ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ

Α.Δ.Ι.Π.

ΑΡΧΗ ΔΙΑΣΦΑΛΙΣΗΣ & ΠΙΣΤΟΠΟΙΗΣΗΣ ΤΗΣ ΠΟΙΟΤΗΤΑΣ

ΣΤΗΝ ΑΝΩΤΑΤΗ ΕΚΠΑΙΔΕΥΣΗ

HELLENIC REPUBLIC

H.Q.A.

HELLENIC QUALITY ASSURANCE AND ACCREDITATION AGENCY

EXTERNAL EVALUATION REPORT

Department of Natural Resources and Environment

Technological Educational Institute of Crete

European Union
European Social Fund

OPERATIONAL PROGRAMME
EDUCATION AND LIFELONG LEARNING
investing in knowledge society
MINISTRY OF EDUCATION, LIFELONG LEARNING AND RELIGIOUS AFFAIRS
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External Evaluation Committee

The Committee responsible for the External Evaluation of the Department of Natural Resources and Environment of the Technological Educational Institute of Crete consisted of the following five (5) expert evaluators drawn from the Registry constituted by the HQAA in accordance with Law 3374/2005:

1. Professor Spyridon N. Agathos (Coordinator)
   (Title) (Name and Surname)

   Catholic University of Louvain, Louvain-la-Neuve, Belgium
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2. Professor Soteris Kalogirou
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   Cyprus University of Technology, Lemessos, Cyprus
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3. Professor Menas Kafatos
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   Chapman University, Orange, California, U. S. A.
   (Institution of origin)

4. Professor Konstantinos C. Makris

   (Title) (Name and Surname)

   Cyprus University of Technology, Lemessos, Cyprus
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5. Dr. Alexis Stassinopoulos, Athens, Greece

   (Title) (Name and Surname)

   President of the Association of Manufacturers of Packaging and Materials (AMPM), Athens, Greece
   (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

- **Dates and brief account of the site visit.**
- **Whom did the Committee meet?**
- **List of Reports, documents, other data examined by the Committee.**
- **Groups of teaching and administrative staff and students interviewed**
- **Facilities visited by the External Evaluation Committee.**

The Department was visited by the External Evaluation Committee (EEC) on June 18 through 20 of 2012. Upon arrival at the site on Monday June 18, 2012 we were received by the Head of the Department of Natural Resources & Environment (DNRE) Professor Georgios Stavroulakis and met with the President of the TEI of Crete Professor Evangelos Kapetanakis, the Vice-President of the TEI Professor Costas Savvakis (Chair, Unit of Quality Assurance (MODIP)) and the members of the Internal Evaluation Committee (IEC), Associate Professor Eleutheria Katsivela, Professor Philippos Vallianatos and Associate Professor Pantelis Soupios. Also present was the Director of the West Branches of the TEI of Crete Professor Michael Tatarakis. Following short briefings by the TEI President, Vice-President and Director, a presentation of the DNRE was made by its Head focusing on the mission and special features of the Department.

The EEC members were provided with documents including the Internal Evaluation Report (IER) of 2008 and its updated version of May 2012, the study guide book of the Department, statistical data and various documents related to the operation of the Department. In addition paper versions were given of all presentations that followed. Finally, by the end of the day, the EEC visited the Department's laboratories in its newly constructed building and met with several laboratory members, at all ranks, including students. Most laboratories were equipped with modern and often highly specialized instruments. The EEC members were also provided with representative senior projects conducted under the auspices of the laboratories.

On Tuesday, June 19, the EEC attended brief presentations of the three sections of the DNRE (Renewable Energy Resources, Environmental Technology, and Water Resources and Geoenvironment). The Committee met with a group of around 25 undergraduate and postgraduate MS students and currently employed alumni of the Department, including one in possession of a Ph.D. degree, in the absence of faculty members. The students' backgrounds varied widely, thus assuring a broad representation in areas of focus as well as years of study. The administrative staff of the DNRE gave information about its setup and activities. Finally the EEC interviewed all permanent faculty members individually. The library facilities were also evaluated as well as the Liaison Office dealing with student and faculty mobility, industrial training and employment. A lunch provided on that day, allowed the EEC to evaluate the on-campus dining facilities available to

students and faculty.

The meetings with all stakeholders were extensive and in-depth, and proved very productive, providing useful information about the status and prospects of the DNRE.

On Wednesday, June 20, the EEC continued the individual interviews with the faculty members and had the opportunity to meet with 4 representatives of local public and private organizations that offer six-month internships for the compulsory practical training of the students, being potential future employers.

The Internal Evaluation Procedure

- **Appropriateness of sources and documentation used**
- **Quality and completeness of evidence reviewed and provided**
- **To what extent have the objectives of the internal evaluation process been met by the Department?**

The EEC recognizes that the time allotted to the visit of the Department was sufficient and points out the willingness of the staff and the students to fully cooperate and provide all information requested. The detailed materials provided were useful and complete which facilitated the work of the EEC and when questions were raised they were answered in a timely and appropriate manner. The objectives of the internal evaluation process were met by the department as evidenced by the presentations and documentation. The strengths and weaknesses of the department were identified in order to develop a plan to overcome problems and define the future goals and aspirations of the department. The EEC was told that this TEI was among the first that actively sought an external evaluation as a means of improving their operation and the relevance of their educational and research objectives. The EEC agrees that it is extremely important for educational institutions to be evaluated by external peers and applauds the willingness and initiative of the Department towards this goal.

A. Curriculum

APPROACH

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

The Department offers an undergraduate program whose basic aims are the study, the design, the development and the valorization of technologies which are currently being used for the appropriate and sustainable management of Natural Resources**.**

More specifically the graduates of the Department are expected to demonstrate an adequate training in the technologies addressing the management of Renewable Energy Resources, of Water Resources and of the Environment and to gain knowledge on the applications of the areas of focus of the Department. In this mission, the DNRE aspires to follow the international advances in the scientific and technological areas of this interdisciplinary field and to open new vistas for training its students.

The Department considers as its highest priority to prepare highly trained professionals in the above field, recognizing the interdisciplinarity and complexity of environmental resources and concerns. Because of this, the faculty members have stated the need to revise the undergraduate curriculum so that it may be compatible with corresponding programs in other European institutions but also in accordance with the already achieved goals of the Department. At the same time, the Department is looking forward to being able to adapt to dynamically evolving relevant technology fields, to be relevant to its students and all its stakeholders as it develops in the future.

- **How were the objectives decided? Which factors were taken into account? Were they set against appropriate standards? Did the unit consult other stakeholders?**
- **Is the curriculum consistent with the objectives of the Curriculum and the requirements of the society?**
- **How was the curriculum decided? Were all constituents of the Department, including students and other stakeholders, consulted?**

The present curriculum is essentially the one originally set up by the first core faculty members that established the Department. The only modification was implemented following the decision of the institutional bodies (General Assembly in 2011 and Scientific Committee of Educational Programs of TEI of Crete) to decrease the number of courses required for graduation from 51 down to 40. Thus, the courses eliminated include 7 electives and 4 English language courses. While the EEC accepts the need to not exceed a maximum of 40 courses for graduation, it recommends the development and offering of elective courses in pivotal areas such as biology-related subjects and the merging of courses overlapping in content or methodology. Moreover, the undergraduate degree (πτυχίο) should be awarded only after the demonstration of adequate knowledge of at least one foreign language. The duration of studies is eight semesters with the last semester being used for the completion of the compulsory six-month practical exercise and the submission of the diploma thesis. However, we note that practically no students complete her/his coursework in four years. We will examine some of the potential reasons below.

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

The DNRE is fully aware of the need for curriculum revision and it is currently contemplating the formal way to implement this revision given the recent major change in the Framework Law on Higher Education in Greece. In practice, the academic staff of the Department considers that the objectives of the Department are accomplished, especially with regard to the quality of the graduates and their job placement potential in the wider area of natural resource and environmental management despite the prolonged economic crisis, highlighting the importance of this field in the national and EU economy. This was confirmed by the unanimous recognition by four representatives of potential placement organizations of the appropriate and well-equipped preparation of the graduates and market adaptability of students by exposing them to meaningful internships in key organizations and entities all highly relevant to their future employment (environmental consulting companies, photovoltaic-based companies, regional water/wastewater authorities, renewable resources consulting, etc.). These include about 40 organizations such as municipalities (e.g. Municipality of Chania, Kissamos, Tripolis, etc), public utility companies (e.g. Athens Water Supply and Sewerage Company, Municipal Enterprise for Water and Sewage of Chania, Municipal Enterprise for Water and Sewage of Thiva, Piraeus Port Authority, etc), Ministries (e.g. Ministry of Environment, Energy & Climate Change, etc) and private sector enterprises (TERNA S.A., Edafomixaniki Kritis

Ltd, etc). Overall, the curriculum revision should be based on continuous collection of information on the needs of the market including demand for qualified engineering personnel as well as on scientific and technological developments in resource and environment management. This is imperative in view of the expected expansion of green technologies and sustainability demands in Greece and specifically in Crete in the coming years.

IMPLEMENTATION

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

The curriculum is not currently fully implemented in accordance with the goal objectives of the Department. In the opinion of the EEC, the curriculum should be better balanced between theoretical and practical training. This opinion was also expressed by the students and several faculty members as well. Nonetheless, the EEC considers that the goals of the curriculum are largely achieved as shown by the relatively high employment of graduates in relevant professional settings or via the pursuit of relevant graduate or Ph.D. studies, and the high respect that DNRE enjoys from other private and public organizations. Based on the updated IER, there is a need for the appointment of additional faculty members, laboratory assistants, technicians and even administrative staff. An increase of permanent teaching faculty members by 30% is recommended. These permanent members will replace the temporary lecturers employed each year to cover the teaching needs of the Department, thus resulting in a considerable reduction in operation costs. It was pointed out that many such temporary teaching faculty members who were in the past carrying a substantial load, were dismissed due to the current economic situation in Greece and lack of government funds, which resulted in the full-time faculty assuming an increased teaching load with no additional consideration or resources. As such, in view of this current situation of tight economy and subsequent hiring freeze, the, much needed to add, human resources could be partially covered by initiating a formal post-graduate curriculum leading to a Master's degree in renewable resources management. In this way, post-graduate students could contribute to the teaching of laboratory courses and offer opportunities for novel research hypotheses to be tested. The equipment of the computer lab is almost totally obsolete requiring the replacement of 20 PC's for the improvement of teaching and access to bibliographic and reference material from the electronic library depository.

The established system of admission to institutions of higher education in Greece does not reflect the actual needs of the individual educational institutions nor the specific needs of public and private organizations that would hire Greek graduates. As a result, the number of students admitted fluctuates tremendously from year to year, with either much higher or lower number of students being annually admitted, than the actual capacity of the institution. The EEC strongly believes that the admission of students from secondary education that lack basic preparation in core subjects of direct relevance to the DNRE's goals (e.g. chemistry, biology, physics and mathematics) constitutes a serious malfunction of the system, extends the duration of studies (beyond the expected 8 semesters of study) and increases the dropout rate with adverse economic consequences. The average time of study for DNRE students is currently about 6.6 years. The EEC realizes that the DNRE pays the price of the unsatisfying Lyceum level of secondary educational preparation and has to provide substantial additional training for the students, and innovative teaching means, going quite often beyond its mission and its primary teaching capacities.

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

The curriculum is in accordance with similar programs offered by higher educational institutions in Europe and elsewhere, but could afford being more sharply focussed to specific directions. The curriculum is offering 40 compulsory courses. Eleven (11) are of General Background, thirteen (13) are of Special Background, twelve (12) are courses of Specialization and four (4) of Management, Economics, Legislation and Humanities. The laboratory courses are of a 2-hour duration. The overall requirements for the degree amount to a total of 240 credit units (ECTS). The European dimension is reinforced through ERASMUS and LEONARDO program exchanges as well as bilateral exchanges with other universities such as the University of the Aegean and University College London (UCL). The EEC encourages the DNRE to seek meaningful exchanges and collaborations with institutions closer to the DNRE geographical region, such as the University of Crete in Heraklion, the Technological Education Institute of Crete in Heraklion, particularly the Departments of Mechanical Engineering and Civil Engineering, and the Technical University of Crete in Chania.

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

There is a good ratio between theoretical teaching and laboratory practice, despite the impression of some students that there is more theory than they would have liked. Nonetheless this is largely contradicted by the generally admitted very low attendance of the theory courses by most students. The practical training lasts 6 months, it is very well organized and coordinated between the Department and various organizations, and is offered in the last (8^{th}) semester provided that the student has successfully completed 2/3 of the course work including all courses of specialty. The EEC studied 5 randomly selected practical training works that were completed under the auspices of the laboratories (in the areas of pollution for the greater Chania region; GPS and remote sensing studies for geophysical and ground conditions; atmospheric motions; bioclimate housing; and airborne diseases) and found that the majority of them were of high caliber, sufficient length and depth of study, following high standards for projects beyond the undergraduate level, and with interesting results. The EEC further encourages high standards of such senior projects and potential publication in peer-reviewed journals when appropriate. Moreover, students should be encouraged to submit and present their works in regional, national and international meetings, whenever possible.

- **Is the curriculum coherent and functional?**
- **Is the material for each course appropriate and the time offered sufficient?**
- **Does the Department have the necessary resources and appropriately qualified and trained staff to implement the curriculum?**

The material is considered appropriate. However, as already noted, it is generally believed (academic and student body) that the Pan-Hellenic entrance examinations are not suitable for all institutions, resulting in the admission of students with no appropriate background in subjects directly related and required by the Department. The curriculum appears functional, as evidenced by the high degree of relevance among laboratory, practical training and theory, but it still requires a substantial revision to reflect the current needs and trends in the field

The academic staff is well qualified, all of them being either PhD holders, or in a minority of

cases currently pursuing their PhD studies. The permanent faculty members cannot cover all the teaching requirements including, notably, laboratory courses. Therefore, there is a need for external, part-time staff. This could be partially alleviated by transferring excess faculty members from other institutions and also by establishing formal post-graduate Master's programs. There is a definite lack of technicians, which obliges the faculty members to perform technical tasks, at the expense of their regular duties.

The infrastructure and equipment are more than adequate, while the newly acquired building provides a spacious and modern work environment. The Department has a modern auditorium and very good classroom facilities. The library serves the two departments of TEI Chania and is open from 9:00 to 19:00. It is equipped with teaching material (textbooks) relevant to the subjects of the Department which can be borrowed by the students and staff. Otherwise there is no updated material suitable for research work. This is expected, considering that two small departments cannot face the costs of an updated research library. The students have free access to electronic literature (through HEALLINK which includes several thousands of research journals, books etc.) and course material (e-classes). However they do not appear to use the premises. They prefer to access the electronic material from their personal or laboratory computers. The library staff (three persons) is friendly and efficient. SUGGESTION: The EEC suggests that the department should consider ways to save manpower by changing the scope and the mode of operation of the library and move more to electronic holdings. (For example it could be open only a few hours a day; enough for the students to borrow and return hard copy books, while they access e-material for most hours on their own).

RESULTS

- **How well is the implementation achieving the Department's predefined goals and objectives?**
- **If not, why is it so? How is this problem dealt with?**

Based on the Department's systematic and substantial statistics and our own perceptions from meetings with alumni and service / industry representatives regarding employment opportunities of the graduates, the implementation achieves the aims of the curriculum to a high degree. Even in the current economic situation, around 40% of the alumni are employed in sectors relevant to their studies, and 9% are pursuing post-graduate studies, i.e. approximately 50% are in a satisfactory situation from the perspective of training conditions; however, the other 50% or so (39% work in sectors outside their main training and 12% are unemployed), either work in jobs totally irrelevant to their training or are unemployed. The DNRE graduates face better than average Greek employability conditions, due to the relevance of the overall DNRE training to market needs, however, the EEC notes that even this improved situation is a serious long-term issue that faces graduates. The publication of notes and textbooks including some translations of established English-language textbooks by the educational staff and the well-implemented practical training contribute to the excellent professional acceptance of graduates by the natural resources and environment sectors. The average time to graduation is 6.6 years and the average grade at graduation is 6.7 (out of 10) with a decreasing trend. The proportion of stagnant students who are not advancing in their studies is high while students dropping out of school within 2N (8) years is 44% (according to data presented by the head of the Department). The low grade of the degree reflects mainly the inadequate science background of the incoming students and the poor performance in the entrance examinations (the current system of

admissions requires substantial pan-Hellenic changes). It is expected that the newly voted Framework Law will shorten this period and the EEC hopes, may address all related issues.

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

The Department is fully aware of the pros and cons of the curriculum and the systemic problems stemming from the current admissions policies prevalent in all Greece. It has already taken an active role in strengthening the Department's contribution as a major contributor to the economic development of the region. It is aware of the current trends in renewable energy and sustainable development in Crete. In order to achieve these goals the Department recognizes the need for continuous upgrading of human resources and infrastructure. The Department is aware of the need for further improvement in the curriculum and aspires to extend its undergraduate offering with a postgraduate program independently through the newly revised law. A major cause for the extension of studies or complete failure to graduate is the admission to the institution of students for whom this orientation was not their first choice. The Department considers as disadvantages causing administrative and educational problems the small number of permanent academic staff, the low number of technical staff, and the distance from Heraklion and the resultant dependence of administrative procedures from the TEI headquarters in that city. The number of students enrolling each year should be fixed, and should reflect the actual capacity of the Department.

IMPROVEMENT

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

The department has postponed the adaptation of the curriculum until the new Framework Law would become operational. The EEC encourages the DNRE to proceed with curriculum improvement independently of any such legislative changes. The curriculum should be in harmony with new developments in research and technological advances in the field of natural resource and environmental management and the department should continue to be receptive to the feedback of the industry.

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

The Department intends to implement plans that assure the development of the curriculum as stated above. This should proceed as soon as possible, as the current conditions discourage innovation among the capable staff. However, given the current economic situation in Greece, affecting all universities, the Department should pursue alternate strategies to assure on-time implementation.

B. Teaching

APPROACH

- **Does the Department have a defined pedagogic policy with regard to teaching**

approach and methodology?

Teaching methods used

The methods used for teaching include lectures, laboratory exercises and field trips for the application of theoretical knowledge. The teaching aids include powerpoint presentation as well as a dedicated e-class platform. Other methods of instruction include seminars and guest lectures for specialized topics. In addition to the seven teaching semesters, there is one semester of practical training in private or public enterprises (10 ECTS), and completion of a diploma thesis (20 ECTS). Attendance in lectures is very poor (around 17%) as a result of optional attendance. Although this is a pan-Hellenic problem, the EEC believes that the various institutions should seek to find ways to resolve this problem for the benefits of education the students receive, possibly by establishing a maximum percentage of absences in order to be able to take an examination. The student body, acknowledging the usefulness of attendance to the lectures, stated that they would seriously consider the matter in case that compulsory attendance was established as part of the course grade. Although elective courses were eliminated in 2011 to reduce the overall number of courses, the EEC strongly recommends the introduction of some electives even if this will require the merging of existing courses. Elective courses can often better address changing conditions in the market, in developing technology and relevant applications and as such should not be regarded as unnecessary commodities.

Teaching staff / student ratio

According to the IER the ratio of permanent academic staff to students is 1:42, which seems to be adequate. However, the established, according to Greek educational law, high teaching load, particularly at lower levels, is a significant impairment of long-term scientific and training productivity.

Teacher/student collaboration

According to the IER faculty members are available to provide advisory work to students during publicized office hours. Students are also welcome to meet with faculty before and after lectures or labs. The EEC found this to be accurate based on communication from the students. The students appear to be satisfied with their collaboration with the faculty who make themselves available for consultations outside scheduled times. The same was reported emphatically by the alumni of the department. The overall small size of both faculty and student bodies results in an informal, friendly, ease-of-access “family atmosphere”, without though compromising the high standards of research and applications in some laboratories and work supervised by the top researchers at DNRE. There are differences in the quality of research in different groups within the Department and efforts should be made for equal accessibility of all students to all faculty researchers to assure students have a variety of choices.

Adequacy of means and resources

The EEC found that the existing lecture rooms are very well equipped. All laboratories are equipped with modern and sometimes state-of-the-art instruments for the needs of instruction in addition to research. The facilities of the library and the pertinent literature are adequate for the needs of the students. The overall teaching facilities of the department are considered adequate, functional and of good quality, and completely cover the

educational needs of the students.

Books and other teaching material inspected appeared adequate. Teaching material is upgraded and updated quite often. The Department was successful in including in EVDOXOS a number of teaching aids (notes, textbooks, etc.) making available to the students optional and supplementary educational materials. Teaching aids are updated regularly with new scientific and technological knowledge.

Use of information technologies

Some lectures are presented using multimedia educational technologies, primarily powerpoint. In addition, access of materials using the internet (e-class platform) is established. Educational multimedia technologies are used in the laboratories, including video presentations. Efforts should be made in the future for continuous access to new and developing technologies to assure teaching effectiveness and access to state-of-the-art tools.

Examination system

The examination system is considered satisfactory. Exams are mainly written and an important portion of the material, especially in laboratory courses, is evaluated through individual written homework assignments and lab reports. Some of the exams are in electronic form. The type most frequently used is the essay type, although other forms, such as true/false and multiple-choice questions are also used.

Active~~ly~~ participation in lectures and particularly in lab sessions and field practice constitute an important part of the overall grade. All exams are proctored. It is required that the evaluation procedure and schedule are communicated to all students at the beginning of the course, and all students are evaluated in the same way.

In cases of learning disabilities special arrangements for examinations are made. Some of the examinations are conducted orally. The diploma thesis defence takes place in the presence of a three member committee, including the major advisor of the student.

The EEC finds this examination system with all its characteristics to be representative of an educational program of high calibre.

IMPLEMENTATION

- **Quality of teaching procedures**

The teaching methods utilized by the faculty are consistent with those used in other academic and technological institutions. Multimedia, board, intranet, lab- and field work are some of the means available for teaching. The EEC believes that faculty members utilize appropriately all means available for teaching. Instructional technologies are fully used by all faculty members.

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

The EEC believes that the teaching material is adequate. Books and other teaching materials may be considered adequate. Teaching material is upgraded and updated quite often. As noted above, the Department has included in EVDOXOS a number of teaching aids. The library is adequate and appropriate for the needs of students; however, more consistent and timely funding would increase modern access to electronic journals and other resources, even reducing the current costs of hard-bound material. The EEC comments favorably on the laboratory safety measures designed and followed by the Department's staff.

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

According to the IER, the content of each course is renewed every five years as approved by the general assembly of the department. The teaching process is periodically evaluated and improved in terms of technique, enrichment of content, and development of new teaching materials.

- **Linking of research with teaching**

Novel technology and relevant research findings are incorporated whenever course material is updated and/or upgraded by the faculty. Students are introduced to research results through bibliographic search during their thesis preparation. The involvement of students in applied or basic research is adequate but should continue to increase and the Department should recognize in concrete ways professors who are productive in research in order to encourage high standards and reputation. To this effect, the Department should apply standards accepted in research institutions, such as citation indices, publications in peer-reviewed journals, international reputation, invitations to international conferences, total number of peer-reviewed articles, etc. to recognize productive faculty and to give them the means to retain their competiveness. Unfortunately, often in Greek institutions of higher learning, lip service is paid to high standards without the commensurate resources and recognition that should be afforded to productive faculty. The Department should strive to continuously increase its own productivity and this can only be accomplished by recognizing productive faculty. Therefore, the EEC recommends that a greater involvement of students should be sought particularly in the high calibre research programs such as geophysical and atmospheric as well as pollution monitoring and control programs.

- **Mobility of academic staff and students**

Although ERASMUS provides for mobility of both students and teachers its utilization is limited. Students have expressed their willingness to participate provided that certain economic constraints are alleviated. On the other hand, although faculty recognizes the usefulness of the cooperative program, the small number of permanent academic staff prohibits their active involvement.
The EEC believes that the Department would benefit from stronger participation in mobility programs. The office responsible for ERASMUS (and practical training) keeps proper and updated records. However, what is missing is the active and continuous promotion to the students of the importance (to their education and their professional opportunities) of the programs which open windows to the real world. A problem related to educational and

professional mobility is that most of the students do not have a working knowledge of English (or of another international language). **SUGGESTION**: The EEC believes that a very important professional (and academic) resource for the Department's graduates is the knowledge of English. The Department should establish a language test which should be a prerequisite for graduation.

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

Students communicated their desire to the EEC for more practical training as compared to theory. Teachers' performance was evaluated by the students for the 2008-2009 academic year. A questionnaire distributed among students on a 1-5 scale (1 being poor, 5 very good), received a 17% participation of all students registered. The averages for the following four categories were as follows: was the material covered in line with the stated goals of the course? (3.9); were the goals of the course clear? (3.9); was the professor fulfilling his duties? (4.0); how do you evaluate the contribution of the laboratory assistants for better understanding of the course material? (3.9). The evaluation of the instruction is conducted for each course. In their self-evaluation, the participating students rated their attendance of theory courses at an average score of 3.8 and of laboratory courses at 4.8 (near the maximum of 5, as expected from lab courses whose attendance in compulsory). The EEC feels that this evaluation system can help to improve teaching approaches and promote the use of innovative and more efficient teaching techniques.

RESULTS

- **Efficacy of teaching**

The quality and effectiveness of teaching evaluated by the students during the last academic year 2011-2012 was rated as high (around 4) on a scale from 0 to 5. Another measure of the high effectiveness of teaching is the accomplishment of strong ties with the industry, and public organizations, which has been already mentioned before (around 40 placement organizations). As stated in the IER and verified in interviews with students, the communication and cooperation between students and faculty members are quite high. In this connection, the establishment of the concept of a Professor-Counselor (or Tutor) is encouraged, although there is ample scope for improved teaching effectiveness of this institution.

The teacher/student ratio for lectures is 42, which is considered satisfactory by the IER, whereas for the laboratory courses it is much better (2 instructors per 12 – 20 students depending on infrastructure and risk aspects of each lab course).

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

Discussions of the EEC with faculty members revealed that most of the students entering the institution are weak in basic science background in subjects such as physics and chemistry as well as mathematics. In fact, these subjects cause relatively high rates of failure early in studies. There is a strong belief in the Department, which is shared by the EEC, that these deficiencies result from the inherent limitations of the system of pan-Hellenic examinations. The Department as well as the EEC strongly suggest that subjects, such as physics,

mathematics and chemistry, should be included as requirements in the entrance examinations for environmental and geophysical studies.

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

According to the DNRE, the average time to graduation is 6.6 years and the average diploma grade (2008-2011) is 6.62. According to the DNRE the proportion of students who do not complete studies within 2N (8) years has increased from 12 to 21% from 2008 to 2011. In the opinion of the EEC the graduation rate and graduation grade, although mediocre, reflect procedures followed for entrance examinations and the, until recently, excessive number of courses required to be completed for graduation.

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

The efficacy of teaching is attributed to the excellent preparation and enthusiasm of the teaching faculty and high level of collaboration between students and faculty. The Department recognizes that the unsatisfactory trends of the time to graduate and obtain the diploma grade are common to other departments and are related to the drop of the minimum threshold of 10 for entrance to higher educational institutions, along with allowing students with poor background in science and mathematics to enter the Department's studies. The Department as well as the EEC strongly suggest that subjects, such as physics and chemistry, should be included in the entrance examinations for the relevant subjects. Another reason presented was the very low attendance in lectures sometimes reaching the level of complete lack of attendance by students. Moreover, the high number of stagnant students is also a reflection of the lack of prerequisites that is largely characteristic of higher education in Greece. The Departments also recognizes that the unavailability of institutional housing for the financially more deprived students forces some of them to work, thus resulting in longer periods of time for graduation.

IMPROVEMENT

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

According to the IER, the Department has proceeded to implement teaching evaluations by students on a permanent basis. Encouraging the students to attend consistently lectures and not only the compulsory laboratory courses would result in higher rates of student success, minimizing the average number of semesters required prior to graduation.

The Department recognizes the high number of courses required for graduation impacts negatively the time to graduation and has moved to decrease these courses from 51 down to 40.

Improvement is also sought through the continuous exposure of the student community to scientific and technological events.

The efforts resulting in more student mobility and professional placements shows that the Department is already moving strongly in the right direction.

Any efforts for improvement are also strongly associated with the availability of the appropriate number of incoming students based on the capacity of the Department for training. The IER points to a maximum number of 120 freshmen every year which in the opinion of the EEC appears to be realistic.

Strategic planning of the department will include the modernization of the educational process with support of innovative teaching and learning based on international standards. To this end, it is recommended that the Department keep up with innovations in teaching, perhaps assigning some faculty to the task to follow such improvements as they occur. Another initiative involves the possibility of adjusting the curriculum with new courses to match the needs of the profession more closely, based on information directly from the industry. The promotion of student mobility at the international level and increase of international collaborations will also contribute to the overall improvement of the department's performance. The department strongly desires the establishment of its own independent Master-awarding graduate program. The EEC strongly agrees with this goal and encourages the Department to seek innovative approaches, including initial collaborations with national and international universities, as a first step.

C. Research

APPROACH

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

The department follows the policy set by the TEI. Research objectives are defined primarily by research interests and specialization of the faculty members. The Department, although oriented towards education, it encourages and promotes applied research activities. We believe that good education and research should include the entire spectrum of research, from fundamental to applied research. The results in this area are more than satisfactory considering the overall high number of publications and citations despite the insufficient state funding for research in Greece. It should be pointed out though that the high number of publications is due to the productivity of a few faculty members.

The permanent faculty members have developed research initiatives in their respective fields focusing on the applied technological part of research, exploiting their own facilities and also cooperating with other institutions within Greece and beyond. The Committee believes that certain labs are very well equipped for research purposes. The number of research technicians is only two and this is one of the disadvantages for performing research activities.

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

There are no internal standards for assessing research presented in the IER. We believe such standards should be clearly defined. All research performed is funded by either national or international agencies indicating that the Department has adopted the standards of quality of research set forth by those agencies in order to be successful in supporting research projects.

It should be noted, however, that this is not enough: Productive faculty should be recognized and supported and not assumed that everyone performs at the same level.

IMPLEMENTATION

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

The EEC's understanding is that the research record of a faculty member is a decisive factor for tenure and promotion considerations. The Department promotes the organization of thematic conferences and seminars for the scientific community and the natural resources, environment and renewable energy sector often in collaboration with regional and national authorities. It also cooperates with a number of national and international universities and research centres. Research findings are utilized in teaching and in the training of students. Results from research have been successfully transferred to the natural resources and environment sector, especially in the geophysics, water and soil quality and renewable energy areas.

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

The level of research activity is more than satisfactory, given that the Department faculty as part of a TEI have high teaching and service workload. Inhibiting factors for the increase of research projects are the lack of their own postgraduate program, the limited number of permanent faculty, the lack of technical personnel and low state funding. The labs, with the exception of the computer lab, are very well equipped but in need of additional technical staff. It is worth noting that the Department has recently acquired a new building whose spaces meet the requirements of modern research laboratory facilities in addition to laboratory instruction. However, since there is no strict separation between research and teaching lab space research activities are subject to disruption during laboratory exercises. Overall the space is still somewhat restricted and in need of expansion. On the other hand most research equipment and instrumental facilities are modern and of high calibre (particularly for the Geophysics and Seismology and to a great extent for the Quality Control of Water and Soil Resources) thanks to the respective labs' involvement in competitive external research projects, which provide the major part of financial support.

- **Scientific publications**

During the last seven years (2007-2011) the active faculty (N=15) published 129 peer reviewed journal publications, 15 non-reviewed publications and 164 peer reviewed communications in national and international conferences and collected 1601 citations over the same period, as set out in the updated IER (Tables 15 and 16). Given the available research facilities and the amount of time devoted to teaching and administrative tasks, in addition to the mainly technological and educational character of the TEIs as opposed to the Universities, the publication levels of the faculty members are quite satisfactory (although, again, we note that relatively few members publish most of the publications).

- **Research projects**

The faculty members are actively involved in submitting proposals for obtaining competitive research projects and funds. During the last years (2008-2011), 14 active faculty members were involved in competitive research projects. From among them 60% were coordinators in

at least one project. The EEC was pleased to discover that although the DNRE represents only 5% (1 amongst 18 departments) within the TEI of Crete, it was able to win competitive funding in 14 Archimedes (I and II) projects, i.e. 25% of the 56 Archimedes projects financed at the TEI of Crete. In addition, 2 out of the TEI's 3 Thales projects (major multi-partner research consortia) were also won by the DNRE as were 3 Heraklitos projects for Ph.D. thesis support – all of them based on evaluation by international panels of experts. As pointed out in the IER (Table 17), in the period from 2005 to 2011 the Department had 19 participations as coordinator and 59 as partner in international competitive research projects, 47 and 72 for national projects. In the last year, several other projects have been submitted awaiting evaluation in national and international competitive program calls. Additionally, faculty members participated as partners of research teams in a number of projects in collaboration with other TEI and universities. We support and encourage higher numbers of submitted proposals to national and EU agencies given the widespread research budgetary cuts.

- **Research collaborations**

Studies have been conducted through collaborations with the regional government agencies, including a series of seminars and presentations focused on the development of renewable energy systems and the assurance and monitoring of water resource quality Research collaborations include national and international institutions, i.e. the Universities of Ioannina, the Aegean, Patras, Harokopion University, the Agricultural University of Athens, Democritus University of Thrace, as well as the Universities of Manchester, Glasgow, Portsmouth, Greenwich, Brunel, University College London and Goettingen.

RESULTS

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

The departmental research is primarily focused on solving problems of natural resources and environmental management in the region of Crete and Greece, but some laboratories have been successful in expanding the scope of their research to the entire Mediterranean region and beyond, and applying goals from fundamental to applied research. The internal evaluation report refers to the limited degree of participation of students in research and is dependent on the requirements of each research project. Nonetheless, the record shows also that the research objectives of all three sectors are advancing well, as evidenced by the metrics of papers published, research funding obtained and impact in the local and national economy.

- **Scientific publications**

Given the available research facilities and the amount of time devoted to teaching and administrative tasks, the publication levels of the faculty members are quite satisfactory. Specifically, while the number of peer reviewed journal publications of the most productive faculty members range from 10 to 33 over the period 2007 – 2011, i.e. 2 – 6 per year, the average productivity of the Department is close to 2 peer reviewed journal papers (or 5 peer reviewed publications in journals and proceedings) per faculty member and per year, which is quite good when the essentially technological orientation of the TEI is taken into account.

- **Research projects**

The faculty is actively involved in submitting proposals for obtaining competitive research projects and funds. As stated above with specific metrics, the level of successful involvement of the DNRE in national and international research projects far exceeds that of the other departments of the TEI of Crete, but it is also highly visible thanks to its presence in high-impact international efforts.

The EEC feels that based on the content of research, results have contributed to the regional and national competitiveness of the natural resources, environmental and energy sectors and for this it commends the Department and encourages its continued involvement on this path.

- **Research collaborations**

Research collaborations include national and international partnerships with scientists from a number of countries, as seen above. The EEC feels that the level of collaborations is adequate given the existing resources and overall situation but it could be further improved.

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

Research findings are utilized in teaching and in the training of students, as expected from the primary objective of the TEI, but they go much further, as evidenced by the faculty members' publications, national and international projects and, last but not least, involvement in regional development activities for Crete and beyond, such as environmental and renewable resource management.

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

The faculty members publish in specialized scientific journals, and their publications are well cited as mentioned above through the specific metrics. The fact that the Department collaborates in international research efforts, such as INTERREG projects, and that some faculty members are coordinators in research consortia, active as Guest Editors, etc. suggests that despite its young age, the Department is rewarded with visibility and solicitation of its research strengths. Finally, some truly pioneering research and know-how emanating from the Department, such as (a) the seismological and geodynamic assessment and prediction activities, (b) the environmental quality control of water, air and soil resources, (c) the renewable energy technologies for buildings, rooftops and greenhouses and (d) the 3D reconstruction of cultural monuments including the 'Myrtis project', are bound to help make the DNRE gain a privileged place internationally. (a) above is particularly visible internationally.

IMPROVEMENT

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

Despite the good level of its research, the Department would like to improve its research capabilities even further. A key issue is the lack of additional permanent teaching faculty and

of trained technicians. Furthermore, the department believes that the new Framework law on Higher Education will present opportunities to offer post-graduate degrees, resulting in the enhancement of its research potential. The EEC feels that the current relationship with the industry should be maintained and further enhanced, with more emphasis on real problems and emerging opportunities of the stakeholders. The EEC recommends the development of a clear research strategy and clear identification and definition of priorities. Going in many different directions will not suffice. We suggest to encourage and promote the already high achieving groups within the Department.

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

According to information presented to the EEC, the department will work towards developing an independent program of post-graduate studies, request an increase in the number of permanent faculty and specialized technical personnel, and improve opportunities of hiring of research faculty. The EEC feels that as long as the faculty evaluation is based partially on research productivity the implementation of a post-graduate program is needed. The primary duty of the faculty is to remain excellent in teaching using innovative techniques and to enhance research that is oriented towards problem-solving. The EEC believes that the Department recognizes the necessity of a more direct involvement of the renewable energy and resource management industry in solving real life problems and maintains a positive attitude towards this matter.

D. All Other Services

APPROACH

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

Regarding other services, such as administration, Information Technology, Library, Internship Placement, Liaison Office, ERASMUS Office and Technical Service support, the general consensus is that they are adequate. The secretarial staff is very competent and helpful. The collaboration between administration and faculty members is excellent, providing high level support to both academic staff and students. However, the Department notes the complications (delays in information dissemination, handling of various administrative and educational issues, and general decision-making) stemming from the dependence of its administration from the central TEI administration in Heraklion. It is not clear to the EEC that the geographical separation from similar departments in Heraklion (such as the Department of Civil Engineering) is sustainable. The Library, in addition to its primary function as a book lending service, provides online access to databases, e-books, and scientific journals. Its space is considered inadequate and the number of books below the desired level for the number of students served.

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

The secretariat has made significant progress in this direction and the use of TEI-online has provided streamlining for administrative procedures. Most procedures exist in electronic

form, including applications, certifications needed by students, submission of grades, etc. The Department's website is functioning well and the students are always aware of schedules (teaching, exams, etc.) and of all other procedures.

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

The student presence on campus is relatively low resulting, partly, from the lack of dormitory facilities. In view of the central TEI administration's decision (Heraklion) to stop the housing of students in hotels, the Department is pondering an institutional intervention that would empower the TEI-Branch in Chania to find an adequate solution to the problem of student housing.

IMPLEMENTATION

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

The Department's administration is well organized and supported by an effective and competent two-member secretarial staff.

- **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 library has a staff of three plus adequate resources in terms of subscriptions and book collections, but the latter should increase. Online access to journals exists but needs to be further enriched. Counseling services are available in theory thanks to the concept of the Professor-Counselor (tutor), which, however, should be applied more consistently in practice. Moreover the faculty is very engaged with all students, as it was found out by the EEC in its discussions with students. Students have free internet access in the library and the computer laboratory. However, there is a need to replace or upgrade the existing PC's that are obsolete. The existence of a free access at all hours in all labs related to Informatics gives the possibility to the students to use computer-based technologies.

RESULTS

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

Administrative services are adequate despite the shortness of space (co-existence of the DNRE secretariat with the secretariat of the Department of Electronics) and have a noteworthy cooperation with the Department. The secretarial staff although consisting of only two people handles all student and faculty issues efficiently. A higher autonomy, however, from the TEI's central administration in Heraklion would make planning and implementation much more efficient. Or, alternatively, explore what duplication of services exists between Chania and Heraklion, and streamline them. The Department's web site is functioning very well.

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

There is considerable concern regarding the shortcomings caused by the absence of student

housing on campus and the lack of a service for the support of working students. The Department is aware of the limitations in terms of services provided to the students and staff and does its best to resolve these problems. But this is in the long term a serious issue that needs to be addressed.

IMPROVEMENTS

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

The Department has recognized the areas in need of upgrading or improvement and is actively seeking ways to remedy the problems, as specified above.

- **Initiatives undertaken in this direction**

The Department is in contact with both the public and the private sector in developing a very successful service of internship placements for the students to carry out their obligatory 6-month practical training. In addition, the Department's laboratories are proactive in providing specialized services to all stakeholders.

Collaboration with social, cultural and production organizations

Please, comment on quality, originality and significance of the Department's initiatives

The collaboration with local and regional public and private bodies through a series of feasibility and practical implementation studies (often at cost and without profit), seminars and conferences have been instrumental in improving the environmental quality and the economy of the region in terms of renewable resource management. The Department has frequently organized international conferences, seminars, open days and workshops addressing several issues of topical importance such as renewable energy sources, geophysics and geoinformatics, environmental chemistry, pollution control technologies, environmental pollution prevention and habitat restoration, bioprocesses, water and soil resources, etc. In addition, several invited speakers have addressed significant issues of local and national importance. For instance, during its local visit in June 2012, the EEC had the pleasure of experiencing first-hand the organization by the Department of the 2012 Prize of Science, Letters and Arts that was awarded to the internationally acclaimed physicist and mathematician Professor Demetrios Christodoulou (ETH, Zurich).

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

- **Potential inhibiting factors at State, Institutional and Departmental level, and proposals on ways to overcome them.**

Inhibiting factors include the lack of a postgraduate program, the limited number of permanent faculty positions, the lack of technical personnel, and the limited state funding. Last but not least the admission of severely underqualified first-year students due to the existing provision of the State law on pan-Hellenic entrance examinations is a key handicap that is undermining the efforts of the Department's faculty to achieve excellence in education and technological research.

The Department has currently no dedicated technicians apt to support teaching and research activities. The two permanent technical staff members have a mechanical/electronics background and basically support the activities of the TEI - Branch of Chania. Therefore, it is essential that three (3) additional technical staff members (with an environmental sciences/chemistry background) are added to the Department's workforce.

The Department aspires to establish purely academic criteria in attracting high quality scientists and engineers as Faculty members that could serve both research activities and upgrade undergraduate and postgraduate studies. Among others, this will also enhance the capacity of the Department to successfully compete for research funding. In addition, it will promote the development of new knowledge, the establishment of innovative technologies for natural resource management and the environmental stewardship required in the region of Crete and the nation.

- **Short-, medium- and long-term goals**

Short- and medium-term goals include
- the continued modernization of educational processes and innovation (curriculum reform) with emphasis on renewable energy technologies and fields linked to environmental pollution and natural disasters;
- the introduction of prerequisites in the course of study;
- finding ways to solve the problem of class attendance;
- the concurrent attendance of both theory (lectures) and lab exercises in a chosen subject;
- the implementation of the concept of Professor-Counselor (tutor) that has not functioned adequately until now;
- the acquisition by the Library of scientific books, including textbooks, on an annual basis;
- the encouragement of student and faculty mobility through the ERASMUS schemes;

Additional short-term actions in research include the interdisciplinary cooperation amongst the Department's faculty members with focus on the needs and problems of the region of Crete and the Mediterranean, plus an effort to separate the research from the educational activities to the profit of both. A concerted pursuit of funding by all faculty members by submitting proposals at every call opportunity is also encouraged.

Another short- and medium-term goal includes the development and implementation of an autonomous post-graduate in the wider area of environmental and natural resource management.

A last but not least short- to medium-term goal, with which the EEC agrees, is a continuous effort on the part of the Department to update its graduates' professional rights that are currently blocked by the Technical Chamber of Greece.

- **Plan and actions for improvement by the Department/Academic Unit**

To above goals can only be attained if the vacant faculty positions are filled and new ones hired, technical personnel is appointed and state funding becomes available to complete the infrastructure of the campus.

- **Long-term actions proposed by the Department**

A key longer-term goal is to render the Department more attractive to potential students. A wide dissemination of the fruits of its research efforts and activities with increased visibility (symposia, invitation of prominent researchers and speakers, etc.) are bound to improve the academic image of the Department. This will also be achieved by continuing the applied research activities of high quality and international recognition (innovation and excellence) as seen in high-impact publications, and by stronger links with research organizations in Greece and abroad.

One of the most important long-term tasks is to maintain or even improve the already high employment rate (65%) of their graduates in natural resource management related professions.

The department proposes the following necessary actions to be taken: improvement of communication between all stakeholders and adjustment of entering student number (maximum 120) to match the capacity of the DNRE. Another long term objective is the adoption of a new national system of entrance examinations which will hopefully include the science (e.g. biology and chemistry) and mathematics subjects necessary for the appropriate training of natural resource management engineers.

F. Final Conclusions and recommendations of the EEC

Conclusions and recommendations of the EEC on:

- **the development of the Department to this date and its present situation, including explicit comments on good practices and weaknesses identified through the External Evaluation process and recommendations for improvement**
- **the Department's readiness and capability to change/improve**
- **the Department's quality assurance**

The statement below is a summary of the DNRE Vision provided to the EEC:

Vision of DNRE

"The Department's field is the rational management of natural resources and the protection of the environment through the application of interdisciplinary approaches and technologies.

The Vision of the Department is the training of high quality Engineers of Natural Resources and the Environment, able to cope with issues arising within any competitive international professional and / or academic sector.

This is accomplished by organizing a program of innovative interdisciplinary education and

research in Greece and in the wider international arena, with emphasis on the Mediterranean region."

We agree with the vision of DNRE and we recommend that Department faculty and administrators follow the vision and attempt to implement it in all practical decisions and workings.

DNRE functions at an excellent level producing well educated graduates with a very high percentage of employment (65%), despite the shortages in permanent faculty and technical staff. The collaborative nature of the work conducted and the positive attitude of all employees was obvious and it is instrumental for the success of the educational experience of the students. These conditions are ideal for the purposes of education and research in the general field of natural resources and the environment. A major asset of the Department is its remarkable cooperation with the local bodies. The EEC was happy to receive the uniform support and praise of the Department from stakeholders familiar with the DNRE's graduates (industry representatives, Government officials, etc.). The Committee strongly believes that the Department is capable of offering scientific and technological education of the highest level and of responding readily and positively to current and future needs of the environmental and natural resource management sector.

The main positive aspects identified are:

- the Department provides high quality teaching, extension services, research and training in an area of strategic economic importance for Greece
- in general, the staff, the equipment, the teaching methods, the communication between teachers and students, and the library services are at a very high level
- the lab facilities are considered as state of the art equipment that can be utilized for pioneering research and high quality services to the sector of environmental and natural resource management
- The interactions of the Department with the local and regional stakeholders is extremely high
- the evaluation of the students during the interview was very positive in all aspects
- faculty members are productive, with a significant number of them obtaining grants from competitive projects and a good output of publications and presentations from their research; their collaboration with national and international institutions are also commendable
- the students are motivated and engaged in their studies and the program in general
- the employment rate and absorption of the graduates in the production process are very high
- the EEC recognizes the practice of the Department to continuously adapt the curriculum in accordance with market needs and scientific and/or technological advances

The main weaknesses identified are:

- the excessive teaching load of the faculty members (10-16 hours according to their rank) which limits their productive time for research and technological applications
- the needed positions of permanent academic and technical staff
- the low qualifications of the admitted first-year students in science and mathematics. Moreover, admissions should be based on the capacity (maximum 120 students) of the Department and not on any other criteria

- non-compulsory attendance of lectures is a problem inherent in the regulations that apply to higher education in the country. The faculty and the students agree that lectures must be compulsory
- the low budget inhibits the good functioning of the department
- delays in the procedures of hiring and promoting on the part of the Ministry of Education
- the deficiency in the English version of the website negatively affects both the department's visibility and full utilization of their professional potential
- the lack of student housing
- low faculty and student mobility through international programs

The EEC <u>recommends</u>:

General recommendations:

A. to continue the remarkable association with all stakeholders (potential employers of graduates, such as public utilities, private enterprises, etc)
B. to ensure that staff and policy makers are fully aware, supportive and involved in the implementation of the strategic plan towards the diversification of the terms of reference of the Department (recognition of graduates' professional rights)
C. it is suggested that the issue of student admission be resolved at the state level taking into full consideration the views of Technological Education Institutions
D. to encourage collaboration of the Department with other relevant departments such as Civil Engineering or Mechanical Engineering of the TEI in Heraklion.

Curriculum related recommendations:

E. establish compulsory attendance to lectures
F. to maintain flexibility in the curriculum able to adjust to the needs of the sector
G. develop an independent postgraduate curriculum with a technological research orientation in the highly attractive areas of renewable energy technologies and fields linked to environmental pollution and natural disasters

Teaching related recommendations:

H. to regularly update the on-line course related information and course content
I. to improve online access to journals and acquire more scientific books and textbooks for students and faculty
J. to maintain and expand the use of the tele-conference capability that facilitates collaboration with research and academic staff as well as other stakeholders
K. to increase stakeholder participation in teaching (e.g. invited seminars by successful practitioners, former graduates, etc.)
L. to improve student and faculty mobility through national and international programs like ERASMUS
M. establish more practice-related diploma theses and offer the 6-month practical training internship earlier in the course (suggestions of the student body)

Research and service related recommendations:

N. to increase national and international research collaboration

O. to increase participation in international project funding, considering the limited access to the national funds

P. to make every effort to secure funding for infrastructure improvement through the ministry and the private sector

Q. orient research towards real-life problems be receptive to the feedback from natural resources and environment industry

R. Reward productive faculty with reduced teaching load, ability to travel and access to the best students

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