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HELLENIC QUALITY ASSURANCE
AGENCY
FOR HIGHER EDUCATION

EXTERNAL EVALUATION REPORT

DEPARTMENT: **DEPARTMENT OF MATHEMATICS**

UNIVERSITY: **UNIVERSITY OF IOANNINA**

October 2011

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External Evaluation Committee

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

- 1) Professor Athanase Papadopoulos (President), University of Strasbourg, France
- 2) Professor Basilis Gidas, Brown University, Providence, Rhode Island
- 3) Professor Stamatis Koumandos, University of Cyprus, Nicosia, Cyprus
- 4) Professor Demetrios Papageorgiou, Imperial College, London, United Kingdom.
- 5) Professor Alekos Vidras, University of Cyprus, Nicosia, Cyprus

Introduction

I. The External Evaluation Procedure

The visit to the University of Ioannina took place on October 17-18, 2011. Initially the site visit was for three days (October 17-19). But because of a nation-wide strike on October 19 (and October 20), HQAA decided that the EEC's visit be completed in two days. The new schedule was very effective and the visit very well organized that the shortening of the site visit from three days to two days had no effect on the evaluation process.

On October 17 the committee initially met with the Rector of the University (Professor Triantafyllos Albanis), the Vice-Rector (Professor George Kapsalis), the Chairman of the Mathematics Department (Professor Dimitris Noutsos), and the four members of the committee that generated the Internal Evaluation Report (IER). The Rector made a presentation about the history and goals of the University as a whole. Subsequently the EEC, accompanied by the Rector, Vice-Rector, the Chairman and the IER members visited the central library, student cafeteria, and other facilities of the University. Then EEC met with members of the faculty of the Mathematics Department; during this meeting, the Chairman presented the department's history, structure (the department has four Divisions), and overall goals of the Department both from the point of view of its educational and research missions. During this meeting the faculty and Chairman responded to a number of questions posed by the EEC committee. After the meeting, individual members of EEC had conversations with individual members of the Faculty.

On October 18, EEC met privately with the Administration and secretarial and technical staff of the Department. Subsequently EEC met with faculty members of each Division separately. EEC also met privately with a group (about 30) of undergraduate students as well as with some Master students and four current Ph.D. students. Subsequently, EEC members had discussions with individual members of the Department about a variety of

topics including research projects, educational issues concerning undergraduate and graduate studies. EEC members met individually with recent hires that provided information about a variety of topics including the factors that attracted them to the University of Ioannina and how they are supported by their colleagues from the point of their research, teaching, participation in conferences, and visits. EEC also visited the computer facilities of the department, and the Niarchos building which has conference rooms, class rooms, a video conference facility, guest rooms, and other facilities.

The following documents were made available to the Committee:

(1) The departmental Course Guide (Προγραμμα Σπουδων), (2) The Internal Evaluation Report (Εκθεση Εσωτερικής Αξιολόγησης), (3) Electronic and hard copies of all the presentation material by the Rector, the Chairman, and the Directors of the four Sections, (4) Examinations in a variety of courses, (5) EEC inspected a number of textbooks by the Mathematics faculty, (6) the Departmental WEB site contains brief CVs – in addition a number of more detailed CV's was given to EEC, (7) written research projects of some the faculty members

II. The Internal Evaluation Procedure

EEC felt that the Department and the Administration did an excellent job in preparing the visit. The presentations by the Rector, the Chairman, and the Directors of the four Divisions were informative. Request and questions by EEC were promptly addressed. The Internal Evaluation Report (IER) was well organized and highly informative, and written according to the guidelines set by HQAA.

EEC appreciated very much that the Chairman and the four members of the IER committee were constantly available or accompanying the Committee. EEC also appreciated the fact that the Rector spent considerable time with EEC and provided important input about the vision of the University. The Committee especially appreciated the fact that the Vice-Rector (Professor George Kapsalis) provided a great deal of support to the Committee, was with the Committee all the time – even during technical discussions though his specialty is far from mathematics.

A-1 Curriculum-Undergraduate

APPROACH

The Department of Mathematics of the University of Ioannina operates as an independent academic unit since 1970. The original mission of the department appears to be the mathematical education of future teaching staff in the secondary education sector. This was implemented about 40 years ago in order to accommodate the high demand for tertiary education in Greece during that period. Presently, the curriculum has been suitably modified and updated in areas such as computational mathematics, statistics and operations research. In addition to undergraduate and graduate education the department pursues research in the

mathematical sciences. Specifically, the curriculum prepares students for careers in secondary education, careers in sectors of industry requiring mathematical skills such as statistics and programming, and continued training in research careers in mathematics.

A standing Curriculum Committee has been formed with the goal of revising the existing curriculum in the near future and with the aim of adapting it to the new University law.

IMPLEMENTATION

The structure of the coursework consists of two cycles of study: (i) twenty Compulsory Courses, almost all of which are taken by the students in the first four semesters, (ii) twenty elective courses.

Each of the Compulsory Courses consists of at least 3 hours of lectures and 2 hours of problems sessions given by the lecturer – basic core courses, such as Advanced Calculus I and Linear Algebra I, consist of 5 hours of lectures and are offered in the first semester. The committee feels that the content of these courses is sound and provides students with a solid mathematical background. However, the total number of contact hours per week in mathematics courses ranges from 20 in semester one to 27 in semester four, and the committee feels that such a load is challenging for freshmen.

The second cycle of 20 elective courses begins in the fifth semester (students cannot take electives in the first two years). These elective courses consist of three hours per week of instruction and no problems sessions. There is a large number of electives to choose from, typically around sixty. Such wide choice allows students to specialize in different areas. However, the committee observed that this large number of courses may be a reason why the number of enrolled students in many courses is low, and indeed the number of students taking exams is in many instances just a handful. On the other hand, there is a large number of students enrolled and examined in compulsory courses (as many as 400 students), making modifications such as continual assessment very difficult (in meetings with undergraduates the committee was informed that such assessments are desirable).

The department has an experienced instructional staff that works at its limits in educating the large numbers of incoming students every year (approximately 250 or more enter each year). The committee feels that some relief could be gained by streamlining the elective courses offered and in particular cancelling undergraduate courses with very few students. Any attrition in the total number of faculty would overturn the fine balance of student to staff ratio and adversely affect the educational mission of the department and the university.

RESULTS

The Department's educational goals are achieved at varying levels of success. A small number of graduates of the Department are admitted to continue their studies at the Masters or PhD levels in well-respected Universities at home and abroad. On the contrary, a significant number of students have a prolonged period of studies whose average varies from 6 to 6.5 years (we will address this issue below). There were no data available for the career paths of graduating students and hence it is difficult to assess the effectiveness of the curriculum regarding employment in sectors other than education.

We perceived a staffing problem as far as the support teaching (e.g. teaching assistants) is

concerned; this would help with the compulsory courses which have a large teaching load, as mentioned earlier. The committee feels that most (if not all) of the compulsory courses can be taught by faculty with any research profile. In addition, creating more sections in the first two years of courses would improve the functionality of the curriculum, though this may not be a straightforward matter given the limitations of student/staff ratio and departmental facilities.

IMPROVEMENT

A departmental Curriculum Committee has been formed and the EEC was informed that the curriculum will be revised to comply with the new University Law. This is a good opportunity to make lasting modifications that address issues such as the relatively long time to completion of the degree and the low final mark of the degree. More discussion of these issues appears in the Teaching Section below.

A-2. Curriculum-Master/Doctoral Program

APPROACH

The current Masters level program provides 4 areas of specialization: 1. *Mathematics (Analysis-Algebra-Geometry)*; 2. *Statistics and Operations Research*; 3. *Applied Mathematics and Engineering Research*; 4. *Computational Mathematics and Computer Science*. The department has been planning to offer an additional program in *Mathematics for Education*. The EEC feels that these areas of specializations have been drawn along the academic division of the department into four sections. Given the total number of Masters students involved (typically 10-15), the EEC feels that a more streamlined and interdisciplinary approach would be more appropriate (we return to this in Section F, last paragraph “**Specializations for Masters Degree**”)

There is a standing postgraduate studies committee that supervises course staffing and curriculum updating for the programs.

The goal of the program is to produce graduates with solid mathematical education and mastery in the areas of their specialization and increased ability to collaborate with scientists in other disciplines. The graduates of the Statistics and Operation research program are expected to be also employed in industry.

The program offers thirty one courses in the specialization Mathematics (14 Analysis, 8 Algebra and 9 Geometry), 23 courses in Statistics and Operations Research, 11 in Applied Mathematics and Engineering Research and 22 in Computational Mathematics and Computer Science.

The Doctoral program is research oriented and aims to producing competent scientists who will potentially staff Academic Units – out of nine recent graduated PhDs six were employed in academic departments as faculty or postdocs.

The Masters and Doctoral programs have been approved first at Departmental level (including academic faculty members and students), then at the University level and finally ratified at the Ministry of Education level. □

IMPLEMENTATION

One of the main obstacles in implementing the Masters curriculum is the small number of students and the large number of specialization areas and courses (some specialization areas attract larger numbers than others, albeit small, e.g. Statistics and Operations Research). The courses seem to reflect the immediate interests of faculty members and the committee feels that improvements can be made especially in the specialization in Applied Mathematics. A possible direction is to produce a modern interdisciplinary degree, such as a Masters in Scientific Computing, based on the strengths of the new hires and expertise in Numerical Analysis and computing. It is also noted that due to the small numbers of students involved, faculty pay particular attention to their students (e.g. offer reading courses on a one-to-one basis). This has produced results since some of these students go on to complete PhDs and obtain academic careers.

RESULTS

Many of the graduates of the Master's program have gone on to matriculate in the Department's own Doctoral Program, as well as in well-respected pure, applied mathematics and statistics programs abroad. It should be mentioned that the Ph.D. Program had 9 graduates in the last six years, 5 of whom are employed as academic staff members, 2 as visiting academic members in Greek Universities and 1 has a postdoctoral position in a University abroad. Some of the scientific results produced in the Doctoral program have been published in international journals of good quality. This is a good track-record and a sound basis for the department to build on, especially in the light of a number of new hires and the opening of the department in new directions. The department does not have any doctoral scholarships (except a limited number of Herakleitos programs) to enable it to expand on the current state of affairs.

IMPROVEMENT

It is not clear to the committee whether the department has plans to streamline or unify its Masters programs. The committee believes that such actions would modernize the programs offered and help in attracting foreign students from neighbouring countries. The latter is something that has been outlined as a plan for improvement by the department.

In addition, providing financial support in the form of teaching assistantships would also attract many good students to pursue doctoral studies in the department.

B. Teaching**APPROACH**

The basic teaching formula combines classroom instruction with problems sections, mostly in a 4hr/2hr weekly combination for the compulsory courses, and 3 hours classroom instruction per week for the elective courses. There are no recitation classes for selective course, but because of the smaller number of students in these classes there is a great deal of flexibility in following the needs of the students. The computer science courses include laboratory classes which have to be given in several sections due to the large number of

students involved. The teaching formula for these courses is 3 hours classroom instruction and 2 hours computer/laboratory class.

The nominal student/staff ratio is above acceptable norms and the committee feels that any reduction in faculty numbers would adversely affect the quality of the education. A clear issue is the instructional load required in the compulsory courses; these are always offered in two sections during the first two semesters, and the EEC was informed that the examinations of only two courses are often different for different sections. The committee believes that this is not good practice and needs to be addressed.

While the number of laboratories and hardware equipment is adequate, it was pointed out to the committee that there are insufficient financial resources to support an appropriate number of licenses for mathematical software such as Maple, Matlab, Mathematica. This is an issue to be addressed at the highest University level because the computer and laboratory facilities are heavily used by the students and are an integral part of the students' educational training.

The impression the committee had during discussions with undergraduate students was that the availability and out-of-class contacts with faculty, varied greatly. The committee feels that it would be of great help to the students if the department explored and implemented office-hours sessions for each taught course. This information could appear in the class syllabi mentioned above. The committee is happy to note that the department is implementing academic advising starting with the 2010/2011 year's incoming students, a process that will assist the students greatly and help reduce time to completion of the degree.

Class notes and texts books, most of them written by the instructors, are available to the students for each course. However, EEC feels that some of the textbooks need to be updated to contain more modern and motivating material. The committee learned of a new interesting course on Computational Statistics recently designed by a recent hire in the Statistics group – the course aims at covering modern computational tools in statistics and its applications. Such courses are very important in motivating the students. The committee encourages the design of such courses – and recommends that the Department rewards such efforts.

While the traditional final examination system is followed, in many of the courses it would be more appropriate to have (at least) one mid-term exam in addition to the final exam. This will be useful from the point of view of following the progress of the students, and it will be more fair to the students from the point of view of the final grade. This was explicitly expressed by the students during discussions with the members of the committee. It is a standard practice in most of the universities, the final grade in undergraduate courses to be based on (at least) one mid-term exam, a final exam, and homework (or projects in high level courses).

IMPLEMENTATION

The content of many of the elective courses is reviewed and updated using the approval of the General Assembly (Geniki Syneleusi) of the department. From the material made available to the committee (books, class notes, examination papers) it is clear that the teaching procedures of the Department are good.

After completing specified groups of elective courses, students can obtain a degree of specialization (for example, degree in Mathematics with a certificate in Statistics and Operations Research, etc.). At present the Department is trying to revitalize the practical training program with local companies, something that has been successful in the past.

Recently a teaching evaluation was introduced in order to obtain the students' feedback. The department plans to use this information to improve its curricula.

RESULTS

The students we interviewed appear to be, by and large, satisfied with their education.

There are however several issues of concern:

- (a) It would be preferable to have more sections with smaller numbers of students with a common exam -- currently there are typically two sections in basic compulsory courses with different exam for each section.
- (b) The examination papers should contain problems of varying degree of difficulty, for example with multiple parts which become progressively harder. This helps assess and reward the understanding by the students of basic material, and should enhance the effort the students put into preparing for exams. The relevant exam papers we saw are demanding and do not reward the students that work hard.
- (c) As pointed out earlier, the evaluation of the students is based only on the performance in the examination at the end of the semester. The students themselves pointed out, and EEC concurs with their suggestion, that their assessments would be more realistic if they had additional exams such as a mid-term exam.

The above issues partly explain the fact that the average time-to-degree is 6 years rather than the expected 4. The deterioration of Mathematical Education in Greek high schools also contributes to this problem.

From the available data, the average final degree grade is 6.05/10. There is only a percentage of 0.32% of students that managed to achieve an overall degree of Excellent (8.5/10 and above). EEC feels that these grades may not reflect fully the knowledge and abilities of the graduating students, and possibly puts them at a disadvantage in the job market or the pursuit of graduate education. The Department needs to address these issues.

IMPROVEMENT

The Department has proposed several methods and ways for improvement. The role of an official "undergraduate student advisor" has been initiated recently, and could alleviate some of the problems above. In addition, it would be good practise to make consultations with the advisors compulsory as is done in many institutions abroad. Also, the introduction of new technologies in the teaching procedure might have a substantial effect here. EEC was informed that the department plans to revise the examination system by introducing alternative forms of evaluation such as midterms, homework, and student projects. The committee encourages the department to follow these efforts through to completion. The Department takes into account the students' evaluation forms and seeks a creative interaction with them. We expect the younger members of the department to take the lead in these efforts in order to bridge the apparent gap between students and faculty.

C. Research

APPROACH

This department is based on four sections: A: Mathematical Analysis (9 faculty); B: Algebra & Geometry (7 faculty); C: Probability, Statistics & Operations Research (5 faculty); D: Applied Mathematics & Engineering Research (11 faculty). Sections A and D can be considered to be the founding elements of the department with the former emphasizing the theory of differential equations and the latter emphasizing numerical analysis (more specifically numerical linear algebra), computer science and mechanics.

The department's main policy and objective in research is to encourage publications in high quality journals and to use such scholarly activities in evaluating promotions. For faculty appointments and promotions the Department follows standards set by the University rules. However the committee suggests that the Department develop its own quantitative measures of scholarship and productivity that go beyond the number of papers, the number of non-self citations, and the h-factor. Though not required by the University and the Ministry of education, EEC also suggests that the Department solicits letters of recommendations from international experts in the field of the candidates.

Regarding the process of promotions, the EEC understands that the department carries out this process within the confines of the national law. However, the committee did not see any evidence of strategic efforts by the department in the identification of excellent faculty members and the facilitation of their promotion. The committee feels that such internal assessment standards are vital for the long-term success of the department, both in attracting but also retaining the best people. It is the view of the EEC that there should exist mechanisms to assess the performance and progress of starting and mid-career faculty members. Such a process would be highly beneficial to attracting and retaining the best candidates and raising the research and scholarly profile of the department.

Prospective doctoral students must have a Masters degree from Mathematics UoI or equivalent and complete an interview for admittance. Once a doctoral student is accepted and declares a research topic (she/he may state the name of a supervisor at this stage), they become a doctoral candidate and a three-member dissertation committee is formed. They can take courses during the first year and beyond. The three-member committee (one of whose members is the supervisor), monitor the student's progress. There is a lowest time to completion of six terms (3 years) and an upper limit of twelve terms (6 years) from the moment a student becomes a doctoral candidate. The final thesis is examined by a seven-member committee that includes the three-member dissertation committee and a doctorate is awarded only if at least five members of the seven member committee approve.

IMPLEMENTATION

Members of the department publish in some of the top journals in their field and this is commendable. The committee notes that the sections of Algebra & Geometry and Statistics demonstrate, on the whole, vitality and have coherent research programs. This is corroborated by their local and international collaborations, participation in conferences and research visits. The EEC also believes that the recent hires, in the areas of Analysis, Applied Mathematics and Statistics are of high quality, and this reflects true leadership by the senior members of the department. The committee feels that this practice should not only continue but should in fact be strengthened and supported by the department, the administration and the State. Due to numerous imminent retirements, there is a unique opportunity of realizing the re-building of the department along the lines already being practiced by hiring top quality young researchers of international stature.

Current external funding consists of two Herakleitos PhD fellowships (in previous years the number of fellowships was 5-6 per year). However the committee feels that there is a great deal of potential for securing funding not only for fellowships but also for research support in general. This conclusion by the EEC is based on the fact that the new hires along with members of the Statistics and Algebra/Geometry groups have ongoing projects that are important in medical and other technological applications or projects at the forefront of modern pure mathematics. Such scholarly activities are highly fundable. The EEC is happy to note that such proposals have been submitted by members of the Applied Mathematics group in collaboration with medical schools in Greece.

The research infrastructure is very good. There is an excellent university library with subscriptions to numerous academic journals and text books. In addition, the department has its own mathematics library which is spacious and is well-equipped with technical text-books and journals. The computational facilities in computer labs are adequate but are in the process of being updated so that tens of new workstations will be available for research and teaching. In addition, each faculty member has a personal computer in their offices; on average these are updated every five years. The situation with software is not as good – there are limited licenses in modern packages such as Matlab and Mathematica which appear to be prohibitive due to cost. The EEC is happy to note that there is a dedicated person for technical support whose role is to keep the hardware and software running and solve day-to-day operations problems. All computers run Microsoft Windows and there are no Linux-based systems; the latter may be worth exploring due to their potential of running stable freeware software and possibly be more suitable for research and scientific computing. There are also several facilities in the university that can be used for research conferences and workshops, and the department has taken advantage of these in the past. It is the view of the EEC that the UoI is an attractive place for conferences and workshops in mathematics and the facilities available for such activities are excellent.

RESULTS

As indicated above the EEC feels there are excellent ongoing projects and collaborations. It is essential that these are supported at the departmental and higher levels. In particular the EEC recommends that the limited departmental funds which are available for research

should support activities such as participation in national and international conferences, facilitation of collaborations and research visits. Clearly support for such research activities is vital in raising the department's research profile and is particularly important for early and mid-career faculty who are establishing themselves on the international arena. It is also important to have a mechanism to support participation of PhD students in conferences in order to broaden their perception of cutting-edge scientific research in their specialty field and mathematics in general.

IMPROVEMENT

The EEC understands that there will be a substantial number of retirements in the immediate future. The EEC is aware that due to the financial crisis it may be difficult to replace all these retirements. However, the committee strongly recommends that all or at least a large number of these positions, are replaced by young mathematicians of at least equal calibre as recent hires. This is vitally important if the department is to achieve the goal of becoming one of the top Greek mathematics departments that combine state-of-the-art research in pure and applied mathematics.

D. All Other Services

APPROACH

The secretarial staff is excellent – better than in many high caliber departments that members of EEC know. We met with 6 out of 7 secretarial staff – they are pleasant, highly qualified, and very efficient, some of them have Ph.D. degrees; some have studied abroad and speak perfect English. In addition we met with the computer manager of the Department. He is also excellent, very pleasant and very knowledgeable.

The infrastructure facilities (libraries, cafeteria, registrar's office, and other facilities) for faculty and students are excellent and modern. The students get free meals at the university cafeteria. The rents they pay for getting university housing depends on the income per person of their family, and for poor families the rent is low. This is an excellent policy from the point of view of attracting students, and for increasing the student presence on campus.

EEC visited a student computer laboratory. A spacious, comfortable, and modern room with about 30 computers used for classes requiring computer support. Two other rooms are used by students during working hours.

The students have a large room in the mathematics department, with individual desks, where they can study. About 35 students can fit in that room, and at the moment we visited it the room was full.

The classrooms are comfortable and with modern equipment. The department also has a conference room where about 50 persons can fit, with electronic projector facilities and modern blackboards.

The committee hopes that all these services will continue.

The cafeteria for faculty and staff members is excellent; it's efficient service and the food very good.

There is a mathematics library, in the mathematics building, and there is a mathematics section at the central University library. The University library has one of the best collections of books, journals, and other educational material among all University libraries in Greece. The library has a great collection of books acquired from private donations.

The mathematics books at the mathematics building library are very good books, and they are useful for the students and faculty. We did not visit the mathematics section at the central University library, but we were told that the section is richer than the one located in the mathematics building. In particular, it contains all the books that have been ordered in the last ten years.

The library subscribes to a number of periodicals, through an electronic library network that involves Greek universities. We hope that recent cuts from the library's budget are only temporal.

EEC recommends that the collection of hard copies of mathematical periodicals be updated. For example, the AMS "Current Mathematical Publications" journal is not useful today, because of the existence of electronic tools. The library also subscribes to some low level Belgian, Japanese and other journals, and it would be preferable if these journals were replaced by higher caliber journals.

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

Departmental level inhibitory factors together with the Department's proposal and EEC's recommendations for overcoming them, have been addressed in previous sections as well in Section F below. Here we focus primarily on State level inhibitory factors:

(i) The number of incoming students is disproportional to the size of the teaching faculty. The Department feels that for an effective and high quality education the number of first year students should be of the order of 150, but the department is currently required to accept nearly twice that number. The committee concurs with the Department's estimate.

(ii) The quality of entering students is not particularly high – a situation that contributes to the fact that the performance of many students is relatively low and, indeed, the time to completion for many students is long. The Department is aware of the problem and is making systematic efforts to alleviate the problem, but many roots of the problem lie beyond the Department's control. For example, students do not develop a particularly strong background in high school or lower education. Moreover, the department is not the first choice -- not even the second choice -- of students entering the department. A key factor for this is the perception of being a department in a rural (περιφερειακό) university – a problem clearly shared by other Greek Universities. It is a pity that a university located in a beautiful city (Ioannina) -- a city located in a region with an ideal geographic location with respect to the rest of Europe, and a long tradition in letters even before the Greek independence – should be in a disadvantageous position because of the perception of being a rural university. This is a State level problem that requires a national vision to remedy it.

(iii) At present, financial support for graduate students comes from departmental funds or

from fellowships (often partial) whenever they are available. The Department plans more aggressive efforts to obtain more doctoral fellowships from programs such as Herakleitos. But EEC feels that no efforts at the Departmental or University level can compensate for the apparent lack of coherent and systematic State programs to support financially graduate students – especially Ph.D students. National competitive programs through which one can obtain student funds are limited and often inconsistent in terms of timing. All these factors seriously compromise the continuity of completing one’s studies. These are problems shared by all Greek universities – they call for a coherent National level program.

(iv) The Department has outlined as a plan an intention to attract international students – especially from neighbouring countries. EEC feels that this is very important and, as we pointed out in Section A-2, modernizing and streamlining or unifying its graduate programs would help in this effort. But the success in attracting international students requires also a coherent plan and policy at the University and State level. A State level plan for attracting international students – especially neighbouring countries -- is in the national interest in addition to being important from the educational point of view. This effort could also be helped by organizing, at Ioannina, International Summer Schools and other academic activities that attract students from other institutions in Greece and abroad. These activities contribute to the visibility of the Department and the University as well as to a broader student education. But there seems to be a lack of funds for such activities. While the Department with the assistance of the University should try to seek funds for such activities from National and EU sources, a coherent State level policy is necessary for a successful realization of such plans.

(v) A State level problem that affects education and makes the lives of young scientists hard, is the unacceptable lack of consistency in the disbursement of payments for Visiting Instructors (“407 faculty”). Often payments are delayed for months and appointments are renewed from semester to semester. This is a State level problem as is the delay of State funds to the University or the Department.

(vi) Another State level problem is the delay in replacing retired faculty or faculty that move to other institutions. The Department expects a number of retirements the coming years. As is indicated in Section F, EEC believes that the Department has the potential to become a unique place mathematically and scientifically within Greece and competitive internationally. Any delays in replacing the retiring faculty or attrition in the current number of faculty positions will seriously imperil that goal.

F. Final Conclusions and recommendations of the EEC

The Department of Mathematics at the University of Ioannina has contributed in an essential way in Greek mathematics. It has educated a good number of people who have become professional mathematicians or school teachers. Beyond this, EEC strongly believes that the Department has the potential to become an attractive center of mathematical research and education with an identity that is unique in Greece and competitive in the international arena. EEC’s belief is based on the following facts: The Department combines activities in both pure and applied mathematics – it has two groups in pure mathematics and two groups in applied mathematics. Modern applications in Medical-Biological studies, High-Tech and Information Technology depend heavily on mathematical/statistical tools and procedures – procedures that depend more and more on the synergy of pure and applied mathematics. Put

differently, a coherent co-existence of pure and applied mathematics is not only attractive but also necessary for modern applications. The mathematics department at Ionannina is well-positioned to achieve such a combination of pure and applied mathematics and hence become a unique department in Greece (and competitive internationally). It is well-positioned because: Already, the Statistics/Operations Research (applied mathematics) and the Algebra/Geometry (pure mathematics) groups are coherent and energetic with local and international collaborations, and with projects that are in the forefront of their areas. The same can be said for several individuals in Analysis (pure mathematics) and Applied Mathematics/Mechanics groups.

Again, EEC believes that the Department has all the basic necessary ingredients to attain the above vision, despite the current national economic difficulties. Clearly success depends on the support of the university administration, and the State, but it depends primarily on the efforts by the Department itself. Below, EEC provides some recommendations that are probably necessary for the Department to attain its vision:

Hiring: As it was indicated before, the department's hires the past few years have been attractive. The Department should continue seeking strong researchers, and in particular should seek candidates that bridge research activities across the current groups. In particular, we recommend the hiring of a person in Probability. Probability is central to modern statistics projects as well to a host of scientific problems of interest to people in applied mathematics and computer science. Thus a hire in this area will bridge the Analysis group with the Statistics/Operations Research and Applied Mathematics groups as well as with the Department of Computer Science. EEC recommends also that the Department should include in its priorities hires in Partial Differential Equations and Harmonic Analysis; these areas in addition to being important by themselves, are interdisciplinary areas that would bridge the pure and applied components of the Department.

Position Advertisement: Whenever a position is available, the Department should make a systematic effort to advertise the position nationally and internationally (in addition to the sites required by the law). In particular, the AMS website MathJobs and the SIAM News should be utilized. The Department should also bring the positions to the attention of Greek scientist abroad. Through such advertisements, the Department would take advantage of the availability of excellent young researchers in European countries and elsewhere – especially in places where the universities face serious economic crisis.

Rewarding Research: To attract and retain high caliber researchers, the Department should develop mechanisms and policies to encourage and reward research. For example, young scientist should be given priority in what to teach, and should be given the minimum possible teaching load at least at the initial stages of their appointments. They should be encouraged to teach (if they want) seminar-type special topics courses instead of regular courses. This, in addition to facilitating their research efforts, will be also an excellent opportunity and an effective educational mechanism for Ph.D. and strong Masters students. Excellent research activities and high caliber publications should be rewarded by encouraging the researchers to apply for promotion at the earliest possible time permitted by the rules. Strong young researchers should be given responsibilities (consistent with the rules) or their opinion be solicited in departmental plans and decisions such as areas of new

appointments or the evaluation of candidates for appointments. They should also be given the opportunity of organizing workshops and seminars, and inviting professors and scholars to spend their sabbatical years at Ioannina. The participation of strong young researchers in departmental plans and decisions are not meant to replace the wisdom and experience of the more senior faculty, but simply to make the department attractive to researchers who have more than one option for places to go – and normally strong researchers have more than option.

Teaching: Designing new courses – especially of interdisciplinary and modern nature -- should be encouraged. Teaching a spectrum of courses rather than a single course again and again is also healthy both from the educational and research point of view. The apparent tradition, standard in the time of chairs (εδρεζ), of teaching the same course for many years is out of date -- it should be discouraged and, in fact, abolished (an individual should not teach the same course more that two or three years in a raw); this tradition is not healthy neither for the students nor the instructors.

Specializations for Masters Degree: Currently there are four specializations at the Masters level. With the exception of Statistics/Operations Research, these specializations attract a very small number of students. EEC recommends the introduction of three new specializations: *Mathematics, Applied Mathematics and Scientific Computing*, and *Statistics/Operations Research*. EEC feels that the two current specializations *Applied Mathematics and Mechanics* and *Computational Mathematics and Computer Science* place the Masters students in a disadvantage position from the point of view of job seeking. Moreover, EEC opinion is that the title *Applied Mathematics and Scientific Computing* reflects the currents trends in modern Applied Mathematics and Computational Sciences.

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