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ΣΤΗΝ ΑΝΩΤΑΤΗ ΕΚΠΑΙΔΕΥΣΗ

HELLENIC REPUBLIC

H .Q .A .

HELLENIC QUALITY ASSURANCE AND
ACCREDITATION AGENCY

EXTERNAL EVALUATION REPORT

Department of Geomatics & Surveying
(Τμήμα Γεωπληροφορικής και Τοπογραφίας)

TEI Serres
(ΤΕΙ Σερρών)

September 2012

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External Evaluation Committee

The Committee responsible for the External Evaluation of the Department of Geomatics and Surveying of the Technological Educational Institution (TEI) of Serres consisted of the following three (3) expert evaluators drawn from the Registry constituted by the HQA in accordance with Law 3374/2005 :

1. Prof. Dr. Peggy Agouris (Chairperson)

George Mason University, Washington DC, USA

2. Prof. Dr. Costas Armenakis

York University, Toronto, Canada

3. Prof. Dr. Michael Sideris

University of Calgary, Alberta, Canada

Introduction

I. The External Evaluation Procedure

The committee performed an on-site visit to the Department of Geomatics and Surveying at the Technological Educational Institute (TEI) of Serres from June 25 to June 27, 2012.

The committee members met with an extensive number of members of the Department and the institution. More specifically, the committee met with:

- the Department Head,
- permanent faculty members,
- several temporary instructors,
- current students,
- graduates of the program,
- administrative staff,
- laboratory staff,
- local employers,

as well as:

- the president of the TEI,
- the vice-president for academic affairs and personnel, and
- members of the Quality Assurance Unit of the TEI.

The committee received and was given access to a high volume of hard-copy and electronic materials to study and evaluate, including (but not limited to) course material, course exams, theses, evaluations, internal reports, future plans, instructor rankings, scientific publications, academic calendar, brochures, forms, their “e-Learning” management system, and much more.

The committee also visited all relevant departmental and institutional facilities, including classrooms, offices, laboratories, auditoriums, computer clusters, the central library and the secretariat.

II. The Internal Evaluation Procedure

The committee was provided three internal evaluation reports by the Department of Geomatics and Surveying; the latest one, dated May 2012, was conducted for the period 03/2010-09/2011. This latest internal evaluation report is an extensive, nicely documented, and well-written document, containing a wealth of useful information and data about the Department.

The report relied on a variety of sources and statistics, which covered courses, students, and

instructors. It is the perception of the committee that the Department used all possible sources of information that they could identify and that were available to them. Consequently, the report appears to be comprehensive and of high potential value for the Department, as well as for the institution of TEI Serres.

In general, the report provided valuable information regarding most major issues faced and addressed by similar academic departments. In that sense, the report responded to the requirements of the internal evaluation process. It also included some critical conclusions that were analyzed to a certain degree and discussed, obviously in an effort to respond to the general objectives of the evaluation process. Overall, the only major criticism that can be made of the report is that it mainly discussed issues that are State- or (possibly) institution-dependent and thus beyond the Department's control (an understandable reaction), but lacks in identifying issues that the Department could improve and correct through its own means and decisive actions.

A. Curriculum

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

APPROACH

Undergraduate program

The objective of the curriculum is to cover the areas of geomatics and surveying, aiming to produce specialized graduates who will work on mapping, organization, analysis and management of geospatial information and have the skills to handle the relevant technologies. Specifically, the curriculum aims to use information technologies for:

- a) the production and revision of mapping infrastructure using surveying, photogrammetric and remote sensing methods to support transportation, hydraulic, urban and spatial planning, cadastre and rural development;
- b) the management and utilization of spatial information and the production of thematic maps using Geographic Information Systems (GIS) technology for studies such as cadastral surveying and land registration, geology, land use, urban planning, environmental impacts, regional and agricultural development, geology, use and management of natural resources, and forecast and management of natural disasters.

The curriculum is delivered in 8 semesters, where the 8th semester is used for the practicum and the thesis. The curriculum consists of 42 courses of which 36 are core courses and 6 are electives in pairs. The courses are divided in two categories: theoretical and laboratory courses. Thus, for a student to graduate he/she needs to take 36 core and 3 elective courses for a total of 39 courses. The 42 courses consist of 9 general infrastructure courses, 14 specialized infrastructure courses, 12 specialization courses and 7 general courses in the areas of administration, economics, law and humanities. There are 5 prerequisite courses, mainly first year courses such as mathematics, statistics and informatics and the series courses (e.g., Photogrammetry I is a prerequisite for Photogrammetry II).

The courses are delivered through classrooms (total of 4, one of them is an auditorium) and laboratory classrooms (7 classrooms equipped with 20-25 computer units and one for surveying and GPS equipment). The library provides electronic access to various and important resources in the field of geomatics and surveying through the higher education national library network that offers access to bibliographic databases, e-journals, e-books and research activities.

The campus-wide “Moodle” e-learning management system, accessible via the Internet, is used to support teaching by posting course lectures and notes, exercises, and practical examples. For course registration and administration, the “e-gram” campus-wide system is used by both the students and the department. Textbooks are distributed freely to the students using the Eudoxus system.

There are 9 permanent and 16 part-time contract-based faculty members. The number of student registered within the normal duration of the program is 1235. Fifty seven (57) students graduated in the last academic year 2010-2011.

Graduate program

The department has a joint graduate program (MSc) on “Prevention and Management of

Natural Disasters" with the Department of Geology and Geoenvironment, National and Kapodistrian University of Athens. This is a two-year program where courses are taught in the first two semesters and a diploma thesis is completed during the last two semesters. In 2011-2012 there were 14 students registered in the program, with one graduating student from the Department of Geomatics and Surveying.

The objectives and contents of the curriculum were based on the relevant legislation, and the curriculum was developed by a working group formed for this purpose. It was based on the objectives and aims of the program. The curriculum covers the generally accepted knowledge fields for the discipline of geomatics and surveying. For the revision of the curriculum there is a three-member committee, which proposes changes to the departmental council of the department consisting of both faculty members and student representatives. The faculty members are in contact with the various stakeholders such as local municipal authorities and industry and thus aware of their needs and requirements in the field of geomatics and surveying.

IMPLEMENTATION

The curriculum is effectively implemented and delivered in a single stream course mode for the area of geomatics and surveying. It is rational and clearly articulated. While the existing courses cover the general field of geomatics and surveying, there are several factors which play important role in the curriculum for both the courses and their contents. These include the professional rights of the graduates, the funding of the program and the employment areas of the graduates. While the department does not have any control of the first two, certain consideration has to be given to the latter, which also relates to the possible introduction of specialization streams. The graduates can find work in the traditional areas of surveying and geomatics, namely surveying, mapping, cadastre, urban and regional planning, road and highway design, transportation and hydraulics. However, consideration should also be given to the many other areas of geomatics applications, such as mobile mapping and wireless communications, business, real estate, marine and coastal zone sciences, natural resources, archaeology, precise agriculture, transportation, forest and land cover/use, water resources, wild life, indoor mapping, lidar mapping, 3D reconstruction and visualization, environmental studies and climate change, clean air in the cities, sustainable development, emergency management and response, internet-based mapping, spatial statistics, as well as the development of geomatics technologies and applications, like for instance through the integration of GIS with photogrammetry, remote sensing, GNSS and spatial decision support systems. This will create an attractive niche area for the Department with respect to the graduates from the two university five-year engineering programs and the sister program of Surveying at the TEI Athens.

The small number of permanent faculty members and the large number of students, many of whom are admitted into the program with low grades and often come from non-technical backgrounds, in combination with the current low to zero funding resources and the large number of contract faculty members has led to significant implications for the delivery of the curriculum. For example, the number of contract faculty members has been recently reduced significantly, classes and particularly laboratories have been combined, and many faculty members have an extraordinarily high teaching load. There is a deficit of 223 teaching hours. Obviously, this has a serious negative impact on the delivery of the curriculum courses and their content. The low (or zero) funding and, most importantly, the lack of operating funds have a negative impact on teaching equipment (lack of service support, new

instruments, computer units) and software (lack of support and maintenance, old software, non-operational software), which in turn reduces the quality of the delivered training to the students.

As mentioned above, an important factor affecting the quality of the delivered course contents is the low knowledge level of the admitted students, either due to low grades or various backgrounds. In addition, the lack of sufficient number of permanent faculty members causes teaching discontinuities, content variability, and material repetitions in the courses that are taught by contract personnel. Furthermore, the number of prerequisite courses appears to be low. Emphasis should be also given to revitalize the foreign language course(s) requirement, with English the obvious choice in this case.

The acquisition of the latest editions of some “key” reference books, such as the Manual of Geographic Information Systems, the Manual of Photogrammetry and the Manual of Remote Sensing will enhance the relevant library resources.

RESULTS

Based on the job opportunities and areas where the graduates work and on the interviews the committee had with stakeholders of the program it appears that the program delivers quite well the “traditional” geomatics and surveying courses. However, attention should be paid in the current and upcoming developments in the areas of GNSS, digital photogrammetry, remote sensing, mobile mapping and wireless communications, multimedia, geovisualization and spatio-temporal databases as well as in the understanding of concepts and principles. For example, the following thematic areas should be included/emphasised in the relevant course material: geodesy (position has been announced, 107 applicants to date), urban and cadastral legislation, GPS kinematic methods for both positioning and navigation; digital photogrammetry, photogrammetric image processing and photogrammetric triangulation, lidar mapping, integration of GPS, IMU, camera and lidar sensors, mobile mapping, land registration systems, integration of GIS with remote sensing, automation in the extraction of information from imagery (aerial/satellite), virtual and augmented reality geospatial applications, hyperspectral and radar images and applications.

The number of elective courses is relative small and should be increased to cover either new courses or the implementation of program streams.

IMPROVEMENT

The department is fully aware of how the curriculum can be improved and it has in place a three-member committee that examines on a continuous base the effectiveness of the curriculum, and considers updates and revisions. However, it must be noted that several critical aspects, such as the number and quality of admitted students and the funding support of the program, are out of the control of the program.

The department should continue its efforts to:

- increase the number of permanent faculty members;
- improve and enhance its laboratory infrastructure;
- enforce the teaching of foreign language(s);

- expand the breadth of geomatics applications across disciplines;
- focus on the applied geomatics niche areas; and
- enrich the syllabus with improved and new courses in the areas of geodesy, kinematic GPS, lidar, geospatial information and communications technologies.

It appears that the Department seems to equate Geomatics almost exclusively with GIS, rather than the broad set of geo-information disciplines and technologies that are typically classified under Geomatics in similar Departments/Institutions both in Greece and internationally.

B. Teaching

APPROACH

The Department of Geomatics and Surveying as a whole and the faculty individually place major emphasis on teaching and funnel a lot of energy into the educational component of their activities, including (but not limited to) teaching methods and tools. And even though a documented, uniform, and well-defined pedagogical philosophy and approach does not appear to be available, at least as far as the committee could see, it is obvious that the Department values teaching and its educational mission.

More specifically, all instructors are using a multitude of teaching methods in the classroom and in the lab, combining traditional oral presentations and face-to-face discussions with interested students with electronic media, visual tools, and hands-on experience.

The instructor-to-student ratio is clearly not satisfactory. The Department has a very large number of students while the number of permanent faculty is very low. This creates the need for a high number of visiting/temporary personnel, which affects the quality of teaching in many ways. Furthermore, with the recent budget cuts, the number of additional temporary personnel has been reduced significantly, leading to a sharp deterioration of the instructor-to-student ratio, cancellation of courses, and a very high level of anxiety among students and faculty.

It appears that the students have a solid and, in most cases, personal relationship with the faculty, particularly with the permanent personnel and the long-term temporary instructors. This has facilitated and enhanced collaborations and communication between students and instructors, especially among the academically strongest performers, and has created a nice atmosphere of loyalty to the Department and a high sense of community among the students.

The Department has good facilities (classrooms, auditorium, laboratories) and adequate teaching resources but it lacks much-needed maintenance and improvement funds. It appears that the existing teaching means and resources as a whole are enough to cover most of their teaching needs. However, it should be repeated here that the number of permanent faculty is very low, especially considering the unnecessarily high number of yearly admitted students.

The instructors are using information technologies in the classroom, and at the same time, are taking advantage of all the electronic tools that are available to them by the institution. It should be noted, as a confirming example, that the “e-Learning” environment is extensively used by the faculty for posting and updating teaching materials, including syllabi, lecture notes, slides, and assignments, as well as for the announcement of examination results and final grades.

The examination system that is followed by the majority of instructors appears to be adequate and tailored to the particularities of each course and the expected level of acquired knowledge. However, the committee has noted the high level of low and failing grades, which should be definitely addressed by the Department.

IMPLEMENTATION

It is clear that the faculty members of the Department of Geomatics and Surveying love teaching and have a great deal of interest in their students and the quality of knowledge they offer through their courses. As a result, it is obvious that they are doing their best to provide the best education they can. Overall, the committee feels that the theoretical aspects of the offered courses sometimes appear to be weak, especially in quantitative subjects. This is an unwelcome (but expected) byproduct of the national admission process, which allows students to be admitted in the Department without the necessary minimum quantitative foundation. As a result, the faculty has to resort to teaching simplified material and using more visual teaching methods, which in turn leads to a weakening of the scientific contents of the offered courses.

The teaching material that is being used varies in style and quality among that various faculty members. Some faculty are using books, occasionally books that they have authored themselves, while others are using notes or collections of papers and other materials from various sources.

The teaching material also varies by course and instructor. Obviously, permanent faculty provide more stability and continuity in their teaching and better designed educational material, and have more interest and opportunity to regularly update the contents of their courses, since they know in advance what they will be teaching in the future. Temporary instructors on the other hand, while in most cases equally energetic, enthusiastic and qualified, show more variability in their teaching styles, material and level, one of the reasons being that they do not know whether they will return next semester and if/what they will be asked to teach in the future.

It is very encouraging that most faculty members are also engaging in research (some more than others). Most of the active researchers are incorporating their findings in their teaching, and expose the students to the latest scientific trends in their respective fields, to the best of their abilities and knowledge, particularly during the thesis work. However, the committee would like to see even more emphasis to be placed on hands-on, practical education and training, as such experience will be more beneficial to the students after they graduate. The job market in the field of geomatics and surveying differs in expectations, demand and desirable skills between graduates of engineering schools and technological institutions.

Most faculty members are making a huge effort to participate in national and international conferences and extramural collaborations and visits. Students are also participating as much as possible, with the ERASMUS program the most prominent example of such mobility.

The institution of TEI Serres has recently instituted an impressive electronic evaluation system that is very detailed, structured and beneficial. Even before the establishment of this electronic system, the students of the Department of Geomatics and Surveying had the opportunity to evaluate each course and each instructor at the end of each semester. The Department keeps detailed copies of these evaluations, meticulously filed and easily accessible. Two comments that can be made here regarding this process, which are somewhat related to each other, are the following:

- the evaluation forms that the students are asked to fill out are unnecessarily long (~37 questions in the latest version) and lack the two general but fundamental questions that can provide a quick but accurate glance at the quality of the course and the instructor, namely a question about the instructor in general and a question about the course overall; and
- the turnaround of completed forms is very low compared to the number of students taking each course, and has decreased even further after the implementation of the electronic evaluation system.

As previously mentioned, both are partially interrelated, as the high number of questions requires a higher time commitment by the respondents, and thus makes them less eager to participate. The result is that the evaluation process is sometimes skewed, since typically the students who complete the forms are the ones who are either very enthusiastic about the course and/or the instructor, or very dissatisfied, and are thus more willing to take the time to fill out the lengthy forms. Either way, the process is definitely less objective and rather incomplete and needs to be improved.

RESULTS

Undoubtedly, the faculty members of the Department of Geomatics and Surveying have the best intentions regarding their teaching and communicating their knowledge and experience to their students. However, the particularities of the Department have affected the attained results in various ways.

More specifically, when typically the composition of each class is so varied regarding the background and skills of the students, it is expected that the efficacy of teaching is consequently reduced, despite the intentions and the effort of the instructor. Furthermore, an additional negative affecting factor is the lack of an adequate number of permanent faculty and the variable (according to the annually approved budget) number of temporary instructors, both of which lead to increased teaching loads and unacceptable instructor-to-student ratios.

There has been a high number of failing grades in the majority of courses, with the more technical/quantitative courses exhibiting the highest numbers. This is expected and justified mainly by the factors discussed previously, but still remains an undesirable outcome that affects the Department in several ways and which needs to be addressed and corrected as soon as possible.

Furthermore, there is a high number of students who take a long time to graduate (with many registered/admitted students not graduating at all) and a declining trend in the average grades of the final degree. As a result, the total number of students keeps increasing due to failing grades and delayed graduation.

It is the impression of the committee that the Department understands most of the reasons that have led to longer graduation times and lower final grades, the main of which are discussed in the second paragraph of this section. However, it is very difficult for these reasons to be corrected, as both the number of admitted students and the budget of each institution, together with the availability of new permanent positions, depend on the State and not the Department per se.

IMPROVEMENT

The Department of Geomatics and Surveying has recognized, observed and recorded the negative trends in grades and graduation times of its students and has identified a few reasons for their existence as well as desirable ways for their improvement.

More specifically, the Department attributes these negative trends to the following factors:

- High number of admitted students;
- Low level of admitted students (low entrance base and various backgrounds);
- Low number of permanent faculty positions; and
- Reduced budget for temporary instructors and relevant resources.

Unfortunately, none of the above factors depend on the Department itself, its planning and collective decisions. As a result, it is extremely hard to see an immediate improvement in the above areas unless the State decides to reduce the number of admitted students, establish an acceptable base and better process for admission, provide new permanent faculty positions, and a higher budget for additional instructors. Considering the current state of the Greek economy, the difficulty (and perceived political consequences) of such potential decisions, and the inherent inflexibility of the Greek system, it is highly unlikely that any of the above problems will be corrected any time soon.

However, the committee feels that it is possible for the Department to act within its power and means and significantly contribute to the improvement of the observed undesirable trends that are listed in the previous section. For instance, a rather quick and easy way to improve classroom performance in certain, more advanced courses is the establishment and enforcement of prerequisites. This will ensure that students who lack the necessary knowledge in certain areas will not be able to take other courses which depend and build on that knowledge. Also, linking corresponding lab and lecture courses (in the sense that if a student fails the lecture she/he will have to repeat the lab as well, and vice versa), will prohibit students from moving forward having passed the lab while still not competent in the material covered in the lecture (and vice versa). Another suggestion would be the establishment of tutorials and remedial sessions, to be organized and supported by the student association, and offered by qualified senior students, in an effort to assist junior students with specific knowledge gaps and weaknesses.

Most importantly though, it is the opinion of the committee that the Department should stay away from any attempts to provide yet another version of a faster but still full-fledged engineering degree. It should seriously consider deepening its focus towards offering a solid and up-to-date applied and practical education and training that focuses on the implementation of geomatics and surveying methods and tools, and the support of relevant processes in the field and in the office. Efforts to emulate five-year engineering programs are not only overly ambitious and extremely hard to achieve (especially considering the above mentioned limitations of the Department) but also clearly unnecessary and, most likely, against the best interests of the students.

A four-year applied program on the other hand will fill an existing substantial (and rising) need for practically trained personnel with immediate experience in applied science and the

latest technological methods, tools, and instruments. This way, students can improve their classroom performance (i.e., obtain higher grades) by staying away from abstract/complicated scientific principles that may be beyond their capabilities and needs, and become more interested in their studies (i.e., achieve shorter graduation times) stimulated by the more exciting hands-on experience, a potentially thriving job market and the promise of faster job placement.

C. Research

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

APPROACH

The Department's mission is the development and dissemination of knowledge in geomatics and surveying through teaching and applied research. Most of its members are engaged in research activities although their main responsibility is the education and practical training of their students, which takes most of their time. The Department's administration is very supportive of the research activities of its members and encourages the inclusion of applied research in the undergraduate curriculum, as well as the publication and presentation of research results in journals and conferences, with the involvement of students whenever this is feasible.

Officially, the Department does not assess the research performance of its members. This seems to be stemming from the facts that

- (a) research performance is not really taken into consideration in the Department's overall evaluation by the Ministry,
- (b) graduate programs (with the exception of a specific joint program) are not offered by the Department, and
- (c) the number of faculty members with doctoral degrees is limited.

Nevertheless, as it can be seen from the three internal evaluations that have been carried out to date, the Department is both encouraging and tracking the research output of its members, using internal standards for research assessment. The metrics the Department has selected to measure research quality include the following: number of books and book chapters; peer-reviewed and non-peer-reviewed publications and presentations; citations; service on conference organizing committees and journal editorial boards; and participation in externally funded research and development projects.

IMPLEMENTATION

The Department promotes and supports research through initiatives of individual faculty members, as well as through collaborations and joint projects with other institutions. For the students, research is promoted primarily through their theses. The best thesis work is often published, or adopted and implemented by various agencies and organizations.

Other than the laboratories developed for the delivery of the undergraduate program of the Department, no other research infrastructure is available. Although these laboratories and instruments are occasionally used for research and development projects, the available infrastructure is insufficient to support not only significant research activities but, occasionally, the delivery of the curriculum and the practical experience of the students as well. For example, more GNSS receivers and a portable gravity meter should be added to the current stable of equipment in the Department, as well as a few operational digital photogrammetric workstations.

Faculty members have published their research in a significant number of scientific journals, books and technical reports, and have presented it at national and international conferences and workshops. Applied research projects have been funded by various public-sector agencies and organizations, while a smaller number of basic research projects have been

undertaken in collaboration with universities and research institutes. Improved research productivity was in fact one of the recommendations in the first internal evaluation report and, since then, research output has shown a positive trend in general, which is commendable given the very limited time faculty members have available for research activities. It is also noteworthy that the Department publishes an online scientific journal, which has already produced three issues and 18 articles.

Specifics on the nature and number of publications, projects and collaborations are given in the Results section that follows.

RESULTS

Although research is a secondary goal in technological institutions, this Department elected to undertake and support research work since its inception. This goal has been inhibited by the extremely heavy teaching and administrative/service load of its faculty members, as well as by the very small number of permanent faculty positions. Given these difficulties, it is surprising to see that the research output is quite significant.

In the last five years (2007-2011), the faculty members in the Department have produced 10 books and 10 book chapters, 17 refereed journal articles, 42 refereed proceedings articles, 11 presentations in refereed conferences, and over 30 other publications and presentations. The above numbers correspond to average numbers of refereed and non-refereed publications/presentations per faculty member per year of 1.3 and 1.1, respectively, with an overall average of 2.7. This number is based on the information provided to the evaluation team during the site visit, and is using the current total number of 9 permanent faculty members. Given that there were only 7 faculty members in 2007, 8 in 2008 to 2010, and 9 since 2011, the above averages are in fact slightly better than the number given above. In any case, and even though most of the refereed conferences are not fully refereed but rather abstract-based, this is a quite respectable performance by the faculty. It should be mentioned that the averages, especially of the refereed contributions, more than double with the inclusion of the contributions of the teaching staff on contract. This is of course due to the fact that the majority of the teaching staff are instructors from Aristotle University of Thessaloniki, hold graduate degrees and are already involved in research programs in their own institutions, including the supervision of graduate students..

Research and development collaborations have been developed with several universities (Athens, Thessaloniki, Macedonia, Thrace, Crete), technological institutes (Informatics, Seismology and Earthquake Engineering) and the public sector (municipalities, libraries, technological and medical institutes). The Department's research has been externally acknowledged outside the Department. For example, there have been 193 citations. In addition, faculty members have been invited to become members of conference organizing committees and reviewers for books, and scientific and trade journals.

Since 2000, the Department has been involved in 39 research and 36 development projects. Applied research results, such as algorithms, software and various types of engineering, mapping and geo-information studies, are in use by several municipalities and public agencies in the Serres region and in northern Greece. Examples of several development projects are given in section 6.1 of the 3rd Internal Evaluation document. Most of them have significant socio-economic impact on, and are very much appreciated by the local community. Due to the applied nature of the research, no patents have been filed.

IMPROVEMENT

The research output of the Department since 2000 shows a significant increasing trend in both the number of research publications and in the number of citations. It is however unlikely that this trend will continue in the future given that

- there is no graduate program (with the exception of the joint program with the University of Athens on the Prevention and Management of Natural Disasters);
- the number of faculty members with PhD degrees is rather on the small side (4 out of 9);
- the faculty members are overloaded with teaching and administrative duties;
- the existing infrastructure (laboratories and instruments) has been designed/selected to serve the needs of the undergraduate curriculum; and
- the quality of the incoming students is noticeably lower than those admitted by similar university departments.

During the committee's site visit and through presentations and interviews - and also from the Internal Review documents - it became apparent that some of the faculty members were very enthusiastic about and would like to engage more in research, even in basic research. Although this would certainly improve the status of the faculty, it would not necessarily result in the advancement of the Department. The purpose of a technological Department should be distinct from, and not try to emulate, a university one. Without discouraging the efforts towards basic research, the evaluation committee believes that the focus should be on applied research, and in particular on the application of this research to the solution of socioeconomic problems. It is therefore recommended that the research focus of the Department be more on development projects, with the collaboration of local and regional authorities. Doing so would have a real positive impact on the public, raise the visibility of and appreciation for the Department, and also enhance the employment chances of the program's graduates, since they would serve a different market and would not have to compete for the same jobs with graduates of five-year engineering programs.

Thankfully, the initiatives undertaken by the Department towards the improvement of research are in this direction, namely towards the modernization and expansion of existing laboratories and the establishment of new ones in order to better serve the program and arm its graduates with the necessary professional skills. As already mentioned, the involvement of students in research is already achieved through their thesis work and, occasionally, their participation in research/development projects and joint publications/presentations with their thesis supervisors. These important activities should continue and be supported as much as possible by the Department. Faculty members interested in performing more advanced research should be encouraged to do so by using other means, such as, e.g., a sabbatical leave or an extended visit at, and/or collaboration with another institution.

At least until the time when research contributions will count towards the evaluation of both the individual faculty members and the Department itself as a whole, the Department should encourage and foster applied research activities but also ensure that that they do not infringe upon the academic performance of the faculty and the proper delivery of the curriculum. At the same time, the tracking and analysis of the annual research output should continue in order to identify trends, provide material for annual departmental reports, and form a culture of individual as well as departmental regular evaluation and improvement.

D. All Other Services

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

APPROACH

The Department is committed to providing administrative and technical services to its teaching staff and students, including the secretariat and technical personnel who support the laboratories and computing needs. It has its own website and provides electronic e-learning services and access to course material, student files, grades, and the library. It is currently in the process of digitizing the older files that are stored in the office of the secretariat.

The availability of and easy access to the services above, as well as to the laboratories, library and computing facilities, have resulted in increased student presence on campus. Another very important reason for this, which was pointed out in the committee's interviews with the students, is the availability of the faculty members and their willingness to meet with students as needed and help them solve any academic (and sometimes even non-academic) problems. This has created a very positive climate in the Department, which is very much appreciated by the students.

IMPLEMENTATION

The Department is housed in a building with total area of 2,500 square meters. The facilities include a 220-seat auditorium, one 40-seat and two 90-seat classrooms, and seven teaching laboratories. Personal computers, geomatics software, as well as surveying instruments are provided for use by the students. Three technicians have been tasked with the operation and maintenance of the various instruments, the laboratories and the computing facilities. They are also providing support to the applied/lab components of the various courses.

The secretariat is operated by two administrative assistants who handle the students' files, course grades and course evaluations, the internal and external correspondence, the minutes of departmental meetings, the website, and also provide administrative support to the Department Head. All student and other administrative documents are filed electronically and can be accessed at any time, which results in a very efficient operation.

The library is well organized and connected to other libraries. It subscribes to major scientific journals, provides electronic access to electronic copies of publications, and is equipped to easily handle inter-library loans. The IT infrastructure of the Department is quite good, with servers and many networked PCs in the computer and other laboratories. Limited software licenses are available for surveying, GIS, photogrammetry, remote sensing, programming languages and other applications.

RESULTS

The building and support facilities, as well as the administrative, student and technical services, are sufficient for the number of students currently admitted in the Department but may quickly become crowded, considering the total number of students, and outdated, considering the lack of maintenance and improvement funds. There are also some recreational facilities available, such as a fitness center, a small open-air theater, cafeteria,

and a (planned) soccer field. E-learning facilities as well as electronic access to grades are provided to the students. In addition, the students have free access to full health coverage not only at the campus health facilities but also at the Public Hospital of Serres. In general, and although there is still room for improvement, the Department views the available space, facilities and services as adequate and so did the evaluation committee during its site visit.

IMPROVEMENTS

The Department has identified several problems with and improvements to the services provided. The staff in the secretariat has in the past been replaced quite often by the central administration with new, inexperienced personnel, resulting in delays and reduced efficiency. The addition of new PCs and the upgrade of the existing ones both in terms of hardware and software are also urgently needed. Unfortunately, the Department does not have the required budget to do so and has to compete for resources with the other Departments of the TEI Serres. Nevertheless, funding for an additional GNSS receiver has been secured, even though needs for additional instruments and specialized software application packages cannot be fulfilled in the near future.

The Department appreciates the need for formal academic advising of students and is planning to assign each student to a faculty member to discuss and resolve academic and other issues. It was also mentioned by both students and faculty members that the Department needs to hire more staff (permanent and temporary) in order to properly deliver the theoretical and practical components of the curriculum. In addition, it is recommended that temporary staff be hired on a three-year contract (rather than one year or one semester contract) in order to facilitate continuity, proper course preparation and curriculum planning, and a secure and less stressful work environment for those involved.

It was not clear from the information provided to the committee whether the students have access to emergency medical facilities on or near campus. Although this is not really a departmental issue, efforts should be made to correct this as soon as possible, in case such a service is not already available.

Collaboration with social, cultural and production organizations

Six members of the staff have participated in collaborative development projects with the Municipality of Serres and other regional institutions and agencies. Several of these had significant social impact and were presented to the public in workshops. The results of others were published in trade journals. Through a memorandum of understanding with the Serres Municipality, it is expected that such initiatives serving the local community will continue in the future.

The Department would also like to provide accredited lab services to the community. However, obtaining such accreditation in the current economic situation is deemed extremely unlikely.

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.

The Department's 2008-2012 report of academic planning addresses the following objectives:

- Development of educational and research activities with the addition of new laboratories;
- Consideration for the students with the improvement of the computer island (cluster) with new computer units, scanners and printers;
- Contribution to social progress and economic development at local, regional and national level by enhancing collaboration with local and regional authorities and participation in joint projects;
- Development of infrastructure and equipment with the addition of new research laboratories (Spatial Knowledge and Spatial Mapping and Environmental and Urban Planning) and new equipment and computer units;
- Number of students, where the maximum admitted number of students is set to 120;
- Faculty members, requesting a total of 22 faculty members and 6 positions for technical staff;
- Curriculum restructuring by introducing new courses and redesigning the contents of the courses;
- The enhancement of the existing joint graduate program; and
- The internationalization of educational and research activities by continuing to participate in the Erasmus program.

In summary, the Department has prepared a four-year strategic plan, which identifies deficiencies, and their causes, and suggests ways for improvement. According to it, at State level, the main inhibiting factors are the very large number of admitted students, the small number of permanent faculty members, and the resulting high teaching loads. Additional factors comprise the lack of (i) a Department-managed annual budget, (ii) a graduate doctoral program and (iii) well-defined professional rights for the graduates.

The main inhibiting factors at the Institutional level, still according to the departmental report are the lack of (i) support for the maintenance, upgrade and replacement of laboratory equipment, (ii) travel funding for conferences, and (iii) make-up courses to improve the technical background of weak incoming students. At the Department level, inhibiting factors are the low quality of admitted students, the long time-to-completion period and the resulting very large classes, as well as the high ratios of students to faculty members and permanent to temporary staff.

The short-term goals of the Department are directed towards restructuring the curriculum including e-learning and other digital technologies, better coordination of courses, the establishment of specializations with the possible introduction of more elective courses, the hiring of more teaching staff on contract, and the introduction of graduate degrees.

To deal with the aforementioned problems medium-term, the Department is requesting in

their four-year strategic plan, among other things, a three-fold increase in the number of permanent faculty members. Long-term, improvements can be achieved only through the elimination of all inhibiting factors mentioned in the previous paragraphs. This would require considerable support both from the Institution and from the State, including the reduction of the number of students annually admitted into the Department to no more than 120, and the hiring of more permanent faculty members.

Overall, the evaluation committee is, in general terms, in agreement with the priorities identified by the Department and the suggested ways for improvements. In particular, as previously mentioned several times, the reduction of the number of admitted students and the increase of the number of permanent academic staff are considered of primary importance for the appropriate delivery of the curriculum and the long-term viability of the Department.

However, and in view of existing and realistic student needs, the optimum projected scientific orientation of the Department, and the current and anticipated needs of the relevant job market, the committee does not feel that a PhD program should be among the Department's priorities at this point, especially considering its other pressing needs and the country's current financial and employment situation.

On the other hand, the development of professional graduate degrees that could appeal not only to recent graduates of the undergraduate program but to mid-career professionals as well, is viewed by the committee as a welcome and highly desirable potential future addition to the offerings of the Department. The establishment and delivery of such degrees (like for instance one-year Master's programs focusing on modern applied technologies and emerging tools) are strongly encouraged, should the necessary means and resources become available.

F. Final Conclusions and recommendations of the EEC

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

The Department of Geomatics and Surveying has exhibited significant growth since the date of its creation. Its growth is not only the result of State-mandated increases in the number of admitted students (an obvious but, as previously discussed, rather unwelcome indicator of growth), but most importantly, it is due to the tireless efforts and high quality of its faculty. Presently, the Department can boast some impressive accomplishments such as the quality of the hands-on training of its graduates and the recognition it receives from the local economy and potential employers. In the previous sections of this report, the committee has tried to identify all good practices implemented and followed by the Department, as well the observed weaknesses that are inhibiting its optimum function.

In summary, and to recapitulate the major points of this report, the Department has qualified faculty, both permanent and temporary, with solid scientific background and substantial professional experience. It has also access to good facilities and adequate resources for the students. However, the number of admitted students every year is unreasonably high and needs to be drastically reduced. Consequently, the number of permanent faculty needs to be increased to meet the demands of this substantial student

body. These two issues are related to each other, and therefore, need to be corrected synchronously and harmoniously, so that in the future, the Department receives only the number of students that it can efficiently accommodate based on the number of faculty members and available resources. Furthermore, the budget for temporary personnel, facilities maintenance, equipment/software updating and relevant expenses needs to be substantially increased.

On the other hand, the most important general recommendation for the Department itself would be to make a concerted effort to shift its focus towards applied science and the practical training of its students, and therefore, to modify its program of study accordingly. Additional recommendations include the inclusion of foundation courses early in the curriculum, such as a much-needed fundamental geodesy course, to provide the necessary basis for subsequent, more advanced courses. In addition, the curriculum will benefit from the addition of a wider body of geospatial technology and application courses, as previously discussed in section A, that will expand the offered geospatial knowledge beyond just GIS and towards the many emerging geospatial application areas.

The committee feels that the Department is eager and willing to make every effort to improve and correct all factors that are affecting its progress. Unfortunately, several of these factors, perhaps the most crucial ones, do not depend on the Department itself but the State. As a result, even though the good intentions of the Department are clear and undisputable, they are not enough by themselves and need to be supported by State decisions in order to be implemented. This is particularly crucial regarding the issues of permanent personnel, number of admitted students, and budget. On the other hand, the Department itself will have to reevaluate its future directions and strategic planning, and focus more on the applied nature of the education and training it provides to its students, as per the discussion in the relevant sections above.

It is also very encouraging that the Department has established an internal evaluation process which has been performed three times already (at various degrees of depth and breadth), and that it plans to reexamine and update its program of study soon. The committee feels that the program of study needs to be evaluated and updated at regular intervals, and that the process has to be formalized in a clearly established and transparent manner. The Department is also encouraged to continue its internal evaluations and, in addition to outlining the areas where it needs the support of the State, to not shy away from expressing deep criticism and an objective evaluation of its own strengths and shortcomings in an open, honest, and critical way. This is the only way that the Department can take advantage of its own capabilities and handle the issues that depend on itself, and which are much easier to correct than the issues that depend on State/political decisions.

Overall, it is the opinion of the committee that the Department of Geomatics and Surveying has the potential to fulfill a missing role in Greece's technical education, occupy an important market niche in the much-needed area of applied technological training and support that is currently void, and provide employment opportunities to its graduates that are not only beneficial to them but important for the local and regional economy and necessary for the overall healthy development of Greece.

The Members of the Committee

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