



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ

HELLENIC REPUBLIC

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HELLENIC QUALITY ASSURANCE AGENCY

ΑΝΩΤΑΤΗΣ ΕΚΠΑΙΔΕΥΣΗΣ

FOR HIGHER EDUCATION

EXTERNAL EVALUATION REPORT

DEPARTMENT OF NAVAL ARCHITECTURE

TECHNOLOGICAL EDUCATIONAL INSTITUTION (TEI) OF ATHENS

December 2010

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External Evaluation Committee

The Committee responsible for the External Evaluation of the Department of Naval Architecture of the TEI of Athens consisted of the following five (5) expert evaluators drawn from the Registry constituted by the HQAA in accordance with Law 3374/2005 :

1. Professor Michael Bernitsas (President)

University of Michigan, USA

2. Professor Chryssostomos Chryssostomidis

Massachusetts Institute of Technology, USA

3. Dr. Dimitris Konovessis

University of Strathclyde, UK

4. Dr. Nikolaos Xiros

Virginia Polytechnic Institute and State University, USA

5. Dr. Elias Kariambas

Bureau Veritas, Greece

Preamble

The Department of Naval Architecture of TEI, Athens, Greece, has undergone a metamorphosis in the past eight years evolving from a 3-year program graduating technology professionals in the maritime field to a 4-year program, graduating professionals with stronger science base education, broader capabilities, and stronger prospects for growth within the industry.

Three important milestones are noted in the recent evolution of the Department:

- (a) 2002: Became a 4-year higher education institute and implemented the first curriculum review and revision.
- (b) 2007 to date: Undertaking a spree of hiring 8 more faculty with PhD degrees and ability to perform basic and applied research in the area of naval architecture and marine engineering.
- (c) 2008 to date: Developing and implementing the second curriculum review and revision, led by Prof. Belibassakis and assisted by the entire staff of the Department.

The Department has now reached a turning point in its growth and development and this evaluation process, both internal and external, is most timely and necessary.

We would like to commend the faculty of the Department and the TEI higher administration for initiating this lengthy and laborious process and for providing us, the external visiting committee, with all needed data with clarity, assistance, and collegial courtesy, which made our task pleasant. We hope that in return the product of our 5-day visit will be of use and helpful advice that can serve their aspirations for growth, achievement, and success in the 5-10 years to come.

We would also like to clarify that this process is an evaluation process and not an accreditation process. In that sense, it is broader as it evaluates all aspects of academic life of the Department and not simply those aspects supporting undergraduate education. On the other hand, it does not analyse in depth the educational program, as an accreditation process would do.

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

The External Evaluation Committee (EEC) visited the Department of Naval Architecture at TEI Athens during the period 29 November 2010 to 1 December 2010.

Following a briefing session held during the morning of 29 November 2010 by H.Q.A.A. on the Greek Academic Quality Assurance Review framework and procedures, the EEC visited the TEI Athens campus and had a short welcoming meeting with the President of the Institution, the Vice President (Academic Affairs), the Chair and staff of the Department of Naval Architecture. During the site visit, the EEC had lengthy discussions with the vast majority of departmental staff, as well as a representative number of graduates and students. The EEC also had an extensive tour of all Departmental teaching and laboratory facilities and the TEI Library and other support services. This report was drafted on 2 December 2010 and finalised on 3 December 2010.

The EEC met with the following people and in the following order: President of the TEI of Athens; Vice President (Academic Affairs); Chair and staff of the Department of Naval Architecture of TEI Athens; Academic staff responsible for the internal evaluation report; Division leaders and other members of academic staff; Laboratory assistants, administration personnel, library personnel, technical support staff; graduates and students (from different years of study).

The EEC was given access and consulted the following documents: the internal evaluation report (of September 2010) prepared according to H.Q.A.A. guidelines by the Department of Naval Architecture; the program of undergraduate studies, including courses syllabi and specifications and staff module reports; staff CVs; student teaching evaluation reports and their statistical analysis; textbooks and lecture notes used; samples of past exam papers, examination scripts and grades; samples of past final year project theses.

The EEC visited: all departmental facilities in general and research and teaching laboratories in particular, i.e. computer laboratories, naval architecture and mechanical drawings laboratory, CASD laboratory, welding laboratory, towing tank and naval architecture laboratory, manufacturing processes laboratory and marine engineering and system dynamics laboratory.

Finally EEC members were provided with complete and detailed information and documentation before the site visit and as requested during evaluation. The Department should be commended on their excellent preparation of this evaluation exercise. The committee would also like to congratulate the TEI administration, faculty, and students for containing the littering and damage caused by political parties to the physical property of TEI as well as the educational environment. The status of TEI-Athens in that respect is far superior to any Greek institutions of higher education visited by EEC members.

A. Curriculum

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

APPROACH

The Department is currently delivering an undergraduate (UG) program of study only.

The goals and objectives of the UG program curriculum are to facilitate the education and training of competent technologists in the area of naval architecture. These are achieved through the delivery of a UG program, generally characterised by coverage of a wide spectrum of skills and knowledge, both theoretical and applied.

The Department has undertaken two comprehensive curriculum reviews, both driven by the need for competent technologists capable of addressing current industry needs. The reviews were mainly based on the experience and knowledge of the academic staff, with some feedback from the industry, graduates and students. In this respect, the curriculum is broadly consistent with the objectives of the Department and pertinent society requirements.

There are limited indications of a comprehensive procedure for the revision of the curriculum. Minor changes to the various modules taught are proposed and implemented by the academic staff and hourly-paid instructors responsible, and reviews of each of the modules are proposed to be carried out every four years. However, it is recommended that a Board of Studies, an Industrial Advisory Panel and a Student-Staff Committee are introduced to provide the mechanisms necessary to facilitate comprehensive curriculum reviews. This should be an identified task in the strategic plan discussed in Section F.

IMPLEMENTATION

The UG programme of study is reasonable regarding breadth, depth and appropriateness, achieving a fine balance in combining the theoretical and applied aspects of training necessary. Students are undergoing compulsory internships of 6 months duration to complement their studies with industrial experience at positions in shipyards, technical/consulting offices, classification societies, shipping companies, flag administrations, etc. This is a well-established feature of the curriculum, however, there is an issue with the absence of supervision of student performance during their placements (to be carried out by academic staff), which has to be addressed.

In general, UG technological educational standards are met, through a consistent and functional manner, resulting in a rationally structured curriculum. Overall, the program of study provides an articulated educational means.

The members of academic staff are very competent and appropriately trained, offering high delivery quality. It is commendable that the Department has recently appointed (within the last 3 years) most of these academic staff, resulting in a considerable reduction of reliance to external short-term (hourly-paid) staff. The Department has a good set of educational laboratories and continuously expends efforts for their upgrades.

Textbooks and lecture notes used are appropriate for the intended educational scopes. The Department has recently introduced a policy for reviewing and comprehensively updating lecture notes at least every four years.

RESULTS

The current curriculum implementation supports Department's mission. The Committee has identified below some areas of potential improvement which can help in curriculum improvement.

IMPROVEMENT

- The program of study can be improved through the introduction of a number of new classes, where the Committee believes knowledge gaps currently exist. These include Mathematics (mainly in the area of differential equations) and Mechanics (mainly in the area of kinematics/dynamics) as well as advanced knowledge in the areas of seakeeping and maneuvering, energy / power systems and system dynamics.
- Similarly, practical (laboratory) modules can be introduced in a number of new/emerging technologies (such as non-destructive testing), as recommended in Section E.5.
- A team design exercise/project is recommended to be introduced to facilitate team-working experience on a design development subject. A minimum of three students constitutes a team.
- Directions of study (specialisations) may be considered to offer more focused studies, for example naval architecture and marine engineering.
- It is recommended that academic staff contact hours are reduced. A good measure in this direction, is the introduction from this academic year of a single (common) entry point for all first year students.
- Industry involvement in all subjects which can be reflected in the current curriculum design and development. This will allow contemporary/unique subjects to be taught addressing industry and society needs.
- For curriculum review purposes, it is suggested that the Department introduces a number of academic structures (Board of Studies, Student-Staff Committee, Industrial Board) which are proven to offer the proper review means.

The department is aware of these problems / needs and makes efforts for continuous improvement to this direction.

B. Teaching

APPROACH (Pedagogic policy and methodology, means and resources)

- Theoretical courses are taught through lectures. Although this seems to be done well, it might be a good idea to explore new teaching alternatives in parallel; for example they can consider a system where they combine pre-recorded lectures with discussion and deliberation sessions. In many of the courses due to overload, no or very few homework assignments are given. The Department must improve on that, by hiring tutors or teaching assistants.
- Lab courses are quite good and are currently one of the Department's strong selling points. The Department may want to consider virtual reality labs to maximize the benefit to the students in terms of accessibility and hands-on time.
- As far as means and resources are concerned, the Department is currently poorly manned for fulfilling its entire educational mission (approx. 1 faculty per 30 students presently). In effect people have to overwork and get over-assigned. Cutting down double offering of courses per year improves things; also cutting down in half the number of students admitted was a major improvement. However, eliminating double offerings will inflate classes to double size meaning that assigning homework will be even more prohibitive. In effect, teaching assistants should be hired to help with homework grading and other auxiliary teaching services. Also, if the Department starts some type of graduate program, these problems will only grow even bigger.
- A very important concern, which would be compounded by any new program introduced, is space and classrooms. The Department, at its present size, probably needs to increase its space by about 50-100%.
- Information technologies are introduced on fast track in all aspects of teaching: programming, computer-aided design, computer-assisted learning etc. However, there are still some important deficiencies that need to be fixed. The most important is a PC/workstation room for students to use.
- The exam system is based almost exclusively, especially for theoretical courses, on the use of a final and possibly a midterm. This approach is considered as outdated and quite restrictive. Weekly homework and projects should be introduced. The EEC acknowledges that this can be achieved only by hiring hourly-paid instructors.

IMPLEMENTATION (Quality and evaluation of teaching procedures, teaching material and resources, mobility)

- The quality of teaching procedures is continuously improving and expected to do so for the foreseeable future. However, there is quite significant spread between the teaching methods and expertise of various instructors. This requires coordination in order to improve educational continuity among classes.
- The quality and adequacy of teaching materials and resources is high and improving.

There is a very well organized library although a shortage in titles was identified. Inter-library loans can be considered to mitigate this shortage. A new pilot program (Eudoxus) has been introduced to distribute the free textbooks for the various classes; with this new program, which is expected to greatly improve things the student will receive their textbook early on in their mail and will be able to choose from a pool of many alternatives. However, a significant deficiency is the inadequate IT infrastructure and lab space for student use.

- The quality of the course material is not consistent in sense of depth and breadth, especially in theoretical courses. This means that there is an urgent need to coordinate between the faculty so that: a) more practical applications are added to courses where the material is advanced yet of no direct applicability and b) more analysis and insight is included in technical and professional courses. In effect, students can easily comprehend techniques and methodologies developed after their graduation.
- There is practically no linking of research with teaching. This is due to the fact that there is no graduate program and most of the faculty, especially the ones recently hired, maintain cutting edge research oftentimes fundamental in nature. In effect, significant effort needs to be dedicated to bring undergraduate teaching in contact with research to achieve mutually tangible benefits. Moreover, this needs to be done prior to the introduction of the graduate program so that it gets done expeditiously and effectively. It is also expected that the professional practice faculty bring to the table their experience and skill from industry where they still maintain valuable contact.
- Mobility of both academic staff and students is quite limited but some steps have been taken to improve this. It is recommended that the Department joins both ERASMUS and IAESTE to gain access to international exchange programs. Faculty should make use of sabbaticals and be encouraged to do so by getting involved in international collaborations and projects.
- Teaching evaluation procedures and questionnaires have only recently been introduced. The Department is urged to strongly consider the results of these questionnaires in its preparation for the future and in the decision making process (see Section E).

RESULTS

- Efficacy of teaching is good in the sense that students seem to recognize the efforts of faculty to teach the practices of their discipline and at the same time introduce them to the fundamentals.
- There are some discrepancies in the success/failure percentage between the various courses. Although some of it may be attributed to the divide between practical and theoretical courses there is certainly still discrepancy outstanding. In the committee's opinion this can be explained only because of the significant divide between those hired recently, that are PhD holders and with significant achievement

in leading-edge research in their respective areas of expertise, and those hired some time ago, when PhD was not even a formal requirement for the job. In the committee's opinion bridging this gap requires that professional faculty bring to the table a stronger mix of their valuable and sometimes irreplaceable professional expertise in order to improve the courses they teach. At the same time, the Department should make sure they are assigned to teach courses relevant to their background. On the other hand, recently hired faculty should focus on more applied research, aligned with the TEI mission, in order to make sure that it is of both interest and use by undergraduate technologists.

- There is significant spread in the time of graduation for students but not so much in their final degree grade. Although some of the spread in graduation time can be attributed to external factors, the large number of students with no direct interest in the Department's subject matter is probably the major cause. To mitigate this, which as noted by the committee affects largely the quality of teaching, a realistic and direct measure is to bring down the maximum allowed number of class hours taken by student per semester from 45 that is set at now to 35 or 30. This way, the time-to-graduation spread can be narrowed down and at the same time improve quality of teaching.
- The Department understands the reasons and causes of the afore-mentioned results to a satisfactory extent. However, more consensus in the measures needed to deal with challenges should be reached both by the Department and the institutional administration.

IMPROVEMENT

- Not a great deal of improvement methods and ways have been proposed by the Department. As the committee sees it, an integrated strategic plan to improve the classes included in the undergraduate program is needed, before any additional load is added.
- The faculty, both professional and academic, in the Department is very supportive and proud of their program. They are working hard toward improving their program and are over-enthusiastic to expand; and this despite the plans of some to move on to other positions in academia or in industry. However, it is the opinion of the committee that they should not be distracted by moving to new tracks of development, before they consolidate their undergraduate teaching, which is a strong selling point for them, their students in the job market and the institution they work for. (See Section E on Strategic Planning).

C. Research

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

APPROACH

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

At present the main objective of the Department of Naval Architecture is to promote the basic research of its faculty. Some excellent work has been accomplished and published in internationally recognized journals and other publications. The principal focus of this research as it currently exists is the coordination of their doctoral research completed in the National technical University of Athens (NTUA). Although this is desirable to continue to some degree, if it continues without any checks it will not serve the best interests of the Department, its student or the Nation.

We recommend that the faculty of the Department identify the objectives of their research with a broader scope. To assist we offer the table below as an example and we recommend that the Department either adopts what we proposed or develop something similar. The reader is also directed to section E for more details.

Faculty	Areas	Math Physics Chemistry	Fluids Thermo	Structural & Ship Design	Marine Eng/ng Control	Compu- tation	Mecha- tronics	Training Thesis	ETC
1	a								
2	a								
3	a								
...	a								
N	a								
1	b	xxxxxxx							
2	b	xxxxxxx							
3	b	xxxxxxx							
...	b	xxxxxxx							
N	b	xxxxxxx							
1	c								
2	c								
3	c								
...	c								
N	c								

a Effectiveness of Faculty research in educational mission

b Effectiveness of Faculty research in Faculty

c Effectiveness of Professional development of students

Table C-1 Research Effectiveness

The objective is that when the table is completed that all open cells must be covered with high marks and all valleys get eliminated as soon as possible. It is expected that not all educational areas will be covered with advanced research. In these instances we recommend that a plan for the relevant faculty keep up to date with the professional development either by attending a suitable number of professional meeting and by establishing a strong relationship with industry.

Has the department set internal standards for assessing research?

No. We recommend that such a process be developed. In the interim we recommend that the following be implemented. A mechanism of student input as to the effectiveness of research to their education and professional training should be developed. Care of accommodating the lower ranking student interests without sacrificing the interests of the good and excellent students. A board of interested constituents (recently graduated students and potential employers to evaluate the applied nature of the research and identify voids. They can also help evaluate the effectiveness of proposed new areas of research and suggest redirection of current research. The more traditional faculty research evaluation based on papers and peer review and/or industry impact, although partially in place should be clearly articulated and the concept of a faculty mentor be established.

IMPLEMENTATION

How does the Department promote and support Research?

The Department is to be commended for participating and being successful in a number of funding competitions. We recommend that it continues and increases its effort in this arena. We recommend to the State to develop Archimedes IV to allow the proper development of newly established departments such as Naval Architecture. We also recommend to the faculty of the Department to become proactive and offer its services to the State to help the decision makers better understand the needs of technical universities.

Quality and adequacy of Research infrastructure and support.

In general the research infrastructure for undergraduate education and research is adequate to good but it still has a lot of voids. We recommend to the State to expedite purchase of missing resources.

Post-graduate education does not exist today. When the time comes to develop such a capability the necessary infrastructure must be put in place. We caution however that care has to be taken not to duplicate capital resources (e.g. towing tank) that already exist in the Athens greater area. Current equipment for faculty researchers ranges from mostly adequate and in one instance to very good (computation).

Scientific Publication and Research Project

We strongly recommend that future publications and research projects are more TEI-centric to allow the development of the Department brand name and the recognition of its uniqueness and importance of its goals.

Research collaborations.

There is very strong collaborations with NTUA especially in the hydrodynamics area. Marine Engineering also has a good relationship with industry which should be encouraged to grow. We recommend however especially in the area of Hydrodynamics lesser dependence to NTUA and development of other collaborators to help establish the brand name of the Department and its independence of NTUA.

RESULTS

The mandate of the Department is to develop and teach applied knowledge. Therefore, the principal metric that has to be used to measure the results of the research is how effectively the research of the faculty trickles down into the classroom and laboratories and how up-to-date the faculty is. Some of the faculty research is already present in the classroom but the Department is still very young so time has to be given. The more basic research needed to keep at the forefront of their fields will be judged with the conventional techniques of peer review, publications, patents etc.

IMPROVEMENT*Improvements in research proposed by the department, if necessary*

The principal focus of the current faculty is the area of Hydrodynamics. This has to be broadened and other areas must be included.

Some independent work has to take place to promote the brand name of the Department.

Initiatives in this direction undertaken by the Department

Maximize interactions with industry for guidance of missing applied research areas.

D. All Other Services

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

APPROACH

The services needed for a smoothly running Institution, School and Department are available to some degree or other. We have tried to categorise them by who provides a particular service.

Central administration

Student records

Free or subsidized food

Library , gymnasium doctor's office parking (for both students and faculty)

School

Classroom

Laboratory

Budget

Office space regular faculty

Office space for visitors

Department

Laboratory equipment

Secretarial help

IMPLEMENTATION

The long-range goal is a completely electronic service. This is desirable because it reduces administrative cost and can accommodate a drastically varying number of students.

Funding is controlled centrally but assigned to a Departmental unit. This leads to inefficiencies because sometimes the wrong equipment is purchased and some necessary equipment are never purchased because are too expensive.

RESULTS

Free or subsidized meals are available for student body. Subsidized meals for the faculty are available. In this way the camaraderie among the students and faculty is increased and the loyalty to the institution is enhanced.

Current policy on funding allocations that does not allow the Department to set its own priorities for the equipment purchased.

IMPROVEMENTS

Electronic student registration should be complemented with some human interaction to allow early identification of medically critical cases

Increase naval architecture titles at the library. They are barely adequate and are missing basic books

Increase office space for faculty

Increase Lab equipment for educational purposes

Consider hiring of laboratory technicians

Allow commingling of budget to allow more effective expenditures at the Department level

Collaboration with social, cultural and production organizations

Successful efforts already made by the department for collaboration with other universities, institutes and societies.

Members of academic staff are active in the promotion of the department via presentations, publications and collaboration with various organizations. These efforts can be further enhanced in order to communicate / advertise to the society the quality work done and the high standards of engineers graduating from the Department. Student technical associations are strongly encouraged (for example, SNAME student association).

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.

Please, comment on the Department's:

- Potential inhibiting factors at State, Institutional and Departmental level, and proposals on ways to overcome them.
- Short-, medium- and long-term goals.
- Plan and actions for improvement by the Department/Academic Unit
- Long-term actions proposed by the Department.

The above issues are answered in Section E.4 at the end of our analysis on strategic planning.

E.1. INTRODUCTION

Presently, the Department does not have a strategic plan.

As stated in the Preamble, this evaluation report comes at the most appropriate time. The Department has undergone tremendous metamorphosis since 2007 under its new mandate of becoming an institution capable of performing applied research.

It is most urgent for the Department to establish a 5-year strategic plan, and use it to guide its further development. As a committee, we first reached a consensus on a plausible vision for this Department before we could write the remaining sections of this report. A vision is the apex of the strategic plan development process. We acknowledge of course that the Department's faculty are best qualified to set a vision and the vision of our committee may not be optimally suited for the Department. The Department may want to adopt, modify, or totally discard the committee's vision but it is urged to establish one at the earliest possible time.

E.2. URGENT NEED FOR STRATEGIC PLAN

On page 101 of the internal committee report, it is stated, that a strategic planning process is not presently mandated by law and accordingly a strategic plan is not in place. On the same page, items a-e are identified as the basis for an anticipated strategic plan. Drawing from our experience with strategic planning in our Universities we would like to make the following recommendations:

- (1) Be proactive, do not wait for the legislative branch of the government to establish a law to mandate a strategic plan. The Department and faculty need a strategic plan immediately to guide their actions regardless of whether the state requires it.
- (2) The Department has grown in a new direction since 2005. The new faculty have added tremendous knowledge and expertise to the new Department but it is heavily biased towards hydrodynamics. Careful planning is needed urgently for further growth.
- (3) Upcoming changes in the greater framework of higher Greek education as well as the ongoing national and international economic slow-down are expected not to generate any new resources for any Greek higher education institution any time soon. During this period of educational change and economic recovery the Department has time to develop and put in place a strategic plan to serve it when new national growth takes place. The

Department is urged to look at this period of hardship as an opportunity to plan and prepare for the next step in development.

E.3. DEVELOPMENT OF A STRATEGIC PLAN

This is not an easy process and requires professional assistance. Following are the committee's recommendations:

- (1) The fact that p. 101 states items a-e as the focal points of a strategic plan shows that the faculty of the Department are no more knowledgeable on strategic planning than any other faculty world wide. In the committee's opinion, items a-e on p. 101 are objectives which are near the bottom of a generic strategic planning process as depicted in Figure 1.
- (2) Seek as a Department and receive professional training on what is a strategic plan, how it is developed, what is its value and its life expectancy. Faculty all over the world are not aware of this process until they have received proper training.
- (3) Strategic planning is a three-stage process. First, collect appropriate data over a period of several months. Second, analyze the data and establish a vision statement as a faculty. Third, have a 2-3 day retreat of faculty away from home, work, e-mail, cell-phones, and other distractions and focusing of the strategic plan itself.
- (4) The benefits of a well-developed plan are numerous and the Department needs those urgently. Here is a short list:
 - The fast growth of the Department has resulted in hiring 9 new faculty most of them with PhD's in marine hydrodynamics. They are most capable of conducting research of international stature but very likely to take the Department in a single biased direction. This may not be compatible with a broader vision for the Department as well as the law-stated mission of being an applied technology school, capable of conducting supporting research.
 - There are other faculty that bring valuable knowledge and expertise to the table. The committee senses that the new law does not acknowledge adequately their valuable expertise. It is the responsibility of the Department to integrate into the growth and development of the Department every single faculty member. It is also the responsibility on every individual faculty member to evolve and adjust to new needs in support of the Department's mission.
 - The strategic planning process is as important than the product itself. In cases of extremely different expertise among faculty, the process is more important than the product. In the process of developing a common vision, faculty come to appreciate what their colleagues can offer, and they realize that it is in everybody's interest to have a vision inspiring to nearly all the faculty.
 - Keeping a vision alive over the years requires that all faculty be flexible, willing to make changes as the Department evolves, and be given opportunities and resources for retraining and education in modern technologies or research.



Figure 1. Generic strategic planning template

E.4. COMMITTEE'S RESPONSE TO THE FOUR QUESTIONS ASKED

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

It is stated in the internal report on page 101 that there is no law-mandated strategic planning process. That should not be considered an inhibiting factor. The Department needs a strategic plan urgently regardless of whether there is or not a law-supported process. When the Department makes requests to higher authorities for funding, they will look favourably at a well thought out plan - particularly if there is clear proof that progress is being made based on the strategic plan and the request for funding or equipment or hiring faculty is consistent with the plan.

Accordingly, the committee feels that lack of a law-mandated process is not an inhibiting factor. On the contrary, it should be looked as an opportunity to be proactive and be used as an example of successful strategic planning in a higher education institution in Greece.

- B. Short-, medium- and long-term goals

The internal evaluation report lists five bullets for immediate action in Section 10.1 and four bullets on mid-term action in Section 10.2. In general, these correspond to tasks in a strategic plan. Even though the committee cannot emphasize strongly enough the urgency of developing a strategic plan prior to further development, it also recognizes that there are immediate needs that the Department has, which are likely to be of high priority in a list of tasks coming out of a strategic plan.

Accordingly, the committee comments below on the tasks stated in Sections 10.1 and 10.2 in the internal evaluation report:

- (a) On books and education support: It is important and should be pursued immediately.
- (b) On hiring faculty: It should not be pursued until a strategic plan is in place or it is likely to further strengthen the area of hydrodynamics, and diminish the possibility of establishing a successful strategic plan.
- (c) On hiring supporting personnel: It is important and should be pursued immediately.
- (d) On laboratory upgrades: As urgent as it is, it should not be pursued until there is a strategic plan on what labs are needed in support of the Department's vision, and all needs are prioritised.
- (e) On a graduate program: The Department has the faculty and capability of establishing such a program and can proceed in that direction. The committee though, strongly recommends to do so after a strategic plan has been implemented or such a graduate program is likely to end up being a strong program in advanced hydrodynamics based on current faculty expertise.
- (f) On rooms, faculty offices, laboratories: There is an immediate need for space with highest priority given to individual faculty offices.
- (g) Laboratory equipment: The committee supports continuous investment in new equipment. A priority list though cannot be established until a strategic plan is in place.
- (h) Establishment of two laboratories in shipbuilding technology and marine engineering: The committee supports this task and again recommends establishing a priority list following a strategic plan.
- (i) On the graduate program: see item (e) above.

C. Plan and actions for improvement by the Department/Academic Unit

The internal evaluation report identifies two items in Section 10.3. The committee acknowledges the urgency of these two tasks as they support directly the current mission of the Department as mandated by law and stated at the bottom of page 16 of the internal evaluation report.

D. Long-term actions proposed by the Department.

Section 10.4 of the internal evaluation report lists four requests addressed to the Greek ministry of education. All four are extremely important. The committee comments follow:

- (a) On number of entrance positions: The faculty recommends a further reduction of entrance positions to 70% of its current number. The committee acknowledges the request but feels that it should not be granted until a strategic plan is in place and such need has been established. Presently, there are two sets of data that are being used interchangeably in discussions. First, the number of registered students and, second, the number of students actually attending class. The former is indeed a large number. The actual number of students though may not be supportive of the request for reduction of entrance positions to 70% of current level.
- (b) On faculty teaching load: The recent law which requires that faculty conduct research and meet international standards of publication requirements for promotion does not provide release time for such activity. This is deemed unfair by the committee and therefore we full-heartedly support this request. On the other hand, we still recommend

that when this request is presented to the Greek Ministry of Education it is accompanied by a strategic plan establishing the need and content of a graduate program.

- (c) On Department autonomy: This is a request that is in agreement with standard practice in Universities in the USA and the UK based on the committee's experience. It is supported by our committee but we also acknowledge that the decision lies partly with the TEI administration and partly with the Ministry of Education.
- (d) On professional rights definition: It is surprising to the committee that this is still a pending issue. It is very difficult for the Department – and as a matter of fact for the entire TEI – to function and attract students and faculty when there is no clear and contemporary definition of the legal rights and responsibilities of the professionals graduating from TEI. The committee believes that the TEI highest administration puts a proposal together and pursues this case persistently with the Ministry of Education until such a law is established.

E.5. COMMITTEE'S SUGGESTIONS FOR STRATEGIC PLANNING

The committee acknowledges that the faculty of the Department are best qualified to establish a strategic plan for the Department. Nevertheless, based on our experience in developing strategic plans in our universities, and having observed the impact of such plans, we would like to offer some suggestions that the faculty may find useful.

- (a) The mission of the Department as stated at the bottom of page 16 is established by law and should not be questioned at the present time.
- (b) The vision of the Department must be established ASAP. Here is the committee's suggestion:

“The Department of Naval Architecture of TEI Athens will be a leader among higher education institutions in the European Union in:

- education of professional engineers capable of applying the latest technology in support of the marine industry
- applied research aiming at transferring and adapting the latest technology to better design, building, operation, and maintenance of ships”

- (c) In interpretation of the proposed vision statement we would like to offer the following thoughts. The Department has changed its course since 2005. It needs to establish urgently its niche of excellence and be recognized for that nationally and internationally. Examples of areas in which the Department can excel and be recognised as unique, follow:

- Applied forensic engineering: Finding the cause of marine accidents such as collision, structural failure, loss of propeller, loss of rudder, loss of control, capsizing, etc. Professor Livanos is working on a case involving the loss of a rudder. Such projects involve broad range of expertise, require collaboration of several faculty, can attract funding from the marine industry, can use student resources, and laboratory equipment.
- On board detection of micro-cracks with non-destructive testing and potential for crack development and propagation.
- Introducing sensor technology in engine and hull monitoring and maintenance.
- Introducing new technologies in pollution reduction.

- Introducing new technologies in prevention of invasive species through ballasting.
- Introducing new technologies in marine electronics, shipboard electromechanics and mechatronics.

It is our understanding that there are no higher education institutions that train professionals in applying such technologies.

- (d) The aim of items (b), (c) above is to establish the uniqueness of the Department nationally and possibly internationally. That will require flexibility of behalf of all faculty and will help establish an expanded market for its graduates.
- (e) It is understood that it is hard for people with long established careers and education to adjust to the rapid changes in technology and engineering but we would like to offer the following scenario for thought. Most of the new faculty have expertise in marine hydrodynamics and will perform research as required by the new law in collaboration with other universities. Without a strategic plan, there is a substantial risk that the Department asymptotically will do world-class research in marine hydrodynamics which in turn will have an impact on education leading to duplication of the function presently performed by the National Technical University of Athens. In a downward market in a sluggish economy, which is expected to have a recession impact on the marine industry, the demand for engineering professionals will likely go down. In case of lack of funds, the Ministry of Education and the Ministry of Maritime Affairs will reduce funding to the field of education including Naval Architecture and Marine Engineering. Who will be subjected to more budget cutting TEI or NTUA? If TEI has established its uniqueness and niche of excellence it will have a fair chance of being the winner.

F. Final Conclusions and recommendations of the EEC

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

In each of sections A-E of this report, EEC has made several recommendations that need not be repeated here. A brief summary of some important points is provided below.

- A. 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.

Good practices

- The Naval Architecture Department of TEI-Athens has made tremendous progress in the past 5 years to the point of metamorphosis. It is presently a 4-year professional school with substantial emphasis on science and engineering principles on top of engineering practice.
- The faculty and TEI administration are to be commended for this success. It has resulted in upgrade of the Department so that its graduates are highly sought by the marine industry.
- Recently hired faculty with PhD's perform high-calibre research publishable in international journals of good impact index.
- Professors hired prior to the PhD requirement mandated by law bring very valuable practical knowledge and expertise to the Department and bring the qualifying factor that distinguishes the Department from NTUA.
- All faculty work very hard to support the very high teaching load and the research requirement for promotion and tenure.
- Faculty and staff are to be commended for the high quality and completeness of the internal committee report as well as a flawlessly organized visit by EEC. The transparency, cooperation, and collegiality offered made the EEC's job productive and rewarding.

Weaknesses

- The recent Department growth has resulted in hiring faculty with PhD's primarily in the area of marine hydrodynamics. They are required by law to perform publishable research for their professional development and academic promotion. If they continue on the path they have trailed there is a substantial risk to become in time a highly qualified and recognized group of researchers in hydrodynamics. That will not serve the Department or TEI well. They are highly qualified and capable individuals and can adopt their areas of focus for the good of the Department.
- The Department must highest priority to develop a strategic plan.
- The Department – within its strategic plan – must establish a vision with a niche of excellence, which will differentiate it from other higher education institutes in Greece and the European Union.
- Presently, the benefits of research do not trickle down to the undergraduate education. Faculty perform research at the PhD level in collaboration with Universities without utilizing the Department's resources – facilities and students. In a well thought-out strategic plan they will have to develop a line of applied research

that can utilize those resources.

B. The Department's readiness and capability to change/improve

- The Department is ready, capable, and eager to make the next step in growth and improvement.
- The EEC cannot emphasize enough the Department's need for establishing a vision and a 5-year plan prior to taking any further steps.

C. The Department's quality assurance

- The Department has done an outstanding job in collecting and analyzing data relevant to teaching and research quality and quantity. EEC strongly encourages the Department to use these data in the process of improving the educational and research programs.
- The TEI Athens and the Department should enhance their efforts to raise their entrance standards to attract even more competitive students. EEC strongly encourages any effort expended to this direction, including maintaining high standards in teaching, grading and assessment of their undergraduate students.

The Members of the Committee

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