



**RE-ACCREDITATION OF THE FACULTY OF GEODESY,  
UNIVERSITY OF ZAGREB**

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28-29 March 2012**

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## **COMPOSITION OF THE EXPERT PANEL**

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- Dr. Johannes Bouman, Research Scientist at the Deutsches Geodätisches Forschungsinstitut DGFI, Munich, Germany
- Dr. Mira Morović, Senior Researcher at the Institute of Oceanography and Fisheries, Split, Croatia
- Dr. Josip Terzić, Croatian Geologic Survey, Zagreb, Croatia
- Mr. Željko Šreng, student, Faculty of Civil Engineering, Josip Juraj Strossmayer University of Osijek, Croatia

Expert panel was supported by:

- Maja Šegvić, coordinator, Agency for Science and Higher Education
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# INTRODUCTION

## *Short description of the evaluated institution*

The Faculty of Geodesy is a higher education institution within the University of Zagreb and was established in 1962. Its origins go back to the end of the nineteenth Century, when the Academy of Forestry was established at the Faculty of Philosophy of the University of Zagreb. There, geodesy was taught together with other technical subjects.

The need to provide a professional education in planning of property relations, division of rural communities and land consolidation, cadastral survey work, etc. led to the establishment of a special Geodetic Course. This course, which was in its teaching basis identical to those at high schools in Prague and Vienna, was taught at the Academy of Forestry until 1919, when it was moved to the Technical College (established 1918) as its Geodetic Department.

In 1926, the Technical College became the Technical Faculty of University of Zagreb, with a Geodetic and Cultural Engineering Department within it, renamed Geodetic Cultural and Technical Department in 1929. In 1946 followed the introduction of two new majors, geodesy and land improvement. Many more changes happened due to profound societal changes around that time, and in 1956, the Faculty of Architecture, Civil Engineering and Geodesy (AGG) was created. Further development led to the creation of the independent Faculty of Geodesy in 1962. It still shares a building in downtown Zagreb with Architecture and Civil Engineering.

Currently, and after the Bologna Declaration, the following study programmes are taught:

- Geodesy and Geoinformatics – university undergraduate programme
- Geodesy and Geoinformatics – university graduate programme
- Geodesy and Geoinformatics – postgraduate (Ph.D) university programme
- Geodesy and Geoinformatics – specialist postgraduate university programme.

Last year enrollment figures for these programmes were: 84, 83, 14, and 13, respectively, which are rather typical numbers. Of those enrolling in the undergraduate programme, more than half come from a high school, and less than half from a vocational secondary school, which exist in the Zagreb area.

Within the Faculty there are five units or Institutes, one of which is the Observatory Hvar. There are six Chairs within the Institute of Geomatics, three within the Institute of Cartography and Photogrammetry, and five within the Institute of Practical geodesy. The fifth Institute is the Registrar's Office.

In 2011/2012, the number of teachers at the Faculty was 29, for a total number of students of 770.

The highest body within the Faculty is the Faculty Council, which has as its members all employees having academic titles, one representative of employees having scientific titles, one representative of employees appointed to teaching positions, four representing employees in associate positions, and five representatives of students, one of them representing postgraduate students. Student members have a right of suspensive veto on decisions concerning students especially. The Faculty Council elects the Dean and Vice Deans who conduct the day-to-day management of the Faculty.

The *mission* of the Faculty is formulated as

*To offer excellent knowledge based on ethically accepted scientific notions and practical skills on national and international level to all users as one of the leading constituents of a*

*recognizable and highly valued University, applying sustainable adequate activities based on regulations and good experiences and improving continuously the quality in collaboration with all interested parties.*

### ***The work of the Expert Panel***

The work of the Expert Panel was based on the Self-Evaluation Report submitted by the Faculty, and on a fact-finding Site Visit executed Wednesday 28 and Thursday 29 March, 2012 at the Faculty in downtown Zagreb, being shown the premises and facilities for teaching and research. The following groups of people kindly agreed to be interviewed:

- The Working Group that compiled the Self-Evaluation;
- The Faculty Management;
- The students, i.e., a self-selected set of students present at the interview;
- The Vice-Dean for Teaching and Students' Affairs, programme co-ordinators and teachers;
- The Vice-Dean for Scientific Activity and International Collaboration, representatives of Committee for Science, and research project leaders;
- Heads of Institutes;
- Teaching assistants and junior researchers.

Also some visits to classrooms were conducted, interviewing students present.

The Observatory Hvar was not visited, but personnel from Hvar were present and interviewed during the Site Visit. Also Split, where there is an undergraduate study programme initiative in which the Faculty is involved, was not included in the site visit.

During the site visit, an active supporting role was played by the staff from the Agency for Science and Higher Education Croatia, in the form of activity co-ordination, clerical support (note-taking) and language interpretation.

# DETAILED ANALYSIS BASED ON STANDARDS AND CRITERIA FOR RE-ACCREDITATION

## ***1. Institutional management and quality assurance***

- 1.1. The Faculty has formulated a mission and a vision, and the strategy seems quite clear to the management but it is not formalized at all; their strategic document is being currently prepared. A draft (in Croatian) was shown to the Evaluation Panel, and it appeared rather terse at this point. **The strategy document should be developed into a credible guideline for the development of Faculty operations, and then should serve as such. For an institution striving to be world class, this should be available in English.**
- 1.2. The institution has presented a number of formal documents specifying the organizational structure, but the Faculty itself identified the organizational structure as a problem, which might have been brought about by the recent reforms. The awareness of these problems by the management indicates that they will be tackled in the near future.
- 1.3. It seems that the alignment with the university policies actually harmed some good initiatives of the faculty, such as publishing the names of the teachers who were best-graded on the student polls. The faculty has taken efforts to align itself with the university strategies, although they might call for their improvement.
- 1.4. The bachelor students do not receive much practical training, and thus graduate without achieving the necessary skill set for functioning professionally with only a Bachelor's degree training. Although a part of the problem with their employability may be caused by the still generally low recognition of bachelors, **the Faculty should still invest much more in efforts to provide them with practical skills that would at least make them as employable as the graduates of the geodetical secondary schools**, which now does not seem to be the case: the Self-Evaluation's Table 3.2 actually covers up this problem by stating that there are only 4 unemployed bachelors out of 254 graduates over the last three years, but fails to note that *most bachelors continue graduate studies* (out of lack of alternatives?)
- 1.5. The field of geoinformatics is not currently included in the relevant national classifications, but is classified as geodesy proper, as apparently the name "geoinformatics" was already taken by the humanities. There are also already stated problems with the learning outcomes of bachelors, as well as lack of knowledge among the staff on modern methods for identifying and assessing learning outcomes such as Bloom's taxonomy (the staff apparently has been trained in this regard, but clearly they should receive further or better training.)
- 1.6. The Faculty does show the will to improve the current situation in all regards, but the improvements are mostly informal and ad-hoc, which however may be partly blamed on circumstances beyond their control (Bologna, e.g.).
- 1.7. The only formal mechanism for improvement of teaching implemented at the Faculty is *student polls*, which have been mainly used as formal evidence in the election of teachers

to scientific grades; however, the results have been used also to improve the teaching quality, but not systematically enough according to students. **This should be improved.**

- 1.8. The Faculty keeps record of published papers, and there are incentives for young researchers in the form of covering costs of participation at international conferences. The faculty also accepts all the formal criteria for advancement and plans to build on them in the future.
- 1.9. The Faculty does have an Ethical Board; the students are not aware of it but they are aware of their ability to complain in case of problems. The Faculty has no record of serious ethical problems, so it is very difficult to assess how effective it is in reality, and the faculty stated that the implementation is still not complete. However, the formal procedures are in place.
- 1.10. Although the students were not informed on the ethical rules as such, they have been aware of their right to complain. As an aside note, it is important psychologically that students not only know that they can complain, but that recourse is readily available for situations where it appears that grading of courses or exams is applied unfairly or unreasonably. **This should be somewhat advertised**, e.g., on the Faculty's Web site.

## ***2. Study programmes***

- 2.1. The Faculty does try to justify its enrolment quotas by the needs of society, and they have adjusted them when another study program of a similar content was established; they also have tried to take into account the situation on the labor market, and not only the student demand. However, the Faculty could improve their statistics on the employment of graduates, and keep better track of them in order to adjust the quota accordingly, instead of referring only to the official Employment Service statistics, which may not be suitable for such purpose.
- 2.2. The quotas are in line with the analysis of the pass rate, and the resources are sufficient; the Faculty is aware that with the current resources they will not be able to increase quotas at all, and is monitoring this. Problems do arise with providing field work and internships to the current number of undergraduates, and **this has to be tackled in the future.**
- 2.3. The Faculty did try to define the learning outcomes in some degree, but what they actually did are primarily descriptions of content, which indicates that the staff does not fully understand the idea of the learning outcomes and should receive further training in this regard. Significant efforts should be invested into this, as mentioned in the Self-evaluation. It is also worrying that, as mentioned earlier, the learning outcomes of the bachelors are not completely clear.
- 2.4. As pointed out above, the learning outcomes are not really stated, which makes it difficult to assess the degree in which the student testing etc. is actually assessing what it should.

- 2.5. The Faculty endeavours to establish the ECTS on the basis of the contact hours, which might not always take into account the actual workload of students; the Faculty has not yet systematically analyzed this, but they plan to do this in the future. Students did not express complaints, although they have also not been fully acquainted with the idea behind the ECTS.
- 2.6. The Faculty has a long and honorable tradition of international cooperation, and many former students and current staff members have continued their studies abroad, which proves the recognizability of their diplomas.
- 2.7. There is little project work connecting several courses and involving student teamwork; there is work in smaller groups and on practical projects, especially at the graduate level, but more should be done in terms of providing training for teachers in order to provide them with different teaching styles; these could be also organized at the university level. The junior researchers have also indicated that the work in smaller groups, which significantly improves the quality, as well as project work, should be supported even in the lower years, by providing additional staff and special resources.
- 2.8. The library is excellent and all the necessary study materials are available on the intranet.
- 2.9. Students, especially at the bachelor level, have an acute lack of opportunities to participate in practical projects, while the number of participating students is low even at the graduate level, and opportunities exist mostly at the postgraduate level. The Faculty used to have compulsory internships and field work, and **this should be reintroduced**, since the Faculty does have contact with practically all geodetic companies in the country, and should be able to provide opportunities to their students; since it's a separate institution, it should also be able to free some days for field work. Additionally, the staff should be more creative in providing the students of lower years the opportunities to participate in their projects. The limiting factor does not appear to be lack of funds, as field work in or near Zagreb would be organizable with limited funding.
- 2.10. The Faculty normally updates the existing study programs, and has not recently tried to set up any completely new study programme from scratch. However, since the management has mentioned a pending review of the study programmes in line with the recent developments in their profession, they should involve stakeholders and students in this process, in order to achieve better results.

### **3. Students**

- 3.1. The information provided might be more clear, as students obviously did not have sufficient information, in spite of the fact that all the promotional activities were in place. The Faculty should thus increase their efforts in encouraging students to inform themselves on everything that is happening and on offer at the Faculty related to education and employability.
- 3.2. While the enrolment criteria are clear for the undergraduate level, they apparently have been applied inconsistently recently regarding the graduate level – they have been revised "on the fly", in a way that created confusion, due to errors in planning when the program was set up.
- 3.3. The pass rate of students indicates that the Faculty did set up good criteria, however, and also employability does not seem to be a problem for the graduate programmes.
- 3.4. The students have a number of extracurricular projects, like a very nice looking magazine and a congress; the Faculty also supports their sports activities.
- 3.5. The Faculty does provide mentorship and guidelines to students.
- 3.6. The student restaurant is substandard, and the Faculty as such does not offer scholarships to students.
- 3.7. The Faculty fully supports the work of the Student Union. However, it would be desirable to have more frequent elections, so that freshmen are always represented in the work of the union; this was a complaint from the students' side.
- 3.8. The students have the possibility to appeal, and there were no complaints on assessment methods.
- 3.9. The Faculty keeps poor statistics on graduate employment, and traces its alumni somewhat haphazardly. This should be improved significantly.
- 3.10. The Faculty is in an unique position to stay in touch with alumni, however, this is done only informally and not systematically, and should be much improved.
- 3.11. Although students are included at all levels of decision making, this relates to the Student Union, which should work more on transmitting the information to all students and communicating with their colleagues. Also, the Faculty should not equate the Student Union with all students, and also communicate with students individually.
- 3.12. The Faculty does communicate with the public, and is involved in various professional contexts relevant to employment. It could perhaps use these channels more actively to improve bachelor employability.
- 3.13. It seems that the communication with the students has improved with the new management, also through the introduction of an Intranet and a Web forum.

- 3.14. The students do not receive systematic feedback on measures they have proposed to improve learning quality, and we have heard complaints.

#### **4. *Teachers***

- 4.1. The Faculty has a number of young researchers, and ensures the continuity of the study programme and all disciplines, as well as replacement of teachers who will be retiring.
- 4.2. As stated above, the Faculty does a good job in carrying out a policy of growth and development of human resources, maintaining the sustainability of study programmes and research activity.
- 4.3. The teacher-student ratio considering full-time teachers is good enough to ensure quality and continuity of teaching; however, it appears to be clearly better on the graduate than on the undergraduate level.
- 4.4. The Faculty has a sufficient number of full-time teachers to maintain an optimal teacher-student ratio.
- 4.5. Lifelong learning for staff is currently lacking, and there is much room for improvement.
- 4.6. The procedures for teachers' advancement are formal and clear, as set up by the University and nationally; the Faculty does plan to introduce additional criteria, such as obligatory international postdoc, project management and impact factors of the journals in which research papers are published.
- 4.7. There were no complaints of too much workload at any level, nor did the students complain of lack of contact with the teachers.
- 4.8. As stated above, the teachers seem to well balance the additional commitments, such as external projects and teaching at Split; however, this might be improved to devote more time to students.

#### **5. *Scientific and professional activity***

- 5.1. The Faculty does not have a formally identified strategy or success indicators, but it is scientifically well established with a long history, and there are in reality no problems at the moment.
- 5.2. The Faculty is an example of excellence with regard to national and international scientific co-operation, participating in a number of relevant activities and initiatives.
- 5.3. As stated above, the institution is, and has long been, an example of excellence in this regard.

- 5.4. The research assistants might get additional encouragement and support to go to conferences or study periods abroad.
- 5.5. The faculty does have a culture of excellence, however, it is not fully formalized.
- 5.6. There are rewards to staff in the form of co-funding publishing, as well as efforts invested in improving the existing journals; the numbers of publications is impressive.
- 5.7. The institution is obliged to keep track, and they have been doing it for years.
- 5.8. Again, the institution is an example of good cooperation on technology transfer to businesses.

## ***6. International cooperation and mobility***

- 6.1. The Faculty attracts students from other Croatian and regional institutions, but more efforts should be invested in attracting international students – to mention the existing good practice of teaching in English.
- 6.2. While the Faculty is well using the Erasmus programme, it might do more with offering additional funding for student mobility, and creating additional opportunities to go abroad.
- 6.3. There have been visits in the past, however, this practice has slowed down recently and should be encouraged more.
- 6.4. The Faculty is involved in a number of relevant associations and actively participates in them.
- 6.5. There are courses in English and the International Student Congress; the Faculty plans to invest additional funds in training administrative staff.
- 6.6. The Faculty could do more to involve their teaching and non-teaching staff in international mobility via Erasmus.
- 6.7. The Faculty participates in a number of different types of EU-funded programs.

## **7. Resources: administration, space, equipment and finances**

- 7.1. The Faculty is well-equipped, but they would require more resources to work in small groups and perform field training at the undergraduate level.
- 7.2. IT and foreign languages are taught to administrative staff, teachers might benefit from further pedagogical training, preferably provided at the University level as this is not specific to geodesy.
- 7.3. The Faculty still has not sought metrological accreditation for their laboratories; however, accreditation did not seem to be crucial for their work. There exists a good collaboration between the Faculty and that of Mechanical Engineering with regard to accreditation.
- 7.4. The necessary modern technological means are available, while the equipment made available to students could of course always be increased.
- 7.5. The Faculty is trying to collect, analyze and use information relevant to improving its activities, however, this might be better formally and strategically planned.
- 7.6. The Faculty Library is very good, well equipped and competently staffed.
- 7.7. The Faculty's financial situation is good, compatible with its mission, and transparent. It might benefit from involving professional non-teaching support staff.
- 7.8. The Faculty earns additional funds and is transparent in investing them.
- 7.9. The Faculty seems to be efficient in investing their own funds, however, more funds should be earmarked for financing fieldwork for students.

# **FINAL REPORT AND RECOMMENDATIONS BY THE EXPERT PANEL FOR THE ACCREDITATION COUNCIL**

In general the situation at the Faculty is very good, although also some critical remarks must be made.

## ***ADVANTAGES (STRONG POINTS)***

1. The study programmes were well established with a long tradition; but then, the Bologna process forced them to change things that were going well, and some errors were made there, as will be discussed below.
2. The research, successful publication activity, and the number of both scientific and professional projects is a strong point.
3. The Faculty's reputation extends internationally, and it actively takes part in international co-operation frameworks both for research and for teaching. English language skills and use are sufficient (but could always be improved).
4. Also, "commercial" projects, of which there are many, seem well integrated in their academic practice – it is also an example of the long and successful tradition of the Faculty.

## ***DISADVANTAGES (WEAK POINTS)***

1. The Bologna process has recently caused some adverse effects, e.g., practical work was largely eliminated because of Bologna, and needs to be re-introduced to all years, together with compulsory internships.
2. The most worrisome point is they deliver bachelors which do not find suitable employment, and the Faculty has not shown any sign of responding to the circumstance that 40% of them are unemployed; they also are not effectively collecting the kind of data that would tell them how many of them actually are professionally employed within the geodetic (or land surveying, spatial science, mapping or cadastral) profession.
3. Information on the Master's programme does not reach the students; it was changed on the fly, and contrary to what they were told earlier: such *ex post facto* changes should never be applied to current, but only to future students.
4. There are also issues between the students and the Student Union, which are not to be blamed upon the Faculty but nevertheless reflect back on it.
5. The Faculty's strategy document, and the strategy thinking itself, needs to be developed, partially on the basis of this review.
6. Additionally, the quality assurance system should be improved.

## RECOMMENDATIONS FOR IMPROVEMENT OF QUALITY

1. The Faculty's strategy document should be developed into a credible guideline for the development of Faculty operations, and then should serve as such. For an institution striving to be world class, this document should be public, available in English, and known to staff and students.
2. Faculty should invest much more in efforts to provide their Bachelor graduates with practical skills that would at least make them as employable as the graduates of the geodetical secondary schools, which currently seems not to be the case.
3. Faculty should work to improve the use of *student polls* and other means as tools for improving the quality of teaching in general, as well as individual courses and study programmes. In order to motivate students to provide honest feedback, there must be confidence in the polls' anonymity. The aim should be a pervasive quality culture.
4. The issues involving students and the Student Union are not the Faculty's fault, but there are things that can be done. The students should be more encouraged to participate in the Student Union, to elect people among themselves and be brought to inform themselves better. The discussion with the students should not be done solely with the Student Union, but the discussion should be held with all students, and innovative ways of communication should be found. E.g., it would help to have Student Board elections every year, as then first year students will always have representation.
5. Faculty should improve its keeping of statistics on alumni and their state of employment, as a means of keeping its teaching in line with the needs of society and employers.
6. Students, especially at the Bachelor level, have an urgent need to participate in practical exercises, field work and internships to develop their practical competences. Opportunities for this used to be provided but have recently fallen by the wayside. These opportunities need to be provided again.
7. Faculty teaching staff need to become better at defining and evaluating learning outcomes.
8. Faculty should more publicise and make explicit its ethics code both for teaching and for research.
9. One thing Faculty should *not* do: anything that might threaten the achievements of its long and honorable tradition. E.g., the *name* of the Faculty continues to teach a lesson in science history which has been all but forgotten elsewhere in Europe and the world: Carl Friedrich Gauß, the Prince of Mathematicians, was a geodesist.