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HELLENIC REPUBLIC
H.Q.A.A.
HELLENIC QUALITY ASSURANCE AGENCY
FOR HIGHER EDUCATION

EXTERNAL EVALUATION REPORT

DEPARTMENT OF MATERIALS SCIENCE AND TECHNOLOGY

UNIVERSITY OF CRETE

April 14, 2011

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External Evaluation Committee

The Committee responsible for the External Evaluation of the **Department of Materials Science and Technology** of the **University 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 George Hadjipanayis (Coordinator)
   (Title) (Name and Surname)

   University of Delaware, USA
   (Institution of origin)

2. Professor Athanassios Giannis
   (Title) (Name and Surname)

   University of Leipzig, Germany
   (Institution of origin)

3. Professor Angelos M Efstathiou
   (Title) (Name and Surname)

   University of Cyprus, Cyprus
   (Institution of origin)

4. Professor Manos Mavrikakis
   (Title) (Name and Surname)

   University of Wisconsin-Madison, USA
   (Institution of origin)

5. Dr. Ilias Iliopoulos, Directeur de Recherche
   (Title) (Name and Surname)

   C.N.R.S.-E.S.P.C.I., 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

- Dates of the site visit

The visit was carried out from April 11, 2011 to April 13, 2011.

- Whom the Committee met

On **Monday April 11, 2011** a general presentation of the research, problems and future perspectives of the University of Crete (UoC), and of the Department of Materials Science & Technology (DMST) in particular took place. The rector of the UoC Prof. I. Pallikaris as well as the vice rector Prof. Papamatheakis outlined the department's contribution to the University, and emphasized the importance of the present evaluation. Members of the External Evaluation Committee (EEC) mentioned to the Rector the lack of adequate space for the DMST in both teaching and research, and pointed out that these limitations slow down the progress of the department considerably. EEC strongly recommended and encouraged the University administration to make every possible effort to resolve this important and essential issue. EEC expects that their recommendations should be taken seriously by the University administration in order to help the department reach its maximum potential. EEC also expressed the view that the Rector and the Senate of the University should make every possible effort towards the enforcement of their recommendations via the HQAA by the Greek government.

Furthermore, the EEC had the opportunity to meet with the OMEA group (internal evaluation committee) consisting of Prof. G. Kioseoglou, Prof. N. Pelekanos, and Prof. G. Fytas and discuss the findings of their internal evaluation.

Day 2- Tuesday, April 12, 2011
A general overview of the Department was given by the Chairman, Prof. D. Vlassopoulos, who spoke about the current research and teaching activities, infrastructure, facilities, and financial situation, including funding, scientific publications and collaborations. Subsequently, the curricula of the undergraduate, graduate, and PhD studies were presented by Professors Vlassopoulos, Pelekanos, and Kioseoglou. In addition, the research activities of the department in the areas of Biomaterials, Hard-Optoelectronics /Magnetics, Material Sciences, and Polymer/Colloids were presented by the respective group leaders. All the presentations were given to the members of the EEC in printed and electronic form. The EEC met with undergraduate and postgraduate students, as well as members of the administration, and technical staff. Finally, the EEC met separately with groups of Assistant and Associate professors.

Day 3 –Wednesday, April, 13, 2011

During the last day of the visit, the EEC had the opportunity to visit all the instructional laboratories which are located in Knossos and Voutes, as well as the computational laboratories.

During these visits EEC members conversed with the corresponding laboratory instructors and students. The EEC also met with the staff responsible for the University IT services. Afterwards, the EEC visited the research laboratories of microelectronics, hard materials, biomaterials, soft matter, and optoelectronics. Research activities in these areas were presented by the group leaders.

During the **last day** of the on-site visit, the EEC had meetings with both the Chairman of the department and the OMEA members. The coordinator of the EEC communicated to both of these groups the EEC's impressions and thoughts on the strong and weak points of the Department of Materials Science and Technology (DMST).

Summary: The Department of Materials Science and Technology managed to prepare a program that allowed meetings and discussions with ALL divisions of the DMST. Furthermore the EEC had the opportunity to speak to all laboratory instructors, to visit the instructional laboratories, as well as the research laboratories of ALL divisions. The EEC had meetings and discussions with representatives of students (undergraduate, masters and PhD students), and the administration and technical staff of DMST.

II. The Internal Evaluation Procedure

- *Appropriateness of sources and documentation used*

The documentation concerning the internal evaluation till 2008 was received by the members of the EEC prior to the site visit. Additional documents with detailed information concerning several research aspects and other activities (see above) were received during the visit.

- *Quality and completeness of evidence reviewed and provided*

The furnished internal report reflects the current situation (i.e., number of students up to 2008; the actual number and list of current Departmental staff) and clearly describes the structure, organization, and duration of the entire degree.

- *Extent to which the objectives of the internal evaluation process were met by the Department?*

Overall the Internal Report met the objectives of the Evaluation Process.

A. Curriculum

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

A1. Undergraduate Programme

APPROACH

- Goals and objectives of the Curriculum

The objective of the undergraduate program of the Department of Materials Science and Technology (DMST) is the study of the structure, chemical and physical properties of materials (e.g., polymers, metals, ceramics and nano-bio materials) using both theoretical and experimental methods.

- Plan for achieving excellence

The structure of the curriculum is similar to the one used successfully in other internationally recognized, excellent departments. The curriculum includes a broad range of courses including the very modern aspects of Material Science (e.g., nano/bio-materials). The undergraduate laboratory training is very comprehensive in both the introductory and advanced level. The material used in classroom and laboratories is updated regularly, and consequently the curriculum is kept current and successful. The ratio of theoretical to experimental courses is appropriate.

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

  The curriculum has been formulated after those of top-rated international programs. The curriculum has been revised three times since the program's inception in order to reflect the current-state-of-the art. This revision process was led by the Departmental Curriculum Committee.

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

The selection of the courses is in full agreement with the objectives of the curriculum. The curriculum includes an optional practical training course, and research dissertation addressing modern society needs. These provide the opportunity to young material scientists to interact with local industry.

IMPLEMENTATION

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

In recent years the number of students admitted in the DMST has been nearly doubled (62 in 2001 to 100 in 2009). The courses are taught by faculty who are experts in the field. The instructional labs are properly equipped with modern instrumentation. In spite of these facts, the students' attendance and the actual number of students taking examinations are very low. Therefore, the success rate is very low and below acceptable international levels. This may be the result of both the weak background of entering students which has been decreasing since the beginning of the program, and the fact that their future employment is insecure because their professional rights have not yet been established.
The EEC also realizes that this trend is a national rather than a local one.

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

The biggest problem of the department is the lack of a dedicated building. Currently, a good fraction of its faculty does not have space for offices. Furthermore, the instructional labs and offices are scattered in several buildings and campuses (nearly 12 km apart) which makes the functioning of undergraduate instruction very difficult. The undergraduate labs appear to be well equipped and are managed by exceptionally qualified technical staff. However, maintenance of the labs is a problem because of lack of adequate funding. The instructors, including both the regular faculty and non-tenure-track scientific personnel, have the qualifications and expertise for teaching the courses of the curriculum. The EEC notes, in particular, that the participation of non-tenure track faculty is very important and absolutely necessary for the successful implementation of the program's goal.

RESULTS

This is a relatively new department and thus, there is no long-term statistics on the employment of its graduates. The EEC found that nearly 30% of the admitted students graduate, and only 1-2 students finish in four years, with the rest of the students graduating between 5 to 8 years. A fraction of the graduates continue with post-graduate studies (e.g.,

one recent graduate is currently pursuing a PhD at Stanford University in the US), and very few go to industry.
After meeting with a number of student representatives, the EEC concluded that these low figures are again related to the fact that the admitted students are weak and they are not well motivated because they do not have professional rights established yet.

IMPROVEMENT

As noted earlier, the Department has been taking the necessary steps to upgrade and improve the curriculum. A significant progress has been already achieved, and the program in its current state is considered to be competitive. The addition of a course in multi-scale computational techniques into the curriculum should be commended. Below the EEC proposes several steps that are aimed to improve the undergraduate program.

Recommendations

1. The number of admitted students should be decreased to 50.
2. An effort should be made to improve the quality of admitted students by accepting students with the proper background. For example, it is totally unacceptable to allow entering students with no background in Chemistry or Mathematics or Physics.
3. A number of pre-requisite courses should be re-examined in order to shorten the time to degree.
4. Modern society needs demand the introduction of new courses related to "green" energy science and technology, disposal and recycling of materials.
5. The instructional labs should include experiments measuring the magnetic properties of matter.
6. The instructional labs should be often upgraded with modern instruments and all the instruments should be properly maintained. Funding should be provided for both activities.

A2. Postgraduate Curriculum

The objective of the program is the education and training of scientists in the field of science and technology of materials that include: magnetic, optoelectronic, polymers/colloids, nano-materials and bio-materials.

The postgraduate curriculum consists of the following three programs:

A) Master of Science (M.Sc.) degree of specialty (ΜΔΕ)
B) Ph.D degree
C) Inter-departmental M.Sc. and Ph.D degrees (Medical School, Physics, Mathematics)

The department usually has 15 graduate student positions available per year. The main problem in the graduate program is that it takes a long time for the students to develop the "concept of research specialization".

The structure of the curriculum includes a broad range of core and elective advanced courses with mandatory participation, required teaching assistance in undergraduate courses,

participation in seminars and colloquia, at least three publications in refereed international journals (for the PhD degree), and a written research dissertation in Greek. Several short courses are also taught by distinguished scientists who visit the department regularly and collaborate with the research groups of the department and ITE.

Both diplomas are driven by excellence in research. This is reflected in the impressive number of publications in international high-impact journals, including the very prestigious *Science* and *Nature*.

The Masters degree satisfies several needs of the Greek industry, which in many cases does not need the sophistication of a Ph.D. degree.

The PhD degree is usually more appropriate for the preparation of students in the academic and high technology industrial careers. The success of both programs is evidenced by the fact that a number of graduates continue as post-docs at top-rated places.

Current legal regulations make it difficult to hire foreign students to the graduate programs because of problems in recognizing their foreign degrees by the former DIKATSA. The department should be commended for its efforts to teach graduate courses in English.

Recommendations

1. An effort should be made to substantially increase the number of scholarships; currently only 50% of Ph.D. students are financially supported.
2. The department, with the help of the University, should make extra efforts to recruit better graduate students–via better advertisement, offering fellowships and other special incentives.
3. The department should require that all graduate students attend the departmental seminars/colloquia.
4. The stipend support should be nearly the same for all Ph.D. students.
5. The department should provide adequate office space for all Ph.D. students.
6. The department should continue supporting the participation of students in national and international conferences.
7. Efforts should be made to facilitate the enrollment of foreign students to the graduate programs.

B. Teaching

APPROACH/IMPLEMENTATION/RESULTS/IMPROVEMENTS

Evaluation of the teaching of the Department was based on the following information:

(a) The 2008-2009 program of studies, (b) the Internal Evaluation Report and presentation given by the Chairman, (c) the discussions with the coordinators of both undergraduate and postgraduate programs, (d) discussions with the representative students, and (e) lab visits while in session.

The teaching load of faculty is usually 1.5 courses per semester. Teaching assignments are initially made by the undergraduate program director and then discussed and approved by the general assembly of the department. Although the expected number of students attending lectures is between80 and 100, the actual number of students attending is between 10 and30. For the instructional labs the size is set up to only 20 students per session and the attendance is good. The low attendance level for the regular lecture courses is alarming and should be properly addressed.

The instructors provide the students with the course syllabus which also contains information about grading and the examination format. Teaching techniques used vary from blackboard to overhead projector and computer-aided presentations which EEC considers to be very appropriate. The instructors hold regular office hours where they meet frequently with students to assist them with any questions or problems they have related to the course material. Also, they communicate through electronic mail as needed. For a good number of courses, detailed information about the course is available on the departmental web site.

EEC feels that the Department has adopted the appropriate teaching material and teaching methodologies. However, there is a lack of office space especially for some of the lab instructors who greatly need it for their regular office hours.

The EEC noticed that a number of courses do not have homework assignments and mid-term exams. For the first time the faculty teaching performance (only in the undergraduate program) was recently evaluated by the students, where the participation of students was only about 15% of the students who usually attend the courses. The results of these evaluations were given to the EEC by the student representatives. The few preliminary data show a negative trend in the teaching performance for some faculty members which should be monitored by the department.

EEC acknowledges the great assistance of non-tenure-track instructors to the educational/teaching programs of the department. Furthermore, the presence of nearby located ITE Center greatly facilitates the teaching of advanced labs especially in the areas related to the research activities of the Center. In addition, EEC was pleased to realize that students have the opportunity to pursue their internship and research dissertation using facilities of research labs.

Recommendations

1. The EEC recommends that some of the basic courses that are offered in the first two years should be taught by the relevant departments (Chemistry, Physics and Mathematics). The committee acknowledges that this may be a general problem in Greek universities, but this situation is not optimal and should be addressed.
2. All the courses must have mid-term exams and homework assignments to enhance greater student involvement in the class and better learning throughout the semester.
3. The student evaluation of instructors should be continued and an effort should be made to increase students' participation in the evaluation process. The student evaluations should also be done for graduate courses. For the consistently negative evaluations, the department should take action to correct any relevant deficiencies. This can be done by monitoring the teaching of those instructors by some of the better instructors and providing them the assistance/advice needed to improve their teaching.

4. The department should develop some guidelines to assess the students' learning at the various stages of their academic program.
5. (**Only for graduate students**) An effort should be made to improve the Qualifying Exams. Our advice is that they should be focused on some of the more advanced undergraduate courses that are considered to be core courses for the department.
6. The department should monitor the future career of its graduates and keep an updated list of Alumni.

C. Research

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

APPROACH

Excellence in research, as established by international standards, is a clear goal that DMST has set for itself.
Defining aspects of this objective include the quality of the faculty and the original research publications produced.
Graduate students are trained and engaged in research at the level of excellence established by their research advisors.

The coexistence and strong interactions between DMST and ITE catalyze the pursuit of research excellence in several research areas which are the heart of DMST program.

IMPLEMENTATION

Research is primarily supported by external competitive grants sponsored mainly by the EU. Severe limitations of departmental funding do not allow for direct impact of research by the department. However, because faculty salaries come to the Department, one can argue that the Department supports research indirectly. Also, the quality of the recruited personnel is defining the prospects of success in research efforts.

Despite the lack of primary research space for the department, but thanks to very active interactions with ITE and other international collaborations of the existing faculty, access to first-rate research infrastructure has been secured until now. However, continued lack of space for the department is putting at risk this very positive trajectory and may impede the future development of the department.

Research output by DMST faculty is impressive: numerous publications in high impact journals (e.g.: Science, Nature, Nature Materials, PNAS, JACS, Angewandte Chemie, PRL, NanoLetters, etc), and the large number of citations reflecting the broad impact of DMST's research work, are among the key characteristics of DMST's accomplishments.

DMST covers a wide range of research areas, including: polymer and colloid science, materials chemistry, optoelectronics, magnetic materials, computational materials science, and biomaterials.

Active research collaborations, both internal and external, are enhancing the research output of DMST. Internal collaborations within U of Crete include those with the Medical School, the Departments of Chemistry, Physics, and Applied Math. High quality international

collaborations are numerous and cover various institutions, including: MIT, Stanford University, Northwestern University, U of Cyprus, Argonne National Laboratory, Max-Planck Society, Eindhoven University, Iowa State University, Karlsruhe Institute of Technology, Imperial College, ONRL, SUNY Buffalo, U of Ottawa, CEA in Saclay and Grenoble, ILL in Grenoble, ESPCI in Paris, CREOL in Florida, U of Edinburgh, Caltech, U of Dusseldorf, Cambridge University, University of Sheffield, U of Manchester, U of Warwick, U of Aachen, U of Nottingham, NIMS in Japan, U of Alberta in Canada, Pohang U in Korea, and U of North Carolina.

RESULTS

Given the lack of adequate space for DMST, and all other limitations discussed at various places in this report, we strongly believe that DMST research accomplishments are impressive by international standards. This reflects the research calibre and dedication of current faculty and non- tenure- track faculty members , consistently crossing the line of formal duty to meet their own internal high standards and research excellence.

DMST has consistently been producing high quality research publications, as evidenced by the prestige of the journals where research is published. A non-exhaustive list of journals where DMST faculty publishes their work includes: Nature, Science, Nature Materials, Nature Nanotechnology, Angewandte Chemie International edition, JACS, and PRL. The importance and impact of this published work is reflected in the number of citations gathered by these publications, which is indeed comparable to the very best one can find for first-rate departments at the global scale. Considering the limitations inherent to the Greek academic and research environment, this is a major accomplishment.

DMST faculty is engaged in a wide range of research activities typical of peer Materials Science departments in well-respected international institutions. Main themes in research projects span hard and soft matter, from polymer and colloid science, to materials chemistry, optoelectronics, magnetic materials, computational materials science, and biomaterials.

Detailed information on active research collaborations has been provided in the IMPLEMENTATION section of this report. Here, we simply reiterate that these international collaborations generate impactful research publications and presentations at international conferences of the highest quality.

DMST's main research mission is focused mainly on fundamental science, but there are examples of more applied research, which could lead to novel materials with a variety of applications, including but not limited to microelectronic and optoelectronic devices, and biomaterials. Interestingly, there is no significant patenting activity by DMST faculty so far, but this is not necessarily a singular exception, when compared against other well-respected international Materials Science programs.

The quality of research performed by DMST since its inception has led to broad name-recognition and respect for the Department. Major awards, including the 2005 Descartes Award by the European Committee and election to Fellow of the Max Planck Society, have been awarded to DMST faculty.
Furthermore, continued success with winning competitive research grants from the EU demonstrates how well-received is research at DMST.

IMPROVEMENTS

DMST has already achieved a high level of research quality, productivity, and visibility. Sustaining all these characteristics in the future, should be a primary goal for DMST.

Recommendations:

1. The Department has already established a reasonable number of clusters of research excellence, with a critical mass of faculty participating in each of those. These research areas should continue to remain strong. However, because of changes in global needs, some adjustments to DMST's research portfolio may be worth considering. For example, cultivating a new core of research activities in the area of "Green Energy" and "Recycling" technologies appear to be pertinent.
2. Faculty should actively explore possibilities for industrial collaborations beyond the borders of Greece, because the latter might be too limiting, given the research areas spanned by the department. These collaborations may expand the basis of funding flowing to the department and guide research to more immediately applicable research problems, which may result to more patents and bring more revenue to the Department. Accordingly, these industrial collaborations may also enhance the interest of prospective students for DMST and the overall morale of its current students. Industrial collaborations may also open the doors for students to seek future employment.
3. Establishing an industrial-liaison office at the University level might facilitate interactions with industry and enhance applied research even further.
4. Infrastructure supporting patenting activity by the faculty with all related legal and other services might protect intellectual property generated by research at the University.
5. Attracting foreign graduate students could further enhance the quality of DMST research program. Faculty already teach courses in English as needed, which is a requirement for bringing these students to the program, but there still exist significant administrative barriers (e.g.: recognition of degrees from foreign institutions) which need to be resolved at the level of Greek legislature, before this external recruiting efforts can materialize.
6. Increasing the number of merit-based fellowships available to the department could help to attract higher quality graduate students and increase further the already high research productivity of DMST.
7. The department should make extra efforts to assist the junior faculty members to succeed in their research by reducing their teaching load in the first year and helping them to develop the network for obtaining research funding.
8. The department chair should suggest/assign mentors to the junior faculty to ensure their future success and promotion.
9. The chairman and faculty should cultivate a friendly and professional environment within the department that will promote and enhance collaborations between the different research groups.
10. The existing synergy between the department and ITE/FORTH is mutually beneficial to both units and should be continued and enhanced.

D. All Other Services

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

RESULTS AND RECOMMENDATIONS

The provision of Departmental services supporting teaching and research activities is conditioned by the structure of the Department. For example, as mentioned previously, the Department is hosted in a number of different buildings. These services include Information Technology (IT) support, administrative support, laboratory technical support, teaching and research infrastructure. Some of them are provided centrally by the University and the ITE/FORTH, others depend on the volunteer contribution of temporary (non-tenure-track) staff and the extra time spent by the technical staff of the Department.

Office space for several junior academic staff and research personnel is absent. This is something that needs to be resolved urgently by the University authorities in close collaboration with the Department.

Secretarial support seems quite effective and adequate (4 persons) and recently modernized (student web registration, grading and electronic lecture notes distribution, purchasing of educational material). The Secretariat of the Department is open daily from 10:00-12:00. Amongst its responsibilities, the Secretariat handles problems related to student web registration, examinations, distribution of educational material and others. The committee noticed a team spirit that leads to the smooth operation of the administrative unit. The EEC notes that the Secretariat staff does not go through the necessary training for upgrading their skills and knowledge on recent tools development.

The technical staff (5 persons) that provide support for the undergraduate and research labs and any other IT support are well-trained to cover the needs of the Department. It should be mentioned here that some of them hold Ph.D's and they fill various Departmental needs which go beyond their line of duty. The EEC hopes that this excellent arrangement will continue in the future.

The Department is served by a small library characterized by functional challenges due to severe limitations in space and budget. There is an insufficient access to e-Journals and every now and then there is a large delay with accessing them (in some cases this is not even possible). This problem is not related to departmental actions but rather to those concerning the University of Crete.

The Department has set-up a committee responsible for the safety of laboratories and that of the Department's daily operation. This Committee has suggested rules to be obeyed based on international safety standards which were approved by the Department and are in effect. This effort should be strengthened and continued given the current situation in the Greek Universities.

Recommendations

1. The department should make plans to purchase large common instruments (shared facilities) for its faculty members, for the efficient and cost effective use of resources.

2. The university should secure a stable and continuous access to electronic journals for students and faculty.

Collaboration with social, cultural and production organizations

Collaboration with local industry is implemented via the optional student practical course included in the fourth year of the undergraduate curriculum and the utilisation of several faculty staff members due to their research expertise. Given the short period of operation of the Department, its most important contribution on the national level comes from attracting significant EU competitive funding.

Given its important scientific and technological expertise in areas related to the country's economic growth, the Department should develop the potential of creating strong social and cultural activities with various local and national organisations.

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.

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

The EEC identified several inhibiting factors at the **State level**. The committee believes that these problems are common to all Greek universities. These problems include:

a) the increased and / or high number of admitted students for undergraduate studies which is currently at the level of about 100 for DMST; b) the lack of funding and support from the ministry of education and from the General Secretariat of Research and Technology during 2007-2010; c) the lack of or insufficient number of fellowships and/or teaching assistantships for the students in the Masters and PhD programs.

The inhibiting factors at the **departmental/university level** are (a) the lack of transparent criteria for the promotion and tenure of faculty; (b) the promotion process is very slow; (c) the limited funding for the departmental operational expenses; (d) the lack of appropriate support for writing patents and securing intellectual property rights through them; (e) the absence of transparent criteria / metrics for the distribution of funds from the university administration to the departments.

Additional inhibiting factors at the departmental level are (i) the increased / high number of admitted undergraduate students; (ii) the lack of start-up packages for new hires; and (iii) the lack of recognition mechanisms (e.g., university and /or departmental awards) for outstanding performance in research and teaching.

The EEC is in agreement with the short-term, medium-term and long-term goals presented by DMST. ***Recommendations***

Specific suggestions to address the aforementioned problems are listed below:

1. Reduce urgently the number of admitted undergraduate students. For DMST, the number of admitted undergraduate students should be at most 50 per year.
2. Introduce transparent metrics, based on documented departmental excellence, for the distribution of funds at the institutional and state level.

3 Institute fellowships and teaching assistantships at the Masters and Doctoral levels.
4 The Department should formulate transparent and measurable guidelines for promotion and tenure based on excellence in both research and teaching.
5 The State must initiate and sustain regular cycles of funding mechanisms.
6 The State should introduce merit-based and excellence-based ranking systems for the universities (i.e., university wide) and the departments.

F. Final Conclusions and recommendations of the EEC

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

The DMST is a relatively new department that was established in 1999 and started accepting students in 2001. Initially the number of admitted students was around 50, but since then has been increasing steadily and currently is around 100.

The department has currently 16 faculty members, 4 Full Professors, 4 Associate Professors and 8 Assistant Professors. The department has approximately 25 graduate students (Ph.D and MSc).

The committee has been impressed by the strong performance of the department in both the educational and research programs despite its short history. What is also impressive is the large number of dynamic and promising young researchers, which is very important for the future of the Department.

EEC makes the following recommendations for the future development of the department. Some of these recommendations are departmental, whereas others are directed to University and State authorities.

Recommendations

Educational

1. The number of admitted students should be decreased to 50 per year.
2. An effort should be made to improve the quality of admitted students by accepting students with the proper background. For example, it is totally unacceptable to allow admitted students with no background in Chemistry or Mathematics or Physics.
3. Modern society needs demand the introduction of new courses related to "green" energy science and technology, disposal and recycling of materials.
4. The instructional labs should be upgraded with modern instruments often and all the instruments should be properly maintained.
5. The department, with the help of the University, should make extra efforts to recruit better graduate students (via better advertisement, offering fellowships and other special incentives).
6. Efforts should be made to facilitate the enrollment of foreign students to the graduate programs.

7. Some of the basic courses that are offered in the first two years should be taught by the relevant departments of the University (Chemistry, Physics and Mathematics).
8. The student evaluation of instructors should be continued and make the effort to increase the student participation in the evaluation process.
9. The department should develop some guidelines to assess the students learning at the various stages of their academic program.
10. The department should monitor the future career of their graduates and keep an updated list of Alumni.

Research

1. The Department should continue to support the existing research areas of strength. A new core of research activities in the areas of "Green Energy" and "Recycling" technologies should be supported because of current society needs.
2. Faculty should actively explore possibilities for industrial collaborations beyond the borders of Greece.
3. Supporting infrastructure patent activities by the faculty with all related legal and other services might protect intellectual property generated by research at the University.
4. Attract foreign graduate students who could further enhance the quality of the research program.
5. The department should make extra efforts to assist the junior faculty members to succeed in their research by reducing their teaching load in the first year and helping them to develop the network for obtaining research funding.
6. The department chair should suggest/assign a mentoring committee to the junior faculty to help them with their future success and promotion.
7. The existing synergy between the department and ITE/FORTH is mutually beneficial to both units and should be continued and enhanced.

Other Services

1. The department should make plans to purchase large common instruments (shared facilities) for its faculty members, for the efficient and cost effective use of resources.
2. The university should assure a stable and continuous access to electronic journals for students and faculty.

Strategic Planning

1. The State should introduce merit-based and excellence-based ranking systems for the universities (i.e., university wide) and the departments.
2. The State must initiate and sustain regular cycles of funding mechanisms.
3. The Department should formulate transparent and measurable guidelines for promotion and tenure of faculty based on excellence in both research and teaching.
4. Introduce transparent metrics, based on documented departmental excellence in research, for the distribution of funds at the institutional and state level.
5. The department/state should introduce fellowships and teaching assistantships at the Masters and Doctoral levels.

The Members of the Committee

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