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COMPOSITION OF THE EXPERT PANEL

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INTRODUCTION

Short description of the evaluated institution

The Faculty of Engineering in Rijeka (henceforth called Faculty) in its current form was established in 1973 and has been developing its study programmes and its research activities ever since. In the academic year 2004/2005 study programmes' curricula were re-adjusted in accordance with the Bologna Declaration (3 + 2 + 3 model) and were implemented at the Faculty of Engineering in the academic year 2005/06. The following programmes are available: university undergraduate study programmes in Mechanical Engineering, Naval Architecture and Electrical Engineering, as well as professional study programmes in the same fields. Lectures at the undergraduate study of Computer Engineering started in 2008 as well as the two-year graduate studies (Master programmes). Nine groups of elective courses were introduced in the study of Mechanical Engineering: Ship Engineering, Industrial Engineering and Management, Engineering of Materials, Computer Analysis of Construction and Machines, Designing and Mechatronics, Process and Energetics Engineering, Computational Engineering, Technology and Computer Engineering and Thermotechnics. In the field of Naval Architecture students can choose between Designing and Constructing Floating Objects and Technology and Organization of Shipbuilding, and for Electrical Engineering there is a choice between Automation and Electric Power Systems. Bachelor/master programmes were completed in 2011 by introducing graduate study programmes in Computer Engineering with two courses: Programme Engineering and Computer Systems.

Doctoral Studies in the Area of Technical Sciences cover the fields of Mechanical Engineering, Naval Architecture and Fundamental Technical Sciences and, from 2011, the field of Interdisciplinary Technical Sciences.

Total area of the Faculty now amounts to 16792 m² and includes: two large lecture halls for 128 students (completely equipped for distance teaching and with a possibility of joining the two halls into one), two large lecture halls for 142 and 122 students, 16 smaller lecture halls and classrooms, 11 classrooms with computers, several laboratory rooms, a new library (403 m²) with a book depot and Internet access, 150 offices, a canteen with a modern kitchen, rooms for student organizations and other necessary rooms and spaces.

Currently, there are 1124 students in seven undergraduate study programmes, 380 students in three graduate (Master) study programmes, and 63 students in the Ph.D. programmes. The Faculty employs 73 professors and 64 assistant lecturers and teaching assistants, i.e. altogether

137 employees in teaching and science and research. There are 52 members of administration and technical staff. The following organizational units belong to the Faculty of Engineering: DAE - Department of Automation and Electronics (13 employees), DNAOE - Department of Naval Architecture and Ocean Engineering (11 employees), DEPS - Department of Electric Power Systems (12 employees), DIEM - Department of Industrial Engineering and Management (15 employees), DMED - Department of Mechanical Engineering Design (16 employees), DMPFLK - Department of Mathematics, Physics, Foreign Languages and Kinesiology (12 employees), DMSE - Department of Materials Science and Engineering (4 employees), DFMCE - Department of Fluid Mechanics and Computational Engineering (10 employees), DCE - Department of Computer Engineering (12 employees), DEM - Department of Engineering Mechanics (14 employees), DTEE - Department of Thermodynamics and Energy Engineering (18 employees), CC - Computer Centre (4 employees), L - Library (4 employees), DO - Dean's Office (3 employees), GPO - General and Personnel Office (21 employees), SRO - Student Records Office (5 employees), AD - Accounting Division (5 employees), CPS - Commercial and Procurement Service (4 employees), TMS - Technical/Maintenance Service (6 employees).

The work of the Expert Panel

A panel of experts (henceforth called Panel) appointed by the Agency for Science and Higher Education in Croatia (ASHE, henceforth called Agency) visited the Faculty on March 29, 2012 and March 30, 2012. During the site visit the Panel made a short tour through the classes, lecture halls, library etc. and held meetings with the following groups:

- Management
- the working group that worked on the self-evaluation of the Faculty, the representative for quality and Quality Assurance Committee
- Vice-Dean for Academic Affairs
- Chairs of Study Programmes
- Teachers
- Assistants and young researchers
- Students
- Vice-Dean for Research

Project leaders

The Panel evaluated the Faculty on the basis of the report on self-assessment, and the results of the visit. The evaluation report consists of two parts:

I. Comments and recommendations on the criteria for the assessment of quality of higher education institutions within universities:

The task of the Panel was to decide on grades for all the criteria adopted by the Agency. In some cases, there were no problems, and the Panel felt that there was no need for further investigations. In these cases the Panel adopted the general policy of putting in the grade 4. It has to be kept in mind that a closer investigation could have shifted the grade towards a grade 5 in some cases. Some of the criteria refer both to the formal process and to the results. However, sometimes the process is there, but it is just a formal one with minor impact on the outcomes. Vice versa, the system can be working very well, but the formalities of the process are not clear. In both cases, the Panel agreed on the grade 3 even though the outcomes are certainly more important than the formalities.

No comments are given fully implemented (grade 5) processes, even though they are obviously the strong points of the Faculty. The Panel is aware of the fact that the general impression on the institution may be less positive than intended because of this non-commenting policy.

II. Summary of comments and recommendations based on visit and self-assessment report:

These reflect the general impressions of the Panel and were communicated to the Faculty at the final meeting.

The Panel is convinced that, due to the complexity of the evaluation procedure, any follow-up actions should be based on the comments and the recommendations given in this report, and not on some average grade.

I. COMMENTS AND RECOMMENDATIONS ON THE CRITERIA FOR THE ASSESSMENT OF QUALITY OF HIGHER EDUCATION INSTITUTIONS WITHIN UNIVERSITIES

1. Institutional management and quality assurance

In addition to the general management of Dean and Vice-Deans there is a very active and dedicated quality assurance group surveying all aspects of academic life. They developed various questionnaires by which they continuously acquire detailed data about ongoing processes. However, this elaborate system failed to identify obvious problems (drop-out rate, quality of study programs). Moreover, neither the management nor the teaching staff were aware of these problems even though all relevant data had been presented to the Faculty Council. Somehow the quality assurance system produces data, but the data seem not to be used as much as they could. Consequently, the QA system has not yet become part of a learning organization. This seems to be a fundamental problem which has to be solved as soon as possible.

1.1. The institution conducts systematic strategic planning by which it engages its stakeholders in understanding its current position and in defining its vision, goals and strategy in line with its mission.

The Faculty has implemented a strategic planning system. Stakeholders are involved via the local Chamber of Commerce. However, the planning system has very little impact on their strategy. For example, they have various questionnaires for students. Nevertheless, changes in the study programme were undertaken without referring to any of these data, and with no visible systematic approach. Consequently the Panel would have assigned 5 to formal structure and 1 to outcome, but compromised on 3 for overall mark.

1.2. The institution has developed effective organizational structures and processes and has formalized them in its legal documents.

The formalization and the structures are all there, but somehow nobody feels responsible for pinpointing problems. Instead a huge amount of data is collected, but no conclusions are drawn from them.

Recommendation: The Faculty should transfer the quality assurance committee from a number collecting unit to one which actively contributes to the improvement of the Faculty and is part of a learning system.

1.3. The institution within a university actively contributes to achieving university goals and has aligned its strategy with the university.

There seem to be no problems.

1.4. Each study programme offered by the institution is aligned with its mission.

The study programmes in Mechanical, Naval, and Electrical Engineering are outdated. The study programme in Computer Engineering is not very well defined.

Recommendation: The Faculty should revise their undergraduate study programs and adjust them to international standards. Guidelines could be taken from ASIIN or any other internationally recognized standard. The restriction of 20% changes should be lifted for that purpose.

1.6. The institution has implemented effective systems of quality assurance and continuous quality improvement, with the goal that a culture of excellence will pervade all aspects of its internal operations and shape its standing with external stakeholders.

The Faculty has implemented an elaborate quality assurance system collecting data covering all aspects of their study programmes and teaching activities. However, these data do not lead to any consequences. In this sense, the Faculty is a bureaucratic system, not a learning system.

Recommendation: The Faculty should thoroughly analyse the flow of information coming from the quality assurance committee. In doing so, the data collection process should be simplified, and capacities have to be shifted from data collection to dissemination of relevant information. The management should establish corresponding checking-up procedures.

1.7. The institution has implemented formal mechanisms for monitoring and improvement of the teaching quality.

There are various questionnaires; hence it was decided to put in grade 5. However, these questionnaires are apparently useless, as they did not lead to any relevant conclusions.

1.9. In line with its mission, the institution has established formal rules for the highest level of ethical behavior in its teaching and research activity.

The Code of ethics is defined at the University level. The Faculty has nominated its Ethics Committee and formalized The Rules of Conduct of the Ethics Committee.

2. Study programmes

The study programmes of the Faculty are in different stages of development. The graduate programs are well developed whereas the undergraduate programs have to be revised and improved - see recommendations.

2.2. The enrolment quotas are in line with the institutional resources for quality teaching and the analysis of pass rate.

In the last academic year, the Faculty tried to improve the quality of their students by imposing stricter conditions for admittance. However, this did not work out, and they ended up with very low enrolment numbers. The admission criteria were then relaxed. However, there was no analysis of the drop-out rate and the pass rate and its relation to admission criteria. The Panel is aware of the fact that the academic level of some students who want to enroll in Engineering is not satisfactory. However, the situation can be improved by giving additional classes which bridge the gap between the knowledge acquired in schools and the requirements of the Faculty.

Recommendation: If the educational level of those students who do not have the highest grades in State Matura is not satisfactory, the Faculty has to establish additional classes with the purpose of helping the students to reach acceptable academic level within the first semester.

2.3. Student learning outcomes, set by the teachers and stated at the level of a study programme and its courses, clearly describe knowledge and skills of the graduates.

The skills and the knowledge of each module are clear enough, however the programme as such is not well-defined in all cases. For example, in the study programme of Computer Engineering, there are very elementary courses in Programming in the first year, and very advanced ones in the third year with no intermediate courses.

Recommendation: The consistency of the courses in the study programs has to be improved in addition to updating the undergraduate study programs. This applies to computer engineering in particular.

2.4. Teachers at a study programme ensure that the assessment of student learning, regardless of its modality, is aligned with stated learning outcomes, represents the full range of learning being assessed, and assesses learning at the level of rigour appropriate to the qualification level.

The assessment procedure is fixed for all classes (70% in class, 30% final exam). This may not be appropriate for all subjects, as students will not get the whole picture if they concentrate too much on very narrow subjects.

Recommendation: The assessment procedure should be revised and a more flexible system should be established.

2.5. *Allocation of ECTS reflects the realistic estimate of the student workload.*There is no systematic assessment of the workload, but there were no complaints.

2.6. The content and quality of the each study programme conforms to internationally recognized standards, ensuring the international recognition of its qualification.

There are deficiencies in all undergraduate programmes. In Mechanical Engineering, for example, Mathematics and Engineering Design are quite weak (not only from hours, but also from the contents), modern subjects such as Control Theory are missing.

Recommendation: Revise all undergraduate programmes thoroughly and adjust them to international standards (e.g. as specified in the ASIIN guidelines or any other comparable international framework for B.Sc. in Engineering).

2.7. Teachers select teaching strategies that are appropriate to the nature of the material being learned, responsive to various student learning styles and encouraging students to beautonomous, responsible learners.

Teaching assistants seem to put a lot of effort in their teaching, but suffer from severe overloads. During the Panel visit some teachers showed a lack of enthusiasm on this subject. On the other hand, groups are comparatively small due to high drop-out rate and /or low enrolment numbers, i.e. conditions are rather good for improving teaching strategies.

Recommendation: The Faculty should revise teaching strategies, especially in the first two years. In doing so, they should re-distribute the working load more evenly.

2.8. Programme faculty made available appropriate amount of supplemental resources, including electronic databases and other sources, which aid knowledge acquisition.

An e-learning platform is available, but not used on a general level.

Recommendation: The Faculty should ensure the systematic use of their e-learning platform. They should also provide access to English textbooks via this platform or an e-library.

2.9. As appropriate to learning outcomes, students have opportunities to reinforce and apply their learning in the context of practical applications, such as through internships, business partnerships, community service, or similar arrangements.

There are internships in the study programmes, but they are too short to be of much use.

Recommendation: The Faculty should include an internship in their study programmes with a minimum duration of 3 months.

2.10. The institution has defined and adopted formal processes by which new study programmes are proposed, approved, and implemented. These procedures monitor development, innovation and improvement of the existing study programmes and also include other stakeholders.

The formalities are there, but when it comes to actual changes on the study programmes, the Faculty seems to act on random impulses. There is no continuous monitoring or improvement of the programmes.

Recommendation: The efficiency of the quality assurance system should be increased related to programme monitoring and improvement.

3. Students

The attitude of the Faculty towards their students has several aspects. On one hand, there is an excellent support for the extracurricular activities; on the other hand, there is a tendency to put

the blame on the students or on the system for everything that goes wrong. The Panel is aware that the current situation in Croatia is not easy and that young people have to make some adjustments before they fit into the academic systems. However, the Faculty cannot assume an attitude in which the blame is always put on outside sources.

Recommendation: Establish more efficient communication structures to learn more about students' problems especially in the first year. This has to be some face-to-face discussion and not just another questionnaire.

3.2. Admission criteria and procedures are publicly stated and consistently applied. They are regularly reviewed for their effectiveness in predicting student success in a programme.

The Faculty defines their admission criteria, but there is no checking whether they predict student success. The idea seems to be that if only the best students are admitted, success will come automatically.

Recommendation: The Faculty should analyse more thoroughly the relation between student admission profile and student success/failure. This is an urgent problem, as their success rate is very low at present.

3.3. The competences of applicants upon admission are aligned with the demands and expectations in the future career of the graduates.

The high drop-out rate indicates that there may be problems in this area. However, the Panel thinks that the blame has to be put on the study programs and also (in parts) on the teaching and not on the admission.

3.5. The institution offers counselling, mentorship and professional orientation to ensure personal and professional development of the students.

There is no mentoring programme or any attempt in that direction. The internship which is part of the study programmes gives some limited opportunity for professional orientation.

Recommendation: The Faculty should establish a mentoring programme or equivalent in order to improve communication between students and teaching staff.

3.6. The institution cares for and raises the level of the student standard.

There is a need for more dorms, but the general standard is quite good.

3.8. The institution publishes its methods and procedures for student assessment and uses various methods for student monitoring. They include feedback by the teacher aimed at improving student knowledge and offer students possibility of appeal.

There is no genuine monitoring of students, only formal surveillance.

Recommendation: The Faculty should move from questionnaire oriented monitoring towards person oriented monitoring.

3.10. The institution maintains contact with alumni.

There is an alumni programme with various events. However, the alumni should be included in interaction with the Faculty in a more significant way.

4. Teachers

The general impression is confusing: The teaching assistants suffer from severe overloads, and there are not enough teachers in Computer Engineering. On the other hand, enrolment numbers are down and/or the drop-out rate is high, i.e. the number of students per year is comparatively low and the student /teacher ratio is quite good.

Recommendation: The Faculty should re-assess their teaching capacities as soon as the new undergraduate programmes are in place, and re-distribute the teaching load.

4.1. Number and qualifications of the teachers are in line with strategic goals of the institution and adequately cover core disciplines.

At present, the undergraduate study programmes do not cover the core disciplines in an adequate way, so it is not entirely clear whether there are enough teachers or not. There is a severe lack of teachers in Computer Engineering which also led to student complaints.

Recommendation (4 Panel members): The Panel thinks that there should be no enrolment in undergraduate Computer Engineering until the new study programs are in place and the teaching is re-organized.

Recommendation (1 Panel member, prof. dr. D. Begušić): The revisions of the undergraduate programmes should be carried out in order to achieve the internationally

reached standards and meet the requirements of the modern industry.

4.3. - 4.4. The institution demonstrates the employment of sufficient numbers of full-time teachers

at a study programme to ensure the quality and continuity of teaching and learning. The

institution takes into account the number of full-time teachers, maintaining the optimal ratio

between students and full-time teachers.

See comments above.

4.5. The institution has well-developed policies for teaching staff that ensure their development as

needed to advance the institution's mission.

There is no programme for assistant teachers' pedagogical qualification and advancement.

Recommendation: The Faculty should establish a programme for pedagogical qualification

of young teachers.

4.7. Policies governing the assignment of teachers' workload provide for a fair and equitable

distribution of effort and include teaching, research, mentorship and student consultations.

The workload is not distributed evenly, as the some of the young teachers have a severe

overload.

Recommendation: see above.

5. Scientific and professional activity

The Faculty is doing fairly well in attracting good research projects. There are some labs with

equipment corresponding to international standards (e.g. Department of Engineering

Mechanics). Their young researchers are a motivated group of people with great potential. All

this can only continue if there is some basic funding of research in Croatia.

5.1. The institution has established a strategic programme of scientific research the

implementation of which is monitored, evaluated and reviewed via defined success indicators.

There is no strategic programme, but this is not a problem, as the Faculty is quite active without that.

5.2. In planning and implementing its research agenda, the institution clearly envisions and provides for cooperation with other scientific organizations and industry both within and outside Croatia.

The Faculty supports its members in establishing research contacts. That is all what is needed at present.

5.4. The institution continuously supports its young researches.

The Faculty supports their young researchers. However, some of the young researchers are burdened with a severe overload in teaching.

Recommendation: The management of the Faculty should redirect resources such that the most severe overloads are reduced. They should also organize their teaching in a way that all young researchers have at least 6 months without teaching. This will certainly increase the scientific output.

5.8. In line with its mission, the institution supports professional activities and services, ensures conditions for knowledge and technology transfer and monitors their evidence.

The monitoring is limited, but may not be necessary.

6. International cooperation and mobility

The Faculty recognizes the importance of international cooperation and mobility. They have established a respectable number of contacts with institutions outside Croatia. There are already some visible results (e.g. international conference in September 2012) and it seems that they are on a good track. There is a good potential for increasing these activities, and the Faculty is encouraged to continue and strengthen their efforts in the area of internationalization.

Recommendation: The Faculty should pursue existing activities, but should focus more on outgoing mobility of researchers and students.

- 6.1. *The institution facilitates and promotes mobility of students from other higher institutions.*Activities are moderate, but the Panel thinks that this is not a top priority at the moment.
- 6.2. In keeping with the international context of study programs, students have opportunities to complete some portion of their programme abroad.

The Faculty supports their Ph.D. students in this respect and has some successes there. Undergraduates have problems going abroad, as the study programs do not comply with international standards.

6.3. The institution encourages international cooperation and mobility of its teachers and analyses implementation of their experience in its activities.

There seems to be some activity on an individual basis. This is adequate for the time being.

6.5. The institution has ensured conditions for attracting students from abroad.

As long as all the teaching material is in Croatian, the study programme is not attractive for students from abroad. However, the Panel thinks that the Faculty should first revise and improve the undergraduate programmes before they start introducing classes in English.

6.4., 6.6., 6.7. The institution is involved in international associations of similar institutions and actively contributes to joint goals. The institution has developed cooperation in the EU Lifelong learning Programme. The institution has developed other forms of inter-institutional cooperation through European projects, bilateral agreements, joint programs, etc.

The Faculty strives for international cooperation, but all activities are still on a moderate level.

7. Resources: administration, space, equipment and finances

A problem of the Faculty in this area is the quality of their equipment. It is not possible to educate engineers for the modern world with theoretical presentations and old computers.

Recommendation: The Panel strongly encourages the Faculty to apply for better funding of equipment.

7.1. The institution provides appropriate resources for all enrolled students sufficient to support their effective learning. These resources include classrooms, laboratories and equipment, library resources, computers, individual and group study spaces, and others in keeping with the institution's multiple learning modalities.

The buildings of the Faculty are in very good condition. There are also enough study spaces. However, most of the labs have rather poor equipment with few remarkable exceptions, e.g. Engineering Mechanics. This is not considered to be satisfactory.

Recommendation: Any funds which are available within the University should be used for improving lab equipment.

7.2. The institution has fully developed rules which regulate the development of the non-teaching staff and provide training opportunities in line with the mission of the institution.

The Faculty has established these regulations and training opportunities.

7.3.-7.4. In keeping with its research agenda, the institution ensures that laboratory equipment and usage protocols comply with recognized international standards. The institution provides the equipment and technical support for its use to ensure that all aspects of the organization can make the most of currant and varied technologies.

In case they have any equipment, they use it properly. The problem is the availability of equipment, see recommendations above.

Recommendation: According to experience in other countries, equipment for research cannot be purchased from basic funding. A nationwide funding system is needed such that the Faculty can apply for project related equipment.

7.5. The institution collects, analyses, and uses information relevant to improvement of its activities.

The Faculty fulfills this requirement.

7.6. Size, usability and availability of the library as well as the level of equipment ensure adequate student supports in their learning and research.

Even though rooms of the library have been recently improved, there is still a severe lack of modern books and periodicals. However, most students in Engineering rely much more on webbased information than on books. Moreover, technical progress is fast and the funds necessary to keep up with all developments are really high. This is a problem which is also well-known in other countries, and the general tendency is to switch entirely to web-based libraries.

Recommendation: Replace the library by a nationwide e-library.

7.7. As an aspect of its regular planning cycle, the institution ensures that it has maintained an appropriate ratio of teaching and non-teaching staff.

The ratio is appropriate.

7.8. Financial stability of the institution is harmonized with its mission and enables students to graduate from their programs. Sources of finance are transparent and all conditions related to financing are transparent and do not limit institutional autonomy when making decisions about teaching and research.

The sources of finances are transparent, and they use their funds well. There was some concern about the follow-up programme in project funding by the Ministry of Science, Education and Sports, because the current programme is about to end.

7.9. Institution's own funds are used to improve the quality of teaching and scientific activity in line with the mission and other formal documents.

Although limited, the available funds have been generally used in line with the formal documents.

II. SUMMARY OF COMMENTS AND RECOMMENDATIONS BASED ON VISIT AND SELF-ASSESSMENT REPORT

• Institutional Management and Quality Assurance, Study Programmes, Students

The Faculty has developed comprehensive study programmes both on undergraduate and on graduate level. A quality assurance system has been established.

As to the graduate programmes, they are well-developed and well-organized. However, the Panel was rather disappointed about the undergraduate study programmes, the general attitude towards teaching, and the general lack of interest in improving current conditions. In all discussions with the Faculty, blame was put on outside factors (e.g. quality of school education), and no ideas were put forth as to improving the situation.

The Faculty has spent a significant amount of work and resources on developing an elaborate quality assurance system. However, this system is not working very well, as nobody seems to feel responsible to draw conclusions from the numbers they produce. The Panel got the impression that communication stopped as soon as the crosses on a questionnaire had been made. In this sense, this system is a bureaucratic one and not a learning one.

In the opinion of the Panel, this is a very serious problem which is somewhat veiled by the comparatively good grades which were given because many questions in the criteria refer both to the formal structure (which is there) and to the outcome (which is by no means satisfactory). Some control mechanism has to be established in order to make sure that the necessary reforms are undertaken. The panel suggests that the new undergraduate study programmes should be re-evaluated after three years upon introduction.

Teachers

The general level of communication among teachers is moderate and reflects the problems associated with undergraduate studies. *A large part of the workload is put on the teaching assistants.* Of course, teaching assistants have to do their share, but, given the good student teacher ratio, there must be some winners of the system who do less teaching than others. The Faculty has to identify its weak links and *re-organize its teaching in a way that the teaching assistants have enough time for research and qualification.*

Equipment

The buildings of the Faculty are in a very good condition. However, there is very little usable equipment in the student labs. This is a problem of the Faculty which they cannot solve by their own. The Panel is thoroughly convinced that additional funds are needed, and that the Faculty will put them to good use.

Research

The Faculty encourages their researchers and gives them all the support they can. Motivation among project leaders is very high, and some groups have already reached international standard and recognition. The Panel is convinced that they are on a good track. However, a certain degree of stability is needed, and it must be clear how and to which extent the sponsorship of research programs on a national level is continued.

Conclusion

The Panel is convinced that the Faculty has the potential for undertaking the necessary reforms in their study programmes and re-organization of their teaching. No regulations from the outside are necessary, as there are many capable and internationally trained people in the Faculty who know very well what are the requirements with respect to qualification of their graduates on an international level.