



**REPORT
of the Expert Panel
on the
RE-ACCREDITATION OF
Josip Juraj Strossmayer University of Osijek
Department of Mathematics**

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INTRODUCTION

This report on the re-accreditation of the Josip Juraj Strossmayer University of Osijek Department of Mathematics was written by the Expert Panel appointed by the Agency for Science and Higher Education, on the basis of the self-evaluation of the institution and supporting documentation and a visit to the institution.

Re-accreditation procedure performed by the Agency for Science and Higher Education (ASHE), a public body listed in EQAR (European Quality Assurance Register for Higher Education) and ENQA (European Association for Quality Assurance in Higher Education) full member, is obligatory once in five years for all higher education institutions working in the Republic of Croatia, in line with the Act on Quality Assurance in Higher Education.

The Expert Panel is appointed by the ASHE Accreditation Council, an independent expert body, to perform an independent peer-review-based evaluation of the institution and their study programs.

The report contains:

- A brief analysis of the institutional advantages and disadvantages,
- A list of good practices found at the institution,
- Recommendations for institutional improvement and measures to be implemented in the following period (and checked within a follow-up procedure), and
- Detailed analysis of the compliance to the Standards and Criteria for Re-Accreditation.

The members of the Expert Panel were:

1. Prof. Arnold Hanslmeier, Ph.D., Institut für Physik, Universität Graz, Republic of Austria
2. Prof. Annette Bussmann-Holder, Ph.D., Max-Planck-Institut für Festkörperforschung and Institute of Physics University of Basel, Federal Republic of Germany
3. Prof. dr. sc. Barbara Drinovec Drnovšek, Faculty of Mathematics and Physics, University of Ljubljana, Republic of Slovenia – head of the Panel
4. Prof. dr. sc. Amir Hamzić, Department of Physics, Faculty of Science of the University of Zagreb, Republic of Croatia
5. Assoc. prof. dr. sc. Igor Pažanin, Department of Mathematics, Faculty of Science of the University of Zagreb, Republic of Croatia
6. Nikola Šegedin, student, Department of Physics, Faculty of Science of the University of Zagreb, Republic of Croatia

In the analysis of the documentation, site visit and writing of the report the Panel was supported by the ASHE staff:

- Vlatka Šušnjak Kuljiš, coordinator
- Ksenija Anić, translator

During the visit to the Institution the Expert Panel held meetings with the representatives of the following groups:

- The Management;
- Representatives of the Commission for Quality;
- The students;
- Deputy Head of Department for Education and Students;
- Deputy Head of Department for Research;
- The Teachers;
- Teaching assistants and junior researchers.

The Expert Panel also had a tour of the library, IT rooms, student register desk, and the classrooms at the the Josip Juraj Strossmayer University of Osijek Department of Mathematics, where they held a brief question and answer session with the students who were present.

Upon completion of re-accreditation procedure, the Accreditation Council renders its opinion on the basis of the Re-accreditation Report, an Assessment of Quality of the higher education institution and the Report of Fulfilment of Quantitative Criteria which is acquired by the Agency's information system.

Once the Accreditation Council renders its opinion, the Agency issues an Accreditation Recommendation by which the Agency recommends to the Minister of Science, Education and Sports to:

1. **issue a confirmation** to the higher education institution, which confirms that the higher education institution meets the requirements for performing the higher education activities or parts of activities, in case the Accreditation Recommendation is positive,
2. **deny a license** for performing the higher education activities or parts of activities to the higher education institution, in case the Accreditation Recommendation is negative, or
3. **issue a letter of recommendation** for the period up to three (3) years in which period the higher education institution should remove its deficiencies. For the higher education institution the letter of recommendation may include the suspension of student enrolment for the defined period.

The Accreditation Recommendation also includes an Assessment of Quality of the higher education institution as well as recommendations for quality development

SHORT DESCRIPTION OF THE EVALUATED INSTITUTION

NAME OF HIGHER EDUCATION INSTITUTION: Josip Juraj Strossmayer University of Osijek
Department of Mathematics

ADDRESS: Osijek, Trg Ljudevita Gaja 6

NAME OF THE HEAD OF HIGHER EDUCATION INSTITUTION: Associate Professor

Mirta Benšić Ph.D.

ORGANISATIONAL STRUCTURE (e.g. chairs, departments, centres): Chair of Pure Mathematics and
Chair of Applied Mathematics

LIST OF STUDY PROGRAMMES (and levels): Undergraduate university study programme in
Mathematics, Graduate university study programme in Mathematics with three specialisations
(Financial Mathematics and Statistics, Mathematics and Computer Science and Industrial and
Applied Mathematics) and Integrated undergraduate and graduate university study programme
in Mathematics and Computer Science

NUMBER OF STUDENTS (part-time/full-time/final-year): 456 full-time students and 25 final
year students

NUMBER OF TEACHERS (full-time, external associates): 17 full-time teachers in scientific-
teaching grade, 8 external associates

NUMBER OF SCIENTISTS (doctors of science, elected to grades, full-time): 17

TOTAL BUDGET (in kunas): 9.835.741,00 kn

MSES FUNDING (percentage): 94%

OWN FUNDING (percentage): 6%

SHORT DESCRIPTION OF HIGHER EDUCATION INSTITUTION:

Department of Mathematics, Josip Juraj Strossmayer University of Osijek, was founded on 1 October 1999 as the first university department in the Republic of Croatia organised along the lines of universities in Western Europe and North America. The core of the future Department of Mathematics formally began to form as early as 1993 when Osijek Mathematical Society and the Institute of Applied Mathematics were founded, after which a regular Mathematical Colloquium was initiated, and finally, in 1996, the scientific journal *Mathematical Communications* was launched. A newly established Department of Mathematics took over two four-year undergraduate university study programmes, i.e., one in Mathematics and Computer Science, and the other in Mathematics and Physics, granting a BSc degree in Mathematics and Computer Science and in Mathematics and Physics, respectively, from the then Faculty of Pedagogy, Josip Juraj Strossmayer University of Osijek. By the implementation of the Bologna process in the Republic of Croatia, the Department of Mathematics, Josip Juraj Strossmayer University of Osijek, got one of the first licenses for its newly established study programmes in line with the Bologna process. Department of Mathematics has been operating at its current location, i.e., Trg Ljudevita Gaja 6. from 2003. When the Department of Biology left the building and moved to new premises in early 2012, the Department of Mathematics was granted new adequate space intended for teaching and scientific activities as well as for a student restaurant. In this way, the Department of Mathematics was granted adequate space in which it is possible to organise and carry out renewed study programmes in an optimal way. In addition, spatio-technical conditions for the implementation of all activities related to scientific research in the field of mathematics were also optimised.

CONCLUSIONS OF THE EXPERT PANEL

ADVANTAGES OF THE INSTITUTION

1. Well supported and recognized research
2. Nice and inspiring environment for teachers and students
3. Enough space and well equipped study facilities
4. Appropriate supplemental resources, including electronic journal databases and literature

DISADVANTAGES OF THE INSTITUTION

1. High teaching load, especially for young researchers
2. Too many administrative staff members in comparison to the number of teachers
3. Lack of mobility, especially among students
4. Insufficient monitoring of the teaching quality and student load
5. Lack of motivation for students' involvement in departments affairs

FEATURES OF GOOD PRACTICE

1. Supplying the local area with teachers who are well prepared for their future tasks
2. Outstanding dissemination activity, namely the publishing activity (Mathematical Communications and Osijek Mathematical Gazette), organizing Mathematical Colloquiums, etc.
3. Signed agreements with corporations in the IT sector
4. Popularization of the study programs in the region (mathematical evenings, winter school, preparation for mathematical competitions)
5. Initial testing and offering preparatory courses for first year students
6. Oral examination as a part of the final exam

RECOMMENDATIONS FOR IMPROVEMENT

1. Management of the Higher Education Institution and Quality Assurance

- The involvement of students and other stakeholders in quality assurance should be substantially increased.
- The changes of the strategic plan should be introduced on a regular basis.
- The number of teachers with respect to the number of the administrative staff should be increased.
- The study programmes and institutional missions should be adjusted.
- The monitoring for improvement of the teaching quality should be conducted for each course at the end of each semester and possibly with specifics of the particular study programme.

2. Study Programmes

- We strongly suggest to initiate a joint study program of Mathematics and Physics. Both Departments, Department of Physics and Department of Mathematics should equally contribute to this new study program.
- More measures of students' accomplishments should be introduced. Feedback from students is highly desirable.
- The allocation of certain ECTS should be revised.
- It is necessary to introduce annual student surveys and internal peer review reports for teaching.
- The number of courses with reviewed web materials should be increased.

3. Students

- Students' feedback should be strongly encouraged.
- HEI should give more support to extracurricular activities.
- Reconsider the entering criteria of enrolment to the undergraduate study.
- HEI should initiate interaction between the students and the HEI with respect to the quality of the study programmes and decision making processes.

- Students should be encouraged by the HEI to actively participate in department affairs.

4. Teachers

- The annual workload of scientific teaching staff is too heavy and should be decreased. In particular, the external commitments need to be significantly reduced.
- We strongly encourage scientific teaching staff to participate in conferences, post-docs and sabbaticals.

5. Scientific and Professional Activity

- HEI should recognize and focus on the reduced number of research areas where excellence is expected.
- HEI should try to initiate other funding sources, for example through bilateral projects.
- Senior researchers should encourage and support younger researchers to apply for funding.
- HEI should nominate its best researchers for awards.

6. International Cooperation and Mobility

- The mobility of teachers and students in both directions should be systematically and substantially increased.
- HEI should offer courses in English at the graduate level.

7. Resources, Administration, Space, Equipment and Finance

- The number of teachers with respect to the number of the administrative staff needs to be increased.

DETAILED ANALYSIS OF INSTITUTIONAL COMPLIANCE TO THE STANDARDS AND CRITERIA FOR RE-ACCREDITATION

Institutional management and quality assurance

1.1

The plan is not updated and adjusted. The conditions have changed since 2011 and this has not been taken into account. The changes have not been monitored on a yearly basis. The mission to include all the teachers of mathematics at the University of Osijek has not been completed.

1.2

In our opinion, the ratio of the teachers with respect to the administrative staff is too low. Similar departments should share common administrative amenities. Legal documents are sufficient.

1.3

Not applicable for university departments.

1.4

Study programmes and institutional missions are not converging. The emphasis is put on educating future teachers, however, in the mission it is stated that they are in charge of organizing research and professional activities. Learning outcomes are published.

1.5

Stronger involvement of students and other stakeholders in quality assurance is missing. Though the internal quality assurance is not formalized there are some positive aspects, for example, initial testing of students and conducting preparatory courses.

1.6

The monitoring for improvement of the teaching quality is conducted every two years. We recommend that it is conducted for each course at the end of each semester and possibly with specifics of the particular study programme. On the other hand, we encourage HEI to continue the practise for training the teachers in methodological and pedagogical skills.

1.7

Although the mechanisms of monitoring the research quality exist, they should be improved to be in line with the procedures described in the ordinances. For instance, formal indicators of research excellence should be introduced.

1.8

All ethical standards are fulfilled. There is no student ombudsman.

Study programmes

2.1

Procedures for monitoring and improving the quality of study programmes should be amended: performing market surveys on a more frequent basis, measures of student accomplishment should be introduced. Improvement of the current study programmes are under consideration. The institution should encourage feedback from students.

We find some statements in the self evaluation too general and definitely insufficiently explained.

2.2

The needs of the society are only partially taken into account when setting enrolment quotas: the enrolment quotas at the graduate study programmes are too high with respect to the number of students. Alumni tracking is well organized and it should be continued in the future.

2.3

Taking into account the institutional resources the enrolment quotas are too high to guarantee quality teaching. The enrolment quota could be in line with institutional resources if the external engagements were significantly decreased, in particular the teaching duties of the younger researchers should be substantially reduced.

Extra courses to decrease high drop-out rates are organized for the first year students.

2.4

Learning outcomes have to be explained in more detail.

2.5

The students are aware of all the requirements needed to qualify for the exam in advance. We particularly encourage oral examinations as part of the final exam. The assessment methods should be reviewed and analysed periodically.

2.6

We observed certain discrepancies between the allocation of the ECTS and student work load. In particular, pedagogical courses are demanding but are allocated 3 ECTS only. Working on diploma thesis is underestimated (6 ECTS). We advise to reconsider the last semester of the graduate study. In the ECTS revisions student feedback needs to be taken into account.

2.7

In view of the international recognition of the senior teachers we are convinced that the study programmes conform to international standards. We expect this to be an encouragement for younger researchers to continue in this way.

2.8

Due to the lack of annual student surveys and internal peer reviews' reports on teaching it is difficult to improve the teaching methods. In particular, the number of courses with reviewed web materials needs to be increased.

2.9

Currently sufficient supplementary sources are available to the students and teachers. Future problems should be anticipated. We acknowledge the publishing activity of the HEI.

2.10

The cooperation with external institutions is functioning for the students of graduate study program of Mathematics and Computer Science whereas for the students of graduate study program of Financial Mathematics and Statistics it is insufficient.

Students

3.1

We are quite satisfied with these criteria but we believe that further improvement is possible, for example by raising the level A mathematics.

3.2

In a building of this size more space should be provided for students' association and cultural activities. The initiatives such as establishing a recreational gym are further encouraged.

3.3

We acknowledge the existing system of mentorship for the first year students, however, it is absent on the higher levels.

3.4

Although the students have a possibility to appeal against the decision concerning their assessment, it is very rare in practise and even discouraged.

3.5

HEI maintains contacts with its former students and collects statistic data on their employment.

3.6

The institution regularly informs the public about its study programmes, learning outcomes, qualifications and employment opportunities.

3.7

Students are not motivated to express their opinion and they do not take part in problem solving processes. This is partly due to a lack of interest, but the institution should encourage their engagement by establishing regular anonymous surveys.

3.8

There is insufficient student feedback of student surveys to supply a useful basis for concrete improvement.

Teachers

4.1

We believe that these criteria are only mostly implemented because the number of the scientific staff is not fully in line with strategic goals of the department. On the other hand, the qualifications of the current staff are adequate.

4.2

The department cannot influence development of human resources due to the current Ministry measures caused by the economic situation of the state. Therefore, we are unable to assess this criteria.

4.3

The institution takes into account the number of full-time teachers, maintaining the optimal ratio between students and full-time teachers.

4.4

We encourage continuing the practise of training the teachers in methodological and pedagogical skills.

4.5

The annual workload of scientific teaching staff is large, preventing the fair and equitable distribution. This inhibits them in participating in conferences or sabbaticals.

We suggest that the teaching duties of younger researchers are reduced, thus leaving them more time for research activities.

4.6

See table 4.3 in the self-evaluation report.

Scientific and professional activity

5.1

Although the institution has the strategic agenda we find it being too general. In particular, a detailed analysis of the research potential is missing. The planned research activities are very dispersed and unlikely to be accomplished.

5.2

The strategic document has not been created together with the partners from other organisations; the ongoing collaborations are, however, not listed.

5.3

Although the minimal requirements from the ordinance are met, we are sceptical that the large number of proposed research subjects can be accomplished.

5.4

We recognize the current research activity and quality of the scientific work and we encourage the continuation of such activity.

5.5

The institution has no mechanisms in place for recognizing and supporting excellence of its employees, in particular a reward system has not been implemented.

5.6

HEI has an adequate number of peer-reviewed scientific publications.

5.7

The number of projects, both domestic and international, should be increased.

5.8

Transfer of knowledge to the industry should be strengthened.

5.9

The commercial activity and cooperation is on a personal basis only, and it is not institutionalized.

5.10

HEI participates in the joint PhD program with other universities in Croatia.

International cooperation and mobility

6.1

In spite of the fact that the institution enables and supports the mobility of students from other institutions, the realisation remains too scarce.

6.2

The students rarely take advantage of the opportunity to complete a part of their program abroad. In view of this fact the department should increase the efforts in obtaining new bilateral agreements.

6.3

The teachers' mobility is limited due to their high teaching load. In particular, post-doc and sabbatical breaks are not encouraged.

6.4

International cooperation is recognized only on a personal basis.

6.5

There is no course in English which prevents foreign students to visit the department and conduct their studies there.

6.6

Due to the limited financial resources the institution is not able to provide conditions for more visits.

6.7

International cooperation is recognized on a personal basis.

Resources: administration, space, equipment and finances

7.1

Resources of the Department of Mathematics fully meet students' needs.

7.2

In spite of the fact that the teachers are satisfied with the number and availability of support staff we are convinced that the ratio should be changed in favour of the teaching staff.

7.3

The institution has well-developed policies that ensure professional development of non-teaching staff, in line with the institution's mission.

7.4

Department of Mathematics has several IT classrooms that mostly comply to international standards.

7.5

The institution mostly secures all necessary technical support.

7.6

The number of seats in the library is insufficient in view of the number of students from 3 departments who share the library. We recognize the efforts of the HEI to ensure the compulsory literature for students.

7.7

For the last two years (that we could analyse) the lump-sum and the financial support from the funding agreement has enabled the financial sustainability.

Although the significant part of the own activity and special regulations income (e.g. tuition fees) are allocated to well defined purposes (new equipment, demonstrators, mentoring in school, external cooperation...) we feel urged to emphasize that – in our opinion – the amount spent on intellectual and personal services is quite high and needs to be reduced (it is of the order of all tuition fees received!).

7.8

The manner in which funds are allocated is on the right track to be fully implemented.