



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ

**Α.ΔΙ.Π.**

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ΣΤΗΝ ΑΝΩΤΑΤΗ ΕΚΠΑΙΔΕΥΣΗ

HELLENIC REPUBLIC

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HELLENIC QUALITY ASSURANCE AND  
ACCREDITATION AGENCY

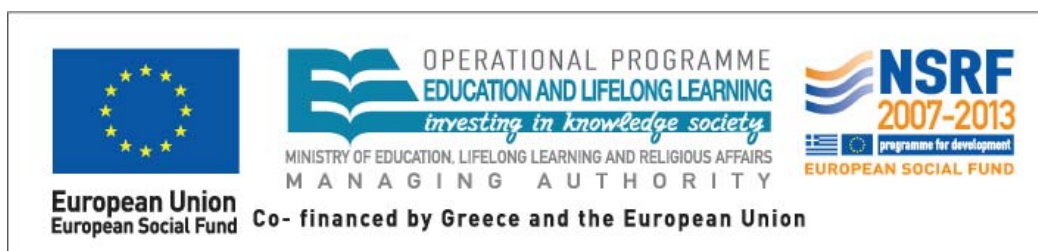
## EXTERNAL EVALUATION REPORT

DEPARTMENT of COMPUTER ENGINEERING and INFORMATICS  
(CEID)

UNIVERSITY of PATRAS

Version: Final

September 2012



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### External Evaluation Committee

The Committee responsible for the External Evaluation of the Department of Computer Engineering and Informatics of the University of Patras..... consisted of the following five (5) expert evaluators drawn from the Registry constituted by the HQAA in accordance with Law 3374/2005 :

1. Professor Athanassios Manikas \_\_\_\_\_ (President)  
(Title) (Name and Surname)  
  
Imperial College London, UK \_\_\_\_\_  
(Institution of origin)
  
2. Professor Nikitas Dimopoulos \_\_\_\_\_  
(Title) (Name and Surname)  
  
University of Victoria, Canada \_\_\_\_\_  
(Institution of origin)
  
3. Dr Nick Buris \_\_\_\_\_  
(Title) (Name and Surname)  
  
CEO, Nebens LLC, USA \_\_\_\_\_  
(Institution of origin)
  
4. Professor Panos Liatsis \_\_\_\_\_  
(Title) (Name and Surname)  
  
City University, London, UK \_\_\_\_\_  
(Institution of origin)
  
5. Professor Anastasia Ailamaki \_\_\_\_\_  
(Title) (Name and Surname)  
  
Ecole Polytechnique Federale de Lausanne (EPFL), Switzerland \_\_\_\_\_  
(Institution of origin)

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

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

## **Introduction**

### I. The External Evaluation Procedure

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

### II. The Internal Evaluation Procedure

Please comment on:

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

The External Evaluation Committee (EEC) visited the Department of Computer Engineering and Informatics (CEID) of the University of Patras from 10<sup>th</sup> to 12<sup>th</sup> September 2012.

On Monday, 10/09/2012, the Committee travelled by mini-bus from Athens to the Achaia Beach Hotel (Rio). After check-in at the hotel, the Committee was met by the Vice Chairman of the Department and the Head of one of its Divisions and was then transported to the University Administration building. Initially the EEC met the Chairman and other senior members of the Department, the Chancellor, three Vice-Chancellors and the Dean of the School of Engineering. Then the Vice-Chancellor for Academic Affairs presented an overview of the University followed up by a Q&A session. Next the Dean of the School of Engineering presented a comparative overview of the seven Departments of the School. A number of presentations were then given focusing on the unit under evaluation. In particular, the Head of Department presented a general description of the Department and various CEID faculty members gave extensive presentations that went into considerable detail on various aspects of undergraduate and postgraduate studies. Later the same night, the Chancellor of the University hosted a dinner for the Committee where a sizable number of departmental faculty members were present.

On Tuesday, 11/09/2012, more presentations of the Department’s research activities were given by CEID faculty members in conjunction with Q&A sessions. These took place during the morning and part of the afternoon. After that, the Committee met with a cross-section of undergraduate students - who were very informative, respectful and insightful. On Tuesday evening, the Committee toured the CEID laboratories accompanied by many members of the Department. Later that night the Chairman of the Department hosted a dinner for the Committee.

On Wednesday, 12/09/2012, the Committee met with junior faculty members and then visited key University facilities (including the Conference Centre and the Library) as well as

the Research Institute “Diophantus” (ITYE) where a brief overview of its structure, research and other activities were presented by one of its senior members. The Committee then returned back to the Department. The Committee commends the Department for organizing a meeting with a respectable group of Alumni and employers of students that have graduated from the Department. This was a very fruitful meeting that took place during a working-lunch and provided significant information to the committee about the Department and its graduates. In the afternoon the Committee met postgraduate students (both MSc and PhD) and discussed their experience within the Department. Following this the Committee met with specialized supporting personnel – both administrative and technical.

Finally, after a short EEC internal session in which major findings were collected, the Committee met with the Vice-Chancellor for Academic Affairs together with the Departmental Management Team for an initial briefing. Following this, the Committee travelled back by a mini-bus to Athens.

Ahead of the visit, the Committee was provided with two thorough and informative Departmental Internal Evaluation Reports - one for the years 2007 to 2011 and a second for the current year 2011-2012.

In addition, during the site visit, the Committee was provided with extensive documentation, copies of all presentations and complete data on almost all aspects of the Department’s operations. The department demonstrated admirable dedication to the procedure with their presence, participation, and contribution. Thanks to their help, the Committee carried out the work thoroughly and without obstructions.

## **A. Curriculum**

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

### **APPROACH**

- What are the goals and objectives of the Curriculum? What is the plan for achieving them?
- How were the objectives decided? Which factors were taken into account? Were they set against appropriate standards? Did the unit consult other stakeholders?
- Is the curriculum consistent with the objectives of the Curriculum and the requirements of the society?
- How was the curriculum decided? Were all constituents of the Department, including students and other stakeholders, consulted?
- Has the unit set a procedure for the revision of the curriculum?

### **Undergraduate Curriculum**

The Department's curriculum includes subjects that span Computer Engineering and Computer Science and to a lesser extent Electrical Engineering.

It is structured as a set of core courses and a set of electives (optional courses). The Department has a set of specific rules in place for ensuring that a student will follow the core courses and choose an appropriate number of electives at an appropriate level. The great majority of courses included in the curriculum are technical in nature and subject specific. The curriculum also includes several elective courses which have an emphasis in the humanities. A minimum number of these courses are required for all the programmes offered by the Department.

The curriculum is delivered in a 5 year programme which culminates with an undergraduate project (Διπλωματική) designed to be carried out during the last (10<sup>th</sup>) semester. It also includes a semester of practical work ("internship") which, however, is not mandatory and thus not chosen by all students. Such a curriculum structure is typical of an engineering University degree programme in Greece.

The current curriculum was adopted in 2008, based on the recommendations of the Department's Curriculum Committee which was established in 2004. This replaced the previous curriculum, adopted in 1998, after extensive consultation with a wide number of sources. These sources included curricula in some of the top universities in North America and Europe, model curricula proposed by IEEE and ACM as well as consultations with the University's different stake-holders.

Although the Department has a well-established Curriculum Committee for overseeing the curriculum, the External Evaluation Committee (EEC) was not provided with the mandate of this committee – including its regular and systematic process of curriculum review for building on existing strengths and mitigating identified weaknesses.

### **MSc Postgraduate Curriculum**

The Department offers the following postgraduate MSc programmes of study:

- (1) Computer Science and Engineering (Επιστήμη και Τεχνολογία Υπολογιστών – ΕΤΥ).
- (2) Integrated Software and Hardware Systems (Ολοκληρωμένα Συστήματα Υλικού και Λογισμικού - ΟΣΥΛ). This program is offered with the participation of members of the Department of Electrical and Computer Engineering, and the Department has applied to convert it to an interdepartmental programme.

All MSc postgraduate studies are in currently active areas of Computer Engineering and Informatics. The Department has collaborated with other Engineering Departments in the University to leverage the available resources in offering interdepartmental programmes. In particular, the Department participates in three interdepartmental postgraduate MSc programmes – including the following MSc

- (3) “Signal Processing and Communications Systems” (Συστήματα Επεξεργασίας Σημάτων και Επικοινωνιών – ΣΕΣΕ)

that is coordinated by the Department and is jointly offered with the Department of “Physics” and the Department of “Electrical and Computer Engineering”.

The three MSc postgraduate programmes that are run by the Department comprise eight courses plus a Dissertation and the admission is highly selective.

The MSc postgraduate programmes have been very successful and reflect the diverse educational and research activities of the faculty members in the Department. In addition, they enjoy a healthy intake of students. Since 2002, there have been 355 MSc Dissertations completed.

The Department has established a Coordinating Committee for Postgraduate Studies that oversees all aspects of postgraduate studies including updating the curriculum.

The Committee noted that the Department also participates, together with the “University of Athens” and the “National Technical University of Athens” (NTUA), in the MSc “Logic, Algorithms and Computation”. However, no information about this MSc and the degree of the Department’s involvement became available to the Committee.

### **PhD Research Curriculum**

The Department offers a PhD research programme where a Master’s degree is required to gain admission. In line with other European Universities there are not taught courses in its curriculum. Since 2002, there have been 58 PhD Theses completed in active research areas of Computer Engineering and Informatics.



## IMPLEMENTATION

- How effectively is the Department's goal implemented by the curriculum?
- How does the curriculum compare with appropriate, universally accepted standards for the specific area of study?
- Is the structure of the curriculum rational and clearly articulated?
- Is the curriculum coherent and functional?
- Is the material for each course appropriate and the time offered sufficient?
- Does the Department have the necessary resources and appropriately qualified and trained staff to implement the curriculum?

### Undergraduate Curriculum

The curriculum is implemented with a clear delineation of core and elective courses which are described in an excellent curriculum-booklet. The booklet comprehensively indicates which semester a course is offered and is expected to be attended by the students.

However, a pre-requisites structure for each option is not implemented. The EEC recommends that prerequisites for all courses, if applicable, should be defined.

Furthermore, although the curriculum amply covers all of the subjects expected in a modern Computer Engineering and Informatics degree, there are some areas that need improvement. These include:

- (1) The structure of the five-year programme.
- (2) The number of courses and their content.

The EEC has the opinion that the number of course-contact hours and the number of different courses in the first two years is excessive. The following table shows the number of contact-hours and number of different courses for the first two years (4 semesters).

| Semester | Contact Hours   | Number of courses |
|----------|-----------------|-------------------|
| 1        | 30              | 8                 |
| 2        | 31 <sup>1</sup> | 10                |
| 3        | 27              | 7                 |
| 4        | 33              | 8                 |

A student attending all the required courses during these terms will not have enough time for private study to learn and retain the information in these courses. In part because of the large number of courses, many students fall behind and/or rely on studying only just before the examinations with the concomitant of high failure rates.

The Department offers 142 different undergraduate courses (see Internal Evaluation Report 2011-2012, page 29). This is an excessively large number of courses. As a result, some

<sup>1</sup> This total does not include the contact hours of the required humanities course.

subjects are spread over many different courses and there is either cross-coverage or the coverage is not of the appropriate depth.

For example, there is a sequence of 6 courses and labs in the area of computer networks (23Y387, 23387E, 23Y538, 234157, 234878 and 235608). While the first course entitled Computer Networks (Δίκτυα Υπολογιστών) includes some queuing analysis, all of the listed courses are discussing mainly ideas, protocols and programming of computer networks. These subjects could certainly be presented in fewer than six courses.

Furthermore, the area of microprocessors is covered in 4 courses and labs (23Y3561, 23361E, 234638 and 234628). Some of the subjects in these courses refer to microprocessor systems and technologies that are not in the current mainstream (e.g. Z80, Motorola, Atmel, PC bus, AT bus, Centronics etc.). In a similar manner, Operating Systems are covered in 3 courses and labs (23Y330, 2330E and 234308). Some of the examples used in these courses concern systems that are quite old and not in widespread use presently (e.g. VAX/VMS, MS/DOS, DECnet etc.). Although many basic principles of design and operations can be taught using such technologies, it is of paramount importance that an engineer be familiar with the current state of the art.

The EEC would like to recommend that the courses be rationalized and cover up-to-date material.

The EEC has identified some management and economics courses included in the curriculum. However, there are no courses that adequately expose the student to issues pertaining to a modern entrepreneurial environment. For instance, there are no courses on starting and running a business (very useful due to the current financial situation in Greece) in either the undergraduate or the graduate curriculum. The EEC would recommend that this area of the curriculum should be enhanced at the earliest opportunity. The EEC would recommend that the Department collaborate with the Departments of Business Administration and Economics towards this goal; or even considering offering a minor in management.

The Curriculum does not include any specific focus to Engineering Design. This is ideally a penultimate year design project that involves a group of students, preferably with different skills and expertise, from different disciplines matching the requirements of the project. Engineering design is<sup>2</sup> “a creative, iterative, and open-ended process, subject to constraints which may be governed by standards or legislation to varying degrees depending upon the discipline. These constraints may also relate to economic, health, safety, environmental, social or other interdisciplinary factors”. Programmes in Engineering pay close attention to Engineering Design. This normally manifests itself as sequences of design focused courses that span the programme and normally culminate in what is called the “capstone project”. In addition, several courses may include elements of design. These need to be documented and eventually assessed to ensure that graduates receive appropriate engineering design education and experience.

<sup>2</sup> This definition is copied from the Canadian Engineering Accreditation Board's Accreditation Criteria and Procedures [http://www.engineerscanada.ca/files/w\\_Accreditation\\_Criteria\\_Procedures\\_2011.pdf](http://www.engineerscanada.ca/files/w_Accreditation_Criteria_Procedures_2011.pdf)

The EEC noted with pleasure that the department has introduced an optional practical work experience (“Internship”). This is an important initiative as it would help students experience an engineering work environment and in many instances allow them to jump - start their career. “Internships” are very popular practical educational activities in both Europe and North America.

### **MSc Postgraduate Curriculum**

The MSc postgraduate curriculum is effectively implemented and comprises of several advanced specialized courses.

The EEC identified 31 postgraduate courses. In addition, the Department has published a detailed postgraduate studies guide.

Postgraduate courses may be cross-listed and co-taught with similar advanced undergraduate courses (paragraph 2.7.1 of the graduate studies guide). This is a good strategy to broaden the graduate curriculum. However, the postgraduate version of the course should be sufficiently differentiated from the undergraduate version by requiring the postgraduate students to do extra coursework or assignments.

## **RESULTS**

- How well is the implementation achieving the Department’s predefined goals and objectives?
- If not, why is it so? How is this problem dealt with?
- Does the Department understand why and how it achieved or failed to achieve these results?

### **Undergraduate Curriculum**

The present curriculum achieves most of the stated goals and objectives of the Department.

However, as stated previously, there is room for improvement by realigning and refocusing some of the material and ensuring that the student work-load (in terms of contact hours and number of courses) is lowered – at least during the first four semesters.

The EEC was informed that class attendance is not compulsory and that many students do not attend classes regularly. This reduces the effectiveness of the programme but also puts these students at a disadvantage, especially with respect to their preparation and understanding of lab work. The EEC recommends that the Department develops a strategy to encourage student attendance. This will improve student performance too.

### **MSc Postgraduate Curriculum**

The EEC feels that the present postgraduate curricula of the 3 MSc programmes achieve their stated objectives. They provide advanced education in fields that are of current interest and need.

## **IMPROVEMENT**

- Does the Department know how the Curriculum should be improved?
- Which improvements does the Department plan to introduce?

### **Undergraduate Curriculum**

The Department thinks that the present curriculum fulfills its educational goals. The EEC certainly agrees with this broad statement. However, the EEC has also identified certain issues with the curriculum currently offered, as outlined above. It strongly recommends that the Curriculum Committee of the Department revamps the curriculum. In our discussions with the Chairman of the Department and the faculty staff, they indicated their agreement to do this.

The Department is of the opinion that a major impediment is the large number of students currently registered in the undergraduate program. The EEC shares this view. The number of intakes in the Department each year and the total number of registered students actively participating in the program far exceed the resources available to the department (both in terms of infrastructure and human resources). This has a direct effect to the quality of the program and the efficient delivery of the curriculum. The EEC recognizes that the large number of students' problem doesn't have an easy solution. This is especially difficult for the Department to tackle as it has no explicit control on the number of students intakes and registrations every year. It is the strong recommendation of the EEC that the number of registered students in the Department be curtailed to more sustainable levels. Moreover, the EEC strongly recommends that the State provides a stable mechanism that would rationalize the number of intakes every year in a Department based on its available resources.

In addition, there are opportunities to better coordinate and avoid overlap with the curriculum offered by the Department of Electrical and Computer Engineering.

### **MSc Postgraduate Curriculum**

The MSc postgraduate curriculum and programmes are well established and functioning. However, some minor adjustments could make these programmes more effective. The EEC suggests that the Department should consider the recommendations, made earlier in this section, on cross-listed MSc and undergraduate courses.

### **PhD Research Curriculum**

Concerning the PhD research program, the EEC was not able to establish whether the doctoral candidates are obligated to pass a qualifying (or comprehensive) examination before they are formally accepted as PhD candidates. This examination normally occurs approximately two years after a student started her/his studies and its purpose is to ensure that the student has adequate understanding of the research area they will be working in and that there is enough confidence that they can produce quality work. Such an examination is standard practice in most institutions abroad, and the EEC would recommend that the Department consider establishing one (in the form of a brief written research report plus a presentation followed by an oral examination by a Committee).

## **B. Teaching**

### **APPROACH:**

Does the Department have a defined pedagogic policy with regard to teaching approach and methodology?

Please comment on :

- Teaching methods used
- Teaching staff/ student ratio
- Teacher/student collaboration
- Adequacy of means and resources
- Use of information technologies
- Examination system

The Department's teaching programme is partitioned into a large number of courses (142 offered in total with 66 required for the award of a degree) and is designed to have a duration of 10 semesters (5 years) combining both theoretical and practical technical education.

The teaching and learning methods used by the Department are Lectures, Study Groups ("Φροντιστήρια") and Laboratory sessions that include coursework. In addition, a compulsory six-month project ("Διπλωματική") is undertaken during the 10<sup>th</sup> (last) semester.

The Department has recently introduced the following two new dimensions to teaching:

1. *Internships*. This involves 3-months of practical training and has a fair participation of students (15-20%). Training is optional and only provides ECTS units. The number of participating students is expected to increase. (See also Sections A & D)
2. *Mentoring/Advisoring*. Faculty members (Academic Advisor) are allocated to new undergraduate students for individual mentoring classes. The implementation of this approach has not yet reached a satisfactory standard but the Department is determined to make it a successful educational tool. Comments made by the students the EEC met indicated that students did not readily meet with their mentors/advisors. However, it is important to mention that the sample of students was small and these were mainly students in the later years of their study. As a result, the mentoring program, having only been introduced recently, may not have affected them.

The Department currently has 26 faculty members and 2052 registered undergraduate students (UG) providing a staff-to-student ratio 1/78.9. This is unacceptably low. Even if we only consider the number of new UG students that entered over the last 5 years (1395 students), the staff-to-student ratio is still unacceptably low (1/53.65). These figures ignore MSc and PhD students and also indicate that 1 in 3 undergraduate students (approx.) are beyond the 5-years duration of the degree. Note that according to the Department's statistical tables, 98.77% of the 2007-intake of students failed to graduate in 5 years.

The EEC spoke to many representatives of different staff-groups (including teaching staff) to listen to their views about the Department's teaching activities. Despite the considerable commitment to teaching by the majority of the faculty and staff, the undergraduate students expressed several serious concerns to EEC, including:

- There is no “help desk”<sup>3</sup> to advise/assist the students with their programming assignments;
- The large size of the classes in the first two years makes it difficult to attend. This forces students to work in isolation (or stay away from the Department’s activities) – leading to low attendance in subsequent years’ classes.

Furthermore, during its meeting with undergraduate students, the EEC came to the conclusion that

- The students don’t really read books; rather, they rely on the internet to obtain information – mainly from websites which do not have a peer-review process – including copying codes, and the use of this information without attribution/citation.
- There is little coordination between courses resulting in material being repeated in several courses, prerequisites not been met or material not being covered.
- That the 1<sup>st</sup> year introductory course where faculty members present material intending to help students familiarise themselves with Computer Science and Informatics, is not really understood by first-year students.

Finally, the Committee concluded that there is no clear picture on teacher/student interaction.

These are issues that the Department has to address.

#### **Means and Resources deployed on the teaching activities:**

- There are some problems with the capacity of some of the teaching rooms and laboratories. However, the Department’s new and impressive state-of-the-art building will significantly improve the smooth operation of both teaching and learning activities.
- The Library facilities provided by the University are excellent but some key IEEE conference proceedings electronic access/subscriptions have been disrupted due to financial difficulties.
- The use of information technologies for teaching (e.g. data projectors, laptops) is satisfactory.
- About 2/3 of the teaching material (e.g. notes, slides, problem sheets, assignments, etc.) is available online for dissemination to the students. It would be desirable to extend this to 100% - i.e. for all the courses.

#### **Examinations:**

- The Department’s annual undergraduate programme comprises of two elements:
  - A 26-week teaching element (2 semesters x 13 weeks per semester) and
  - A 9-week formal assessment element (3 periods x 3 weeks per period).

It is clear that the assessment element is about a third of the teaching element, which

<sup>3</sup> It should be noted, however, that students have access to faculty members and teaching assistants during office hours. They also engage in some "social networking" mechanisms and forums to discuss pertinent coursework related matters.

is very high. This, in conjunction with the policy allowing students to repeat exams without any upper limit, not only overloads the faculty members but is also destructive to their research, to the students, other activities and to the overall educational process as a whole.

- The examination of the undergraduate project work (Διπλωματικές) needs radical improvements. Almost all “Διπλωματικές” have been marked with 10 out of 10 (outstanding mark). Only few have been marked with 9 out of 10 (which is still an outstanding mark). Furthermore, members of the Committee inspected several “Διπλωματικές” and found the quality of some of them “debatable”. This implies that there is a serious problem with running and examining “Διπλωματικές” and this has to be addressed by the Department.
- The Department schedules final exams over a three week period<sup>4</sup>. This is a consequence to the large number of students failing courses and having to pass the final exam without having to re-attend the failed course(s). The EEC feels that an extended exam-period is counterproductive and suggests that the Department gradually reduce the length of the exam-period and, at the same time, adopt policies of ensuring that students are not allowed to progress without having successfully passed prerequisite courses. The Department should also consider not allowing students an unlimited number of attempts in passing a final examination without repeating a failed course.

**Other Comments:**

- The Department does not have a mechanism for detecting plagiarism by electronic or other means. This is a matter related to academic ethics and good practices and is very important for Dissertations (“Διπλωματικές”) but also for written coursework (“Εργασίες”). The Committee is aware of entities, both in Greece and abroad, that sell academic work. Like other successful departments abroad, it is of paramount importance that the Department institutes robust policies that deal with the detection and punishment of plagiarized work. Due to time constraints, the EEC did not dwell on allegations brought to its attention of students engaging private tutoring schools for help with their academic work. At best, the mere existence of such tutoring businesses reflects learning issues at the university community of students, academics and administration. At worst, these businesses may offer expedient avenues for students to pass classes aided, in part, by someone else's work. This issue cannot be ignored and must be addressed before it gets more serious. Therefore, the EEC strongly urges the Department to consider an academic quality assurance plan and actions that would ultimately render the private tutoring businesses unnecessary.
- Meeting deadlines is extremely important for professionals and in particular for professional engineers. However, the existing culture within the Department (and the Greek University system in general) does not allow for educating the students to handle and comply with this important real life constraint.

<sup>4</sup> In the departmental documents it is stated that the duration of the exams per semester is 2-weeks. This indicated that, in reality, the examination period has been extended.

## IMPLEMENTATION

Please comment on:

- Quality of teaching procedures
- Quality and adequacy of teaching materials and resources.
- Quality of course material. Is it brought up to date?
- Linking of research with teaching
- Mobility of academic staff and students
- Evaluation by the students of (a) the teaching and (b) the course content and study material/resources

The unbearably large number of students per faculty member is the source of many problems damaging the quality of teaching in the Department– despite the substantial commitment given by the majority of the faculty members to teaching.

The Committee checked a number of laboratories and a selection of laboratory teaching materials. Some Laboratories were good but others were designed to accommodate a small number of students making the resources inadequate to accommodate the teaching and learning outcomes of the Department/students. Furthermore, the infrastructure in some of the laboratories (especially electronics, circuits and digital electronics) was dated but deemed adequate. On the other hand, the computer center was well equipped with up-to-date servers and workstations.

The Committee did not have the opportunity to perform a thorough review of the quality of the course material. However, it concluded that the number of courses is too high, especially in years 1 and 2. In addition, some courses need to be revised and modernized (please also see Section A).

Furthermore, the Department has a below average mobility track record of students via its collaborative programs held with a number of European Universities.

The “Lecturer Evaluation Questionnaire” is carried out in the class using printed copies. As the student’s attendance is low this method results to a low participation in this evaluation process. It is recommended that the Department devise a mechanism/strategy to maximize students’ participation for all courses and that student evaluations should become a "metric" of the Department’s teaching performance.

The role of “Academic Advisor” for student counselling and mentoring was only recently introduced and it was too early to assess its effectiveness. Incoming students are now assigned a faculty member as his/her “Academic Advisor” who stays the same until the student's graduation. Faculty stated that only a small percentage of students actually seek help from their mentors and academic counsellors. In addition, more senior students were not aware of these changes. It is expected that this situation will change rapidly with the new law that poses stricter limits on the duration of the program of study and will require students to follow a more surgical approach to the planning of their studies.



## RESULTS

Please comment on:

- Efficacy of teaching.
- Discrepancies in the success/failure percentage between courses and how they are justified.
- Differences between students in (a) the time to graduation, and (b) final degree grades.
- Whether the Department understands the reasons of such positive or negative results?

Some Faculty members and undergraduate students expressed their concern about

1. the unacceptably large class sizes for some 1<sup>st</sup> and 2<sup>nd</sup> year courses;
2. the problem of low attendance in the Lectures and other classes for courses beyond the 2<sup>nd</sup> year.

These both shrink the efficacy of the teaching and the Department is aware of these problems. It is expected the new departmental building to help handling the 1<sup>st</sup> problem. The Department is also determined to find effective ways to stimulate attendance for solving the 2<sup>nd</sup> problem.

Furthermore, several students expressed the desire to have a little more exposure to the practical "engineering" part of their programme. They voiced the concern that the programme is too heavily gravitating toward the "theoretical" aspects of the discipline.

Based on the statistics provided in the Department's "Internal Evaluation Report", the average failure-rate of the students per course is unacceptably high, compared to the international norm. For instance, the course 23Y361 has a failure rate reaching 91% in the academic year 2011-2012. Furthermore, it is important to point out that 2 out of 3 courses that run in the first two semesters have an average mark which is below the "pass" mark. These failure rates are difficult to justify. The Committee's intention was to check several examination papers/questions including their corresponding model answers – and thus assess their quality, level and fairness. However, the limited duration of the site visit did not allow this assessment.

During the site visit, some members of the Committee observed some "bad practices" in the invigilation of the examinations that coincidentally were taking place during the EEC's visit. [e.g. students going, almost freely, in and out of the examination room to smoke, visit the restroom, discuss details of the exam questions, etc.]. The Examination mechanism/strategy should be revisited and "quality assurance" issues related to invigilation duties and the running of examinations should be addressed by the University and observed by the Department. This should provide proper and strict mechanisms for avoiding disturbances, maintaining vigilance against cheating and preserving a peaceful and unobtrusive examination room.

Finally, it should be noted that teaching takes place in several forms and there are both formal and informal opportunities to deliver it. Professors should be more conscious of the "role model" character of their work. When professors don't behave well and smoke, for instance, within the various parts of the building (places where smoking is not allowed), they certainly do not convey an image that would inspire students to take their role in society seriously and respect themselves for the value and potential they represent.

## IMPROVEMENT

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

The Department is aware of the problems associated its teaching activities and is determined to ensure a good-practice in teaching, learning and assessment is met. The Committee commends and encourages these efforts.

The EEC is aware of the intended role of the existing first-year introductory course to familiarise the students with Computer Engineering and Informatics. However, based on students' comments made to the EEC, the Committee believes that this course should be restructured to better serve its intended purpose. The EEC suggested that the Department should consider introducing an intense series of *Course Information Seminars* during the first few months to the incoming new students. These seminars would

- outline and paint the landscape of the current professional landscape in “research” and “development” worldwide;
- explain the big and not so big "problems" of the field in “layman’s terms”;
- provide the background necessary to address these problems;
- outline the undergraduate programme in detail with very clear connections on how it aims to tackle the “problems” highlighted as well as discussing the "prerequisite" material and inter-dependencies of the various courses.

Such an effort would greatly motivate students to stay involved and actively participate in their programmes of study without "getting lost" in the system - which was well received by many students, the CEID alumni association and faculty members alike.

## **C. Research**

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

### **APPROACH**

- What is the Department's policy and main objective in research?
- Has the Department set internal standards for assessing research?

The Department's research activities are healthy and involve faculty members, postdoctoral researchers, PhD research students and, in some cases, MSc/UG students.

The Department is active both in competitive national and international research and, in particular, in competitively funded European projects involving various international collaborators. The Department aims at strengthening the inter/multi-disciplinary aspects of its research, while further cultivating existing collaborations and strong links to leading research institutes and groups in Europe, North America and Asia.

The close proximity of the Computer Technology Institute (I.T.Y.E) provides an excellent opportunity for collaboration in, and support of, research projects. This also reinforces the Department's contribution to the local and national economic, technological and societal needs.

However, the Department has not set specific internal standards of research assessment. The department should specify clear merit-based metrics and standards for research output. For instance, these may be related to publications in high-impact factor journals and peer-reviewed conferences, citation index numbers, international visibility, local and international research community services, PhD supervision and research grants.

### **IMPLEMENTATION**

- How does the Department promote and support research?
- Quality and adequacy of research infrastructure and support.
- Scientific publications.
- Research projects.
- Research collaborations.

There is financial support for research activities (e.g., travel money per faculty member to attend conferences and events), which is sufficient for a few trips per lab per year. The faculty members use the budget to send PhD students to conferences to present their PhD research work.

The Department rewards exceptional research activities by reporting these activities on its website. The "Awards" site (reachable from the Department's main webpage) is complete and up-to-date. The department, however, could organize more personable ways to award exceptional research activities, e.g. a mention at a departmental event, a signed letter from the Head of Department, etc.

Faculty members make their research available online, and in most cases the information is

up to date. The pages on departmental seminars and conferences, however, are outdated by several years. These should be updated with the newest information for the benefit of the students. In addition, one seminar series announcement posted on a hallway was three (3) years old! Even though billboards are not the most popular means of advertisement for today's students, more should be done for a vibrant academic research environment.

The Department also supports a departmental library which makes several journals and periodicals available to students. The list, however, is far from complete and the students either rely on inter-library loan (which takes weeks) or on borrowing other people's legal subscriptions. Neither option is an acceptable or scalable solution. The university library should have complete subscriptions to IEEE and ACM conference proceeding, journals, periodicals, and other computer science publications as well as copies of books in their newest edition. Publications aiming to summarize recent research in computer science should be made available - such as Morgan & Claypool's Synthesis or NOW Publisher's Foundations and Trends series.

The PhD research students are happy with the infrastructure and the labs, as well as with the level of interaction with their PhD supervisors. They consider their research topics exciting and timely, and they are highly motivated. Their training includes opportunities to

- a) contribute to proposals for grants, thereby developing their ability to express and defend their ideas in writing,
- b) teach and help in courses (this takes only 10% on average and at most 20% of their work week), and
- c) give research presentations to practice their oral presentation skills and encourage cross fertilisation of ideas.

The PhD students expressed unhappiness with the stipend level although the EEC was not able to accurately determine the level of their funding. Its impression was that most of the students receive some kind of funding either as scholarships or from research grants to perform specific tasks and/or provide some teaching help in the laboratories.

The EEC would recommend that the Department introduce policies that would ensure transparency on graduate student funding. More importantly, the Department (and the University) should try to raise funds in support of PhD research students.

PhD student exchange programmes are announced on the Department's website under "news". The information is complete and timely. However, only two students in the group of 30 that the Committee met had the opportunity to go on a trip through the Erasmus programme.

The Department encourages high-quality internationally visible research and its scientific publications are at a satisfactory level with over 2 journal and 4 conference peer-reviewed publications (on average) per faculty member per year.

Although the Department attracts significant external research funding, the Department should encourage and facilitate more faculty members to apply and obtain research grants (only 63% of the faculty currently participate in funded international research projects). The

faculty members could, for example, use their allotted travel money to join European efforts in creating consortia and fostering collaborations.

Overall, the Committee concluded that the research infrastructure is of a very high quality. The research laboratory equipment is very good and up-to-date. The computer centre, university library, convention centre, and other buildings (including the new Department's building) are modern and offer all facilities needed for the Department to achieve its goals.

## RESULTS

- How successfully were the Department's research objectives implemented?
- Scientific publications.
- Research projects.
- Research collaborations.
- Efficacy of research work. Applied results. Patents etc.
- Is the Department's research acknowledged and visible outside the Department? Rewards and awards.

The EEC was shown several practical projects, especially in the communications area, that had resulted in software which was used by other researchers and industry. However, the EEC did not see

- any evidence of Intellectual Property (IP) protection through patents, copyright or trademarks;
- any policy discussing the assignment of IP between the University and individual researchers. Such a policy is of paramount importance in enabling industrial collaboration.

The EEC is cognizant of the difficulties and resources needed in pursuing a patent. However, it is of the opinion that the Department and the University should devote resources in protecting the IP generated by the University. The Department should also collaborate with the University to promote technology transfer through patents and spin-offs.

There are no patents as of yet and this is a big target for improvement for the Department.

Many faculty members have received significant recognition of their research in the form of best-paper awards, other rewards, and invitations to organize prestigious international conferences.

## IMPROVEMENT

- Improvements in research proposed by the Department, if necessary.
- Initiatives in this direction undertaken by the Department.

In addition to the suggestions above, following are some opportunities for improvement:

1. The department should encourage and, if possibly, fund memberships for all of its faculty members to computer societies such as IEEE, IET and ACM. Furthermore, the Head of Department should nominate faculty members for "Senior Memberships" and encourage and promote "Fellowship" nominations in these societies. These honours carry significant international weight.

2. The Department should increase collaborations with industry by leveraging the connections of individual members to the benefit of the students with invited talks and events. These are typically sponsored by the industry as job fairs. Such events can even start with many successful local (in Patras and in Athens) companies which are by and large led and staffed by alumni from this very department.
3. Research by new junior faculty members should be actively encouraged and supported by the Department by allowing them a higher budget for PhD research students and travel, and perhaps a lower initial teaching load. An experienced academic should be assigned to each new faculty members to serve a “Mentor” for the first few years of their appointment.
4. It would be beneficial for the Department to centralize admission of all PhD research students and monitor their progress through a semi-annual assessment process. Furthermore, a “qualification” mechanism before an examination committee at the end of the first year (in a form of a short research report, supported by a presentation and oral examination) can be a great motivation for students to establish their breadth of knowledge in the area of their research. This also provides a mechanism for keeping only students capable of obtaining a good quality PhD.
5. There is a lot of high-quality patentable research from both faculty members and PhD students in the department, with great industrial potential. Unfortunately, there is no straightforward mechanism to make patent applications in the Department for faculty members or students. The Department should collaborate with the University to promote technology transfer through patents and spin-offs and safeguard the intellectual property of its faculty members and students.
6. Several faculty members feel that student activists, some faculty members and the environment pose obstacles to commercialization of research results. The EEC strongly recommends that opportunities be identified to change the currently prevailing attitudes and stereotypes towards commercialization activities.

## **D. All Other Services**

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

### **APPROACH**

- How does the Department view the various services provided to the members of the academic community (teaching staff, students).
- Does the Department have a policy to simplify administrative procedures? Are most procedures processed electronically?
- Does the Department have a policy to increase student presence on Campus?

In addition to being serviced by central university organizations, the CEID department is serviced by a number of departmental facilities, infrastructure, organizations and active committees. There is a Secretariat consisting of a staff of seven (7) which deals with various student affairs such as registration, operational logistics, undergraduate and graduate studies, etc. For certain matters, the manager of the Secretariat reports to the University's general Secretariat office. Secretariat staff expressed that their work is well functioning and effective. They have frequent and fast professional interaction with university organizations when it comes to student data. In addition to the Secretariat manager, there is one staff dedicated to operations, one to the graduate program and three to records, electronic data entry and its maintenance. There is also one staff who schedules final exams for the department.

There is also a staff of five (5), known as "ΕΤΕΠ", who deal with more specialized student affairs such as educational needs, computing resources and labs. This staff maintains a computing centre and its infrastructure dedicated to the CEID and its students. In fact, the EEC was told that the central university computing resources were heavily influenced and benefited from the expertise and knowledge acquired by CEID in building and maintaining their dedicated computing centre. Other activities of this staff included the facilitation and reproduction of class notes, laboratory books and lab operational issues.

At the university level there is an organization catering to the administration of research needs of the department. The "Special Account of Research Contracts" (Ειδικός Λογαριασμός Κονδυλίων Έρευνας – ΕΑΚΕ) aims to facilitate the establishment and proper execution of faculty research projects. ΕΑΚΕ also administers the Caratheodory program. This program offers some funding to proposals on key and innovative ideas. These proposals are evaluated by external committees. It is viewed as a very positive program as its funding is very flexible allowing faculty members appreciable academic freedom in their work.

However, it appears that it was only recently that the services of ΕΑΚΕ have become competitive enough to attract more focused attention by the faculty members. Historically, many of the faculty members utilized the services of the Institute of Computer Technology and Press -Diophantos (Ινστιτούτο Τεχνολογίας Υπολογιστών & Εκδόσεων - ΙΤΥΕ). The EEC visited the ΙΤΥΕ and was given an overview of its operations. The EEC was very impressed by the capabilities and efficient financial health of the ΙΤΥΕ. Its scientific output as well as the commercialization of some of its work is commendable. ΙΤΥΕ should continue to operate in the same fashion and under the same principles with strong interaction with CEID faculty and external industrial and academic entities. It was conveyed to the EEC that the salaries

and operational expenses of the ITYE were completely covered by the projects awarded to it via competitive proposal submission procedures.

Additionally, there is a university wide new "Research Development Office", also known as "Innovation and Technology Transfer Office (ITTO)". It seems that ITTO has been set up to assist in cataloging significant research and, ultimately, assist in funding and securing Intellectual Property in top priority fields of research. However, this effort is in its infancy and has little substance. Direct use by the Department's faculty members was available by perusing the ITTO website (rdo/upatras/v1). The EEC believes that ITTO should become a priority at the university level and the CEID department should constantly try to find opportunities to co-develop an intellectual property strategy with ITTO. The university's investment to a holistic education will not reach its full potential if a strategy around intellectual property is not developed.

The EEC urges both ITYE and EAKE to seriously expand their activities and focus their efforts to facilitating the creation, licensing and commercialization of Intellectual Property Rights. Focus just on publications and free dissemination of knowledge is not good "business". Commercialization and licensing of Intellectual Property provides a very real and relevant acknowledgment and validation of scientific and engineering work. It also provides needed financial resources for further improvement of the department's research program and the ultimate professional placement of its graduates. This is particularly true to the University of Patras since it does not possess any endowments and depends overwhelmingly to public funding.

The central university services that benefit the Department directly and indirectly include Networking, Main Library, Student Exchange and Mobility (Erasmus Program), Assistance in organizing conferences, matching funds for the Andreas Mentzelopoulos Scholarship, Office of Public Relations, partial funding of students helping with the operation and monitoring of laboratories and, last but not least, matching funds for equipment through projects awarded at the level between 50,000 and 1 million euros.

There is a university wide office, ΕΣΠΙΑ, with adequate budget from ΔΑΣΤΑ (Δομή Απασχόλησης και Σταδιοδρομίας). This supports optional but competitive student internships ("πρακτική άσκηση"). At the university level, the program is funded by over 2.7M euros through August 31st, 2015. The CEID portion of the program is funded at the level of 300k euros through August 31st, 2015. Even though the program commenced in 2009, its actual implementation was delayed due to resistance from some of the student activists. In 2011 28 students from the 41 who applied, participated in the program for 54 available positions. In contrast, in 2012 41 students were awarded positions from 52 applications for 65 positions. These numbers show a good trend and a healthy competition. The program enjoys a low overhead and, interestingly, women comprise more than 50% of the students participating in it. The responses of the participants were very positive. The EEC urges the department to further advertise and promote this program.

From the tables of data gathered by the department it was observed that not many students participate in the student exchange program. When asked, students responded that the experience of such exchange programs has mostly social benefits and less so educational and/or scientific. Amazingly, they did not show much enthusiasm for the Erasmus program.



There is a new departmental building under construction. The location of this new facility is very near to the ITYE which has strategic importance and provides potential. This building nears completion and it is modern and very well designed. It has the potential of providing a major boost to the status of the Department and competes with similar state of the art buildings worldwide.

In general, the Department views that facilities and services offered to its students, staff and faculty are good and appropriate. Faculty expressed their satisfaction and gratitude, (especially when compared to other departments in the country) for the existence of funds for travel to scientific meetings and conferences. Apart from minor and the occasional adjustments and improvements, the EEC was not made aware of any major plans to change/improve services.

The Department tries to encourage the regular and active participation of students in their study program. For example, the department schedules an annual meeting where alumni are invited to talk to students on professional activities.

The Department does not have an “appraisal”-type mechanism. An appraisal mechanism should be devised for all departmental faculty members and staff with clear expectations and progress assessment criteria evaluated on an annual (or biennial) basis. This is important to retain and motivate staff and improve their teaching and research productivity.

## IMPLEMENTATION

- [Organization and infrastructure of the Department’s administration \(e.g. secretariat of the Department\).](#)
- [Form and function of academic services and infrastructure for students \(e.g. library, PCs and free internet access, student counseling, athletic- cultural activity etc.\).](#)

For the most part these services seem adequate. However, some issues need to be addressed:

- The *computerization of the records* especially for the graduate programs;
- The *time consuming and error-prone manual transcription* of undergraduate grades to electronic forms; and
- The *inadequate security provisions* for the records. For example, graduate student records are kept in file cabinets that are visible and can easily be broken in. The departmental server that keeps the records is located in an insecure room in the department. There is no security policy adhering to international standards that would ensure the safeguarding of personal records.

The CEID website needs serious updating and an effort to systematically improve the consistency of its information. There is some confusion of terms and names of organizations, especially when they are translated into English. For example, the Innovation and Technology Transfer Office (ITTO) is also called Research Development Office (RDO). Some faculty members do not have adequate or current information on this website. Some of the labs have little and in some cases no information on their websites. Some were last updated long ago (e.g. [http://lca.ceid.upatras.gr/index\\_en.html](http://lca.ceid.upatras.gr/index_en.html)).

There is a departmental library staffed by one librarian. This library houses various volumes of particular interest to CEID as well as undergraduate and graduate theses. It also has a small but functional study space. Students mentioned that they use the library on occasion and they have been helped by the procurement of papers that are not directly accessible at the university's main library (i.e. without special ordering). The main university library is well equipped and housed in a spacious, pleasant and very well-functioning building with a good infrastructure. In fact, the EEC saw students from the department studying at the main library but not at the departmental library. Some students and professors alerted the EEC to the fact that the membership and subscription level of the Main Library has been reduced from years past. This has caused some difficulty and delay in accessing certain publications, albeit not unbearable.

The area of Patras seems to have adequately rich cultural activities for a decent size city.

## RESULTS

- Are administrative and other services adequate and functional?
- How does the Department view the particular results.

Administrative services seem adequate.

## IMPROVEMENTS

- Has the Department identified ways and methods to improve the services provided?
- Initiatives undertaken in this direction.

The EEC feels that the CEID library is perhaps not fully needed. The EEC suggests that the essential departmental library needs be perhaps merged and accommodated by the Secretariat. It is essential that any realised cost savings be applied toward an increase in the level of subscriptions. For example, consider storing the student theses and some key monographs (such as CEID faculty monographs) with the Secretariat and converting them to electronic form so that there is no need for a departmental librarian and space. Instead, use some of the space currently used by the library creatively for study and open student areas for technical interactions (e.g. a whiteboard and a couple of chairs).

One point that could be improved is “data entry”. Apparently, students register for their courses electronically. Then, they print their registration information on a hard copy that is physically delivered to the Secretariat staff. Said staff subsequently transfer the data manually again in yet another electronic form for central administration by the university. The centrally administered data is accessed via a software tool that also allows a certain degree of statistical information extraction (e.g. how many students received a certain grade at a certain class in a certain year). When additional functionality is desired, the Secretariat staff places a feature request to the university which, in turn, redirects to an external company that develops and maintains the software. Secretariat staff expressed the desire for speedier response from the aforementioned external company. So, while in general the Department uses mostly electronic procedures in administrative tasks, improvements are still needed to allow the unification and/or integration of data management software. Additionally, the grades of the students are currently delivered to the students in hard copies. To minimize delays in conveying information and to reduce labour and supply costs, the grading information could be communicated electronically and reproduced in hardcopy form.

on an as requested basis. Additionally, graduate records are mostly kept in hard copy form. In addition to accessibility improvements and the reduction of unnecessary labour, complete conversion to electronic forms would increase data security. Sensitive student electronic data should not be stored locally, but on central university resources where comprehensive policies and security mechanisms should be applied to safeguard the integrity of the information.

Additionally, by talking to the CEID Secretariat staff the EEC identified a list of seven action items/subjects for improving the services offered to both students and faculty communities. These are:

- 1) Electronic etiquette and protocol;
- 2) Electronic conversion of now hard copied records of the Graduate Study Program;
- 3) Electronic submission of member requests;
- 4) "Digital Jump" : electronic interconnection of digital services (–e-Διοικείν);
- 5) Digital formal documents (i.e. requests, certificates, etc.), digitally "signed" documents;
- 6) Secure sign-in, Electronic records data security and integrity;
- 7) Secretariat staff training and performance incentive programs.

### **Collaboration with social, cultural and production organizations**

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

Only a small number of students participate in the Erasmus exchange program. Furthermore, no enthusiastic comments were made by the students about it. Perhaps Erasmus and other exchange programs like it should be better organised and funded for the benefit of the students. The EEC thinks that there are opportunities for improvement of the social and cultural aspects of student life. The exchange program can be turned into a very productive and invaluable experience for the students. In this effort, a focus on English taught in at least some of the classes could be a great catalyst.

On the other hand it was clear that the university has a strong base of alumni in the area. The alumni association includes many members who have started their own business and have had their business become "public" and/or participate in mergers and acquisitions. This was a very pleasant and commendable situation. The loyalty of the alumni appeared to be so strong such that many had their kids admitted by and enrolled in the department as students. The alumni association, however, was not aware of any need to financially support the department. The EEC suggested that opportunities be sought to engage the alumni association for modest funding to enhance the educational experience of the students through the establishment of scholarships or the donation of laboratory infrastructure.

Despite a loyal and active alumni association, no good records of the whereabouts of graduates are maintained. CEID has indicated that this situation will be mitigated in the future, but no plan was presented on how this will be accomplished. In fact, the Secretariat,

overwhelmed by students who are allowed by past law to extend their studies for very long time have little precise information on those who have not actively contacted the department. Hopefully, the new law will materially limit the total time required to complete one's degree, in the spirit of creating more solid engineers with some judicious compromise on personal and circumstantial flexibility.

In Section 1.2 of the department's Internal Evaluation Report (IER) employers from Industry are not mentioned as an integral part of the "community" in its preparation. Opportunities should be continuously sought to engage the "employers". It could materially improve the overall value of the department's work. For example, CEID should consider establishing an "advisory board" consisting of among others, external members from industry. Employers, as receivers of the university output, are an integral part of any internal evaluation report.

There are no female academics on the Department's faculty members. The Department stated that although opportunities were presented in the past and female candidates had applied in isolated cases, these opportunities did not materialize. The EEC believes that it is important for the department to actively seek participation of female academics and other minority scientists and engineers in its programs. For example, several female alumnae in the alumni association could be excellent role models by virtue of their entrepreneurial success in creating and running businesses. Additionally, high profile seminars could be structured that would include prominent female scientists and engineers. Interestingly, and showing a level of somewhat unexpected maturity, many female students did not see the absence of minority professors as an issue. Nevertheless, the EEC strongly urges the department to achieve a more balanced presence of minorities on all its faculty ranks.

Finally, the EEC observed that a large number of faculty members are graduates of the Department. The EEC believes that these faculty members are highly qualified and are contributing to the reputation of the Department as a place of excellent education and research. However, hiring one's own graduates in faculty positions should be balanced with also hiring faculty members from other Universities to create a healthier and diverse makeup.

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

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

Please, comment on the Department's:

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

The main objectives of the Department are:

- 1) The provision of high quality education at both undergraduate and postgraduate levels;
- 2) Research excellence in a number of research fields relevant to the remit of the Department, i.e., Computer Engineering and Informatics.

Overall, the EEC feels that strategic planning and development at both Departmental and University levels is seriously constrained by the legislative framework imposed by the State and associated budget allocation. In order for the Department to fully achieve its objectives of excellent education and research in the context of the global economy, it is necessary to have more flexibility in its operational and planning framework, which relates directly to staff recruitment, student numbers, facilities and services. In what follows, the Committee's observations/conclusions in terms of strengths, weaknesses, opportunities and threats are presented.

#### **Strengths**

- 1) This was the first Department offering undergraduate programmes in Computer Engineering and Informatics in Greece and maintains a leading role in the provision of studies in the field.
- 2) The Department includes a good number of talented academics with strong track records of internationally recognised research.
- 3) It attracts the top tier of qualified students. The majority of its students are very well motivated and eager to develop themselves.
- 4) The management of the Department is proactive to the needs of its staff and students.
- 5) Very good collaboration between members of staff at all levels, and a student body that respects and appreciates the efforts of Departmental staff.
- 6) It offers a core undergraduate programme with a wide range of Computer Engineering and Informatics modules, and three specialist MSc postgraduate programmes.
- 7) State-of-the-art specialized facilities (both laboratory and computational) facilitate the provision of quality research.
- 8) A good number of academic staff publishes at internationally leading peer-reviewed journals and conferences.

- 9) Many faculty members have received significant recognition of their research in the form of best-paper awards, other rewards, and invitations to organize prestigious international conferences.
- 10) Academic staff are successful in attracting significant levels of research funding from EU and national research programmes, either directly through the University or through “ITYE”.
- 11) The Department has good links with professional bodies (e.g., TEE) and industry, at local, national and international levels. But these links could be strengthened even further.
- 12) There is a record of established academic exchange collaborations with Universities in the EU and worldwide, involving both members of staff and students.
- 13) Availability of state-of-the-art University facilities such as the Library and Athletics Centre.
- 14) A new departmental building is under construction.

### **Weaknesses**

- 1) The staff-to-student ratio is unacceptably low, and is not representative of that of a research-oriented Department. This poses a massive threat in the reputation of the Department in terms of the provision of high quality teaching and the further growth of research activities. The number of incoming students must be reduced, which will also increase their overall quality.
- 2) The first four semesters in the undergraduate programme are heavily loaded in terms of lectures, laboratories and tutorials. This poses a major problem in the ability of students to absorb and reflect on the learning material.
- 3) Some of the modules have unacceptably high failure rates. The Department should introduce an internal quality procedure, where examination questions are moderated to ensure that they are fair, of the right level and can be successfully answered within the allocated time.
- 4) There is a significant number of registered perpetual students. This has a negative impact on several dimensions of the teaching and evaluation process as well as on the logistical organisation of the Department. While this is an issue affecting higher education students across the sector in Greece, the Department should be pro-active and carry out an analysis of bottlenecks in the teaching provision system. Communication with these students so that they can feel part of the university community may be also an option.
- 5) An excessively large number of courses are taught in the undergraduate programme. This poses a problem for both students and staff in terms of loading. The undergraduate programme needs to be rationalised, by evaluating the learning outcomes to be achieved at the end of each year of studies, and suitably merging and/or eliminating modules; minimal overlap and proper breadth and depth of material covered, as per international norms, should be ensured.
- 6) The number of academic staff is small compared to the student population and the range of teaching and research activities. The majority of academic staff are senior (Full and Associate Professors), while there is a small number of Assistant Professors and Lecturers, which demonstrates a rather intermittent recruitment policy.

- 7) The Committee feels that academic loading is non-uniform, with some staff carrying out the bulk of the work, while others are contributing unevenly. Hence, the research load and the advising of "Διπλωματικές" are not optimum. With this many students, **every** faculty member should supervise at least a few "Διπλωματικές".
- 8) Research output quality varies amongst faculty members. An academic mentoring system, coupled with a yearly appraisal process, would assist faculty members of staff in achieving its potential and developing themselves.
- 9) A significant number of academic staff carried out their PhD research studies at CEID. In order to maintain cross-fertilisation and outward-looking research activities, more external faculty recruitments should be encouraged.
- 10) Female academics, minorities and people with special needs should be encouraged to join the Department. The Department and the School of Engineering should do more to attract these groups in their faculty members.
- 11) There is a lack of knowledge transfer activities at the departmental level. Given the number of excellent research academics, and the strong student potential, further impact is expected in terms of patents and transferring knowledge to industry, possibly through joint spin-off companies.
- 12) The Department needs a forward-looking vision in terms of its position on the international arena. The vision statement should be backed up by specific objectives in terms of its core processes of teaching, research and knowledge transfer. These objectives should be quantified in terms of Key Performance Indicators on a yearly basis, to provide feedback in terms of the efficiency of the processes.
- 13) The Department has introduced the concept of "Student Advisor" - however this is not a formal, timetabled activity. The Student Advisor should be able to assist students, particularly, junior ones in the first and second year of studies, so that they may be more easily integrated in the Department.
- 14) There are no formal procedures to support the training of research students. The Department should introduce a structured programme to assist students in the development of their research skills, scientific writing and presentation skills. In addition, quality control procedures to detect issues related to the achievement of their research goals should be assessed on an annual basis.
- 15) There is limited funding to support PhD studies. The Department should develop procedures to provide some support to PhD students in the form of scholarships, for instance, by making use of fundraising opportunities with alumni and industry, as well as the partial use of research overheads, in collaboration with the University authorities.
- 16) In the current Departmental building the teaching rooms and amphitheatres cannot easily accommodate large student numbers. In addition, the appearance of the common areas needs to be improved.
- 17) There are no common rooms for undergraduate, postgraduate and research students. Common rooms assist in the development of a 'community', where students share experiences and communicate with each other.
- 18) Annual personal review, development and feedback mechanisms for faculty members and other staff could be considered by the Department and the University. This is important for all staff in order to retain and motivate them and improve efficiency.

### **Opportunities**

- 1) Further automation of student-facing processes (e.g., marking and transcripts) will contribute to increasing the quality and efficiency of student services.
- 2) The Department should increase its interaction with Alumni in order to create further training and funding opportunities for its students and recent graduates.
- 3) The Department should produce a knowledge transfer plan to put into use its research potential in order to innovate, in partnership with local, national and international organisations (both major industry and Small and Medium Enterprises), possibly within the setup of the Patras Technological Park.
- 4) Further increasing the collaboration with the Department of Electrical and Computer Engineering in areas of joint remit so as to increase critical mass as well as coordinate curriculum and reduce overlap.

### **Threats**

- 1) The lack of resources in supporting the activities and facilities of the Department is of considerable concern.
- 2) A major factor of uncertainty is the completion of the new building for the Department. Although this is more than two-thirds complete, the necessary funds for its completion have not yet been approved.
- 3) The number of academic staff is critically low and needs to be urgently addressed in conjunction with decreasing student numbers.
- 4) The low number of 407-category teaching staff (see page presentation A3) will significantly overload the faculty staff with more teaching duties and this will have a negative impact on their research activities.
- 5) Urgently addressing excessive academic loading to ensure that all members of staff are treated properly and are given the appropriate means to deliver high quality teaching and research.

### **Other Recommendations**

- 1) Seek ways to reduce the CEID Library real estate footprint, perhaps by merging some functionality with the Secretariat and use cost savings to ensure better access to journals and periodicals to mitigate recent cuts by the main Library.
- 2) Execute plan for automation of records and processes, e.g. digital transition of records and processes of the Graduate Program, class registration, data security and integrity, etc.
- 3) Intensify the effort to promote the internship scheme and take full advantage of its potential to benefit students' careers and strengthen the department's relations with industry.
- 4) The Department should urge and drive, if not "push" for, a balanced, university wide mentality of educational AND Intellectual Property strategy. CEID faculty members should seek opportunities to work with the Innovation and Technology Transfer Office (ITTO), ELKE and, last but not least, ITYE, with appropriate commercialization end goals instead of just scientific publications.



- 5) Student exchange programs (e.g. Erasmus) should be better utilised and expanded. Perhaps in conjunction with workshops and seminar series. This would augment the social aspects of the exchange with a professional and deeper educational experience. Several courses should be taught in English for the long term benefit of the Department's students. That would also facilitate the expansion of the exchange programmes.
- 6) The Department should consider the establishment of an “Advisory Board” that would review educational and professional matters. This board should include representatives of employers as well as professional and entrepreneurial alumni.
- 7) The webpage of the Department needs to be re-designed so that is both functional and representative of the achievements and services offered. The consistency of information should permeate seamlessly from the CEID to the School of Engineering and, finally, the University of Patras at large.
- 8) PhD theses could be written in English to enhance the visibility of the research outside Greece. In addition, some members of the Committee believe that the School of Engineering should consider offering some, if not all, of the upper level courses in English. The engineering graduates should be well armed to provide technical services and develop and market products to the international community.

## ***F. Final Conclusions and recommendations of the EEC***

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

Conclusions and recommendations of the EEC on:

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

In order for the Department to fully achieve its objectives of excellent education, excellent research and strike an optimum balance between "teaching" and "research", it is necessary to have more flexibility in its operational and planning framework, which relates directly to staff recruitment, student numbers, facilities and services. The EEC presented in Sections A to D of this report its main findings on the curriculum, teaching and research activities as well as on the various departmental services. The main observations and conclusions of the EEC were then grouped in Section E in terms of strengths, weaknesses, opportunities and threats. In this final section the Committee summarises its main conclusions/findings in the form of the following recommendations to the Department:

1. The Department should develop and adopt a modern but flexible/adaptive strategic plan with clear aims, milestones, quantitative measures, evaluation criteria and quality assurance procedures to steer the Department's activities.
2. The Department should improve on its academic practices and facilitate students learning. The undergraduate programme should be thoroughly revised with a realistic and modernized curriculum with prerequisites courses towards diverse specializations. In particular,
  - a more 'learning outcomes orientated' approach should be adopted,
  - the number of courses should be rationalized/reduced - especially in the early years,
  - some courses should be revamped and avoid unnecessary overlap of material,
  - all pre-requisite courses for each optional course should be clearly stated,
  - the assessment procedures should be improved and continuous assessment should be implemented,
  - interaction between staff and students should be increased/improved,
  - the "Student's Advisor" role should be enhanced and formalized.
3. The Department should devise incentives to ensure that the undergraduate students participate in educational activities during each semester. For example midterms, homework, quizzes/tests that count towards the final grade are incentives that could be used.

4. The PhD research programme should have a “structure” with clear PhD progression stages - providing intermediate milestones in student’s work towards the final goal of the PhD thesis.
5. The work load of the faculty members needs attention to better balance teaching duties and research activities.
6. The number of undergraduate students is too large and should be reduced to a more manageable size. There is a huge number of perpetual students which is, however, a pathogenic and chronic problem of the Greek University system that should be mainly addressed by the State.

Overall CEID is a successful research department and the Committee was impressed by its research laboratories and building infrastructure and the University Library facilities. Moving the Department to its brand new building in the near future will positively influence not only the working lives of both staff and students but also the Department’s teaching and research activities.

Finally, the Committee thanks the Head of Department and staff for their hospitality during the visit and for their willingness to discuss matters in an open and frank way.

## The Members of the Committee

| Name and Surname             | Signature |
|------------------------------|-----------|
| 1. Athanassios Manikas _____ | AM _____  |
| 2. Nikitas Dimopoulos _____  | ND _____  |
| 3. Nick Buris _____          | NB _____  |
| 4. Panos Liatsis _____       | PL _____  |
| 5. Anastasia Ailamaki _____  | AA _____  |