Report
of the Expert Panel
on the Reaccreditation
of the University Postgraduate (Doctoral) Programme
Biophysics
Faculty of Science
University of Split

Date of the visit:
September 3rd, 2018

November, 2018

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INTRODUCTION

The Expert Panel appointed by the Agency for Science and Higher Education (ASHE) created this Report on the Re-accreditation of the University Postgraduate (Doctoral) Programme *Biophysics* on the basis of the Self-Evaluation Report of the Programme, other documentation submitted and a visit to the Faculty of Science, University of Split.

The Agency for Science and Higher Education (ASHE), a public body listed in EQAR (European Quality Assurance Register for Higher Education) and a full member of ENQA (European Association for Quality Assurance in Higher Education), re-accredits higher education institutions (hereinafter: HEIs) and their study programmes in line with the Act on Quality Assurance in Science and Higher Education (Official Gazette 45/09) and the Ordinance on the Content of a Licence and Conditions for Issuing a Licence for Performing Higher Education Activity, Carrying out a Study Programme and Re-Accreditation of Higher Education Institutions (OG 24/10). In this procedure parts of activities of higher education institutions and university postgraduate study programmes are re-accredited.

Expert Panel is appointed by the Agency's Accreditation Council, an independent expert body, to carry out independent evaluation of post-graduate university study programmes.

The Report contains the following elements:

- Short description of the study programme,
- The recommendation of the Expert Panel to the Agency's Accreditation Council,
- Recommendations for institutional improvement and measures to be implemented in the following period (and checked within a follow-up procedure),
- A brief analysis of the institutional advantages and disadvantages,
- A list of good practices found at the institution,
- Conclusions on compliance with the prescribed conditions of delivery of a study programme,
- Conclusions on compliance with the criteria for quality assessment.

Members of the Expert Panel:

1. **President of the Expert Panel, Professor Gernot Riedel, University of Aberdeen, UK**
2. Professor Michael Drinnan, University of Newcastle, UK
3. Professor Justin McCarthy, University College Cork, Ireland
4. Dr. Dorte Gilså Hansen, Syddansk Universtitet, Denmark
5. Giovanni Marco Nocera, doctoral student, Max Planck Institute, Germany
6. Massimiliano Ferrucci, doctoral student, KU Leuven, Belgium.

The higher education institution was visited by the following Expert Panel members:

- **Moderator of the site-visit, Professor Michael Drinnan, University of Newcastle, UK**
- Professor Gernot Riedel, University of Aberdeen, UK
- Professor Justin McCarthy, University College Cork, Ireland
- Giovanni Marco Nocera, doctoral student, Max Planck Institute, Germany
- Massimiliano Ferrucci, doctoral student, KU Leuven, Belgium.

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

- Marina Matešić, coordinator, ASHE.

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

- Management,
- Study programme coordinators,
- Doctoral candidates,
- Teachers and supervisors.

The Expert Panel also had a tour of the premises.

SHORT DESCRIPTION OF THE STUDY PROGRAMME

Name of the study programme contained in the licence: Biophysics
Institution delivering the programme: Faculty of Science, University of Split
Institution issuing the degree: University of Split
Place of delivery: Split
Scientific area and field: Natural Sciences

Number of doctoral candidates: 12 active in the moment (29 enrolled since the commencement of the programme, 7 completed)
Funding available for 11 (3 as TAs, 5 as research assistants within Croatian National Science Foundation funding, 2 as researchers at the MEDILS Institute for Life Sciences, 1 self-funded)
Number of teachers: 10 +9 externals
Number of supervisors: 21 appointed since 2011, at present 10 supervisors to 12 students (16 more potential supervisors available)

Learning outcomes of the study programme: generic

Programme outline:
Up to 48 ECTS in courses (obligatory and optional, 19 courses) or 26%, all in first year; the rest in research, mentorship reports, defence (136).

RECOMMENDATION BY THE EXPERT PANEL TO THE ASHE'S ACCREDITATION COUNCIL

It is the overarching opinion of the Expert Panel that the programme contains, in a very mature form, a considerable number of elements required for good practice of student support, as well as framework features necessary to run, maintain and ensure PhD progress and guarantee a high number of achievements. In addition, the related coursework is of high quality and complements ongoing experimental work.

However, the Panel (together with the management and supervisors) has also identified areas that require improvement, which we list and weigh them in our detailed response including an evaluation of the urgency for these changes to take place. We are content that implementation of improvements is no easy endeavour given the limitations (personnel, financial...) and strains the Faculty is under. Yet changes are needed to equip the PhD programme for competition with similar programmes in a European context, but also to bring the standards to a level that would facilitate international exchange between PhD programmes, research institutions and private sector, and ensure that the candidates' experience a smooth transition when joining Croatian education streams. Reciprocally, this will set up the Croatian students for more competitive and successful international careers.

Our frank discussions with all parties involved in the programme of Biophysics suggests that there is internal acceptance of many of the issues raised by the Panel. The Panel also experienced the will to communally explore new avenues to remedy shortfalls, and to address issues of governance and support that are required in modern-day higher education. As a consequence, we recommend a confirmation on compliance for performing parts of activities (renew the licence).

Although shortfalls do not weigh enough to affect the general framework of the postgraduate programme, we have expectations that we list in our recommendations and expect the HEI to follow through in order to conform with equivalent European programmes within the follow-up period. We would expect to see that programme management (incl. faculty) embarks on a constructive dialogue with ASHE, which will oversee transitions and progressive improvements, but also may become instrumental in advising on good practices and methods for attaining and maintaining excellence.

It is hoped by the Panel that this process, once completed, will set the programme up as a high achieving postgraduate education stream within the Faculty of Science at the University of Split.

The Expert Panel would like to congratulate the *Biophysics* team and express how much we all enjoyed the visit. All members of our team learned from the good practices we observed on the visit, and we very much look forward to hearing about the continued success of your programme.

ASSESSMENT STRATEGY

In our assessment, we kept in mind the following three broad principles:

1. That the programme should aspire towards the best practices of (see below):

- The Bologna Seminar on "*Doctoral Programmes for the European Knowledge Society*";
- CroQF, level 8.2;
- EU Principles for Innovative Doctoral Training.

2. That there should be a common benchmark for scope and quality in PhDs across the EU, in order that qualifications have extrinsic value and can be considered transferrable between member countries.

3. That strategic decisions about the programme always be made in the best interests of patients and healthcare across the EU and the rest of the world. This is in keeping with the research priorities of national agencies such as NICE, as well as major national and international funding bodies.

Special weight was given to the self-nominated study objectives, and how these are contained within best practice. The assessment was based on the Self-Evaluation Report provided by the Faculty Council of the Faculty of Science, University of Split, and the site visit conducted by the Expert Panel on the 3rd September 2018. At the same time, adherence to level 8.2 of the Croatian Quality Framework Act was considered as a minimum standard.

The Bologna Seminar on "*Doctoral Programmes for the European Knowledge Society*"

i. The core component of doctoral training is the advancement of knowledge through original research. At the same time, it is recognised that doctoral training must increasingly meet the needs of an employment market that is wider than academia.
ii. Embedding in institutional strategies and policies: universities as institutions need to assume responsibility for ensuring that the doctoral programmes and research training they offer are designed to meet new challenges and include appropriate professional career development opportunities.
iii. The importance of diversity: the rich diversity of doctoral programmes in Europe – including joint doctorates – is a strength which has to be underpinned by quality and sound practice.
iv. Doctoral candidates as early stage researchers: should be recognized as professionals – with commensurate rights – who make a key contribution to the creation of new knowledge.
v. The crucial role of supervision and assessment: in respect of individual doctoral candidates, arrangements for supervision and assessment should be based on a transparent contractual framework of shared responsibilities between doctoral candidates, supervisors and the institution (and where appropriate including other partners).
vi. Achieving critical mass: Doctoral programmes should seek to achieve critical mass and should draw on different types of innovative practice being introduced in universities across Europe, bearing in mind that different solutions may be appropriate to different contexts and in particular across larger and smaller European countries.
vii. Duration: doctoral programmes should operate within an appropriate time duration (three

to four years full-time as a rule).
viii. The promotion of innovative structures: to meet the challenge of interdisciplinary training and the development of transferable skills.
ix. Increasing mobility: Doctoral programmes should seek to offer geographical as well as interdisciplinary and inter-sectoral mobility and international collaboration within an integrated framework of cooperation between universities and other partners.
x. Ensuring appropriate funding: the development of quality doctoral programmes and the successful completion by doctoral candidates requires appropriate and sustainable funding.

CroQF, level 8.2:

Descriptors of learning outcomes for this level are:
knowledge - creating and evaluating new facts, concepts, procedures, principles and theories in a field of research that extends the frontier of knowledge;
cognitive skills - using advanced, complex, original, highly specialized knowledge, skills, activities and procedures required for developing new knowledge and new methods as well as for integrating different fields;
practical skills - creating, evaluating and performing new proposed specialized activities and new methods, instruments, tools and materials;
social skills - creating and applying new social and generally acceptable forms of communication and cooperation in interaction with individuals and groups of different affiliations and different cultural and ethnical origin;
autonomy - demonstrating personal, professional and ethical authority, managing scientific research activities and a commitment to development of new ideas and/or processes;
responsibility - taking ethical and social responsibility for successful execution of research, socially beneficial results and potential social consequences.

EU Principles for Innovative Doctoral Training

Research Excellence - Striving for excellent research is fundamental to all doctoral education and from this all other elements flow. Academic standards set via peer review procedures and research environments representing a critical mass are required. The new academic generation should be trained to become creative, critical and autonomous intellectual risk takers, pushing the boundaries of frontier research.
Attractive Institutional Environment - Doctoral candidates should find good working conditions to empower them to become independent researchers taking responsibility at an early stage for the scope, direction and progress of their project. These should include career development opportunities, in line with the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers.
Interdisciplinary Research Options - Doctoral training must be embedded in an open research environment and culture to ensure that any appropriate opportunities for cross-fertilisation between disciplines can foster the necessary breadth and interdisciplinary approach.
Exposure to industry and other relevant employment sectors - The term 'industry' is used in the widest sense, including all fields of future workplaces and public engagement, from industry to business, government, NGO's, charities and cultural institutions (e.g. museums).

This can include placements during research training; shared funding; involvement of non-academics from relevant industry in informing/delivering teaching and supervision; promoting financial contribution of the relevant industry to doctoral programmes; fostering alumni networks that can support the candidate (for example mentoring schemes) and the programme, and a wide array of people/technology/knowledge transfer activities.

International networking - Doctoral training should provide opportunities for international networking, i.e. through collaborative research, co-tutelle, dual and joint degrees. Mobility should be encouraged, be it through conferences, short research visits and secondments or longer stays abroad.

Transferable skills training - "Transferable skills are skills learned in one context (for example research) that are useful in another (for example future employment whether that is in research, business etc.). They enable subject- and research-related skills to be applied and developed effectively. Transferable skills may be acquired through training or through work experience". It is essential to ensure that enough researchers have the skills demanded by the knowledge based economy. Examples include communication, teamwork, entrepreneurship, project management, IPR, ethics, standardisation etc.

Business should also be more involved in curricula development and doctoral training so that skills better match industry needs, building on the work of the University Business Forum and the outcomes of the EUA DOC-CAREERS project. There are good examples of interdisciplinary approaches in universities bringing together skills ranging from research to financial and business skills and from creativity and design to intercultural skills.

Quality Assurance - The accountability procedures must be established on the research base of doctoral education and for that reason, they should be developed separately from the quality assurance in the first and second cycle. The goal of quality assurance in doctoral education should be to enhance the quality of the research environment as well as promoting transparent and accountable procedures for topics such as admission, supervision, awarding the doctorate degree and career development. It is important to stress that this is not about the quality assurance of the PhD itself rather the process or life cycle, from recruitment to graduation.

The common approach should provide a framework of reference, whilst preserving flexibility and autonomy for institutions and doctoral candidates.

A ADVANTAGES OF THE STUDY PROGRAMME

A1 Enthusiastic students: The 6 students we met were a credit to the programme; well-motivated, engaging and willing to make their views known. We noted that 5/6 students were women. All spoke good English and were supportive of the English language medium. One student pursues a co-tutelle PhD with Sorbonne University (Paris, France); two others graduated outside Croatia (Karlsruhe, Germany; Copenhagen, Denmark).
These factors all speak to the outward-looking view of the students as scientists first, willing to engage with the scientific community on equal terms. We expect them to go on to careers as successful scientists.
A2 Multidisciplinarity: The programme has the potential for strong multi-disciplinary links. In particular, we were impressed with the STIM Centre of Excellence, which has linked the bio-sciences with chemistry and physics. This centre has recently appointed 20 students, with 5-7 placed in biophysics. There is further potential for stronger links with the medical faculty, and Panel members were disappointed that internal accounting and governance barriers stopped this from being stronger.
A3 Ambitions for expansion. While the programme is currently small, we note the potential in terms of infrastructure and supervisory capacity to have up to 80 students in-programme simultaneously. This is an opportunity for the Faculty, and we have commented elsewhere. We also noted the provision of new equipment; some, such as the clean room, are unique in Croatia. Such investment in facilities will help create a unique selling points for the Faculty that should help to foster outside collaboration and industrial sponsorship.
A4 Value for money. The Panel commend the extremely good value for money offered by the programme, relative to other PhD programmes across the EU. This is achieved in part by the subsidy of the programme, which is seen as an asset to the University.

D DISADVANTAGES OF THE STUDY PROGRAMME

D1 Taught course structure: The Panel noted the high load of taught courses, particularly for 1st year students. Estimates for the proportions of time spent in research vs. taught modules varied depending on who we asked, but was in the range of 60:40 (research : taught) to 30:70 (research : taught). This workload places considerable strain on the teachers, in some cases with only one or two students attending the class; the resource could be freed up to the benefit of the post-graduate students and teachers. Moreover, we believe that unnecessary taught commitments adversely affect the scientific depth of the theses. The scientific output is the key metric of European PhD programmes and a critical objective that should inform all decisions on taught courses.
Students and supervisors were broadly in agreement with the issues: many taught modules do not meet the needs of a modern biophysics PhD candidate; some specialist modules only meet the needs of a small proportion of students; and some modules deliver basic content that is core knowledge for the incoming student ('Fundamentals of Molecular Biology' was cited as an example).
D2 Single mentoring. A proportion of students have only a single PhD mentor. We note that, in the majority of cases, the relationship works well. Nevertheless, to give a wider academic perspective, we prefer that students have two mentors. This is particularly important for a

multidisciplinary programme and may indeed lead to further cross-fertilisation of ideas between faculties.

A related concern is the lack of an appropriate framework to support the students in case of personal or scientific disagreements with their respective supervisors. While this has not proved a problem to date, the second supervisor or mentor offers a light-touch means of resolving disagreements without the need to raise a formal grievance.

Finally, there is a real concern that the pool of supervisors will be diluted without co-supervision across the board. New supervisors need the support of a senior supervisor with successful experience; and senior supervisors are often successful and busy, and therefore need the support of junior members who can offer hands-on support.

D3 Depth of study in PhD research: Review of theses revealed considerable heterogeneity in terms of scientific breadth. The majority were less than 100 pages, reported on a single research theme, and contained brief *Methods* and *Results* sections. Some theses were extremely short. In the European context, the Panel considers it unlikely that these would be considered an adequate synthesis of a 3(4)-year programme of PhD-level work unless the quality was unprecedented. In comparison to the European norm, the body of work is typically more in keeping with a Masters (MPhil or MD) thesis, approximating to no more than two years of full-time research work. We believe this is a consequence of (i) the relatively high taught workload, and (ii) access to scarce resources that sometimes requires travel to Zagreb, for example. Nevertheless, our impression was that the scientific content of the theses was of high quality. Therefore, we intend a comment on the breadth of work, rather than the quality of the science being conducted.

D4 Length of PhD; full-time vs. part-time study: Several Panel members suggested the curtailment of the overall maximum study period. This would be aided by better monitoring structures and milestone definitions, but also by a more stringent handling of timescales with a strong preference for full-time study. This has the added benefit of retaining the currency of the work.

D5 Marketing: We note that on occasions, the programme does not market itself as effectively as possible. This includes: missing or out-of-date information on websites, and missed opportunities to bring the programme to wider attention.

D6 Supervisor support: Quality of supervision has already been noted, and the best supervisors are to be encouraged and incentivised. In contrast to European norms, there was no evidence to indicate whether the publication record was used in the appointment, performance assessment or proportion of academic staff.

D7 Governance and metrics: We had some concerns around the governance of the programme. While we accept that these have not resulted in difficulties to date, the procedures should be in place as the programme expands for the day when inevitably, there will be a student in difficulties. Good governance is supported by good programme data. Had they been available, the Panel would have found detailed metrics extremely helpful; from admissions and progression, to graduation and the future careers of the graduates. Some of this information was made available during our visit, but was not readily to hand. So far as we can tell, the information is not used actively to identify failing students, an important aspect of programme governance. We believe that outcome metrics will be an important tool in the long-term evolution of the programme in an international setting. For example, we commend the team on the PhD completion rate, which appears somewhere in the region of 60%. This is comparable with PhD completion rates in other EU member countries (typically >70%), and notably is significantly better than the figure for Croatia as a whole. Without ready access to such statistics, it will be

difficult for the programme to differentiate itself, to be attractive to incoming students and other stakeholders.

GP EXAMPLES OF GOOD PRACTICE

GP1 Relationship between mentors and students: We note and commend the quality of the programme supervisors; the students spoke very highly of supervisors and were overwhelmingly appreciative of their support. A close relationship between mentor and student is widely practised. While not without some problems, the Panel felt that this approach has considerable merit and is helpful in diffusing tensions and aiding in the progress of the work.

GP2 Internationalisation: We were encouraged that all classes were delivered in English, which was not clear from the Self-Evaluation Report. In terms of the thesis, the English language was given equal status to Croatian; students were almost unanimously in favour of writing in English, given that it is the worldwide language of science. This will foster the internationalisation of the programme; it will lower the hurdle to inviting overseas experts to participate in teaching, supervision and examination of Croatian students, and help to establish equity with other HEIs in Europe.

There have been small steps taken, with one student coming from Portugal and with a number studying oversees for parts of their PhD programme. In the longer term, internationalisation offers opportunities for scientific collaboration and to attract researchers from overseas under the right circumstances. The uptake of this opportunity has been relatively low, but should be actively promoted. We note moves in this direction, for example, the international summer school on biophysics, and an exposition at the Split international conference.

GP3 The programme is aspirational: We were encouraged that all the current cohort of students planned to stay in the medical sciences, with a number planning for a post-doctoral position outside of Croatia. Once again, this left us with the impression that the course was delivering students who had a place in scientific community in Croatia and beyond.

R RECOMMENDATIONS FOR THE IMPROVEMENT OF THE STUDY PROGRAMME

R1 Taught course structure: As an aspiration, we believe that programmed teaching should account for no more than 20% of the course. Clearly, generic skills remain central to the early education programme, but specialist knowledge relevant to each individual PhD topic should be acquired by self-study or alternative means; lab meetings; scientific interactions with supervisor; regular study reports; etc. We promote a more project-based approach for the achievement of merit. This would imply an overall reduction in taught credits, and a corresponding reduction in time spent therein. We recommend that the faculty review their programme of compulsory and optional teaching courses taking into consideration:

- Compulsory attendance should be limited to 3 or 4 courses that teach the essentials of biomedical research, for example: study design and medical statistics; bioethics; and academic & grant writing.
- Other modules are optional, in order that each student can compose a portfolio of courses to suit their own learning needs.

- Students can opt out of specific modules if they can demonstrate prior learning from an accredited higher education programme.
- Where possible, similar content should be rationalised into a single course taking the best elements of each donor course.
- Consider use where appropriate of Massively Open Online Courses (MOOCs). There are excellent specialist MOOCs available that have been developed using resources that are not available to any but the largest institutions. They are widely applied in Panel members' host institutions.
- The Panel recommends the introduction of appropriate external and international experts for the delivery of specialist aspects of the programme as part of the internationalisation effort. This should also be implemented in other post-graduate programmes in Croatia.

R2 Move towards co-supervision for all students. We recommend that students have two supervisors, where possible. The second supervisor may have more of a pastoral and supportive role; interactions should be documented by regular meetings with the PhD student in order to help monitor progress, but also to identify problems early on and diffuse them painlessly. This is particularly important for multidisciplinary projects, where supervisors should come from co-disciplines, and where more than 2 mentors may be named. We also promote the inclusion of external supervisors, for example when students deliver parts of international collaborations.

R3 Depth of study. For equity with other EU programmes, we feel that some individuals' programmes should have more substance. Typically, though not always, we believe a PhD would be expected to have at least two major sub-themes or lines of enquiry that test different skill-sets in the candidate. In order to address this shortfall, we first recommend that the programme team address the points made earlier against the taught component of the programme. If managed carefully, it is our impression that this might recover up to an entire year of research time and therefore, further changes to the programme would not be necessary.

R4 Length of PhD; full-time vs. part-time study: We recommend that the faculty encourage all students to engage in full-time study where appropriate. In addition, the improvement in governance will help to identify the students who over-run because they are failing to thrive in their postgraduate life.

R5 Marketing: Keep the outward-facing materials (web sites) up-to-date, particularly adopting and advocating the English language as the common language of science. Encourage staff to avail themselves of EU reintegration research funding opportunities. Promote opportunities for staff to engage in more international research projects and exploit more international funding opportunities through research partnerships. One strategy for achieving this is the establishment of a dedicated office that can support HEI staff in identifying sources of funding and strengthening the research proposal. Furthermore, the HEI's international network can be an asset in this endeavour as many European research funds are intended for multiple beneficiaries.

R6 Supervisor support: An incentive programme to reward and retain staff mentoring and publishing at the highest standards should be considered. This might also build the opportunities for internationalisation into the staff job profiles.

R7 Governance and metrics: We have made a number of comments regarding governance and metrics for the programme. This is such an important and multifactorial issue for the development of an internationally-competitive programme that they are addressed separately below.

GOVERNANCE AND METRICS

The Panel agreed that the recording and regular publication of progress and completion rates is a vital element of quality control that can be expected from every PhD programme. Good statistics on PhD outcomes will help to rank the Faculty nationally and internationally, and will, in the longer run, attract high quality students. For example, we note that on an international comparison, high quality universities/institutions present with better completion rates, and this is considered an important measure of programme quality (https://www.timeshighereducation.com/news/phd-completion-rates-2013/2006040.article).
We believe that many of the issues with the programme would be resolved with proper programme governance, supported by good information on individual students and aggregate data that will become the course metrics for success.
In larger programmes, we observe that students can be 'in the system' for many years without their progress being appropriately monitored. It is unclear to the Panel how or whether failing students would be identified early or picked up in time to prevent them from dropping out of the programme altogether. While we had no concerns now, uncertainty exists as to the numbers provided in the SER for progress tracking and completion rates with some known errors.
In our larger institutions, then given the economies of scale these functions would be delivered by a Faculty or University-wide graduate school or school for Doctoral studies. While that may be an aspiration for the future, the functions themselves are important in establishing and growing a high-quality doctoral programme.
Below we give the key functions of the graduate school or a similar organisation and propose some metrics and statistics that can be used to monitor them.

Entry requirements and admissions
Clear and objective admission criteria should be documented so that a decision can be made.

Metrics, summary statistics and outcomes
The University/Programme should record each application for the programme, the outcome of the application with a reason as appropriate. Where the student joins the programme, then the start date and other relevant documentary details should be recorded.

- Total number of applications
- Qualifications of applicants
- 'Offer to study' rate
- Acceptance rate
- Intake per year

All of these are important indicators of the success of a programme, and give early indication of growth, decline or changes in the student demographic.

Appointment of supervisors and learning agreements
Rules for appointment of supervisors should be better established, each student having a minimum of two supervisors. The lead supervisor should have previous experience of doctoral mentorship, whereas the co-supervisor can be a new mentor as appropriate. In line with our own institutions, we recommend that panels are appointed by discussion between supervisors and the existing committee to make the appointment transparent and balanced with the needs of the student. There should exist signed learning agreements between the student, supervisors and

Faculty. They set down the responsibilities of all parties and form the basis of their collaboration. The learning agreement should specify a schedule of meetings between student and supervisors, at least once per month.

Metrics, summary statistics and outcomes

- The names of the supervisors, and the date on which they were appointed
- Date of signing the learning agreement.

These metrics can be used as an early indication of students who are not engaging with their supervisory team, or vice versa.

Ongoing progress assessment

Students opined that they had little or no formal feedback from their progression reports, and would greatly appreciate independent view from independent assessors. The Panel felt that a more defined framework needs to be developed that monitors and documents the progress of the student by regular reviews. These meetings should be recorded as a record of research progress that can be reviewed by Faculty in the case of difficulty.

Skilled academic assessors who can judge the scientific progress of the candidate should be included in this process. In line with our own institutions, we recommend that panels are appointed between supervisors and the Faculty Council. There should be early contact with the assessors at submission of the project proposal. Then, each student should have a review of progress, at least on a yearly basis. This can take the form of (for example) a one-to-one meeting or an open 'PhD day'. A progression report for the student should be compiled by the assessors and reviewed by a Faculty committee. It should include measures of quality and achievement of milestones. Slow progression and non-achievers need to be identified early and contingencies put in place for help to improve the student's prospects.

Metrics, summary statistics and outcomes

- The names of the progression panel, and the date on which they were appointed
- Date of submission and approval of the project proposal
- Dates of meetings
- Progression report, with recommendation for progression
- Publications and other scientific outputs from PhD research.

These support structures and their success/failure needs to be monitored and revised.

Programme engagement and attendance can be monitored from submission of the project proposal, and the attendance at regular meetings. In addition, a delayed approval of the project should be followed up as an early indicator of a potential difficulty.

This forms a part of the **progression review** with independent members of faculty. At least annually, the student's progress against the expectations for a student at that stage can be monitored. Students who are not performing to standard can take remedial action.

Stage of study: This gives early warning of failing or disengaged students. The Panel noticed a conflict between research and employment for many Croatian students, and this can reduce their ability to commit time to post-graduate studies. In the worst case, there is anecdotal evidence from other institutions that students stay in the system indefinitely, and their research loses currency. In the situation where a student is failing, it is preferable to identify this at an early stage so as not

to waste the time, money and effort of all members of the research team. While we did NOT note any such concerns here, these data provide objective evidence for outside agencies, giving the confidence to invest in students with an expectation of a return in a reasonable time period.

Publications as a metric of quality.
Although this point is not without contention, publications can be used as a metric of the quality of the students and the study programme.

Appointment of examiners and thesis defence
We recommend that panels are appointed by discussion between supervisors and the existing committee. We believe this will make the appointment transparent and balanced between basic science and medicine. Where possible, we encourage the team to invite an external examiner from a different country. As with all our institutions, this will be an important part in building the case for comparable quality across all programmes in the EU. Members of the Expert Panel have agreed to make themselves available as volunteers.

Metrics, summary statistics and outcomes

- The names of the examination panel, and the date on which they were appointed
- Date of submission of thesis
- Date of defence of thesis
- Outcome of thesis defence
- Completion rate
- Time to completion.

Completion statistics are a direct indicator of the health of a higher education programme. Despite poor statistics, we understand that completion rates are low across Croatia when compared to PhD completion rates in other EU member countries. Of particular concern is the lack of monitoring in all institutions, and it remains elusive what happens to the students that initially enrol. A take-away message from our visit to Split is that engagement and completion is relatively good; in which case, it is all the more important that these statistics are transparent and freely available for students and industry who wish to invest time and money in one of Croatian universities.

Complaints and resolution
As the programme grows, there will inevitably be occasions where students fail to thrive academically, where they have disagreements with their supervisors or mentors, or where they have other personal difficulties. The students we met had no real knowledge of their options under these circumstances, except to speak to the Doctoral Council. It would be desirable to establish a formal complaints procedure, which would protect students and supervisors alike in the event of difficulties.

Metrics, summary statistics and outcomes
While not essential, good records of complaints can be helpful in establishing patterns of poor practice.

COMPLIANCE WITH THE PRESCRIBED CONDITIONS FOR THE DELIVERY OF A STUDY PROGRAMME

Minimal legal conditions:	**YES/NO** **notes**
1. Higher education institution (HEI) is listed in the Register of Scientific Organisations in the scientific area of the programme, and has a positive reaccreditation decision on performing higher education activities and scientific activity.	NO (a letter of expectations was issued in the previous evaluation)
2. HEI delivers programmes in the two cycles leading to the doctoral programme, i.e. first two cycles in the same area and field/fields (for interdisciplinary programmes), and employs a sufficient number of teachers as defined by Article 6 of the Ordinance on the Content of a Licence and Conditions for Issuing a Licence for Performing Higher Education Activity, Carrying out a Study Programme and Re-Accreditation of Higher Education Institutions (OG 24/10).	YES
3. HEI employs a sufficient number of researchers, as defined by Article 7 of the Ordinance on Conditions for Issuing Licence for Scientific Activity, Conditions for Re-Accreditation of Scientific Organisations and Content of Licence (OG 83/2010).	YES
4. At least 50% of teaching as expressed in norm-hours is delivered by teachers employed at the HEI (full-time, elected into scientific-teaching titles).	YES
5. Student: teacher ratio at the HEI is below 30:1.	YES
6. HEI ensures that doctoral theses are public.	YES
7. HEI launches the procedure of revoking the academic title if it is determined that it has been attained contrary to the conditions stipulated for its attainment, by severe violation of the studying rules or based on a doctoral thesis (dissertation) that has proved to be a plagiarism or a forgery according to provisions of the statute or other enactments.	YES
Additional/ recommended conditions of the ASHE Accreditation Council for passing a positive opinion	**YES/NO** **notes**
1. HEI (or HEIs in joint programmes) has at least five teachers appointed to scientific-teaching titles in the field, or fields relevant for the programme involved in its delivery.	YES
2. In the most recent reaccreditation, HEI had the standard Scientific and Professional Activity marked as at least "partly implemented" (3).	YES
3. The doctoral programme is aligned with the HEI's research strategy.	YES
4. The candidate : supervisor ratio at the HEI is not above 3:1.	YES
5. All supervisors meet the following conditions: a) PhD, elected into a scientific title, holds a scientific or a scientific-teaching position and/or has at least two years of postdoctoral research experience;	YES (note: several retired professors still mentor students)

b) active researcher in the scientific area of the programme, as evidenced by publications, participation in scientific conferences and/or projects in the past five years (table 2, Supervisors and candidates); c) confirms feasibility of the draft research plan upon admission of the candidate (or submission of the proposal); d) ensures the conditions (and funding) necessary to implement the candidate's research (in line with the draft research plan) as a research project leader, co-leader, participant, collaborator or in other ways; e) trained for the role before assuming it (through workshops, co-supervisions etc.); f) received a positive opinion of the HEI on previous supervisory work.	
6. All teachers meet the following conditions: a) holds a scientific or a scientific-teaching position; b) active researcher, recognized in the field relevant for the course (table 1, Teachers).	YES (note: same as above).
7. The supervisor normally does not participate in the assessment committees.	YES
8. The programme ensures that all candidates spend at least three years doing independent research (while studying, individually, within or outside courses), which includes writing the thesis, publishing, participating in international conferences, field work, attending courses relevant for research etc.	YES
9. For joint programmes and doctoral schools (at the university level): cooperation between HEIs is based on adequate contracts; joint programmes are delivered in cooperation with accredited HEIs; the HEI delivers the programme within a doctoral school in line with the regulations and ensures good coordination aimed at supporting the candidates; at least 80% of courses are delivered by teachers employed at HEIs within the consortium.	-

QUALITY ASSESSMENT

A-advantages D-disadvantages GP-good practice examples R-recommendations for improvements	
1. RESOURCES: TEACHERS, SUPERVISORS, RESEARCH CAPACITIES AND INFRASTRUCTURE	
1.1. HEI is distinguished by its scientific/ artistic achievements in the discipline in which the doctoral study programme is delivered.	**High level of quality** The information provided in the Self-Evaluation Report provides several analyses of the scientific achievements and research outputs of the staff involved in the supervision and mentorship of doctoral research. The teaching staff has published 403 papers (table 1) and the supervisors of doctoral research in Biophysics have published 361 (table 2) scientific papers in the last 5 years. Teaching staff have h-indices in the range of 6-71 with 3 staff > 40; 8 staff >20; and 12 staff < 20. The Faculty has many staff either supervising few or no doctoral candidates, indicating the opportunity to strategically increase doctoral student numbers. It is difficult to determine how much research income is secured by doctoral supervisors to fund doctoral students and research. This would be an important indicator of research success. Table 2 does suggest that the majority of doctoral supervisors have had success in either leading or participating in international and domestic research projects in the past 5 years. Funding available for 11 doctoral students (3 as TAs, 5 as research assistants within Croatian National Science Foundation funding, 2 as researchers at the MEDILS institute for life sciences, 1 self-funded). During the site visit it became clear that academic staff are active in research grant writing and have success in securing funding to support doctoral student research. **R5:** Encourage staff to avail themselves of EU reintegration research funding opportunities. Promote opportunities for staff to engage in more international research projects and exploit more international funding opportunities through research partnerships. Five doctoral supervisors have left University of Split; this may indicate that the University needs to introduce a more attractive staff-retention plan. Staff recruitment and retention were discussed in detail during the site visit and the Panel was encouraged to see the Faculty engage in

	strategic search and recruitment efforts, though success in recruiting international staff is hampered by differences in international salaries. The Self-Evaluation document emphasises research cooperation with STIM Centre for Excellence; however, this site had not had any news & events posted since 2015. During the site visit, it became apparent that STIM Centre for Excellence is an interdisciplinary research-focused centre that has recently secured 5 million euro in funding for doctoral and postdoctoral training. Five new doctoral students will be in the area of Biophysics. **R5:** University should ensure that websites and information is updated on a regular basis.
1.2. The number and workload of teachers involved in the study programme ensure quality doctoral education.	**High level of quality** Teaching staff at the Faculty of Sciences in Split delivers 67% of the taught curriculum. A very high percentage of teaching staff (Table 1) are not involved in doctoral student supervision (Table 2). Out of 19 teaching staff, only 6 are listed as supervisors, indicating opportunity to expand the doctoral study programme. **R1:** The HEI employs a sufficient number of qualified and experienced academic staff to ensure the delivery of a robust and quality doctoral training programme. However, it appears that the staff are mainly involved in the delivery of a large number of courses to undergraduate and graduate programmes. Due to the already high-teaching load and low number of doctoral students, the programme may benefit from restructuring through the clustering and/or amalgamation of taught courses and to offer more focused and specialised research-orientated courses to doctoral candidates. It was encouraging to hear that the taught course work has reduced. Most staff and students support a more research-focused doctoral programme and stream-lined delivery of course content to better match doctoral candidate learning needs.
1.3. The teachers are highly qualified researchers who actively engage with the topics they teach, providing a quality doctoral programme.	**High level of quality** The teaching staff has published 403 papers (table 1) and the supervisors of doctoral research in Biophysics have published 361 (table 2) scientific papers in the last 5 years. Teaching staff have h-indices in the range of 6-71 with 3 staff > 40; 8 staff >20; and 12 staff < 20. **R6:** The Faculty employs sufficient number of qualified and experienced staff with a research output that is comparable to European norms. All supervisors are research-active.

	The h-index for the majority of staff is lower than 20 and the median h-index is 13 but the number of citations per publication is good. There are a few extraordinary outputs, notably Koutecky, Dželalija & Tossi. In contrast to European norms, there was no evidence to indicate whether the publication record excellence was used in the appointment, performance assessment or proportion of academic staff (besides the usual national appointment criteria). An incentive programme to reward and retain staff publishing at the highest standards should be considered.
1.4. The number of supervisors and their qualifications provide for quality in producing the doctoral thesis.	**High level of quality** The Institution employs sufficient full-time academic staff to ensure the quality and continuity of this doctoral programme. 21 supervisors have been appointed since 2011; at present, there are 10 supervisors to 12 students (16 more potential supervisors available), so the ratio is 1:1.2. These numbers demonstrate the potential for increased student intake and growth of the programme, provided funding is secured. Supervisors are well qualified to supervise and mentor doctoral students and research projects, with a successful track record of PhD supervision. The majority of doctoral supervisors have had success in either leading or participating in international and domestic research projects in the past 5 years. Since its foundation in 2007, the doctoral programme in Biophysics has enrolled 29 doctoral students, 7 of which have completed study and graduated. However, 5 students have withdrawn from the programme.
1.5. The HEI has developed methods of assessing the qualifications and competencies of teachers and supervisors.	**High level of quality** The HEI has guidelines and standards (Rules of the Postgraduate University Study of Biophysics) for the appointment of supervisors of doctoral students. Supervisors (at least assistant professor level) must be a person with a doctoral degree, and be scientifically active and recognised in the scientific community. Supervisors must also have an active publication record (indexed in the Web of Science database) with published scientific papers related to the topic of doctoral work within the preceding 5 years. **R7:** The Faculty was encouraged to introduce a more robust governance policy and auditable process to enable the review and assessment of doctoral student supervisors and doctoral candidates.

1.6. The HEI has access to high-quality resources for research, as required by the programme discipline.	**High level of quality** The Faculty has relocated to a new modern building two years ago. Efforts are currently underway to acquire modern state-of-the-art equipment to support research efforts. At present, some doctoral students must travel to Zagreb and other institutions to avail themselves of state-of-the-art equipment, but the Faculty has secured infrastructure funding for the purchase of microscopy and flow cytometry equipment, amongst other things. This provides the Faculty and doctoral study programme with a unique advantage in attracting collaborative research funding opportunities.
2. INTERNAL QUALITY ASSURANCE OF THE PROGRAMME	
2.1. The HEI has established and accepted effective procedures for proposing, approving and delivering doctoral education. The procedures include identification of scientific/ artistic, cultural, social and economic needs.	**High level of quality** The SER set down the reasons for establishing the programme some 10 years ago. This included an analysis of social, academic, economic or other needs of the community, and the desire to link with international initiatives for advancement of Croatian science in the EU research area. The SER rightly places high importance on multidisciplinary working, and the Panel felt the STIM centre had a vision for bringing together diverse fields of bio-technology with strong socio-economic links to the local area. Nevertheless, opportunities were missed; for example, there was relatively little evidence of cross-faculty supervision to give the work a biological or clinical context. In addition, the SER places emphasis on internationalisation. We were encouraged by the students we met, who had taken opportunities to study outside of Croatia. Nevertheless, we were concerned that the programme did not have a strong outward-facing profile that might attract further students or collaborators from outside of Split or Croatia. It was difficult to find information on the offerings of the biophysics programme, and the STIM website did not appear current. The SER had no statistics on employability, though the Faculty provided such statistics on request. All alumni are now employed, with one working in Portugal and one in Bosnia & Herzegovina, so we cautiously believe the programme is effective in this regard. **R7:** Develop better statistical reporting.

	R5: Develop and advertise the outward-facing presence of the programme. We would like to see a living website with key activities, outputs and performance indicators.
2.2. The programme is aligned with the HEI research mission and vision, i.e. research strategy.	**Improvements are necessary** There is a research strategy in from the SER, but the SER does not well demonstrate the link between the goals of the strategy and the *Biophysics* programme. In the strategy document itself, there are 5 over-arching goals and 33 tasks. The *Biophysics* programme is clearly well-aligned with some of the goals (e.g. 6.5 Assuring the high quality of doctoral studies), but as in other areas of this report, there is little description of outcome measures, and therefore it seems very difficult to assess progress against the strategy. Terms like *as much as possible* (Task 32) make a task impossible to assess objectively. In some cases entire tasks (Task 31: *Establish a protocol for monitoring PhD student progress during the study*) are difficult or meaningless without internal processes and monitoring that are common across all programmes in the Faculty. **R7:** Develop better statistical reporting, thereby establishing outcome measures against which the research mission can be evaluated.
2.3. The HEI systematically monitors the success of the programmes through periodic reviews, and implements improvements.	**Improvements are necessary** There was a notable lack of statistical evidence for success of the programme. The overall monitoring practices were fragmented and in need of an overhaul, with stricter timelines and better-defined outcome measures that objectively measure programme and candidate success. A formal monitoring and feedback process was not seen. At the moment, the programme is small enough that monitoring has not proven a problem in practice. However, the Panel felt some basic statistics, such as stage of study and completion rates, ought to be available (some of this information was made available on request). Our own institutions across the EU are obliged to provide these statistics for national higher education agencies on a regular basis and the success of students. Their timely progress is a proxy for the success of the PhD programme of schools and institutions. With monitoring and strategic goals, this provides a strategy for attaining grants and funding young researchers. **R7:** We would hope to see better record-keeping for future (self)evaluations: number of applicants, number of enrolled candidates, number of students on each year, percentage of dropouts in each year, information on duration of studies,

	information on how long does it take to complete in time 1st, 2nd or 3rd year, etc. In addition and as already noted, statistics on publishing of both students and supervisors could be improved.
2.4. HEI continuously monitors supervisors' performance and has mechanisms for evaluating supervisors, and, if necessary, changing them and mediating between the supervisors and the candidates.	**Improvements are necessary** The Panel identified shortfalls in the way supervisors are assessed and their performance is monitored. There is no clear system in place for monitoring the performance of supervisors. The so-called 'direct' measures of impact factor don't necessarily relate to good supervision. What is missing is a more objective measurement of the trajectory of each individual student in connection with his/her mentor and how they perform over time. We noted that to date, candidates were overwhelmingly positive about their supervision, and unable to make substantial recommendations for improvement. However, the ambition to expand the programme will inevitably bring difficulties in due course. **R7:** We would hope to see better record-keeping for future (self)evaluations; statistics on publishing of both students and supervisors could be improved.
2.5. HEI assures academic integrity and freedom.	**High level of quality** This issue was not discussed in depth. The University has guidelines on integrity and ethics, with the ultimate sanction of withdrawing the degree. However, we were led to believe that the University does not employ systematic methods of plagiarism detection, and this might be considered for the future.
2.6. The process of developing and defending the thesis proposal is transparent and objective, and includes a public presentation.	**High level of quality** Documentation regarding the procedures of production and evaluation of a doctoral thesis proposal and defence was provided, with template forms and a summary of such in the SER. A committee with at least one external member is responsible for the evaluation of the thesis proposal. The supervisor should not normally be a member of this committee. The thesis is defended in public before the committee.
2.7. Thesis assessment results from a scientifically sound assessment of an independent committee.	**High level of quality** Documentation describing the thesis development, structure, and defence was provided for review. We note that at least one high-quality publication is a requirement of graduation.

	The Panel had the opportunity to review a selection of theses produced from the programme. Comments on the overall quality of theses are provided at the top of the document. **R7:** It was not clear how the thesis committees were appointed and reviewed. Since this is an enormously important part of the PhD process and of the quality control for the programme, we have made recommendations in this area at the top of the document. In particular, an international presence in defence panels would be desirable.
2.8. The HEI publishes all necessary information on the study programme, admissions, delivery and conditions for progression and completion, in accessible outlets and media.	**High level of quality** The website provides comprehensive information on the study programme in the English language. This includes: programme guidelines; curricula; past theses; past scientific outputs; important contacts; current news; and the programme's own self-evaluation for this report. We note, however, that some of the web links have not been populated. **R5:** A very helpful start. The HEI should develop the website and invest in informing students on opportunities on calls for funding, since there is a high number of schemes out there which students do not seem aware of.
2.9. Funds collected for the needs of doctoral education are distributed transparently and in a way that ensures sustainability and further development of doctoral education (ensures that candidates' research is carried out and supported, so that doctoral education can be completed successfully).	**High level of quality** The SER explains clearly how tuition fees are spent. The HEI has established a system of funding the programme and where possible, the candidates' research and research results' dissemination costs. **R5:** To pay close attention to the quality criteria of the assessment: *secures funding, apply to calls for co-funding doctoral programmes, establish partnerships and finds other sources of (candidates') research funding useful for solving social, scientific or economic challenges.* With more funding for projects, there will be more opportunities for students and the research community at the Faculty.
2.10. Tuition fees are determined on the basis of transparent criteria (and real costs of studying).	**High level of quality** Tuition fees are extremely competitive and in this small programme are lower than the costs. This is subsidised for the strategic benefit of hosting the programme in Split, with an ambition to grow the programme.
3. SUPPORT TO DOCTORAL CANDIDATES AND THEIR PROGRESSION	

3.1. The HEI establishes admission quotas with respect to its teaching and supervision capacities.	**High level of quality** The HEI does not explicitly outline a methodical calculation of admission quotas. The HEI currently has 10 supervisors leading 12 PhD candidates; the ratio of supervisors to candidates is 0.8, which is well above the minimum suggested ratio of 0.33. Although some members of the staff do have a significant teaching workload (more than 360 norm teaching hours), there is space/capacity to absorb new PhD candidates. The obligations of supervisors are outlined in Article 17 of the Rules of Postgraduate University Study of Biophysics. According to Table 1 provided in the SER, all teaching staff have 2 or more publications in research journals for the past 5 years. Furthermore, in Table 2 of the SER, the current supervisors have 5 or more publications for the same time period. According to table 2 of the SER, no supervisor has more than 2 doctoral candidates under their supervision.
3.2. The HEI establishes admission quotas on the basis of scientific/ artistic, cultural, social, economic and other needs**.**	**High level of quality** The HEI has established the need for doctoral graduates in the field of Biophysics and Biomedicine from communications with pharmaceutical company Pliva and the Public Health Institute of Split-Dalmatia County. Furthermore, the HEI is involved in a research project (STeM CEKOM – Center of Competence in the STEM Area), in which there are 12 private sector members. According to the SER, PhD candidates graduating from the HEI have not waited long before being employed. From the past six graduates, four are employed in academia, one is employed by the Department of Public Health of Split-Dalmatia County, and one is employed by a biomedical start-up company. Stakeholders already play an active role at the HEI, for example in teaching and advising, thereby ensuring relevance of the doctoral study to social, scientific, and industrial needs. Stakeholders have shown interest in growing collaboration with the HEI. This can be achieved, for example, by including stakeholders in future proposals for research grants. Furthermore, a more formalized relationship between HEI and stakeholders, for example in the form of 'advisory boards', can also be helpful in concretizing plans for increased collaboration. **R5:** If the opportunities for collaboration in the local area are limited, the HEI can reach out to its already international academic network (other research institutes) to identify stakeholders abroad.

3.3. The HEI establishes the admission quotas taking into account the funding available to the candidates, that is, on the basis of the absorption potentials of research projects or other sources of funding.	**High level of quality** The SER does not explicitly outline a methodical establishment of quotas based on funding and/or research projects. However, available funding is taken into account in the admissions process. Of the 12 current PhD candidates, 8 are funded from research projects, 3 are employed by the HEI as assistants (teaching/research), and 1 is self-funded. A desirable aspect of any doctoral study programme is for all candidates to be funded through research projects. **R5:** As the HEI envisions growing its student body, it should consider increasing its efforts to secure funding for such doctoral research projects. One strategy for achieving this is the establishment of a dedicated office that can support staff at the HEI in identifying sources of funding and strengthening the research proposal. Furthermore, the HEI's international network can be an asset in this endeavour as many European research funds are intended for multiple beneficiaries.
3.4. The HEI should pay attention to the number of candidates admitted as to provide each with an advisor (a potential supervisor). From the point of admission to the end of doctoral education, efforts are invested so that each candidate has a sustainable research plan and is able to complete doctoral research successfully.	**High level of quality** Each PhD candidate is ensured a potential supervisor and research plan at the time of the admittance interview with the Admission Board; this requirement is enshrined in Article 17 of the Rules of the Postgraduate University Study of Biophysics. In the SER, the HEI emphasizes the importance of training the PhD candidate for independent research. Table 4.2 in the SER provides a detailed comparison of the HEI's PhD research plan with the plan of a renowned university in Norway. Supervisors are required to submit an annual report on the progress of the doctoral candidate. However, the governance related to how the HEI follows up on these annual reports is not clear and no concrete procedures, for example in the case of student complaints or a general provision for pastoral care of students, were in place at the time of the site visit. **R7:** The HEI should put forward concrete and easily-accessible procedures for documenting the progression of each candidate. Candidates typically spend the first two years on satisfying coursework requirements. A desirable aspect of a doctoral program is the ability of the candidate to commence their doctoral research immediately. This can be achieved, for example, by reducing the amount of required coursework. The HEI has already begun the process of reducing the coursework, although the Panel would like to see further reductions (see section 3.10 for

	details). While a doctoral research plan for each candidate is expected at admissions, a concrete proposal is not expected until the defence of the thesis topic (which at this time does not typically occur until after all coursework is completed, e.g. 2 years on). **R7:** The HEI can request applicants to provide a research proposal (written together with prospective supervisor/mentor) as part of admissions, thereby motivating the students to orient themselves on the research aspect of the doctoral programme.
3.5. The HEI ensures that interested, talented and highly motivated candidates are recruited internationally.	**High level of quality** The HEI has some international exposure, as indicated by the two PhD candidates from abroad. The HEI has limited outreach mechanisms, e.g. advertising through collaborating institutions abroad. The study programme, including the website and all relevant documentation, is in English, which is a great asset for internationalization; the HEI is not marketing this asset very strongly. Recently, the HEI has organized a summer school on biophysics, in which 70 students participated. These are steps in the right direction and the HEI is encouraged to continue these efforts. **R5:** The HEI should take steps to advertise the fact that their doctoral program is in English, e.g. by explicitly mentioning this on their website. The HEI has mentioned in the SER that applications from two potential international candidates did not materialize due to 'complex administrative doings'. **R5:** The HEI could investigate these issues and identify strategies to simplify the administrative nature of international applications. The HEI already has considerable international research collaboration, which can be a strong source of international recruitment. Current doctoral candidates at the HEI are mobile, as proven by the research stays abroad, e.g. Italy, France, Slovenia, etc. **R6:** Extending this mobility to the teaching staff can increase the HEI's exposure to international networks and, through joint projects (e.g. as recommended in section 3.3) can attract more international candidates.
3.6. The selection process is public and based on choosing the best applicants.	**High level of quality** Articles 10 and 11 of the Rule book document provide a list of requirements for application to the PhD program, including transcripts from previous studies and recommendations from recognized experts (ensuring past performance), a certificate of English proficiency or proof

	thereof from conversation in English with the Admission Board, a motivation letter (indicating interest in scientific research), and a recommendation letter from the prospective supervisor. The applicant is interviewed by the Admission Board prior to selection. Article 13 of the Rule book establishes that the list of selected PhD candidates is published on the program website, ensuring public selection process. The number of admitted students is low, very likely due to the HEI's limited exposure, e.g. in the local region. **R5:** The HEI should expand their exposure, e.g. issues on internationalization provided in section 3.5 are also relevant here.
3.7. The HEI ensures that the selection procedure is transparent and in line with published criteria, and that there is a transparent complaints procedure.	**Improvements are necessary** Articles 10-14 of the Rule book provide information on the requirements for selection in the PhD program. Article 13 of the Rule book explicitly states that the list of accepted applicants shall be published on the HEI's website. Furthermore, Article 13 establishes the complaints procedure for rejected applicants: a time frame of 15 days from the time of notification is provided to initiate an appeal directly to the Dean. The complaints procedure for candidates is currently informal: students are well aware that they can bring issues directly to the head of the program. This has worked well for the HEI so far, perhaps due to its small size. **R7:** As the HEI grows, these informal procedures can become a drawback, potentially putting at risk candidates and supervisors alike.
3.8. There is a possibility to recognize applicants' and candidates' prior learning.	**Improvements are necessary** The Rule book states that the HEI recognizes prior achievements and learning by allowing the applicant to include in their application additional documents, such as awards in previous studies, publications and conference presentations (oral and poster), and other activities contributing to the applicant's learning. The HEI recognizes up to 12 ECTS credits from prior learning. Some candidates were required to take classes that they had already completed. **R1:** In addition to a general reduction of the required coursework, the Panel would like to see the HEI customize the curriculum to each candidate's previous learning (e.g. in Bachelors', Masters' programs, or previous doctoral curriculum).

3.9. Candidates' rights and obligations are defined in relevant HEI regulations and a contract on studying that provides for a high level of supervisory and institutional support to the candidates.	**High level of quality** Articles 15-22 of the Rule book outline some of students' obligations with regards to the technical and administrative aspects of the doctoral program. No dedicated events are currently being organized to ensure candidates are reminded of these rights and obligations. The student body was well aware of the rights and obligations. **R7:** As the HEI intends to grow, organizing such events on a regular (yearly) basis would be useful to ensure a larger body of candidates are informed.
3.10. There are institutional support mechanisms for candidates' successful progression.	**Improvements are necessary** Tables 3.1 and 3.2 in the SER provide data on the institutional support given to previous and current PhD candidates, respectively with regards to the number of published papers, attendance at international conferences, and funding (both from the HEI and from other sources). The data presented in these tables indicates a significant level of support for ensuring motivation and active engagement of doctoral candidates in their research. In Article 20 of the Rule book, some of the mechanisms for ensuring progression of the candidate's research are outlined. The candidate is allowed to change thesis advisor once, and this can only be done in the first year of study. Furthermore, the candidate is allowed to change thesis topic once, with the supervisor's written consent. Annual reports are submitted by the supervisor to ensure the candidates' progression. However, concrete governance procedures for ensuring the candidate's progression were missing. Candidates know they can approach the program head directly in the case of issues. So far, this has not been a problem at the HEI, probably due to its small size. **R7:** As the HEI envisions increasing in size, it should put in place detailed procedures for accountability in this respect. Average completion time for candidates is between 5-6 years. Candidates typically begin in full-time status; however, due to the coursework and other requirements, they change to part-time status soon after, typically in the first year. As many as 25% of all students drop out from the programme. Suggestions were made in previous sections that can ensure candidates complete in a shorter amount of time, including reduction of required coursework, customization of required coursework to each candidate's

	needs and past learning and expecting candidates to produce a concrete research proposal upon enrolment. **R1:** While the HEI has begun the process of reducing required coursework, they are staying within the maximum 20% allowed change set out by the University regulations. In order to achieve the necessary coursework reduction, the HEI should request the necessary permission from the University Senate. This should be implemented with the specific focus on subsequent re-accreditations. The Panel would like to see average completion time be reduced to 4 years. In order to do this, 80% of the program should be research-oriented. Candidates should be involved in the doctoral research from the first day. Coursework should only occupy 50% of the first year, while years 2 and onwards should be entirely dedicated to research.
4. PROGRAMME AND OUTCOMES	
4.1. The content and quality of the doctoral programme are aligned with internationally recognized standards.	**High level of quality** The overall ambition of the programme tends towards a more internationally competitive standard, and the Panel was pleased to be made aware of this progress. It was noted that the SER is not always clear about such details, but these were highlighted during the site visit. It became clear that: **i)** the overall body of research work required for the PhD in this programme was estimated at about 60% of time, most of which occurs towards the latter part of the PhD (years 3-4). While the research outcomes of the programme certainly comply with the norm internationally, because the hands-on qualities of the students reach high standards, entry year 1 and 2 are overloaded with taught coursework, which leaves little time for laboratory practice. This was identified as a considerable burden by the management and supervisors, and progress has already been made to reduce this taught coursework and move towards a more tailored and streamlined coursework requirements for each individual student (see below). **ii)** Candidates do acquire transferable skills through courses and their research work (statistics, data analysis skills). This constitutes an important element of any doctoral programme and may be expanded and regularly updated to take into account the latest research in these areas. **iii)** Programme duration aims at comparability with other European programmes. Nevertheless, apart from the burden of taught courses in year 1/2, some students enrol only on a part-time basis, leading to a considerable prolongation of study. The Panel noticed that more PhD

	funds are becoming available, and it is hoped this would reduce the average length of the PhDs in the near future. **iv)** Some improvements on supervisor allocation and governance have been alluded to in earlier sections. It may be worth noting that several of the suggested improvements only require the translation of the Rule book into practice and should be relatively minor in terms of implementation. **v)** Broader international access to the programme would help to lift its reputation and European and worldwide recognition. While the Panel recognised that progress is under way for this to being achieved, it is a high priority area and the programme management and supervisors should be encouraged to take immediate actions. Involvement of international examiners in the process of project selection, practical research student support would be a considerable asset. **R1 and R3:** The HEI has already begun the process of reducing required coursework, but University regulations apparently curtail changes to a maximum 20% per annum. If this were indeed the limit, a reduction of 40-60% of taught course work can be achieved over a 2-3 year period and from then on would be in keeping with European and international standards. A faster change may be brought about by direct application to University Senate. This would automatically free up time to be spent in the laboratory enhancing the skill base of the students. **R2:** Creation of a primary and secondary supervisor is standard in most European universities/institutions to date, and this can readily be set up for this programme. **R7:** Although many of the governance issues are already stipulated in the Rule book, they lack implementation into practice and HEI need to set those up to underpin the ambition of growth of this programme.
4.2. Programme learning outcomes, as well as the learning outcomes of modules and subject units, are aligned with the level 8.2 of the CroQF. They clearly describe the competencies the candidates will develop during the doctoral programme, including the ethical requirements of doing research.	**High level of quality** The Panel was encouraged by the range and internationality of the courses delivered on specific subjects. These have clear learning outcomes and are delivered including up-to-date research results and technologies. While some may be underused by the students or could be removed from the time table altogether (see above), we were still impressed by the engagement of the teachers and the appreciation by the students. Of note, one alumni and now stakeholder even suggested that, for her current employment, this course work was more relevant than her hands-on experience.

	In any case, this enables personal and professional development and a more tailored course structure for each candidate taking into account prior achievements is highly supported from the Panel. What has been less clear is the relevance and engagement in ethical and social activities. This may be due to the nature of the Biophysics programme, but both completion rats and quality of the students enrolled in the programme are testament for the execution of high quality and responsible research. Moreover, learning outcomes of the programme as a whole are aligned well with European standards, as explained in the SER. The management is weary of some work required to generate complete overlap in this respect (shorter time to completion, better funding, expansion of the programme to generate breadth of topics, stronger integration with centres of excellence at the University of Split, …).
4.3. Programme learning outcomes are logically and clearly connected with teaching contents, as well as the contents included in supervision and research.	**High level of quality** Overall, the taught courses had clearly defined outcomes (see previous response). As noted elsewhere, the existence of some taught modules with little or no bearing on the candidate's research topic make them less attractive and their content questionable for this programme. Moreover, courses have very little uptake and their relevance is questionable from an economical perspective. The Panel noticed that this has been identified by both management and supervisors/teachers and should become an area of improvement in the near future. This should take into account personal requirements of individual projects, but also prior knowledge and expertise of each candidate so that students can concentrate on specialisation and can be fast tracked if prior experience can be confirmed. A regular review of the course topics and their relevance based on uptake is proposed by the Panel.
4.4. The doctoral programme ensures the achievement of learning outcomes and competencies aligned with the level 8.2 of the CroQF.	**Improvements are necessary** The Panel assessed whether the research outcome is equivalent in the context of EU requirements and self-formulated aims. This was based on: • Sample theses provided. They appeared mixed in terms of data presentation and some contained only short results sections, while others linked to multiple publications; • Sample publications were listed. These again appeared of mixed quality from high to low impact and from

	substantial review of literature to brief communication of results. Consequently, the quality of PhD's is broad, with extremely high and few low performers. There is clearly the potential to improve the overall quality of the programme, and it is the suggestion of the Panel that stronger competition at entry to pre-select high performing students and an audit of the quality of work from mentors / supervisors would be worthwhile in this context. This was unfortunately not possible during our audit, but should be conducted regularly through a University internal review. **R1:** We have previously suggested a complete overhaul of the course structure and regular reviews of the usefulness of each course in terms of educational value for the programme of *Biophysics*. If further reductions in taught course work can be accomplished, this will in itself help to increase laboratory activities and increase the amounts of results to be reported in the PhD thesis. Some of them are somewhat short at present (see above).
4.5. Teaching methods (and ECTS, if applicable) are appropriate for level 8.2 of the CroQF and assure achievement of clearly defined learning outcomes.	**High level of quality** This was assessed only superficially, more in the context of proposed learning outcomes (see above). However, the Panel is aware that courses are lecture-heavy and require examinations to complete and achieve the credits of each course. While this is not in itself bad, the Panel notes that the post-graduate education should embrace multiple teaching styles (seminars, students presenting case studies, tutorials, interactive discussions of research data…), and exams may be avoided through regular in-course assessment of individual performances. Some courses (generic skills, statistics…) were highlighted as clearly enabling and supporting the research.
4.6. The programme enables acquisition of general (transferable) skills.	**Improvements are necessary** Soft and transferable skills (e.g., Ethics in Research, Writing Skills, Search strategies on prior work, etc.) are part of an international seminar that has been delivered by Professors Alessandro Tossi of the University of Trieste (Italy) and Ljiljana Fruk of Oxford University (UK). Such elements could be strengthened with more in-depth or advanced methods of statistics, experimental design, data reproducibility and others. The reduction of specialist courses would allow for a more generic teaching in year 1 and strengthen both scientific practice and the principles of scientific conduct.

4.7. Teaching content is adapted to the needs of current and future research and candidates' training (individual course plans, generic skills etc.).	**Improvements are necessary** The Panel was concerned about two issues: • The overall requirement to fill up credits through taught courses; there is a considerable overload of taught courses in year 1, and the time slots sometimes create issues for students with ongoing commitments. This needs to be revised and course content needs to be mapped against relevance and a more 'precision teaching' for each individual could be developed. As for the courses themselves, methods for training seem to be appropriate, but could be improved (see 4.5). • As noticed by both management and supervisors (and to some extend the students), and agreed on by the Panel, requirements for taught courses need to be reduced so that a 20:80% split of course vs practice can be attained (see above). There was some suggestion that teaching supports some students during their post-graduate life. It should be the overarching aim to concentrate more on hands on laboratory work and provide other means of support.
4.8. The programme ensures quality through international connections and teacher and candidate mobility**.**	**High level of quality** The Panel noted considerable internationalisation in this programme. Given that the programme is small, and the need for Biophysics in the wider area of Split is limited, a success of the programme may be realised through international recognition. This would require recruitment of more international students to the programme and getting colleagues from European centres involved. A first hurdle has already been taken, and the programme is also delivered in the English language. A stricter enforcement of the thesis writing in English would also support this ambition so that currently established co-tutelles and collaborations with Italy, France, Germany and the UK can be intensified and expanded. Another way how this can be promoted is that co-supervision between two European universities receives priority over local projects.

*** NOTE: RECOMMENDATIONS OF THE EXPERT PANEL TO THE ASHE'S ACCREDITATION COUNCIL AND QUALITY LABEL**

The role of the Expert Panel in the re-accreditation of doctoral study programmes is manifold. The Expert Panel or part of the Expert Panel visiting a higher education institution drafts a report on the basis of a self-evaluation report, the accompanying relevant documentation, and a site visit to HEI. The draft report is adopted by all members of the Cluster Expert Panel, while the president of the Cluster Expert Panel is responsible for coordinating the assessment levels.

The report contains an assessment on whether a doctoral study programme delivered at a higher education institution complies with the prescribed laws and by-laws, as well as any additional/recommended requirements defined by the Agency's Accreditation Council, and whether a higher education institution can obtain a positive, i.e. satisfactory quality assessment according to the criteria set out in this document. Moreover, the Expert Panel must make recommendations for quality improvement.
Based on the assessment of all these elements, the Expert Panel may propose to the Accreditation Council of the Agency to issue either a confirmation on compliance, a letter of expectation for the period up to three (3) years in which period the higher education institution should eliminate the identified deficiencies, or to deny the license.

If the Expert Panel has assessed that a doctoral study programme delivered by a higher education institution does not meet legal and other requirements or that the quality of a study programme is not ensured (i.e. that HEI does not meet additional requirements or recommendations made by the Accreditation Council, or has a very poor quality assessment), they should propose to the Accreditation Council to deny the license.

If the Expert Panel considers that the relevant laws and bylaws have been met by a higher education institution, but that certain elements mentioned above do not meet the quality requirements, while they consider that the identified shortcomings can be corrected within a time frame of three years, they should issue a letter of expectation.

If the Expert Panel considers that all legal and additional/recommended requirements have been met and the quality assessment is satisfactory, i.e. that a study programme fulfils the learning outcomes appropriately defined for that level and scientific area, they may propose the issuance of a certificate and have a HEI commit to quality improvement and reporting to the Agency during the follow-up period.

Finally, if the Expert Panel has, in accordance with the criteria mentioned above, proposed issuing the certificate of compliance and assessed that, in addition to meeting the minimum quality requirements – i.e. the qualification framework level - for a study programme, the programme should be identified as a doctoral programme of a 'high level of quality', the Expert Panel may propose to the Agency's Accreditation Council that such a doctoral study programme be awarded the 'high quality label'. Thus the Agency, with the consent of the Accreditation Council, grants a higher education institution the right to use the label for their academic and promotional purposes.
The 'high quality label' cannot be proposed or awarded to a programme or a higher education institution that does not comply with the requirements laid down by the laws and bylaws mentioned in this document, and any additional requirements recommended by the Accreditation Council. Moreover, the

quality assessment awarded to a study programme should reflect a high level of quality inasmuch that at least half of the sub-criteria in each of the quality assessment criteria are assessed as being of high quality. The Accreditation Council of the Agency issues a final opinion on the label awarded. The content and form of the quality labels shall be prescribed by the Agency in a relevant general act.

The Accreditation Council of the Agency discusses the final report with all recommendations and suggestions, and issues their opinion on the report. Based on a prior opinion of the Accreditation Council, the Agency issues an Accreditation Recommendation to the minister responsible for science and higher education, and upon receipt of the minister's final decision on the outcome of the procedure, awards the 'high quality label" to a higher education institution.