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

EXTERNAL EVALUATION REPORT

DEPARTMENT OF ELECTRICAL ENGINEERING

TEI OF THESSALY, GREECE

Version 2.0
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External Evaluation Committee

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

1. Professor George K Stylios (President)
   (Title) (Name and Surname)

   Heriot Watt University, UK
   (Institution of origin)

2. Prtofessor Panos Bakalis
   (Title) (Name and Surname)

   University of Greenwich, London, UK
   (Institution of origin)

3. Professor Anastasis Polycarpou
   (Title) (Name and Surname)

   University of Nicosia, Cyprus
   (Institution of origin)

4. Professor Elias Siores
   (Title) (Name and Surname)

   University of Bolton, UK
   (Institution of origin)

5. Professor Panagiota Morfouli
   (Title) (Name and Surname)

   Institut Polytechnique de Grenoble, Grenoble, France
   (Institution of origin)

N.B. *The structure of the "Template" proposed for the External Evaluation Report mirrors the requirements of Law 3374/2005 and corresponds overall to the structure of the Internal Evaluation Report submitted by the Department.*

The length of text in each box is free. Questions included in each box are not exclusive nor should they always be answered separately; they are meant to provide a general outline of matters that should be addressed by the Committee when formulating its comments.

Introduction

I. The External Evaluation Procedure

The External Evaluation Committee (EEC) met from the 5th of May to the 7th of May 2014 to conduct the external assessment of the Department of Electrical Engineering of the Technological Educational Institute (TEI) of Thessaly, Greece, referred to as "Department" and "Institution" respectively in this report.

The EEC visited the Campus of the Institution under evaluation where they had a short meeting with the Head of the Department Prof I Andritsos and Dr Moschakis. A meeting with the President of the TEI was made on the 6th May. The 6th and 7th of May were spent with specific visits to facilities and discussions with staff and students, on the 7th of May 2014 and prior to the departure from the Institution, a preliminary feedback presentation of the findings was given to the Department.

The visit to the Institution involved meetings with the following academic staff members of the department:

- President Professor P Goulas and Vice President Professor X Chartona
- Head of the Department Prof I Andritsos
- The member of the academic staff who was responsible for the internal assessment report (OMEA); Dr M Moschakis
- Some members of the permanent academic staff;

Prior to arrival at the institution the HQAA provided, in electronic form to the EEC the following documents:

- the 2009 - 2013 internal evaluation report prepared under HQAA rules,
- the programme of undergraduate studies
- the template used for reporting the academic activities of staff members
- the template used by the academic staff for module description

During the visit to the Institution the EEC was also given or demanded copies of:

- updated statistical supplementary data of the period December 2013 - 14;
- the programme of undergraduate studies;
- the guide for industrial placements, at the request of EEC;
- samples of exam papers and coursework briefs, at the request of EEC;
- samples of exam and coursework scripts, and dissertations; at the request of EEC
- samples of module grades including coursework, exams and dissertations; at the request of EEC
- samples of textbooks and other learning resources (e.g., E-Class, Books, Lab reports, lecture notes);
- the course syllabus and specifications (in E-Class);

The EEC was given an especially prepared for the evaluation folder which contains: (1) the presentations given to the EEC by the Departmental members.

The EEC visited the following facilities of the Institution:

- lecture theatres / rooms;
- the conference centre
- undergraduate and research student laboratories;
- academic staff and administration offices;
- the library;
- the secretariat;
- student and staff refectories; and
- the sport facilities (the gym)

The EEC is aware that some remarks/suggestions contained in this report may not meet the existing institutional and legal framework of Greece, but are consistent with the policy of their own institutions and that of the EU.

II. The Internal Evaluation Procedure

The Internal Evaluation procedure was followed by the Department in accordance with the HQAA directive. The appropriate template was used and all members of the academic staff were involved for the preparation of internal assessment report.

According to the report, the sources used were taken from:

- the departmental archive;
- reports related to programmes of undergraduate studies and instructional / teaching evaluation;
- data collected from the questionnaire for module evaluation, module description and academic activity reporting;
- departmental general meetings;
- archive of student grades

Module evaluation obtained from students was low and the EEC encourages the Department to think how to increase it and to consider student involvement in both the questionnaire design and in data analysis and feedback. Furthermore, it recommends to the Department to communicate to students more effectively the module evaluation procedures and its purpose.

The EEC feels that aspects of the internal evaluation report were partially met: Important steps dealing with quality in teaching and curriculum have been attempted through the module evaluation by students and module description by the academic staff, but the participation and the implementation were poor. A more critical consideration of some of the assessment report points is needed for helping the Department to improve in curriculum, teaching and research. Concerning research the Department needs to define a clear strategy and show how they will improve the research output and impact. While the research achievement on some individual level is high, the research strategy at Departmental level is poor. Moreover, significant research achievements are poorly presented and promoted outside the Department.

The Department, staff and students, welcomed the evaluation process as an opportunity to gain external feedback for improving the Department, its student experience and the

institution.

ACKNOWLEDGEMENTS

The EEC would like to thank the HQAA which has been very effective in organising our visit and providing all necessary papers, and for being very helpful and accessible for advice and guidance throughout our evaluation process.

A. Curriculum

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

APPROACH

- ***What are the goals and objectives of the Curriculum? What is the plan for achieving them?***

A new curriculum has been designed (merging and deleting old modules) covering new technology that is used in today's industry.

The department following governments' legislative regulations for reducing the departmental cost suppressing the initial specialisations: (1) Electronics and Control and (2) Energy and Industrial Design.

These changes are within the teaching abilities and expertise of the Departmental staff and also provide more employability and professional development for the students.

The overall aim of the curriculum has been clearly defined by the Department and is stated in the programme of study. It is focused on producing Electrical Engineers who specialise in all areas relevant to the design, production, installation and repairs of electrical systems and their applications.

- ***How were the objectives decided? Which factors were taken into account? Were they set against appropriate standards? Did the unit consult other stakeholders?***

These objectives are determined based on (i) the aims of the Department as given in the statute (Φ.Ε.Κ.), (ii) the history and heritage of the department and its faculty, (iii) the curriculum of other relevant departments at national and international level and (iv) through continuous discussion in formal and informal Departmental and institutional meetings including the involvement of the students themselves, through student representatives.

- ***Is the curriculum consistent with the objectives of the Curriculum and the requirements of the society?***

The objectives of the new curriculum are the effort to produce properly trained graduates with abilities consistent with the vocational rights of Electrical Engineers as set in the Presidential Decree 346/8/06/1989. A second important factor influencing these objectives is the Department's strategy to keep its curriculum in agreement with those of similar departments in Greece and also to cover technological aspects that are essential in our days.

Nonetheless, the Department has proposed to further improve of the current curriculum by re-introducing redesigned, modernized versions of modules of the previous curriculum.

Theoretical and background modules are taught first while almost every module includes laboratory assignments and projects to help the students increase their capacity in theory and enhance their practical abilities in the field of Electrical Engineering.

- ***How was the curriculum decided? Were all constituents of the Department, including students and other stakeholders, consulted?***

The Department tries to keep the objectives up to date; however, it is not clear that the decisions are taken with consulting the industry or the alumni.
The curriculum serves well the traditional aspects of Electrical Engineering,
In an effort to keep up with the rapid growth and changes in the field, the Department offers background and core modules in the first two years (Physics, Mathematics, Electronics, English, Power electronics, etc.) and specialized modules in the last two years. Overall, the emphasis of the curriculum is on breadth of relevant subjects which is consistent with the

strategy of other departments followed in the Electrical field. The EEC encourages the Department to strengthen their links with the local community to better understand societal needs to revise the specialized modules offered.

- ***Has the unit set a procedure for the revision of the curriculum?***

Procedures for the revision of the curriculum are set out in the statute, governing the operation of the Department and are based on subject area informal group meetings that feed into departmental committees. According to the statute, restructuring of the curriculum is allowed every three years. In order to do so the Department follows departmental procedures, including student representatives and the relevant legislation of the state. The EEC feels that the faculty members should enhance their links with industry and with their alumni in an effort to act proactively for curriculum revision. So far, the major revisions of the curriculum emerged as a result of changes in the legislation made by the Ministry of Education.

IMPLEMENTATION

- ***How effectively is the Department's goal implemented by the curriculum***?

The curriculum appears to be rational, clearly articulated, coherent and functional, while the taught material and duration of modules delivery emphasizes the practical aspect of the area.

The undergraduate programme includes general content and specialized modules. A total of 39 modules and a project dissertation (counting as one module) must be completed for the award of the degree. These modules are taught over seven semesters (usually five or six modules per semester). The six month industrial placement ("Πρακτική Άσκηση") and the project dissertation are taken by the students in the eighth semester. During placement, the students work in the premises of an industrial partner and in some rare cases in Departmental labs. Both project dissertation and industrial placement provide a further opportunity for an integration of theoretical knowledge with practice using experimental tools, techniques and methodologies of the chosen subject.

The project dissertation and the industrial placement are the main channels for student preparation and familiarization with research. The Department and the EEC are in agreement that these processes are an important component of the degree as they facilitate a smooth transition to industrial environments and research culture. The final year project (dissertation) usually combines a theoretical study with the development of industrial electrical application or a system, either fully implemented or up to the design (or simulation) level. Students having not an industrial placement are undertaken projects that frequently used as teaching material in several lab modules. According to the faculty members the final year project provides the highest opportunity to students to expose themselves to the practical aspects of Electrical Engineering in a coherent and systematic way.

- ***How does the curriculum compare with appropriate, universally accepted standards for the specific area of study?***

Consistent with national and international best practice, the structure and the contents of the curriculum are well-documented both in electronic format as well as hard copy. These records describe 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 EEC agrees with this policy since it prevents students from carrying forward courses that would be necessary for a proper understanding of the background concepts avoiding accumulation of non-progression students.

- ***Is the structure of the curriculum rational and clearly articulated?***

This structure appears to be well articulated in the degree guide ("οδηγός σπουδών") with a rather detailed description of the offered modules. In an effort to further improve the

implementation of the curriculum, the EEC recommends the Department to clearly indicate in the degree guide, for each one of the modules "recommended prerequisites" in order to help students better understand the overall curriculum progression.

- ***Is the curriculum coherent and functional?***

Overall, the curriculum appears to be coherent and functional allowing for smooth development of both theoretical knowledge (breadth than depth) and practical abilities in the field of Electrical Engineering by gradually increasing exposure to specialized labs. Having said that, there are some problems associated with the inability to synchronize theory lectures with labs.

- ***Is the material for each course appropriate and the time offered sufficient?***

Detailed module information including syllabus, aims and objectives, learning outcomes, bibliography, are provided at the Departmental webpage for the majority of modules. The EEC reviewed the teaching material for theory and laboratory work and found it adequate. However, EEC notes the limited usage of e-Class, which is the formal Learning Content Management System (LCMS) of the Institution, and considers that the philosophy of online dissemination of teaching material is not well-cultivated in the Department. EEC believes that this issue must be addressed by the Department as a particular mean for improving the implementation of the Curriculum.

After interviewing faculty members and students, it has been clear that staff members have been making commendable efforts in implementing the curriculum, despite the large number of students, particularly in carrying out laboratory work. Infrastructure appears to be adequate as far as the novelty of the equipment is concerned but in many cases is insufficient to support actual hand on activities of every student, whilst specialised equipment are lacking There is no doubt that the faculty members have the necessary training and expertise to deliver the curriculum, but there is a high degree of reliance on non-permanent academic staff for the delivery of some of the modules which is a cause of concern. The greatest concern, however, is the fact that the laboratory work, one of the strongest aspect of the degree cannot be carried out efficiently due to the unacceptably low staff to student ratio discussed in other sections of this report. Limited individual exposure of all students to lab exercises has been highlighted by students and was raised in the EEC's meeting with faculty members, who have acknowledged this issue and have assured the EEC that they are doing their best, given limited budget to hire non-permanent staff.

- ***Does the Department have the necessary resources and appropriately qualified and trained staff to implement the curriculum?***

In summary, the programme of studies strives to provide breadth across the field of electrical Engineering and to integrate theory and practice. The current implementation of the curriculum is deemed by the committee adequate, coherent and functional. Improvements are possible as suggested in the previous paragraphs. The limited available human resources mainly, in terms of permanent academic staff (eleven), impose constraints and stretches the Department's ability to sustain the implementation of the curriculum. The culture in the Department is responsive and collegiate, fostering good collaboration among members. The EEC is particularly impressed with the approachability, friendliness, collaborative and supportive spirit of all faculty members, also confirmed by the students.

RESULTS

- ***How well is the implementation achieving the Department's predefined goals and objectives?***

The implementation of the curriculum seems to be achieving the Department's goals as defined by the programme of studies. Discussions with a few of the Department's alumni

have confirmed that the content, structure and articulation of the curriculum, allow for the production of electrical Engineers consistent with the vocational rights of electrical engineers as set in the Presidential Decree 346/8/06/1989, while keeping flexibility for further specialization and continuation of studies at higher levels (Masters, PhD). The programme is well supported by laboratories, computer software, IT infrastructure, and library facilities. The present rate of students' attendance is rather high in laboratories (since this is mandatory) but quite low in classes that are theory based. The EEC encourages the Department to investigate ways to increase the attendance of students to these classes.

- ***If not, why is it so? How is this problem dealt with?***

An important obstacle in achieving sustainability and improvement of the Department's goals is the lack of necessary resources, especially laboratory staff. In particular, the equipment in many cases is insufficient and combined with the excessive number of students compared to staff, results in some laboratory exercises becoming just demonstrations rather than active lab work carried out by the students. The students have confirmed in discussions that staff is doing everything they can to deal with this problem (in many cases they are adding many extra unpaid hours of laboratory sessions. But the number of students in those sessions is prohibitively high. For the problem to be eliminated more extended usage of simulation software is used; whenever this is possible prior to the lab sessions may be beneficial for students' involvement in lab exercises.

- ***Does the Department understand why and how it achieved or failed to achieve these results?***

The overall workload of the curriculum as perceived by the students is rather high. There are various factors contributing to this issue: First, the students consider that the lab work-theory load is very low. Second, the educational background of the incoming students is diverse and it ranges from students having a solid foundation to Mathematics and Physics, to students having none at all. Many students are familiar with lab work and practical laboratory activities while others are not familiar at all. As a result, a considerably high percentage of students find it challenging either to follow and pass the maths / physics modules or follow and get full advantage of the laboratory classes. The faculty members try to do their best to alleviate this problem. Some of the lecture hours are replaced by virtual labs (exposure of students to simulation software like Matlab) while tutorial sessions are organized whenever the teaching load and the available budget.

The key issues inhibiting the effective run of the curriculum can be summarized as follows:

1. Lack of control over student entry is a challenge, especially as students have different backgrounds on entry, especially in terms of mathematical ability and/or lab work.
2. Long mean completion time for students, low pass rates in modules and low lecture attendance are issues of concern that need addressing.

IMPROVEMENT

- ***Does the Department know how the Curriculum should be improved?***

The Department attempts to improve the quality of curriculum through internal reviews of its entire academic staff. The EEC considers recommends the Department should also seek the systematic advice from other stakeholders, namely industry and alumni, along with inputs from academic staff, students and Central Administration. An essential ambition of the programme should be to prepare students for their professional life and hence enhancing considerably their employability and skills.

Another issue is the increasing tendency to cut down laboratory classes allegedly due to the limited budget allowed by the Government for hiring non-permanent staff. The number of

students in laboratory sessions must be kept low for effective learning. As a result, this increases the overall cost of laboratory classes and in a limited budget framework laboratory modules become non-sustainable. The EEC and the Department (both faculty members and students) consider that is of high importance to maintain the lab work, at least, at the current level. In that perspective several measures have been agreed:

- ***Which improvements does the Department plan to introduce?***

(1) The Department should propose the soonest possible a postgraduate programme of study at MSc level in order to provide an opportunity for its own graduates and others to further specialize in the Department's fields of expertise. This may also provide extra funding.

(2) The Department should investigate ways of attracting PhD students, probably in cooperation with other institutions in Greece and abroad. PhD students, with advance the primary research of the Department and would allow smoother operation of the curriculum by offering tutorials and helping in laboratory modules.

(3) Involvement of students in laboratories as assistants should be extended and better planned in order to facilitate full utilization of sessions.

(4) Utilization of software tools for design and simulation could be imposed in theoretical classes in a project oriented basis. This will allow familiarization of students with modern approaches of design, analysis and testing of electronic systems and hopefully will increase the motivation of students to attend the theoretical classes and the laboratory sessions.

Finally, the Department should encourage e-learning approaches, whenever this is possible, and as a first step they should make better use of the current LCMS (e-Class).

B. Teaching

APPROACH

- ***Teaching methods used***

The Department of Electrical Engineering covers subjects in the field of Electronics and Automation. Energy and Industrial Design. The aims of the Department, according to the curriculum is to provide students with high quality education, with modern scientific and technical knowledge, as well as the development of skills necessary for practicing the profession of Electrical Engineering.

The pedagogical policy of the Department is based on the combination of applied theoretical and technical education. The Department uses mostly traditional teaching methods.

It deploys a variety of teaching and learning methods including lectures, laboratories, homework, a mandatory diploma thesis and an internship. Due to the nature of the curriculum, it is necessary to provide a strong emphasis on practical exercises and lab activities which provide to students real opportunities and practical benefits. The EEC finds that the Department's facilities, laboratories, and equipment are satisfactory but in accordance with students' and academic staff comments, the EEC notes that some of these labs are saturated due to the large number of students. This point and in particular for high risk laboratories (eg high voltage laboratories) is really unacceptable. Not only students are not covered concerning their basic health safety but in addition the proposed laboratories do not meet the educational objective as it performed under very difficult conditions, which are not satisfactory to staff and particularly to students

Therefore, an approach of offering group work in problems, solving with task allocation and team working, or replace some practical exercises with simulations, integrating more interaction between theoretical teaching and labs, may be an effective way of complementing existing traditional teaching, in order to enable the Department to fit in more students.

- ***Use of information technologies***

The department uses an e-class online system to deliver teaching material and relevant information.

The EEC also notes the low student attendance rate in lectures (10% - 20% for the vast majority), whilst in laboratories being compulsory, 100% attendance is noted. There is a culture among students, especially in the early years of the program, not to attend lectures and tutorials since none of them are compulsory. While such attitude do not necessarily reflect badly on the quality of teaching, it is important that the Department increase its efforts in attracting students to classes and engage them with the teaching and learning practices. Such change of student behavior will undoubtedly improve the quality of teaching and learning experiences and simultaneously improves student performance. Another possible explanation could be that conventional teaching methods do not attract students. Again, an approach offering group work in problems solving or by developing in part the e-learning teaching, or by providing for students evaluation a more continuous control system (quizzes/midterm exams) and not only a final exam, may be an effective way of complementing existing traditional teaching and evaluation methods and a chance that students will be more alert and take more interest by thinking and learning. In any case the Department is strongly invited to address this difficulty.

- ***Teaching staff/ student ratio***

The Department currently has 9 full-time permanent academic members, 13 temporary instructors, 3 technical support members and 1,5 administrative staff and close to 1400 total number of undergraduate students (among which only the 50% are actives). The student/academic staff ratio is so, very high, and can reach 60 to 70:1 (30:1 for some courses because of the very low participation of students). In the cases of laboratories, this can reach 25 to 50:1, which as mentioned before can be risky in terms of Health and Safety and best practice. Potential solutions to this problem can include more simulation sessions, extent the access time to the labs, but of course the best solution would reduce the number of incoming students or increasing staff number.

- ***Adequacy of means and resources***

The resources were definitely inadequate. This is beyond the usual complaining one hears in many Universities. In the Department the inadequacy of resources was evident. Not only in terms of teaching and technical support staff , but also in terms for example of computers, and room facilities. There is no common room for the students to sit and read. Due to lack of technical personnel, the teaching labs usually open during the lab sessions and remain inaccessible at other times.

The committee visited several classrooms with different capacities and several laboratories (high voltage, electronics,..). It is the observation of the EEC that all classrooms must be equipped by updated technology resources that will facilitate the delivery of courses. The committee recommends that the department, being progressive and open-minded, develops basic policy, setting course passing standards, not just use conventional methods. This follows international practice.

- ***Examination system***

Students are assessed by written examinations in all courses every semester in February and July. In September they are entitled to repeat the examinations in all courses of the previous academic year, which is not common practice in the EU. The laboratory assessment is carried out in part by a practical exercise in the laboratory and in part by a report at the end of each cycle of practical work during the semester. The personal monitoring of each student for practical work results in a percentage of success much higher to that observed in the theoretical course exams. The evaluation of the dissertation ("πτυχιακή") is examined by a three-member committee actioned by the Head of Department upon the request of the student.

A major problem for the department is that only 43% of the students are present at the exams. The exams average failure rate is approximately 50%. Although this is characteristic of the whole educational system, low pass rates sometimes indicate an issue with course delivery. Several specific lecturers (as "general physics") had consistently low pass rate (in many cases is the last exam to obtain the diploma), which may indicate that the problem could lie with the background of the students and lack of effort (either they did not take advanced math/physics courses in high-school or because their high-school grades were low) , but also the lecturer methods or the content and goals of the course (the strong theory-emphasis of the curriculum during the first year, dampens probably the student's enthusiasm to study on an on-going emphasis). Although part of the blame can be put on students, the onus is on the teaching staff to incentivise and attract the students to the class, as well as to deliver the content as efficiently as possible and for bringing students to the same academic level of progression. This is where teaching methods and best practices may help.

- ***Teacher/student collaboration***

From the meeting with students, the EEC inferred that the teacher/student collaboration is in general very constructive and productive. The very good interpersonal relations between academic staff and students are an important advantage for the department that should be exploited through promotional material to attract more and better quality, dedicated students.

IMPLEMENTATION

- ***Quality of teaching procedures***
- ***Quality of course material. Is it brought up to date?***

The level and quality of teaching and teaching preparation of the course seems to be good and students are in general positive about the efficacy of the teaching, especially from the non-permanent faculty members and seem to be satisfied with the teaching procedures and quality.

Problems arise primarily due to the large number of student intake, because the Department has to accommodate approximately 20%-50% more than the planned number of students (table 1), with just 9 permanent academic staff.

Year	Total offered places	Total occupied places	% more students
2010	160	243	52
2011	160	190	19
2012	150	201	34

Table 1. *Number of places offered and accepted by government (occupied)*

- ***Quality and adequacy of teaching materials and resources.***

The course or laboratory material consists of books, theory notes, laboratory notes, PowerPoint presentations, etc. The distribution of trade books is proposed to students through the ΕΥΔΟΞΟΣ system. Students can choose a book from a proposed list per lesson.

- ***Evaluation by the students of (a) the teaching and (b) the course content and study material/resources***

The introduction of formal teaching evaluation for each course is a good practice. The analysis of the data is a key process. Utilising such data to improve the student teaching experience is vital. However, the EEC noticed following discussion with the students the percentage of questionnaires returned seems to be very low because there seems to be no significant action on improvement opportunities based on such student evaluation. This does not motivate students to increase participation, and teaching staff are encouraged to improve student's understanding, implement changes based on student evaluation with transparency so that the student participation in increased. It seems that the outcome/findings are not used to further enhance the Departments' performance since there is no formal procedure to discuss and reflect on these results, and in doing so develop ways to integrate the needs of the students in teaching improvement and course development.

- ***Mobility of academic staff and students***

The mobility of academic staff to other overseas universities and research organizations is a good practice but this seems to be a very weak point of the Department. The Department should encourage academic staff through its policies and financial support (like ERASMUS programs) to undertake sabbatical breaks in overseas institutions. The mobility of students is very slightly spread. There is a relatively small number of students who benefit from the ERASMUS European-wide student mobility programs. The EEC urges the Department to better advertise these opportunities to the students and increase their participation in these programs. Additionally, the EEC urges the active researchers in the Department to seek opportunities to send their students on short visits to their collaborators abroad.

RESULTS

- ***Efficacy of teaching.***

The efficacy of teaching is generally good, but students note that some lectures do not adhere to recent curriculum changes. The EEC strongly suggests a greater involvement of the industrial sector in curriculum development for example; case studies and lab materials can enhance the scope of the Department.

- ***Discrepancies in the success/failure percentage between courses and how they are justified.***

It has been revealed that some students cannot follow the course due to personal reasons (mainly financial problems), while others have difficulty in following certain subjects of the curriculum. Part of this problem is the quality of student intake, with insufficient background (students can enter from Lyceum and from technical schools). This significantly contributes to delaying their graduation.

- ***Whether the Department understands the reasons of such positive or negative results?***

The Department can find ways to raise the level of knowledge of the weak students and to incentivise the students to attend more consistently.

- ***Differences between students in (a) the time to graduation, and (b) final degree grades.***

The number of students completing their studies in a reasonable time (10 to 12 semesters) is quite low (table 2). This is an unsustainable problem of major importance and must be resolved as a priority. The new legislation (which will be applied from next year) and which specifies a maximum of 6 years for completion of studies should be implemented.

Year of entry	Total years of schooling	Percentage of graduates
2004	9	29,1%
2005	8	27,4%
2006	7	27,4%
2007	6	15,2%
2008	5	4%
2009	4	0%

Table 2. *Total years of studying*

It is noted that the average degree award grade is consistently low,. (i.e. ~ 6,1/10 from 2008). Also, the percentage of students obtaining first class awards, i.e., awards with an overall mark between 7 and 8.5/10 is extremely low (around 2,3%), while the percentage of students obtaining an average degree around 5.5/10 is relatively high (~ 50%). It is the responsibility of the Department to make sure that its students learn and graduate to an appropriate standard, with a reasonable normal speed of grades.

Moreover it is difficult to establish indicators of educational provision, in relation to good employment rate, because there is no systematic monitoring of graduates destinations. The Department is encouraged to develops means (Liaison Office) for accessing of such data.

- ***Linking of research with teaching***

There is no a real link between research and teaching. Regarding the policy for postgraduate studies, the Department does not offer any postgraduate program at Master's level. The EEC members believe that it could be a good idea to set up an MSc course but the important point that needs to be addressed would be the direction to which the MSc should take in order to truly differentiate the Department from others, whilst maintaining and enhancing the strengths and expertise of its staff members.

IMPROVEMENT

- ***Does the Department propose methods and ways for improvement?***
- ***What initiatives does it take in this direction?***

The Department would like to see teaching loads reduced, at least as a first step. The EEC strongly supports this demand as it would certainly improve quality of teaching. The Department and the EEC are concerned with the fact that for several years, students with an average entry above 10/20 are given the opportunity to enroll and study. If this can be improved, it would lead to less disparity within the student body and more effective teaching.

A very low attendance in certain lectures, which is of great concern, which may also contribute to the low graduation rates. Thus, in those modules that the assessment is only by exams and as such attendance is not required, the EEC encourages the Department to reflect and consider ways that this can be changed i.e., mid-term exams, assignments, or assessment by multiple choice (MCQ). It will be also beneficial if the department invest in either electronic whiteboards or electronic writing pads coupled with projectors, in order to be able to record the lectures and make them available on the course's website. This will be extremely beneficial to the students that have to commute and also to students that had to miss some of the lectures.

A significant component of learning through problem solving coupled with interaction of lectures and laboratories need to be addressed as part of solving student progression issues. The Department should also consider and formalize ways to assist the weaker students when they enroll and to align student intake backgrounds to a common level.

Concerning the very useful industrial placement, perhaps a closer and more formal relationship with companies and students monitored by visits, where possible, can eliminate problems and improve the experience. Ex-graduates may be involved more effectively for finding industrial placements but also more actively involved for advancing the teaching and research aims of the Department by setting up for instance and industrial advisory committee. Finally, the EEC would like to encourage the exchanges abroad through the ERASMUS programmes which should be intensified to allow higher international experience by students and staff.

The EEC recommends also that the department organize on an annual basis seminars and one day meetings (with the active participation of the industrial partners), where students are given the opportunity to see industrial current activities and research projects; understand what will be expected in subsequent years.

C. Research

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

APPROACH

- ***What is the Department's policy and main objective in research?***

Research is encouraged and staff are very positive in engaging in research and scholarly activities. There appears to be in place a very general approach to research rather than an orchestrated approach with specific aims and objectives for applied research which should be clearly identified with TEI's vision and mission. This is evident by the lack of clear policies in place at organisational, faculty and departmental levels. There are basic procedures in place for non-competitive research funding, but no clear objectives related to external funding acquisition, especially with potential involvement of industry. No definite pathways for potential involvement into Horizon programs provided by the EU, or any other competitive research funding agencies. There are no guidelines and no mentoring schemes in place for new staff members/ early career.

- ***Has the Department set internal standards for assessing research?***

Research outcomes are produced by only a few staff members. There are no internal standards for targeting outcomes and evaluating research in terms of competitive grants gained, number of publications in international journals of certain impact factor, number of presentations at prestigious international conferences etc.

IMPLEMENTATION

- ***How does the Department promote and support research?***

There is no framework and no mechanism in place for supporting research, let alone promoting research internally or externally to the organization. The absence of Post Graduate taught (MSc) or research programs such as the award of PhDs does not help establish a viable research environment. Critical mass of researchers with clear focus has not been identified. Benchmarking with other similar organizations is not evident.

- ***Quality and adequacy of research infrastructure and support.***

Research infrastructure is marginal and its scheduled maintenance is questionable. Central funding support is ad-hoc and not based on any specific action plan. There is no evidence of access to other laboratories in the vicinity, or support for visits to other research establishments with more suitable infrastructure, except a fragmented cooperation with other institutions of two members of staff. Clearly, equipment infrastructure needs to be regularly maintained, quality assessed and the possibility of establishing accredited and certified laboratories must be explored.

- ***Scientific publications.***

Publication outcomes concentrate on a few staff members whose effort is commendable. The international journals they publish in are reputable, thus resulting in incrementally increasing academic kudos and international recognition. The socioeconomic impact of the research outcomes and the technology transfer to the local industry needs to be centrally directed and supported.

- ***Research projects.***

The number of projects undertaken in the last few years is limited and the monetary return

to the organization has been marginal. However, staff have been involved in a few competitive grants with good academic outcomes.

- ***Research collaborations.***

Collaborations have been established with other universities, primarily in Greece. Despite the fact that the Department claims a rather large number of local organizations that accept students for internships and final year projects, there appears to be negligible collaborations with local industry at research or consultancy levels that provide external income to the Department.

RESULTS

- ***How successfully were the Department's research objectives implemented?***

Absence of clear research directions and aims, render any measures of success redundant.

- ***Scientific publications.***

The range of international journal publications presented approach the Impact Factor of 1.5 which is on par with other similar Departments of comparable organizations in Greece.

- ***Research projects.***

Research projects are limited in terms of quantity, industry input and thus societal benefit.

- ***Research collaborations.***

Collaborative projects are limited to academic partnerships mainly, rather than extending to industry partnerships.

- ***Efficacy of research work. Applied results. Patents etc.***

Research work is of applied nature and mainly supported by ESPA. Recent activities are fast diminishing without any indications as to how activities can be sustained. No clear policy as to how patents can be supported and no Intellectual Property Rights management efforts with clear rewards for the inventors and the monetary returns for organization from assignments, licenses etc.

- ***Is the Department's research acknowledged and visible outside the Department? Rewards and awards.***

The Scopus h – Index, that is a good indication of academic impact and international reach for research active staff leaves room for improvement. Nevertheless it is on par when compared to staff members with other similar organizations. Rewards are limited because there are no research management related policies that govern research monetary outcomes and returns. Regarding awards it is naïve to claim Marquis Who is Who as a credible source for assessing academic excellence.

IMPROVEMENT

- ***Improvements in research proposed by the Department, if necessary.***

A need for a strategic plan with clear aims and objectives for research and technology transfer is needed. This can provide the framework for research focus and activities in the Department. Equipment and facilities associated with this research concentration need to be kept and maintained at excellent standard required for publishing in international journals and collaborating at national and international level with other academic organizations and

industry. Such equipment can form part of a cluster entity under an identifiable theme that is also resourced with a critical mass of research staff from the Department and other collaborating Departments and organizations. Such Laboratory / Cluster has to be quality accredited by suitable bodies / associations. Marketing of this entity nationwide and at European level is paramount to allow professional involvement in different funding schemes.

- ***Initiatives in this direction undertaken by the Department.***

No initiatives have been undertaken in this direction so far.

D. All Other Services

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

APPROACH

- ***How does the Department view the various services provided to the members of the academic community (teaching staff, students).***

The Department has eight well-equipped laboratories specialized in various fields of electrical engineering including electric machines, power electronics, photovoltaic systems and renewable energies, prototyping and etching, physics, etc. There are a few computers present in some of these laboratories providing students access to simulation software (e.g. PSIM). There are no technical personnel providing IT support for the Department's computers (e.g. maintenance and repair). It was also realized that students have more exposure on simulation software (80%) that hands-on experience with actual breadboard circuit design, fabrication, testing, and evaluation (20%). These laboratories are available to students only during the scheduled time for the course. Aside from that, these laboratories are locked providing no access to students who are willing to work on their final year projects or other supplementary projects assigned by the academic staff. It was also noted that the capacity of these labs ranges from 20 to 25 students working concurrently. However, the number of students in laboratory sessions reaches double this number creating serious problems with security and teaching effectiveness.

The library is housed at a new, spacious, and comfortable building. It has a sufficiently high number of administrative personnel providing services to students and academic staff. There is a dedicated study room for the students and a computer lab with online and Wi-Fi access. In addition, there is a large volume of books, the majority of which are Greek titles. The scientific magazine collection is rather limited. The library has online subscription to a number of scientific magazines.

- ***Does the Department have a policy to simplify administrative procedures? Are most procedures processed electronically?***

The Department managed to simplify administrative procedures through the use of computers and online facilities. Specifically, students register for their courses and monitor their academic performance using a centralized networked computer platform. Likewise, the academic staff utilizes this platform to assign grades at the end of the semester avoiding paper-bound processes and unnecessary hassle. Other procedures that have been simplified using electronic means include student registration for the final year project, submission of various application forms, and completion of the semester-based questionnaires for the assessment of the course and the academic staff.

- ***Does the Department have a policy to increase student presence on Campus?***

Student presence on campus is relatively low. This phenomenon is more pronounced for theoretical courses where student presence is not compulsory. For laboratory/practical courses, there is no problem because student participation is an absolute requirement for passing the class. The computer and study rooms in the library premises seem to alleviate the

problem of low student presence on campus. In addition, there is a gym in the campus with sufficient sports/exercise equipment and athletic facilities (e.g. table tennis, etc.) where students overwhelmingly embrace during their free time. A large number of students were present in the gym during our visit. Similar type of facilities may help overcome the problem of low student presence on the campus. The department did not provide any other convincing plans and/or policies on how to further increase student presence on campus.

IMPLEMENTATION

- ***Organization and infrastructure of the Department's administration (e.g. secretariat of the Department).***

The infrastructure of the Department's administration is sufficient. The secretariat of the Department deals with a number of issues aiming mainly toward student support and service. The administrative staff consists of only one person; however, no serious problems or complaints were reported by the academic staff or student community in terms of quality of service or inadequacy. Many administrative services are currently being processed through the use of online facilities and computer platforms, thereby releasing the heavy load of duties allocated initially to the secretariat of the Department.

The sufficient organization and infrastructure of the Department's administration was also commended by students and academic staff. Toward this effort, an important role is played by the academic staff taking a significant amount of administrative load off the shoulders of the Department Head and the Secretariat. It is noted that a number of committees have been formed in the Department, focusing on various administrative/academic issues, such as the committee for student practice, the committee for transfer students, the committee for the curriculum, the committee for internal evaluation, etc. The EEC also commends the excellent communication and overall good relationship that exists among the academic and administrative staff as well as between the academic and student communities.

- ***Form and function of academic services and infrastructure for students (e.g. library, PCs and free internet access, student counseling, athletic-cultural activity etc.).***

The Department makes use of the library of the hosting TEI. The library is located at a new spacious building housing 60,000 books and periodicals. There are 9 librarians providing services to students and faculty. Due to financial problems and limited funds, the most recent available magazines that appear on the shelves are dated back in 2012. We also realized that the library does not have any scientific magazines covering topics related to electrical engineering. On the other hand, the existing collection of books related to electrical engineering is very limited; some of these books appear in multiple copies and some others are not related to the topics taught in the Department. The limitation of the library to house a sufficient number of books and magazines for the Department's needs is supplemented by online facilities such as the E-class and the Hellenic Academic Library link, respectively. Using the E-class facility, students have access to a number of e-books used as textbooks or reference books by the faculty as well as the course outlines/syllabi and other supplementary material. Using the Hellenic Academic Library facility, students and academic staff can access well-known periodicals such as IEEE transactions, IEEE magazines, etc.

The library houses a computer lab and provides online access to students (LAN/Wi-Fi). It

also houses a very spacious and pleasant facility for quiet studying. Students visit the library primarily to use the computer facilities and to study in a quiet environment. There were 15 computers in the lab supervised by one IT person present at all times. A small number of those computers (3-4) were non-functional. At least 12 students were present in the computer room at the time of visit and there was sufficient number of students in the study room.

The classrooms, staff offices, and laboratories were in good condition. There was no computer and projector in these classrooms. As explained to the EEC, the lecturer is responsible to bring a laptop and a portable projector at the time of lecture. As the number of students admitted every year is considerably high (approximately 200) and the number of teaching staff is relatively low (9 permanent staff and 13 staff on contract), the classrooms are often overcrowded (especially the laboratory sessions which are compulsory) resulting in serious problems with monitoring and supervising student progress in class. Such an environment also raises issues of health and safety. The Department has also access to an amphitheatre; however, the seats are not sufficient to accommodate the increased number of admitted students. The amphitheatre has an installed projector and a computer in place.

The restaurant is spacious and clean. It prepares three different meals per day for approximately three thousand students. These are students entitled to a free meal based on family income. For those students who are not benefiting from this system, the cost per meal is 4 Euros, which is considered expensive. A student currently needs a total of 12 Euros for all three meals offered by the campus restaurant. Students interviewed by the EEC have reported their concern and strong objection to the high pricing of the restaurant's meal. The majority of the students who are not entitled to a free meal prefer to either cook at home or purchase something from the bakery, instead.

Wi-Fi service is available only at some of the institute's premises (e.g. the library) but not everywhere on campus. Students reported that the Wi-Fi service is often turned off providing no online access at all times.

On campus premises do not provide access to handicapped people or people with disabilities and special needs. There are no ramps or elevators in most of the buildings deeming these premises inaccessible to people with disabilities. In addition, there is no counselling office to provide psychological support to students in need or people with learning disabilities such as dyslexia.

RESULTS

- ***Are administrative and other services adequate and functional?***

A number of administrative services (e.g., student registration, submission of grades, etc.) are done using a computer-based online system that seems to work well. There were no serious complaints by either students or academic staff concerning the online platform currently in place.

The Department has only one secretariat staff which is responsible for all paper-based administrative services. Even though there were no serious complaints concerning the quality of service provided by the secretariat to students and/or academic staff, the

Department cannot function properly with just one person at the particular post. At the moment, a significant amount of administrative load is undertaken by the academic staff.

The library has a limited collection of books in electrical engineering, some of which are totally unrelated to the topics covered by the existing curriculum. The magazine collection is old and outdated. There is not a single magazine on electrical engineering topics. There is however electronic subscription to a plethora of magazines from which academic staff and students can download current articles.

There is no faculty/student mobility office dedicated to the exchange of faculty or students with other universities. There are some signed agreements with other institutes abroad but no student or faculty has made use of this program in recent years.

There is no counseling office to provide services and support to students in need.

There is no office that keeps statistical records on the whereabouts of the Department's graduates; i.e., Where are they employed? What type of jobs did they take? What is the percentage of graduates that attended a post-graduate degree? What is the percentage of graduates that started their own business?

There is no liaison office dedicated to provide easy transition of students from the academia to industry and to ensure closer ties between industry and academia. Currently, there is no communication between the Department and industry constituting a major gap that needs to be urgently bridged.

- ***How does the Department view the particular results?***

The academic staff and students recognize that the aforementioned limitations have a negative effect on the overall picture of the Department and that specific measures must be taken in order to improve services and quality of service. The majority of staff believes that the economic situation in Greece and recent budget cuts have a negative effect on the overall performance of the Department.

IMPROVEMENTS

- ***Has the Department identified ways and methods to improve the services provided?***

The academic and administrative staff is aware of the aforementioned problems facing the Department regarding the services provided; however, the difficult financial situation and the restrictions imposed by the Government are two of the major reasons to blame.

Concerning the fact that students and academic staff do not choose to make use of the Erasmus program, the Department believes that it has to do with the poor financial situation of the interested parties.

The Department did not identify any well-thought and effective ways or methods to improve some of these services at departmental or institutional level.

- ***Initiatives undertaken in this direction.***

The library has recently moved to a new building providing a friendly environment for students to study and do their homework. The availability of a computer lab in the library housing 15 computers with online access and Wi-Fi facilities is an important initiative to keep students on campus.

The use of an online platform where a number of administrative tasks are done using computers improves services and student/staff satisfaction. Other services such as E-class and online subscription to scientific magazines helps toward this direction.

The presence of an athletic centre and outside courts (e.g. basketball courts, table tennis, etc.) provides students the opportunity to exercise, train, and play in a safe and friendly environment.

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.

This is a well constructed department with good provision; the level of education is good and the communication between student and staff and also amongst staff commendable.

The department should aim to become more outreaching and should try to sustain itself by talking with other department(s) on immediate future planning.

The department should aim to do more research and to undertake postgraduate MSc and PhD programs

The proactive connection with industry is a must requirement and with the manufacturers association.

The department should start planning its activities with milestones, timing and costing, and should exercise performance reviews to scrutinise progress and to avoid bottlenecking.

Some key inhibiting factors are:

- The framework and adverse economic conditions render heavy teaching and administrative loads for the faculty, thus inhibiting research growth;
- The legislative framework that allows students to remain enrolled indefinitely irrespective of their academic performance, thus creating a large body of inactive students although now legislated needs to be implemented.
- Low staff/student ratio is unsustainable and needs addressing.
- Economic hardship of the students is a problem needing a sustained strategy.
- Implementation of degree completion by limiting the length of registrations in

accordance to latest state rules.

- Lack of formal centralized procedures for assessing attainment of teaching and learning objectives;
- Reduced professional rights to the department's graduates as described by the law. As a result, the department becomes less attractive to good applicants. The academic level of the department's student is further affected by a societal perception (lower class than polytechnic/university level) related to Technological Institutions (TEI).
- The acceptance of new students with low grades, mixed backgrounds and against their choice creates a number of difficulties in teaching, degree completion, low morale and identity perception of graduates.
- Lack of funds for recruitment of staff supporting technical and research roles. This includes disproportionate low fraction of research 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 PhDs.
- Lack of accreditation of research laboratories;

Most of the strategic planning factors seemed to be shared by all Departments in TEI. The very low staff/student ratio, which is the main teaching challenge for the department is affected by two State policies. Firstly no new academic/teaching positions are approved by the Ministry of Education, due to the current economic climate and therefore the number of academic staff continuously decreases, as retired members are not replaced. Secondly, the number and quality of student entrants are explicitly or implicitly specified by the Ministry of education. The Ministry sets the exact number of entrants for each department. By increasing the number of entrants it reduces the quality of students, as applicants with high entrance scores choose to study other subjects and/or in universities or other institutions. 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 technical to university status.

Given the current financial circumstances, it is difficult to foresee the release of any substantial State funds. In view of that, the Department and Institute could plan in raising external funding from third party resources. The establishment of taught and research postgraduate programs as well as enhanced interaction with the industry could attract further funds in this direction. Consulting to companies, research and development services and the use of laboratories by companies maybe areas that may attract outside income.

F. Final Conclusions and recommendations of the EEC

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

Conclusions and recommendations of the EEC are as follows:

Teaching

- The attendance in lectures is poor, ways of making it compulsory needs to be found to eliminate this problem
- Different means of teaching, i.e. e-learning and other ways need to be examined and implemented to reduce problems with traditional teaching and to help weaker students
- Care should be taken so that all modules are as up-to-date as possible
- The practical hands-on student experience should be preserved and in fact do more practice-based teaching
- There should be an interaction of theory with practice for the effective delivery of the curriculum
- The Department is asked to find ways to enhance student motivation to increase participation
- The Department is asked to find ways to enhance the participation with the industry and outside the locality of the TEI, nationwide and abroad
- The setting up of ΗΜΕΡΙΔΑ type of activities is good for staff, students, the TEI and the community
- The staff evaluation is paramount and needs to be improved so that there is more participation. The feed-back needs to be more transparent and findings must be implemented

Curriculum

- ✓ The current state of the art/technology needs updating constantly and these updates are to be incorporated in the whole curriculum (modules and labs)
- ✓ The Department needs to think how to implement supplementary laboratory exercises for helping students
- ✓ Re-evaluation of course curriculum needs to be done to make redundant dated lecture material
- ✓ MSc provision needs to be established, encouraged to seek collaboration with other Departments and/or institutions
- ✓ PhD provision as second supervisors with other universities at home and abroad needs to be instigated
- ✓ New technologies need to be introduced in the curriculum

Research

- A need for a strategic plan with clear aims and objectives for research and technology transfer is needed to provide the framework for research focus and activities in the Department.
- Equipment and facilities associated need to be kept and maintained at excellent standard required for publishing in international journals and collaborating at national and international level with other academic organizations and

industry.

- Laboratory clusters under an identifiable theme resourced with a critical mass of research staff from the Department and other collaborating Departments and organizations can be quality accredited by suitable bodies / associations.
- Marketing of expertise nationwide and at European level is paramount to allow professional involvement in different funding schemes.

Other Services

- ✓ The administration of the TEI as a whole was found excessive
- ✓ The departmental secretariat needs one more secretary
- ✓ There was good practice in the area of centralisation of student registrations and in industrial placements
- ✓ There was good practice with regard to the on-line services, especially the e-Class
- ✓ The Department and institution is encouraged to look for cost effectiveness by centralising classrooms and laboratories.
- ✓ The gymnasium facilities were found to be good and provide a good service to students and staff
- ✓ The study room in the library was good but PCs needed continuous servicing/up keeping
- ✓ The access to rooms and labs and other facilities including library need immediate consideration for health and safety. Access to disable students is a civilised human requirement first and then a legislative one and needs fixing immediately
- ✓ There is good communication between staff and students and their working relationship commendable
- ✓ The teaching programmes are in line with the capacity and capability of the department and the institution as a whole
- ✓ In light of diminishing staff and difficulties in approval of new recruitment, the Department is encouraged to seek solution for efficiency and sustainability by discussing merging with other schools and also scoping out postgraduate Master's programme(s) with other schools
- ✓ There is no student counselling office for supporting the students in difficulties other than academic, i.e. psychological etc.
- ✓ There is lack of Wi-Fi access in the whole campus of the TEI
- ✓ For the paying students € 4.00 per meal is excessive
- ✓ We seek the Department to develop a proactive positive relationship with its stakeholders; council, associations, graduals, local community, businesses, where future developments and action planning benefit all and implementation is everybody's requirement

General Comments

- o Readiness and capability to change and improve needs to be the attitude of all staff in the Department, allowing them to do so because of state rules, political or other aspects must be removed to concentrate on a timely, sustainable, striving and dynamic higher education sector
- o The Departmental quality assurance needs to be set up in detail and how it is to

be implemented.

- The participation of students and their feed-back in staff evaluation need to be increased and the implementation of the questionnaire findings made transparent to students
- Action planning with budgets and milestones need to be looked at carefully and urgently. The sustainable future of the provision needs to be modelled by its staff, students and other stakeholders and not to be left to chance at a later stage.

The Members of the Committee

TEI OF THESSALY

DEPARTMENT OF ELECTRICAL ENGINEERING

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