

**EXTERNAL EVALUATION OF THE POSTGRADUATE  
PROGRAMME IN GEO-INFORMATICS**

**DEPARTMENT OF RURAL AND SURVEYING ENGINEERING  
TECHNICAL UNIVERSITY OF ATHENS**

**submitted by**

**Professor P. A. Cross**

Head of the Department of Geomatic Engineering, University College London

**Dr. Costas Armenakis**

Research Scientist, Geomatics Canada

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## PREAMBLE

The Faculty of Rural and Surveying Engineering at the Technical University of Athens since 1998 has led and hosted the interdisciplinary post-graduate programme **Geo-Informatics** leading to the award of the degree **Postgraduate Diploma in Geo-Informatics**. The other two faculties involved in the post-graduate programme are the Faculty of Electrical and Computer Engineering and the Faculty of Mining and Metallurgical Engineering. This document records the results of an evaluation of this new programme by Dr C Armenakis (Research Scientist, Geomatics Canada) and Professor P A Cross (Head of the Department of Geomatic Engineering, University College London) in May 2000. The quality of the programme has been evaluated, and this report is structured, according to the recommendations of the International Federation of Surveyors (FIG) Working Group on *Quality Assurance in Surveying Education*.  
(see <http://www.ddl.org/figtree/pub/figpub/pub19/figpub19.htm>).

## 1 PROCEDURE

The evaluators made a two-day formal visit to NTUA during the period 15/16 May 2000. During this visit the evaluators,

- met with the Special Inter-Faculty Committee of the GeoInformatics postgraduate programme for general discussions, especially relating to overall structure of the programme, admission policy, examination regulations, administration and laboratory facilities, and quality control arrangements,
- met with individual Faculty members for specific discussions relating to particular courses,
- met with groups of past and current students,
- visited a number of laboratories and teaching areas, and generally viewed the learning resources,
- viewed a number of research theses,
- reviewed literature supplied to students, examples of examination papers, coursework assignments, and
- reviewed examples of student work, including both examination scripts and course work.

In addition Dr. Armenakis attended the final oral examination of a thesis.

## **2 CURRICULUM DESIGN CONTENT AND ORGANISATION**

The fact that the programme and its curriculum are attractive is evidenced by the large number of applicants (65 applicants in 1998-99 and 95 applicants in 1999-2000). Only 20 postgraduate students were accepted in each year. Considering the developments and trends in Greece (e.g., National Cadastre, large infrastructure projects), the programme is relevant to the needs of the Greek geomatics market and industry. The programme has fair and rigorous admission procedures that ensure high quality of students.

It is a very well organised programme. It has a strong interdisciplinary flavour with emphasis on rural and surveying engineering, and on computer science. The first term courses, called core courses, aim to bring students from different backgrounds to suitable level and prepare them for the specialization courses of the second term. This is not an easy task as for some students having taken the rural and surveying engineering undergraduate programme this may result in repetition, while for students coming from other faculties this may cause difficulties. Certain changes in the curriculum are expected as some of the material of postgraduate courses has started to be taught at the undergraduate level and some degree of overlap exists in the core courses. It is also possible to address the different background of students by introducing qualifying courses for the non-rural and surveying engineering students. For example courses such as those dealing exclusively with courses taught at the senior level of the undergraduate rural and surveying engineering programme (e.g., geodesy, cartography, photogrammetric mathematical models, remote sensing, GIS) could fall in the qualifying category. Although the programme is not designed to be a pure GIS course, several students perceive it as such leading to a small element of disappointment. Introducing a more GIS-related material, for example Databases now part of Computational Methods in GeoInformatics may alleviate this concern. The sustainability of the programme will be impacted by changes in undergraduate curriculum, which may lead to the need to reconsider the content of the first term as graduates from the new undergraduate programme join the postgraduate programme.

The thesis topics are of three types: a) applications oriented to solve a problem using the available tools, b) development and implementation of an algorithm to solve a specific technical problem, and c) of theoretical nature. Most of the theses seem to fall in the first category. There might be a place for more computer science electives for those students who may go on to become GIS developers/researchers rather than users. Therefore, there ought to be some compulsory computer programming (even in a very high level language) included in the course.

The ability to add/subtract/amend elective courses easily is a very positive feature as it allows the programme to react to the developments and needs of specific student cohorts and market trends.

The fact that students had to have foreign language skills to start the programme is welcomed as well as that these language skills are enhanced by the use of foreign language material during the course. The inclusion of abstracts in English in the thesis dissertations is commendable. The use of another language could be further expanded although it may have legal implications.

### **3 TEACHING, LEARNING AND ASSESSMENT**

Through the programme, the development of generic skills and new knowledge are well developed. The programme is sufficiently academic rigorous, diverse and stimulating. The teaching staff is highly qualified. The efforts to bring in outside speakers are remarkable and even more of such talks are encouraged, especially those covering real-world issues and implementations.

A holistic multi-disciplinary approach is evident in the core courses where many teachers teach one course. However, problems may arise related to too many teachers on courses as this can lead to overlaps and to too superficial a treatment of some topics. This holistic trend could expand to the thesis topics where a problem can be approached from many angles and its solution involves more than one technology.

Whilst recognizing that it is only used to support generic GIS principles the strong reliance on Arc/Info limits the experience gained by the students. The acquisition and use of GeoMedia is a good first step to introducing other systems. Also the combination of two or more systems (e.g., GIS, digital photogrammetric stations and remote sensing packages) for course or thesis work is highly recommended.

Learning a GIS (in this case Arc/Info) at the same time as undertaking project work may not be efficient for the students. This issue could be solved by introducing a one-off training course early in the programme (or before it starts), or by assigning more teaching assistants during the early projects.

### **4 STUDENT SUPPORT AND GUIDANCE**

The students have indicated a very high level of satisfaction with every aspect of the programme including general support, overall guidance, teaching etc. Seminars on how to do research and on presentation skills are also available. Students are encouraged to publish and participate in national and international conferences. Regular opportunities for discussing academic and other issues, both formal and informal, are available. The overall programme has met and is continuing to meet their expectations.

As mentioned earlier the students undertake three types of theses (applications, technical and theoretical). Most students undertake the first type but good students (and especially those with strong computer science backgrounds) are encouraged to undertake the other two, and this is very good strategy.

The introduction of more flexibility to take courses offered by other graduate programmes within NTUA should be considered and the staff should make students aware of the various possibilities and arrangements.

## **5 STUDENT PROGRESSION AND ACHIEVEMENT**

The progression of the students is based on the widely accepted educational norms such as, written tests and examinations, oral presentations, and projects. The thesis consists of a written dissertation and an oral defense.

This is full time course but most students are working to support themselves. A scholarship is available but amounts to a very low income, so most students are effectively doing the course part-time. This is not an ideal situation. Consideration should be given to allowing part-time students to complete the programme in a longer time and to offer more teaching assistantships.

The distribution of project work over time could usefully be reviewed in order to achieve a more balanced workload for students.

A potential problem in the future could arise when students from the new undergraduate programme enter this programme as they will have covered much of the first term course material.

## **6 LEARNING RESOURCES**

The computing facilities are excellent with plenty of software packages and satisfactory access arrangements. As mentioned earlier the use of more than one GIS package will benefit the students, although the wide use of ArcInfo in Greece is recognized as the main reason for concentration on this package.

The access to, and the resources of, the departmental and main libraries are good. Books, proceedings and journals are available but the students should be encouraged to use the libraries more (rather than just being given photocopies of relevant material).

The amount and quality of general working space is a problem. Most students work at home when not in front of computer. With the addition of the new building facilities in September 2000 the situation is expected to improve.

## **7 QUALITY ASSESSMENT AND ENHANCEMENT**

There is a well developed work package to evaluate the programme. This includes measuring students' feedback on content, teaching quality and overall organisation as well as the employment of external auditors to undertake the preparation of this report.

The evaluation results indicated a very high level of student satisfaction against all criteria. Many modifications made in the second year of the operation of the programme followed comments made in the first year - indicating that the process is working extremely well. The informal system of student feedback also works well – teachers are sympathetic and react rapidly to problems raised by students.

Staff members are very highly qualified and motivated. Some are leaders in their field, all up to date through reading, attending international meetings and doing research. The students realise and appreciate this.

Attention should be paid to the uniqueness of this course in Greece in order to build even stronger links with government agencies and private industry – especially through thesis work.

## **8 GENERAL CONCLUSIONS AND RECOMMENDATIONS**

The specific objectives of the programme when it was established were to:

- maintain and strengthen the quality, professional expertise and international recognition of the undergraduate programme;
- create and offer courses at a academically rigorous graduate level;
- introduce courses that are coherent and with appropriate scientific depth;
- respond to the development needs and research directions of the nation;
- design the programme recognizing the minimum legal duration of studies;
- attract students from other universities.

Based on our evaluation these targets have been met if not exceeded. It is a very well organised multi-disciplinary postgraduate programme. The programme is run by highly qualified and motivated staff with the capacity to teach and create new knowledge. The programme attracts significant number of students and the students are very satisfied with their investment in this postgraduate programme.

The level of the courses meets postgraduate standards. Certain adjustments of their content and structure will be required to meet the needs of the new students, technological developments and trends, as well as the evolving needs of the Greek geomatics market. It is expected that as the programme matures a

balance will be achieved between applications, development and theoretical theses.

The sustainability of the programme should be considered. Links with national and international institutions as well as the private sector need to be explored and established. This will not only attract operational and research funds but also research and development opportunities for the students and the staff.