not available to members of staff.

Laboratories are equipped with focus on learning and teaching. The capacity of laboratory facilities to support research activities is therefore somehow limited. In practice, this is partly addressed by focusing activities on applied R&D and exploiting cross-disciplinarity. For instance, the Committee was shown prototypes developed for applications in precision agriculture; and training in the area of automation.

RESULTS

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

Research projects

The update to the Internal Evaluation Report provides a list with 22 grant awards during the period 2003-2013. Names of investigators involved with their role in the project, the corresponding funding body and the period during which the grant run were included although the level of funding was not provided. The list of research grants can thematically be broken down to:

➢ 6 grants were awarded towards the development of research and training infrastructure as well as curriculum including the areas of informatics, mechatronics, intelligent transport systems and wireless sensor networks

➢ 1 grant was awarded towards the support of the industry liaison and career office

➢ 2 grants towards research and reconstruction of ancient Greek automata

➢ 4 grants in the area of water (measurement, desalination) and aquacultures

➢ 3 grants in the area of control

➢ 2 grants in the area of biomaterials and wearable electronics for biomedical applications

➢ 2 grants commissioned by local industry (Olympia electronics, Semetron)

➢ 2 grants on infrastructure and structural modelling

In terms of the funding source, there is a mixture of:

➢ 16 projects funded through Greek sources, including 5 projects through "Archemedis III" which specifically focuses on the Technological Education Institutes.

➢ 4 projects funded directly from the EC (TEMPUS, FP7)

➢ 2 projects funded by the local industry

In terms of the project consortia, 6 among the aforementioned projects are in collaboration with various Greek and overseas research organisations including university departments and research centres while from the available evidence the remaining 16 projects appear to be within the host institution exclusively.

Scientific publications and patents

In terms of the scientific publications, the update to the Internal Evaluation Report presents

40 journal publications for the period 2009-13; of those 10 are from visiting staff to the Department while the remaining 30 are from permanent members of academic staff; according to these statistics there is an output of approximately 7.5 journal publications per year. Among the 40 publications, the majority are in published by internationally leading publishers such as the IEEE, Elsevier, Springer, the IET and others while there are 3 articles in national journals.

During the visit the Committee was made aware of one patent relating to an educational platform for practical training on control for transport.

Industrially funded research

As described above, during the past decade the Department has undertaken two projects funded by the local industry. This activity is aligned with the applied orientation of the Department. Please refer also to the annex of the following section D (collaboration with production organisations).

Research collaborations

External collaborations are being actively pursued for the purpose of securing and executing research activities in external facilities hosted by other universities and research institutes. Key collaborations with other Greek institutions include: Agricultural University of Athens, University of Patras, National Technical University of Athens. Although the main focus of the MSC program with Kingston University is on teaching, some research can be undertaken as part of the 6-month MSc thesis. Other overseas collaborations include those with the University of West Scotland, Aleppo in Syria, Budapest University of Economics and Technology.

Wider visibility

Over the past decade the Department has organised at least two national events, which promote the Department's visibility in the wider research community. Some of the R&D activities undertaken as part of final year's project has reached national TV shows, thus raising the R&D profile of the department in the wider society. Likewise, final year students participate in national competitions, raising the profile of the department within the community.

IMPROVEMENT

The Development Plan for 2010-2015 makes indirect reference to research by promoting support for the participation of the faculty members in research activities 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. More important, on the basis of the discussions with the officers of the Institute and the faculty, the Committee has been convinced that there is a very serious effort to promote research. It is recommended that the Department develops and published a comprehensive plan describing the department's mission objectives and strategy for improving the research environment. The existing document needs to be improved in order to become a guiding document for the improvement of the Department..
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.

D. All Other Services

APPROACH

The information provided in advance of our visit in relation to all other services is primarily summarized in the internal evaluation report. During the visit the Committee had the opportunity to meet the 4 members of staff that form the administration team supporting the department. There were also visits to various institutional departments supporting student and academic staff of the department; these include the library, the international liaison and Erasmus office, the network organization center, the conference center, the quality assurance unit and the industrial liaison and career office. The Committee also visited some classrooms and internet access facilities and viewed the Departmental web page.

The various services provided to the members of the academic community are overall viewed as efficient and effective. Within the available resources and budget, considerable effort is made to support student learning and enhance the student experience. Infrastructure such as library, internet access facilities and classrooms are modern and appropriately staffed. The departmental administration office provides services to the students such as enrolment and module registration. Emphasis is placed on the use of the web in order to simplify procedures and bureaucracy. The web presence of the Department is adequate. There are also links for off-campus registration to modules and laboratories.

IMPLEMENTATION

The Department's administration is well organised and equipped. The main administration office is staffed by three administrators and is hosted in a spacious and well-equipped environment. A secretary staffs the head of the department office. Announcement boards are tidy and up to date. Tables outside the office are provided to communicate examination marks during close hours. The office is open to the public/students between 12 noon-2 pm three days per week. In exceptional circumstances the office can accept students outside these times. Registration to individual modules and laboratories can be made electronically in order to simplify procedures. Examination results are made widely available.

Three departmental members of technical staff support laboratory facilities. The Department maintains a dedicated meeting room for staff meetings. Restroom facilities are available including facilities for disabled people. The Department further maintains a space for internet access, equipped with several PCs within cubicles. Wireless web access is also available to staff and students in a large part of the University area.
The departmental website has recently been upgraded and contains adequate information both in terms of informing its students as well as promoting the educational and R&D activity in the Department; it is the Committee's view that there is space for improvement in terms if the departmental web site layout towards more user-friendly navigation.

Central institution facilities appear to function well; the library is spacious, well organised and with staff is in place to provide assistance. It is linked to other University libraries throughout Greece and can offer interlibrary services. There is ample study space in the library, although at the time of the visit few students were in the library; the Committee cannot judge whether space is sufficient. The library maintains hardcopies of all final year project dissertations.

The industry liaison and career office is primarily focused on serving students towards the practical placement (stage) and less towards knowledge transfer between in-house R&D expertise and the industry. The office further offers counselling services to staff and students who request it. The Committee was assured that all students find "stage" placements

reasonably quickly, some of them even during the first two years of their studies. It was asserted by the career office that according to national statistics, graduates of the Department have a 3.6% unemployment rate; the extent to which this is the result of the activities of the career office could not be ascertained; however if true it is an impressive statistic.

The quality assurance unit is in charge of managing student's feedback; this takes place at institutional level and is handled outside the Department. Although this initiative is in the right direction in improving student satisfaction lecture attendance and presence on-campus, some improvements can be made as at present the Department appears not to receive students feedback in due time for corrective action.

The international liaison office appears to be active with the Erasmus programme; the department maintains Erasmus agreements with several high-quality Universities across Europe. The Committee was informed that on average approximately 10 students are exchanged annually both inwards and outwards from the Department. If so, it would be an indication of a well-functioning office.

The institution is connected to the web through high speed GigaBit optical fibres. Internet access is available free of charge, albeit is encrypted in order to avoid illegal use. Virtual Personal Network facility enables students' access to on-campus software and services. Each student is allowed online storage space of 50 GB, regularly backed-up, which is impressively large compared to equivalent service in other institutions abroad.

There is no mentoring provision for the students, although at a personal basis staff claim to have had this relationship informally.

The Department benefits from a very modern and high-quality conference centre which is available to the Institute. Each academic member of staff has a dedicated office space, albeit costs towards furnishing and equipment of faculty offices often rest with staff.

RESULTS

During our discussions with staff and students no specific issues around the delivery of support services was raised. Administrative services at department level appear to be adequate and functional.

Clerical and administrative staff gave the impression of being friendly and helpful, with a commitment to the well-functioning of the department. The laboratories are in good order, clean and tidy. The laboratory space and equipment is limited for the number of students, which commonly results in groups of 4 or more students working on the same set-up. It is understood that this reflects the available budget, which is beyond the remit of the department.

IMPROVEMENTS

The Institute has recently introduced an electronic administration system, which aims to reduce bureaucracy and simplify procedures. Although the system is fairly new and perhaps underused, it is anticipated it will be increasingly used in the future. As part of this process, the Institute is planning to introduce the use of electronic signature.

Given the little, if any, financial autonomy of the department, there is little margin for initiatives at departmental level.

Collaboration with social, cultural and production organizations

The Department of automation has a specific interest in the history of automata from the Classical and Hellenistic period. In particular, through two funded projects during 2009 and 2011 respectively, the Department has worked in collaboration with archaeological institutions and organisations in order to study the mechanisms and build functioning

models of ancient automata. Some of the developed models have been donated to the Institute and are exhibited in various locations across the campus, including the conference centre and the library.

In terms of serving the needs of the local industry, and as also mentioned in section C of this report, there are indications of increasing knowledge transfer initiatives; during the periods 2008-09 and 2013 the Department has executed two industrially-funded projects on behalf of Olympia Electronics and Simatron respectively. The former relates to the development of a wireless network platform for sensors while the latter on the use of commercial off the shelf components for the development of taxi equipment.

In close cooperation with end customers (e.g. greenhouses) the Department has also developed solutions ready to be applied in various industries. Final commercial products can be promoted and provided to the market through various sales channels (system integrators, wholesalers etc.). An interesting and effective approach of promoting the solutions prepared and developed by the Department (TV shows, school visits) gives the opportunity to attract customers and potential students.

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

The Department does not have a written strategic plan that describes its mission, establishes goals and identifies mechanisms for achieving them. The Development Plan for 2010-2015 sets forth some directions for the Department. Also, the sections on Conclusions (Chapter 9) and Plans for Improvement (Chapter 10) of the Internal Evaluation Report implicitly define objectives for the Department and identify potential inhibiting factors. The major objectives may be summarized as follows:

- ➢ Improvement in the quality of the graduates of the Department;
- ➢ Expansion of the research activities;
- ➢ Establishment of graduate programs.

Some key inhibiting factors are:

- ➢ Lack of professional rights to the institution's graduates as described by the law. As a result, the institution becomes less attractive to potential students;
- ➢ Lack of funds towards recruitment of staff supporting technical, administrative and R&D roles. This includes disproportionate low fraction of R&D budget allocation to the Technological Education Institutes when compared to the universities and the lack of funds to replace faculty members who retire;
- ➢ The legislation framework that does not allow the Department to offer post-graduate degrees and establish and operate research laboratories
- ➢ The legislation framework that specifies heavy teaching and administrative loads for the faculty, thus inhibiting R&D growth;
- ➢ The legislative framework that allows students to remain enrolled idefinitely irrespective of their academic performance, thus creating a large body of inactive students

Other inhibiting factors identified by the Department are:

- ➢ The evaluation process would become a bureaucratic exercise if no action is taken to address the issues identified through the process;

- ➢ Lack of formal centralized procedures for assessing attainment of teaching and learning objectives;
- ➢ Limited use of the concept of pre-requisite courses resulting in students registering in courses for which they are not adequately prepared;
- ➢ Quality and economic hardship of the students.

The inhibiting factors fall into two major categories, external and internal. Most of the external ones relate to State Law and are beyond the control of the Department and the Institute. It is the view of the Committee that the aforementioned inhibiting factors are significant and need to be addressed at the State level.Until the legal environment changes, the Department would have to function as it has making the best use of a bad situation. Having placed the Universities and the Technical Education Institutes at the same educational level, the State needs to clarify some contradicting features that have emerged since the transition of the Institutes from "higher" to "highest" educational institution status.

The characteristics of the student body is also a factor external to the Department and the Institute. Economic hardship forces some students to work in parallel with their studies. As a result, those students, although they might have the incentive and abilities to perform well, they do not have enough time to study and fall behind in their program of studies. Another subset of the student body that fall behind in the program of studies consists of poorly prepared students who have no interest in their education. The problems caused by the latter group would be solved by the establishment of a maximum period during which a student would be allowed to matriculate. Regarding the students who are eager to study but face economic hardships, the Department has identified the problem but has not yet found a solution. The following observations pertain to the internal factors.

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 signature and registration/enrolment platform is being developed as means to simplify procedures.

Further inhibiting factors identified from within the department include the lack of a centralised procedure to assess the extent to which the learning and teaching objectives have been achieved, the low average marks achieved by the students due to the level of curriculum in conjunction with the reduced effort placed by the students, the lack of continuous student engagement with their studies during the semester. In the Internal Evaluation Report, the Department recognises that it lacks a coherent strategy without elaborating further on it.

Some key mid/long-term aspirations of the Department and the institution relate to the State imposed inhibiting factors itemised before. The Committee understands 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 has pioneered through earlier internal regulations), the maximum duration of the studies.

The Department is eager to offer a graduate program. Prof. Alafodimos told the Committee that the application for this has been with the Ministry of Education for the past 3 years and is awaiting approval following this evaluation. The Committee has not seen the proposal; therefore it cannot comment on it. 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 from the Technological Education Institutes. 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 could plan on existing as well as third party resources. 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.

An identified need is the review of the teaching curriculum and syllabus, which is based on an earlier review during 2004-05. This 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.

Finally, the lack of trust by the Faculty on the evaluation procedure is understandable. Although abroad evaluation is used widely, the concept is new for Greece and it is the first time the Department undertakes such an exercise that extends beyond the faculty's present culture. This is likely to explain some of the deficiencies found in the internal documentation, which arguably stops short of an in-depth exposition of strengths, weaknesses, opportunities and threat analysis. It is the view of the Committee that internal evaluation and strategy documents would benefit from an improvement to the quality control system that will bring to fore all relevant supporting data for the claims made and a more concrete implementation and strategy plan.

F. Final Conclusions and recommendations of the EEC

The overall picture of the Department as formed through this evaluation procedure is positive in that the department is rather well organised and delivers high quality applied engineering skills to its graduates. TheDepartment 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 learning and training of graduates is underpinned by well-equipped functioning laboratories delivering the educational mission of the department to provide practical experience to their graduates.

The overall student experience appears to be positive with relatively simple procedures for administering student matters (such as enrolment, registrations, dissemination of marks etc.). Based on the discussions with the students it appears that the Department is in good rapport with their cohort. To a large extend, this is also attributed to the attitude of the members 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. Evidence of collegiality among the faculty and commitment to the common task of promoting the Department's profile was also apparent during the visit.

The faculty is active in outreach activities with the view of establishing links with other institutions in order to underpin teaching and research (such as the MSc project with Kingston University and the Institute's own Electronics Department and the research co-operation with the Agriculture University of Athens).Departmental efforts to maintain a positive student experience are matched by the commitment at institutional level to maintain modern infrastructure as evidenced by the new library building and conference centre.

In the Development Plan for 2010-2015 there are were no clearly articulated goals and strategies. The Committee senses a difference of opinion among the faculty in relation to which direction the department should focus, namely towards a more applied engineering education or more research. Although these two concepts are not necessarily incompatible, the Department needs to develop a clearer sense of its mission and goals along with better defined implementation strategies. Such a plan is essential in order to specify the focus of

resources needed for future development.

The majority of the issues discussed during the visit of the External Evaluation Committee can be connected to the ambiguous status of the Technical Education Institutes in the domain of the tertiary education. By law, they are considered institutions of higher education at the same level as universities, nevertheless they are treated differently particularly with respect to the allocation of resources and the activities they may undertake. The State has to make up its mind. The Technical Education Institutes are equivalent to universities or they are not. If they are, there should not be any distinctions in the education and research activities they are allowed to pursue as there are no distinctions regarding the expectations on research and on the qualifications for appointment to the faculties of universities and institutes. If they are not, the State should clarify their respective roles and distinguish the requirements for appointments to their faculties in order for the Technological Education Institutes to be able to develop their programs within a clearly defined framework.

Recommendations

➢ The State revises the Higher Education Act to clarify the role of the Technical Education Institutes in order for them to be able to develop to their full potential.

➢ The Technical Education Institute of Piraeus develops a strategic plan that defines its mission as a unique institution and sets forth broad institutional objectives to define the framework to be used by the departments in developing their own strategic plans. The Department of Automation formulates a strategic plan that defines education and research objectives particularly with respect to the role its graduates will be expected to play in the Greek economy.

➢ Until the legal framework is changed, the strategic plan of the Department should view its proposed graduate programs distinct from those of the universities and identify the uniqueness of the graduate program the 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 higher education institutions.

➢ Put in place a mechanism to update the curriculum based on the development in the technical field as well as the feedback from the performance of the students in the classes. Presently this is taking place on an ad-hoc basis and the Committee recommends that it be formalised.

➢ The Department should develop and advertise to the students a structured system of tutoring to address the problem of low academic performance , and low graduation rates within the nominal 4 years duration of studies caused by the poor preparation of the incoming classes of students.

➢ To address the problem of students prolonging their studies due to financial difficulties, the Department should consider modifying the curriculum, even informally, to extend the length of study to five or even six years to allow students to follow the correct sequence of courses without being forced to "repeat" course.

➢ The Department should institute a formal mechanism for maintaining contact with its alumni. Such a mechanism would provide feedback for improving the educational program, help for the employment of graduates, and increased visibility. Use of tools such as the Wold-Wide Web and social media would enhance the image of the Department in the society at large.

➢ If the Department sets as its goal to promote research, it should change the current system of allocating teaching loads to the faculty give more time to the junior-level

faculty to engage in research by commensurate reduction of the teaching load. The Strategic Plan should should establish a close link between research performance and reduction in teaching load.

➢ The Department should expand and strengthen its links with the industry to further expand the R&D activities and enhance the profile of the Department.

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

The Members of the Committee

     Name and Surname   Signature

1. Nicholas Kyriakopoulos

2. Christos-Savvas Bouganis

3. George Goussetis

4. Nikolaos Marantidis