

Decision on the Evaluation Result

Study programme:

“Joint European Master Degree in Nuclear Physics” (NucPhys)

offered by **Universidad de Sevilla** (USE, Spain, coordinator) in cooperation with **Universidad de Barcelona** (UB, Spain), **Universidad Complutense de Madrid** (UCM, Spain), **Université de Caen Normandie** (UniCaen, France), **Università degli Studi di Catania** (UniCT, Italy), and **Università degli Studi di Padova** (UniPD, Italy).


Based on the report of the expert panel on the 5th July 2024 the Direction¹ of the Agency for Scientific and University Quality of Andalusia decides:

1. The master degree programme “**Joint European Master Degree in Nuclear Physics**” offered by Universidad de Sevilla (Spain) in cooperation with Universidad de Barcelona (Spain), Universidad Complutense de Madrid (Spain), Université de Caen Normandie (France), Università degli Studi di Catania (Italy), and Università degli Studi di Padova (Italy) is accredited according to the criteria and procedures defined in the European Approach for Quality Assurance of Joint Programmes.

The study programme complies with the requirements defined by the European Approach for Quality assurance of Joint Programmes and the European Qualifications Framework (EQF) in its current version.

2. The accreditation is given for a period of **six years**, valid until 5/7/2030.
3. A follow-up report shall be submitted to ACCUA by the end of the second year of the joint programme's implementation, after the first cohort of students completes the programme (two academic years). The consortium shall provide ACCUA with a report detailing how each recommendation for improvement from the panel (section 11.1 of the review report) has been addressed, including supporting evidence. The follow-up report may also include any other relevant changes to the programme in relation to the quality assurance standards defined in the European Approach for Quality Assurance of Joint Programmes.

¹Consultation of the European Approach Reporting Commission has not been necessary as it is a single evaluation report.

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The following recommendations are given for further improvement of the programme:

STANDARD 1: ELIGIBILITY

1.1. Status

- As soon as the Italian regulatory framework allows for programmes reviewed within the European Approach to be accepted, the Consortium should start processing the relevant changes in the programme in order for students to benefit from the extended recognition of the degree.

1.2. Joint Design and Delivery

- The Consortium should make additional efforts to involve students, administrative staff, associate partners and stakeholders in the design, development and delivery of the programme. Documentary evidence of those efforts should be produced.
- The roles of all partners as part of the Consortium, particularly University of Barcelona and Complutense University of Madrid, should be clarified in the official documentation of the programme, including the Student Handbook and the academic calendar (Annex 16).
- Further efforts should be made to integrate financial information, including participation of each partner in funding and financial management, as well as at offering information to students about financial support across all institutions.

1.3. Cooperation Agreement

- The Cooperation Agreement should be completed and signed before the programme starts.
- The programme website should integrate all of the relevant information about the Joint European Master Degree in Nuclear Physics, including all actual participating institutions, and avoid any confusion with the previous/current Master Erasmus Mundus. All partners should include links in their website to the official programme website.

STANDARD 2: LEARNING OUTCOMES

2.1. Level

- Learning outcomes must explicitly reflect their advanced nature in the domain of Nuclear Physics, and it must be clear that they exceed undergraduate, bachelor level, emphasizing their alignment with master's level expectations.
- All the LOs have to demonstrate their connection with Nuclear Physics, rather than adjacent technical competencies, and their acquisition must be supported by the programme's contents.

2.2. Disciplinary field

N/A.

2.3. Achievement

- It should be clarified how the learning outcomes will be achieved, and all of the information regarding how they will be achieved, such as the Guidebooks, must be published on the website.


2.4. Regulated Professions

N/A.

STANDARD 3: STUDY PROGRAMME

3.1. Curriculum

- The guidebooks for each of the courses must be fully developed in terms of detailed contents, bibliography, teaching staff for each module and evaluation procedures including the relative weight of each evaluation modality for each course.

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3.2. Credits

N/A.

3.3. Workload

- The workload in terms of ECTS and number of hours of study should be clearly stated for each of the courses and modules, as well as the distribution among all of the six participating universities.

STANDARD 4: ADMISSION AND RECOGNITION

4.1. Admission

- The admission criteria should include affirmative action rules based on gender, diversity and inclusiveness. Moreover, applicants with migration background and from low-income families should be considered as well, taking into account that the total cost of the master is 18.000€.
- The academic criteria of academic excellence (up to 30 points) and interview (up to 50 points) have to specify how these scores can be acquired with a clear relation on how the subcriteria are ranked. Special attention should be paid to the evaluation of the academic suitability of applicants with Majors other than Physics. The details should be published on the website.
- The student handbook has to contain detailed information on all six universities, and not just on USE. Moreover, it should contain detailed information on the selection procedure where each of the admission criteria has to be detailed and ranked.

4.2. Recognition

- The Cooperation Agreement has to include the number of ECTS recognized in each case as in Table 1 and Table 2 of Annex III this crucial information is missing. At least, the maximum number of credits to be recognized by all participating universities should be established.


STANDARD 5: LEARNING, TEACHING AND ASSESSMENT

5.1. Learning and teaching

- The Student's Handbook should include detailed information on the content of each course. The guidebooks have to be provided describing the context within NucPhys and the overall objectives. According to the Bologna strategy, the guidebooks should include the workload, intended learning outcomes, and aligned contents, teaching and learning methodology, assessment methods and criteria, as well as any other necessary information.
- How students from different academic backgrounds will be helped to reach the same level of expertise to follow the courses should be explained.
- A calendar should be provided to see when the visits to Associate centers can take place and their compatibility with other courses/assignments.
- The use of digital learning technology to allow all the master's partners to be present throughout the programme delivery is recommended.
- Regular coordination meetings between the teaching staff in order to align the content of the modules and other aspects are recommended.

5.2. Assessment of students

- The relative weights of the different assessment methods (written/oral examinations, assignments, projects, continuous assessment) have to be specified in the different modules.

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STANDARD 6: STUDENT SUPPORT

- Further coordination and centralization of the information provided to students about student support services is recommended, in particular concerning the mobility support services, that should play a central role in this master. A guidance for visa should be implemented beforehand, as well as a single guidebook for students regarding mobility.
- Detailed information on the professional orientation services available in all the six universities is desirable.

STANDARD 7: RESOURCES

7.1. Academic, administration and services staff

- Information about the faculty who will teach each course (faculty CVs with links to their ORCID profiles) should be accessible on the website.
- Information about the administrative team to meet the organizational, monitoring and logistical needs of the Master should be provided.

7.2. Facilities and material resources

- It would be desirable to give an exhaustive information about laboratories and facilities available for each course, including libraries, computer centers and specific software.

STANDARD 8: TRANSPARENCY AND DOCUMENTATION

- A website with all the programme information should be available online, as stated in the SER.
- The programme website should include the Student Handbook and might also show the profiles of alumni, to provide prospective students with an idea of career opportunities.
- The composition of all committees should also be made public, including contact information.


STANDARD 9: QUALITY ASSURANCE

- The public policy for quality assurance of the Consortium, as part of its strategic management, should be developed in writing.
- It is desirable that quality assurance considers not only strong and weak points, but also points to be improved to follow up the progress of the master evolution.
- It is recommended to establish clear indicators to follow up the programme evolution, and to consider indicators to evaluate the progress of the alumni, for instance employment rate.
- All of the procedures within the Quality system should be developed in writing.

With regard to the rationale behind this decision the Direction refers to the attached evaluation report.

In Córdoba, on the date of the electronic signature.

THE DIRECTOR

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Evaluation Report by the Review Panel

Name of the Programme:

Joint European Master Degree in Nuclear Physics (NucPhys)

Name of the Coordinating Institution:

University of Seville



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EXECUTIVE SUMMARY

This review has been conducted by a panel of international experts coordinated by the Agency for Scientific and University Quality of Andalusia (ACCUA) within the European Approach for Quality Assurance of Joint Programmes (EA).

The review corresponds to an ex-ante accreditation of a proposal for a Joint European Master Degree in Nuclear Physics to be delivered by six universities: Universidad de Sevilla (USE) as coordinator, Universidad de Barcelona (UB), Universidad Complutense de Madrid (UCM), Université de Caen Normandie (UniCaen), Università degli Studi di Catania (UniCT), and Università degli Studi di Padova (UniPD), herein after referred as the Consortium.

The programme is a 2nd cycle degree within the Qualifications Framework in the European Higher Education Area (QF-EHEA), EQF level 7, with 120 ECTS credits. The programme will be taught in English, in a classroom (face-to-face) learning modality, involving international mobility of students. The programme aims to train experts in the field of Nuclear Physics with the objective of responding to the needs of the industry and academia. It is particularly suited for students who intend to do a PhD in the field of Nuclear Physics: theoretical, experimental or applied.

The main programme strengths are the general design of the master with the students travelling at least to three different countries, with a single entry institution; the quality of associated partners for internships and visits; the high satisfaction of students and alumni about the programme, grounded on the way issues are handled and professional possibilities opened to them; the high quality of facilities available; the good support provided by very committed staff at all participating institutions; the quality of the teaching staff; and the employability of graduates, according to both students and employers.

Detailed and reasoned description of the recommendations for improvement per standard

STANDARD 1: ELIGIBILITY

The Consortium should make the necessary programme adjustments as soon as the regulatory framework in Italy allows to implement the European Approach, ensuring students benefit from extended degree recognition. Efforts to involve students, administrative staff, associate partners, and stakeholders in the programme's design, development, and delivery should be documented. The roles of all partners need to be clearly defined in official documentation, and financial information should be integrated to inform students about available support. The Cooperation Agreement should be completed and signed before the programme starts, and the programme website should accurately reflect all participating institutions and avoid confusion with the Erasmus Mundus Master currently ongoing.

STANDARD 2: LEARNING OUTCOMES

Learning outcomes (LOs) must explicitly reflect their advanced nature in the domain of Nuclear Physics, aligning with master's level standards. Clear information on how these LOs will be achieved and measured should be provided, with detailed resources such as Guidebooks available on the website.

STANDARD 3: STUDY PROGRAMME

The guidebooks for each course must be fully developed, detailing the content, bibliography, teaching staff, evaluation procedures, and the relative weight of each evaluation method. The workload for each course and module, in terms of ECTS and study hours, should be clearly stated and distributed among the six participating universities.



STANDARD 4: ADMISSION AND RECOGNITION

Admission criteria should include affirmative action rules that promote inclusiveness, considering applicants from diverse backgrounds, including those from low-income families. Detailed academic criteria for excellence and interview scoring should be published, especially for non-Physics majors. The Student's Handbook must contain comprehensive information about all six universities. The Cooperation Agreement should specify the maximum number of ECTS recognized by all participating universities.

STANDARD 5: LEARNING, TEACHING AND ASSESSMENT

The Student's Handbook should include detailed course content, with guidebooks describing the context within NucPhys, objectives, workload, learning outcomes, content alignment, teaching methods, assessment methods, and criteria. Support mechanisms for students from different academic backgrounds should be clarified. A calendar for visits to Associate centers and the use of digital learning to ensure partner presence throughout the programme is recommended. Regular coordination meetings among teaching staff are also recommended. The weights of the different assessment methods used must be specified for each module.

STANDARD 6: STUDENT SUPPORT

Coordination and centralization of information regarding student support services, particularly mobility support services, should be improved. A visa guidance document and a single guidebook for student mobility should be provided. Detailed information on professional orientation services at all six universities is desirable to enhance student support.

STANDARD 7: RESOURCES

Information about the faculty in charge of teaching each course, including CVs and/or ORCID profiles, should be accessible on the website. Additionally, details about the administrative team responsible for meeting the organizational, monitoring, and logistical needs of the master programme should be provided. Comprehensive information about the available laboratories, libraries, computer centers, and specific software for each course should also be made available.

STANDARD 8: TRANSPARENCY AND DOCUMENTATION

A comprehensive website with all programme information, as stated in the Self Evaluation Report (SER), should be available online. This should include the Student's Handbook and alumni profiles to give prospective students insights into career opportunities. The composition of all committees should be publicly accessible, including contact information.

STANDARD 9: QUALITY ASSURANCE

A written public policy for quality assurance within the Consortium, as part of its strategic management, should be developed and implemented. This policy should not only address strengths and weaknesses but also identify areas for improvement, tracking the programme's evolution. Clear indicators for monitoring the programme's progress and alumni success, such as employment rates, should be established.

INTRODUCTION

A) The procedure conducted for the review process

As coordinator of the joint master, USE requested ACCUA the ex-ante evaluation of the joint master programme according to the European Approach, providing the SER according to the proposed format and 19 annexes as additional evidences. After discussion with quality assurance agencies from France and Italy, ACCUA proposed the expert panel. The panel composition and CVs were sent to USE. No objections were made and ACCUA nominated the expert panel. Moreover, ACCUA provided an online training session for the



panel. Each member of the panel analysed the self-evaluation report (SER_full_011023.pdf) and provided an individual assessment. During the individual review process the panel requested additional information to the Consortium, that was diligently provided. At the pre-visit meeting of the panel individual reports were discussed and it was agreed to request additional evidences from the Consortium, with the advice that those issues would be addressed during the visit. Minutes for this pre-visit meeting were issued. The external visit was held online and took place on May 13th and 15th, 2024. With all the information provided by the Consortium and the external visit, the panel issues this preliminary report.

B) Information on the review panel and its activity

- **Composition of the review panel**

- President: Alberto Oleaga Páramo
- Academic member of the panel: Canio Noce
- Student member of the panel: Kiara Hervella Seoane
- Professional member of the panel: Robert Jacqmin
- Secretary: María Dolores Rodríguez Frías

- **Coordination of the review process**

The review process and the internal procedures to nominate the expert panel have been coordinated by ACCUA and developed according to the European Approach. Communication between USE, the expert panel and ACCUA has been fluent.

- **Description of the panel visit**

The visit took place online, on May 13th and 15th, 2024. The agenda was agreed with the coordinating university and the expert panel. The coordinating university provided a list of participants who attended the different sessions via Cisco platform. ACCUA organised the online visit and provided technical assistance. The visit took place without any notable incident. All planned meetings were held and most of the planned participants attended. Minutes for all planned meetings were issued.

- **Coordination for the review report writing**

A first version of the provisional report has been elaborated by the Secretary of the panel taking into consideration the individual reports of all members of the panel and the findings and conclusions agreed during and after the visit. The final version of the provisional report has been agreed by all members of the panel.



INFORMATION ON THE PROGRAMME

Name of the programme: Joint European Master Degree in Nuclear Physics

EQF level: 7

QF-EHEA level: 2nd cycle

Degree awarded: Joint European Master Degree in Nuclear Physics

Number of ECTS points: 120

ISCED field(s) of study: not reported in the SER.

The Consortium responsible for the degree is formed by the following institutions:

1. USE: Universidad de Sevilla (coordinator)
2. UB: Universidad de Barcelona
3. UCM: Universidad Complutense de Madrid
4. UniCaen: Université de Caen Normandie
5. UniCT: Università degli Studi di Catania
6. UniPD: Università degli Studi di Padova



ASSESSMENT OF EACH STANDARD

STANDARD 1: ELIGIBILITY

1.1. Status

Guideline

The Institutions offering a joint programme should be recognised as Higher Education institutions by the relevant authorities of their countries. Their respective national legal frameworks should enable them to participate in a joint programme, and, if applicable, to award a joint degree. The institutions awarding the degree/s should ensure that the degree/s belong to the higher education degree system at the countries in which they are based.

Assessment:

The six participating partners, Universidad de Sevilla (USE), Universidad de Barcelona (UB), Universidad Complutense de Madrid (UCM), Université de Caen Normandie (UniCaen), Università degli Studi di Catania (UniCT), and Università degli Studi di Padova (UniPD) are Higher Education (HE) institutions (Annex 1) and have applicable legal national frameworks, which entitle them to participate in a joint master (Annex 3).

Nevertheless, only France and Spain can implement the use of the European Approach for Quality Assurance of Joint Programmes (EA), while Italy currently does not accept the EA for ex-ante accreditation of joint programmes. The Italian quality assurance body, ANVUR is not registered in EQAR (Table 3), it is currently undergoing an external review process in order to do so. Therefore, the joint master degree will be accredited in a first step in Spain through ACCUA and in France, upon recognition by the EQAR registered French quality assurance bodies.

USE as coordinating institution is in charge of issuing the physical joint degree, while in Italy the students will be awarded an Italian National Degree, in addition to the joint degree if they spend at least one semester at one of the two Italian universities involved. In following steps, it will be implemented in both universities in Italy or if not yet available in Italy, at least they are committed to proceed with their National Accreditation procedure allowing the delivery of a joint master degree.

The presented “step by step” roadmap seems to be feasible and the institutions are highly committed to this joint master.

Documentary evidence:

- SER.
- Annex 1. Legal status. Accredits that the six partners are HE institutions.
- Annex 3. Joint degrees. Accredits the legal national frameworks of the three countries involved: French Decree from August 7th of 2018, in French; Italian Decree, from October 22th of 2004, n 270, in Italian; Spanish Royal Decree Real 822/2021, of September 29th of 2021, on the issuance of official university degrees, in Spanish.
- Table 3. Status of the external quality assurance systems, as well as national frameworks for joint programmes, in NucPhys countries and Universities.
- Figure 2. Step by step approach for accreditation and awarding NucPhys in France, Spain, and Italy.



Achieved	Partially Achieved	Not Achieved
X		

Recommendations:

As soon as the regulatory framework allows for programmes reviewed within the European Approach to be accepted in Italy, the consortium should start processing the relevant changes in the programme in order for students to benefit from the extended recognition of the degree.

1.2. Joint Design and Delivery

Guideline

Joint programmes should be offered jointly, involving all the cooperating institutions in the design and delivery of the programme.

Assessment:

The NucPhys master is a two-year joint programme with 120 ECTS divided into 4 terms and structured in 5 modules. NucPhys has been proposed as an evolution of the current Erasmus Mundus Joint Master Degree in Nuclear Physics. More than 30 associated partners are involved in the NucPhys master and comprises companies and research centers such as GANIL, LNL, LNS, CNA, ALBA etc.

While, USE (Spain) will be the coordinating institution, all six partners will be jointly involved in the academic governance and management of the master through the management board, academic committee, quality assurance committee and the selection committee that comprise one academic representative of each of the six universities fully involved in the programme. Moreover, the academic committee is in charge of developing a joint and well-structured curriculum for NucPhys that takes into account the best expertise of each partner.

The SER mentions that USE will coordinate budgeting and financial tasks. Although there is no information in the SER about the development of a participatory budget within the framework of the project's operation, this information can be found in the Cooperation Agreement.

All relevant information for students is provided in a Student Handbook (Annex 16), where information on the common definition of learning outcomes, establishment of shared teaching and examination methodology, common approach to internship supervision (with an academic tutor, an institution/industry tutor, and a fully joint examination committee), joint assessment of internship defences, introduction of cultural activities, implementation of common quality control mechanisms, and the development of a joint and integrated management structure, among others, can be found. The Consortium has implemented a system of academic and administrative information exchange to facilitate management of the programme.

The academic calendar (Annex 16) shows the dedicated timeline of the milestones foreseen for USE, UniCaen, UniCT and UniPD, while no milestones are foreseen for UCM and UB.

Documentary evidence:

- SER.
- Annexes 5 and 6. Study Programme and Structure.
- Annex 11. Contains each institution's internal quality assurance procedures.



- Annex 14. Relation of more than 30 associated partners.
- Annex 15. Associated partners involved in NucPhys: GANIL, LNL, LNS and CAN.
- Annex 16. NucPhys student's information 2024-2026.
- Annex 17. NucPhys application form.
- Figure 3 (wrongly numbered as 4 in the SER). Distribution of roles of partner universities, students and associated partners in NucPhys.

Achieved	Partially Achieved	Not Achieved
X		

Recommendations:

The Consortium should make additional efforts to involve students, administrative staff, associate partners and stakeholders in the design, development and delivery of the programme. Documentary evidence of those efforts should be produced.

The roles of all partners as part of the Consortium, particularly University of Barcelona and Complutense University of Madrid, should be clarified in the official documentation of the programme, including the Student Handbook and the academic calendar (Annex 16).

Further efforts should be made to integrate financial information, including participation of each partner in funding and financial management, as well as at offering information to students about financial support across all institutions.

1.3. Cooperation Agreement

Guideline

The terms and conditions on the joint programme should be laid down in a Cooperation Agreement. The agreement should cover in particular the following issues:

- Denomination of the degree/s awarded in the programme.
- Coordination and responsibilities of the partners involved with regard to management and financial organisation, (including funding, sharing of costs and income, etc.).
- Admission and selection procedures for students.
- Mobility of students and teachers.
- Examination regulations, student assessment methods, recognition of credits and degree awarding procedures in the consortium.

Assessment:

The Cooperation Agreement covers the whole range of matters which must be duly included: coordination and responsibilities, financial organization, admission and selection procedure for students, mobility, examination regulations, assessment methods, recognition of credits and degree awarding, quality assurance, etc.

Four committees are foreseen, with representation from associated partners. The committees are the Academic Committee, the Selection Committee, the Internal Quality Committee, and the NucPhys Secretariat.



The application, selection and admission procedures are clearly stated in the Cooperation Agreement. The application is online to the coordinating institution USE through the NucPhys website. The admission criteria are clearly stated but each of the criteria to be assessed is not clearly ranked in the Cooperation Agreement.

Some of the contents are apparently a copy of the Erasmus Mundus agreement, including non-relevant information and missing some of the contents that are expected to be included: conversion factors for different grading systems, a joint regulation for examinations and an integrated approach to recognition of previous academic experience.

Concerning the public available information on the programme, this will be public in a single and common website <http://emm-nucphys.eu/>. Nevertheless, while it is stated in the Cooperation Agreement that the partners will maintain links to that website from their own websites, these links are not found on the general website.

Quality assurance will be based on both internal and external assessment measures. The Quality Committee will ensure proper global evaluations by external experts to guarantee External quality assurance. In relation with Internal quality mechanisms, both students and teachers will assess each semester of the master studies.

All the financial resources will be distributed among partners according to the payment scheme given in Annex 2 of the Cooperation Agreement. USE as coordinating institution will manage the fees according to the criteria agreed by the Consortium and will be distributed among the universities taking into account the number of students admitted by each university. It is however unclear how the budget will be distributed among Spanish universities.

The distribution of pedagogical elements by campus, the associated ECTS credits and the mobility scheme, although not completely clear in the SER, was clarified during the online site visit.

The Cooperation Agreement is not signed and the courses offered by each institution are not established in the Cooperation Agreement. During the site visit the Consortium coordinators declared their commitment to further develop the Student Handbook and the Study Programme, as well as to get the Cooperation Agreement finalised and signed before the programme starts.

Documentary evidence:

- SER.
- Annex 2. Cooperation agreement for NucPhys.
- Figure 5. NucPhys students physical Mobility scheme.

Achieved	Partially Achieved	Not Achieved
		X

Recommendations:

The Cooperation Agreement should be completed and signed before the programme starts. As stated in section 1.3 of the Guide for the evaluation of international joint programmes within the European Approach Framework for Quality Assurance, issued by ACCUA (Version 1.0 of 21/10/2022): *“The terms and conditions on the joint programme should be laid down in a Cooperation Agreement. The agreement should cover in particular the following issues:*

- *Denomination of the degree/s awarded in the programme.*



- *Coordination and responsibilities of the partners involved with regard to management and financial organisation, (including funding, sharing of costs and income, etc.).*
- *Admission and selection procedures for students.*
- *Mobility of students and teachers.*
- *Examination regulations, student assessment methods, recognition of credits and degree awarding procedures in the consortium.”*

The programme website should integrate all of the relevant information about the Joint European Master Degree in Nuclear Physics, including all actual participating institutions, and avoid any confusion with the previous/current Master Erasmus Mundus. All partners should include links in their website to the official programme website.

STANDARD 2: LEARNING OUTCOMES

2.1. Level

Guideline

The intended learning outcomes should align with the corresponding level in the Framework for Qualifications in the European Higher Education Area (FQ-EHEA), as well as the applicable national qualification framework(s).

Assessment

NucPhys employs learning outcomes (LOs) to outline the knowledge, understanding, and skills students should possess upon programme completion, alongside the workload (ECTS), throughout curriculum design and delivery, emphasizing student-centric education. NucPhys graduates are expected to have achieved at graduation 24 Learning Outcomes (LOs) defined by the level 7 of the qualification framework for the European Higher Education Area (QF-EHEA), corresponding to the second cycle master studies and the European Institute of Innovation and Technology (EIT). For instance, QF-EHEA-1 clearly states that the LOs have to demonstrate knowledge and understanding founded upon and extends and/or enhances that typically associated with the first cycle. Additionally, Annexes 5&6 show the transformation of these LOs into Module Learning Outcomes (MLOs) (see Annexes 5 &6).

Documentary evidence:

- SER.
- Annex 4. Learning outcomes.
- Annex 5 & 6. Study programme and structure.

Achieved	Partially Achieved	Not Achieved
	X	

Recommendations:

Learning outcomes must explicitly reflect their advanced nature in the domain of Nuclear Physics, and it must be clear that they exceed undergraduate, bachelor level, emphasizing their alignment with master's level expectations.



All the learning outcomes have to demonstrate their connection with Nuclear Physics, rather than adjacent technical competencies, and their acquisition must be supported by the programme’s contents.

2.2. Disciplinary field

Guideline

The intended learning outcomes should comprise knowledge, skills and competencies in the respective disciplinary field(s).

Assessment

The Master programme aims to meet the need for training new profiles of experts in the field of nuclear physics. This need has strategic characteristics for various applications in different fields such as energy resources, biomedical sciences, analysis and characterization of new materials, studies, application in the artistic field, automation, and control in industrial contexts. The learning outcomes correspond to the master’s field and they are interdisciplinary in nature, in line with the master’s orientation due to the fact that Nuclear Physics has multiple applications to different fields of strategic economic relevance that comprises fusion and fission nuclear energy, biomedical sciences, material science, environmental studies (atmosphere, soil, waters), chronological dating, art, airport and toll security, military applications etc.

The evidences provided show that the intended learning outcomes are in line with the programme that covers experiments and instrumentation in large accelerators (path 1), theory on Nuclear Physics (path 2) and applications and small accelerators in the nuclear physics domain (path 3). Besides, there is a very interesting group of Associated Partners in the three paths, which should contribute to the success of the programme. These are developed taking an international, interdisciplinary and intersectoral approach, which includes the development of specific technical and transversal skills to lead technical situations in multicultural and diverse environments. The innovative aspect is also a striking element of the training.

The programme intends to make use of innovative learning methods. Technical skills are integrated through a systematic approach that also includes theoretical content. The innovative aspect is also a prominent feature of the training and corresponds to a specific need in Nuclear Physics.

Documentary evidence:

- SER.
- Annex 4. Learning outcomes.
- Annex 5 & 6. Study programme and structure.
- Annex 14. Associated Centers.

Achieved	Partially Achieved	Not Achieved
X		

Recommendations:

N/A.



2.3. Achievement

Guideline

The programme should provide the necessary procedures to demonstrate the intended learning outcomes are achieved.

Assessment

The study programme is detailed in Annex 5&6. The programme architecture is well-balanced. To achieve the programme objectives, the degree profile has been developed and agreed upon by all partners. As stated in the SER, students, industry professionals, and academic experts have contributed to this programme to ensure the achievement of expected learning outcomes, innovation in the learning process, and the assessment of skills acquisition. The study programme (120 ECTS) has been developed and agreed among all partners, with the support of students from the current Erasmus Mundus master and selected Associated Partners. The fact that the first semester is common for all students at USE is a strong starting point intended to put all students on the same level of prior knowledge and perform all administrative tasks for all of them at the same time, at the same place. The development of the 4 semesters (5 modules) is well described in Annex 5-6. The three offered paths (in S2-S3) are well aligned with the intended learning outcomes. The internship in S3 is a good complement to the Master thesis in S4 so that the students can have a relevant experience with one of the Associated Partners before going on with their Master thesis, mainly in the academic partners. Annex 5&6 include the guide with workload, learning outcomes, contents, teaching and learning methodology, assessment criteria and methods, and any other necessary information following the development of the Tuning matrix. The latter is provided in Annex 4.

A fundamental part is scheduled in S1 to ensure that all students get a common level in the areas covered in the core of the master but there is not enough information in the SER to assess if this module 1 taught at USE has the level of a master and not merely the level of a bachelor.

The design of the programme should allow to achieve the PLO and QF-EHEA expected learning outcomes, but probably not the EIT-OLOs. It is not entirely clear how the proposed assessment procedures will effectively demonstrate that the learning outcomes are achieved. NucPhys Student's Handbook comprises relevant information for the student regarding academic issues, grading system, evaluation, exams, internships..., as well as practical information regarding students, services (accommodation, visa, etc.) though the online resources are for Erasmus Mundus students. It is expected that it will also include a guidebook for each course which, for the time being, is not available. The NucPhys Student Handbook is mentioned in SER to be provided in Annex 19 but is found in Annex 16. Annex 16, finally, contains useful information regarding these relevant points (the summary table of semesters, modules and milestones of the academic calendar).

Documentary evidence:

- SER.
- Annex 4. Learning outcomes.
- Annex 5 & 6. Study programme and structure.
- Annex 16. Student Handbook.
- Annex 19. Individual Facilities provided by NucPhys partner universities.

Achieved	Partially Achieved	Not Achieved
	X	



Recommendations:

It should be clarified how the learning outcomes will be achieved, and all of the information regarding how they will be achieved, such as the Guidebooks, should be published on the website.

2.4. Regulated Professions

Guideline

If relevant for the specific joint programme, the minimum agreed training conditions specified in the European Union Directive 2005/36/CE, or relevant common training frameworks established under the Directive, should be taken into account.

Assessment

This standard is not applicable. The joint programme will not qualify for any of the regulated professions.

Achieved	Partially Achieved	Not Achieved	Not applicable
			X

Recommendations:

N/A.

STANDARD 3: STUDY PROGRAMME

3.1. Curriculum

Guideline

The curriculum structure and content should be adequate to achieve the intended learning outcomes.

Assessment

To achieve the learning outcomes, the design and structure of the master have been decided by all six partners in the Consortium in order to produce a top-level master's degree. The SER gives information on the master structure, as well as its distribution in semesters, partner universities and teaching formats and contents. It has been established as a 120 ECTS master, divided into two years (4 semesters), with five modules and three main specializations, experiments and instrumentation in large accelerators, Nuclear Theory Physics and applications and small accelerators as well as a previous fundamental module in the first semester. The first semester (S1, Module 1) is well designed to give a common background to all students before they start the specialization path (Module 2, 30 ECTS in S2, 12 ECTS in S3). The "Common Advanced course" in S3 (6 ECTS, Module 3) is a very good opportunity to incorporate every year the main novelties in the field. The internships will also take place in S3, part-time (Module 4, 12 ECTS). Finally, S4 (Module 5, 30 ECTS) is solely devoted to the master thesis which will, indeed, give the opportunity to do it at the different partners.

In order to assess if the subjects of the courses are adequate for the intended learning outcomes at the level of master degree, a more detailed explanation jointly with bibliography is needed. The description of the modules does not explain in detail how the learning outcomes are going to be evaluated. Written exams are mentioned for some part of the modules, but it is not detailed the weight of the different evaluation systems.

The SER explains the grading system adopted and its correspondence with the different national systems. Table 4 shows the ECTS distribution on the different paths and modules according to the mobility and specialization



path. Although the credits of each module are detailed, the number of hours allocated to the different learning activities are not provided. The timeline with the temporal distributions of the courses for each path is clearly detailed in the SER and seems to be appropriate. It is very well appreciated the possibility offered to the students to follow the internship or master thesis in the associated labs or companies.

The student's mobility has been carefully designed so each student will have to spend semesters in three different countries, which is a very interesting path (Figure 5 in SER explains it well).

Documentary evidence:

- SER.
- Annex 2. Cooperation Agreement.
- Annex 4. Learning Outcomes.
- Annex 5-6. Study Programme and Structure.
- Annex 16 Student's Handbook.
- Table 4. ECTS distribution on the different paths and modules.

Achieved	Partially Achieved	Not Achieved
	X	

Recommendations:

The guidebooks for each of the courses must be fully developed in terms of detailed contents, bibliography, teaching staff for each module and evaluation procedures including the relative weight of each evaluation modality for each course.

3.2. Credits

Guideline

The European Credit Transfer System (ECTS) should be applied properly and the distribution of credits should be clear.

Assessment

The SER shows the structure of the master with the distribution of ECTS per module. The master is correctly constructed to distribute the 120 ECTS between the different parts of the master. Each path is directly related with the specialization the student will be awarded. It is clearly stated that in case the student complete 42 ECTS from different paths, in this specific case, after the completion of all the ECTS corresponding to each other module, the student will receive the master degree, but without specialization. The structure of the programme is coherent and the distribution of ECTS per module is adequate. The list of courses offered in each university during the different semesters and for the three paths are shown as well. Extra-curriculum activities are offered as well to promote student's entrepreneurship and transversal leadership skills.

Documentary evidence:

- SER.
- Annex 2. Cooperation Agreement



- Annex 4. Learning outcomes.
- Annex 5 & 6. Study programme and structure.
- Annex 16. Student's Handbook
- Table 4. ECTS distribution on the different paths and modules.

Achieved	Partially Achieved	Not Achieved
X		

Recommendations:

N/A.

3.3. Workload

Guideline

A joint bachelor programme will typically amount to a total student workload of 180-240 ECTS-credits; a joint master programme will typically amount to 90-120 ECTS-credits and should not be less than 60 ECTS-credits at second cycle level (credits ranges according to the FQ-EHEA); for joint doctorates no credit range is specified.

Assessment

The total workload is 120 ECTS, 60 ECTS per year, distributed in four semesters, including the fundamental module (30 ECTS), where 1 ECTS is the equivalent of 25 to 30 hours of study. In the first semester students enrol at USE. In the second semester, students follow the programme depending on the chosen path in the six universities involved. What cannot be evaluated is the workload of each course for its size as there is no syllabus presented, there is no mention of how many reports should be presented or how many exams taken at each course, save for the internship and the master thesis.

The SER only mentions that 1 ECTS would be between 25 and 30 h. The workload in terms of hours is not clear. The distribution of hours among each of the six participating universities is also unclear.

Documentary evidence:

- SER.
- Annex 4. Learning outcomes.
- Annex 5 & 6. Study programme and structure.

Achieved	Partially Achieved	Not Achieved
X		

Recommendations:

The workload in terms of ECTS and number of hours of study should be clearly stated for each of the courses and modules, as well as the distribution among all of the six participating universities.



STANDARD 4: ADMISSION AND RECOGNITION

4.1. Admission

Guideline

Admission requirements and selection procedures should be appropriate in light of the programme 's level and discipline.

Assessment

In order to establish the requirements and the criteria for admission to the master, which are the same for all students, the internal procedures for admission and selection of students that all partner universities have been taken into account are shown in Annex 7. From the documents, it emerges that the admission requirements and criteria for the NucPhysprogramme have been established and are common to all students. They are listed on the master website as well as in the Student Handbook (Annex 16). The access requirements, the application procedure and documentation, and the selection process are detailed in the documents provided. SER (Figure 6) shows the timeline of the admission and selection procedures. The selection process is also carefully detailed, with the scores attached to each considered item, which can add up to 100; the items in consideration are appropriate for the contents and level of the master degree:

- a) (up to 30) Academic excellence.
- b) (up to 3) Relevant work experience related to the field of the Master Course.
- c) (up to 5) Student motivation to undertake the Master and relevance to her/his professional development.
- d) (up to 10) Recommendation from the references.
- e) (up to 2) Others.
- f) (up to 50) Individual interview on-line, including language skills and relevance of the student's background to the field of the Master Course.

The entry profile for the students is very well defined and in accordance with the EU regulation. The academic criteria are ranked but for academic excellence (up to 30 points) and interview (up to 50 points) there is not a detailed information on how the grading scale should be interpreted.

SER states that the recruitment will be made without regard to race, colour, age, religion, sex and national origin. Nevertheless, the admission criteria do not include affirmative action rules based on gender, diversity and inclusiveness. Moreover, no mention is made of special provisions for people with migration background, people from low-income families, considering that the total cost of the master is 18.000€. SER only mentions that the Selection Committee in agreement with the Academic Committee will have the right to reserve a certain quota of every intake to promote diversity, inclusiveness and gender equality issues. Applications will be ranked according to criteria, rated on a scale of 0 to 100. To ensure the clearness and transparency of the selection process, every applicant will have the right to know their final position according to the following scheme:

- Group I: Applications of very good quality (score higher than 75 points out of 100).
- Group II: Applications of good quality (score between 60 and 75 points out of 100).
- Group III: Applications of weak quality (score less than 60 points out of 100).

The roadmap is to be publicly available to guarantee the transparency of the access and admission processes and the Selection Committee will have the right to reserve a 5% quota of every first-year intake to promote



diversity, inclusiveness, and gender equality. Overall, it is considered the admission requirements are appropriate for the joint programme.

Documentary evidence:

- SER.
- Annex 7. Internal procedures for admission and selection of students of the six universities partners.
- Annex 16. Student Handbook.
- Annex 17. Application form.

Achieved	Partially Achieved	Not Achieved
	X	

Recommendations:

The admission criteria should include affirmative action rules based on gender, diversity and inclusiveness. Moreover, people with migration background and people from low-income families should be considered as well, taking into account that the total cost of the master is 18.000€.

The criteria of academic excellence (up to 30 points) and interview (up to 50 points) have to be clearly detailed on how these scores can be acquired with a clear relation on how the subcriteria are ranked. Special attention should be paid to the evaluation of the academic suitability of applicants with Majors different from Physics. The details should be published on the website.

The student handbook has to contain detailed information on all six universities, and not just on USE. Moreover, it should contain detailed information on the selection procedure where each of the admission criteria has to be detailed and ranked.

4.2. Recognition

Guideline

Recognition of qualifications and periods of studies, (included recognition of prior learning) should be applied in line with the Lisbon Recognition Convention and subsidiary documents.

Assessment

The recognition of qualifications and periods of studies is in line with the Lisbon Recognition Convention, where the number of credits recognized is in function of the QF-EHEA level of studies conducted and of their compatibility with the joint master course contents, within the limitations of in force national regulations on academic recognition. The elements of mutual recognition have been analysed and have led to the creation of a framework for academic recognition stated in the Cooperation Agreement (Annex 2) where Table 1 and Table 2 of Annex III of the Cooperation Agreement show the recognition of qualifications and the recognition of credit mobility, prior learning and work experience, with the aim of reducing existing administrative barriers and obstacles in order to promote academic recognition of qualifications and credit earned in each university partner. This document is complete because it takes into consideration the qualifications and prior learning of potential students as well as the learning outcomes to be achieved. Nevertheless, it is not stated in the Cooperation Agreement the number of ECTS recognized in each case and in Table 1 and Table 2 of Annex III this crucial information is missing. Moreover, NucPhys has defined a common set of academic recognition application forms to be used by the students when applying for academic recognition (Annex 18).



Documentary evidence:

- SER.
- Annex 2. Collaboration Agreement.
- Annex 8. Recognition in each of the six universities partners.
- Annex 18. Recognition template.

Achieved	Partially Achieved	Not Achieved
	X	

Recommendations:

The Cooperation Agreement has to include the number of ECTS recognized in each case as in Table 1 and Table 2 of Annex III this crucial information is missing. At least, the maximum number of credits to be recognized by all participating universities should be established.

STANDARD 5: LEARNING, TEACHING AND ASSESSMENT

5.1. Learning and teaching

Guideline

The joint programme should be designed to correspond with the intended learning outcomes, and the learning and teaching approaches applied should be adequate to achieve them. Student diversity and their needs should be respected and attended to, especially in view of potential different cultural backgrounds of students.

Assessment

The methodology and educational approach applied in the joint programme are formally adequate. Annex 9 shows the internal regulations and procedures for teaching and assessment of students of all partners. Together with the Student's Handbook, each semester the students will have a complementary guidebook describing the context within NucPhys and the overall objectives. According to the Bologna strategy, the guidebooks should include the workload, intended learning outcomes, and align contents, teaching and learning methodology, assessment methods and criteria, as well as any other necessary information. Learning activities as described include *learning by doing*, *learning by developing*, and *learning by thinking/reflecting*. Annex 05&06 NucPhys includes module workloads, general objectives, expected learning outcomes, main module contents, as well as teaching and learning methodology and assessment methods. The pedagogical development of the project implements a sequence of means and pedagogical methods that facilitate the student learning process. In fact, in addition to traditional lectures, active learning methods based on content-based assessment, competence-based assessment, and impact-based assessment will be used.

Annex 9 shows the internal regulations and procedures for teaching and assessment of students of all partner universities. Annex 16 shows the outline of the Student's Handbook. Each course will have a guidebook describing the context within the programme and overall objectives. According to the Bologna strategy and the TUNING methodology, the guidebooks will also include the workload, intended learning outcomes, and aligned contents, teaching and learning methodology, assessment methods and criteria, as well as any other necessary information. For the time being, this information is not included.



In the case of visits to Associate centers, it is not clear when this could be achieved, a calendar for these visits is missing. The welcome weeks at the beginning of the master and prior to each semester is a well-designed means to prepare the students for learning. The Consortium is stressing the need for lecturers to improve their competences and they offer a good design of interactive activities among them to discuss course content, teaching and joint supervision methods, and evaluation practices. There will be a virtual environment for learning, teaching and assessment, a collaborative workspace, which is a strength of the proposal. In the guidebook for each course, it should be very clear which contents will be taught virtually (if any) and how. Finally, all university partners have programmes to address students with special needs.

Documentary evidence:

- SER.
- Annex 5 & 6. Study programme and structure.
- Annex 9. Student assessment.
- Annex 16. Student Handbook.

Achieved	Partially Achieved	Not Achieved
	X	

Recommendations:

The Student's Handbook should include detailed information on the content of each course. The guidebooks have to be provided describing the context within NucPhys and the overall objectives. According to the Bologna strategy, the guidebooks should include the workload, intend learning outcomes, and align contents, teaching and learning methodology, assessment methods and criteria, as well as any other necessary information.

How students from different academic backgrounds will be helped to reach the same level of expertise to follow the courses should be explained.

A calendar should be provided to see when the visits to Associate centers can take place and their compatibility with other courses/assignments.

The use of digital learning to allow all the master's partners to be present throughout the programme delivery is recommended.

Regular coordination meetings between the teaching staff in order to align the content of the modules and other aspects are recommended.

5.2. Assessment of students

Guideline

The examination regulations and the assessment of the achieved learning outcomes should correspond with the intended learning outcomes. They should be applied consistently among partner institutions.

Assessment

NucPhys will promote "Fit-for-purpose" assessment methods of learning outcomes and different assessment approaches will be used, content-based, competence-based and impact-based assessments. Students failing to pass individual taught modules will be able to take supplemental examination or re-submit required work. The Master programme proposes both active and passive methods for assessing knowledge and skills.



Students who do not pass individual teaching modules will have the opportunity to take a supplementary exam or resubmit the required work. NucPhys will use a grading system with an assessment scale from 0 to 100% and Table 5 shows the grading system and its equivalence to the EHEA and national grading systems. The master ensures a homogeneity of evaluation, whatever the path taken and the host university. The innovative approach of this Master's programme is also integrated in the assessment methods of the students.

There are contradictions between the written references to continuous exams and the oral, final exams which take place in Italy.

Documentary evidence:

- SER.
- Annex 5 & 6: Study programme and structure.
- Annex 9: Student assessment.
- Table 5. NucPhys grading system and its equivalence to the EHEA and national grading systems.

Achieved	Partially Achieved	Not Achieved
	X	

Recommendations:

The weights of the different assessment methods (written/oral examinations, assignments, projects, continuous assessment) have to be specified in the different modules.

STANDARD 6: STUDENT SUPPORT

Guideline

The student support services should contribute to the achievement of the intended learning outcomes. They should take into account specific challenges of mobile students.

Assessment

As can be seen in the Self-Evaluation Report, there are students support services, guides and programmes, like the academic governance and management structure, the Student Association that is a network formed by alumni and current students, etc. They should facilitate the achievement of the intended learning outcomes. Annex 16 contains information about the services, guides, and support programmes available to master students. Additionally, Table 6 of the SER contains links to student support services for each of the universities in the Consortium.

The master uses several levers for integrating students into the programme to enable them to take the courses in the best possible conditions. A link between the partner institutions allows the promotion of the master's programme and ensures cohesion in the activities offered to students. The supporting documents will facilitate the immersion of the students in an international curriculum with different orientation paths. The creation of an Alumni network is an important element in the follow-up and tutoring of incoming students. The panel appreciates that the information on student support is quite comprehensive, but information on career guidance services is missing.



Documentary evidence:

- SER.
- Annex 16.Student Handbook.
- Table 6. Links to students support services at every NucPhys partner university.

Achieved	Partially Achieved	Not Achieved
X		

Recommendations:

Further coordination and centralization of the information provided to students about student support services is recommended, in particular concerning the mobility support services, that should play a central role in this master. A guidance for visa should be implemented beforehand, as well as a single guidebook for students regarding mobility.

Detailed information on the professional orientation services available in all the six universities is desirable.

STANDARD 7: RESOURCES

7.1. Academic, administration and services staff

Guideline

The staff should be sufficient and adequate (qualifications, professional and international experience) to implement the study programme.

Assessment

Annex 10 includes the CVs of the main academic staff that will be involved in the master. The qualifications are adequate with excellent profiles and highly active in the international research communities. There are sufficient academic staff according to number, profiles, category and experience to implement the joint programme. All the professors involved in this programme are considered experts in their field and have the teaching and research experience to participate in this master. On the positive side, the teacher-to-student ratio is good, and they have external, associated faculty who bring experience. The administrative team is also well-defined to meet the organizational, monitoring, and logistical needs of the master, as reported in Figure 4 of the SER.

Documentary evidence:

- SER.
- Annex 10. CVs of the main academic staff that will be involved in NucPhys.

Achieved	Partially Achieved	Not Achieved
X		



Recommendations:

Information about the faculty who will teach each course (faculty CVs with links to their ORCID profiles) should be accessible on the website.

Information about the administrative team to meet the organizational, monitoring and logistical needs of the master should be provided.

7.2. Facilities and material resources

Guideline

The facilities provided should be sufficient and adequate in view of the intended learning outcomes.

Assessment

The Consortium have provided the human and material resources necessary for the successful implementation of the Master. The facilities of the participating universities for student learning, research, and innovation activities are sufficient and adequate for the number of students who will participate in the Master and for achieving the expected learning outcomes. This information is inferred from the SER and Annex 19, which lists the services, provides a brief description of them, and links to all the facilities provided by NucPhys partner universities, as well as from the information provided during the visit. On the other hand, in the SER there is a very complete description of the research facilities provided by the associated centers, which is indeed a very strong point towards achieving the goals of the programme. Exhaustive information about laboratories and facilities available for each course is missing.

In Annex 19 is presented only the laboratories of USE. It is needed to have this information not only for the associate centres as presented in SER but also for the five remaining partners of this Consortium.

No information about the digital resources (MOODLE etc.) is presented.

Documentary evidence:

- SER.
- Annex 16. Student’s Handbook.
- Annex 19. Facilities.

Achieved	Partially Achieved	Not Achieved
X		

Recommendations:

It would be desirable to give an exhaustive information about laboratories and facilities available for each course, including libraries, computer centers and specific software.



STANDARD 8: TRANSPARENCY AND DOCUMENTATION

Guideline

Relevant information about the programme like admission requirements and procedures, course catalogue, examination and assessment procedures etc., should be well documented and published by taking into account specific needs of mobile students.

Assessment

At the time the Self-Evaluation Report was written, part of the information was not available in the Student’s Handbook. This information will be available to students prior to the start of the master. There is an open repository hosted in the digital platform, and available through the NucPhys website, that will include, among others, master thesis projects from students of previous cohorts, summaries of summer internships, summaries of extracurricular activities and a selection of testimonials from previous alumni on their experience in NucPhys. The available public information seems to be sufficient, adequate and accessible to students via social media, sustainably printed leaflets, etc. It is also intended to have at the web page the Internal and External Quality reports. All these actions will increase the transparency.

Documentary evidence:

- SER.
- Annex 16. Student’s Handbook.
- Annex 19. Facilities.

Achieved	Partially Achieved	Not Achieved
	X	

Recommendations:

A website with all the programme information should be available online, as stated in the SER.

The programme website should include the Student Handbook and could also show the profiles of alumni, to provide prospective students with an idea of career opportunities.

The composition of all committees should also be made public, including contact information.

STANDARD 9: QUALITY ASSURANCE

Guideline

The cooperating institutions should apply joint internal quality assurance processes in accordance with part one of the ESG2015.

Assessment

NucPhys implements a joint transnational Internal Quality Assurance System (IQAS), following the ESG2015 and the guidelines provided by the Tuning Project Higher Education Structures in Europe. The USE QA Management Unit is tasked with coordinating the accreditation and monitoring of the joint degree in contact



with the external quality control agency ACCUA. Governance bodies are structured to meet quality assurance requirements, and the tools appear to be functional, covering all logistical, pedagogical, and organizational aspects to ensure the quality of education expected from a master programme.

Annex 11 provides the internal quality assurance of four of the universities involved, while the UniCaen and UCM internal quality assurance is not provided. NucPhys has established a joint transnational internal Quality Assurance System following the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG2015). Moreover, an Internal Quality Assurance Committee has been established to ensure the joint programme internal quality assurance, design improvement strategies and implement all the internal evaluation strategies and mechanisms. Questionnaires for students will be set up to evaluate their degree of progress. Moreover, the professors in this programme will also be able to evaluate themselves thanks to an internal quality assurance system. Support is provided to guide them in their work within the master's programme.

NucPhys considers an external quality assurance as an essential tool to assess the level of excellence of the master and verify whether the master has met the objectives for which it was set up, to analyse the degree of satisfaction among the students, to identify strengths and weaknesses of the master, to evaluate the content, methodology and strategies used, to evaluate the application of the grading scale and to evaluate the success of trained students and alumni, among others. For this purpose, surveys among students, professors, alumni, staff and external stakeholders will be implemented. Although the Internal QA system for the joint programme is well defined, the public policy for quality assurance of the consortium which should be part of its strategic management, as ESG1.1 states, is not provided. The system procedures are yet to be written.

Documentary evidence:

- SER.
- Annex 11. Internal Quality Assurance of UB, UCM, USE, UniCT and UniPd.

Achieved	Partially Achieved	Not Achieved
	X	

Recommendations:

The public policy for quality assurance of the consortium, as part of its strategic management, should be developed in written form.

It is desirable that quality assurance considers not only strong and weak points, but points to be improved to follow up the progress of the master evolution. It is recommended to establish clear indicators to follow up the programme evolution, and to consider indicators to evaluate the progress of the alumni, for instance employment rate.

All of the procedures within the Quality system should be developed in writing.



CONCLUSION AND EVALUATION PROPOSAL

11.1. Recommendations Summary

STANDARD 1: ELIGIBILITY

1.1. Status

- As soon as the Italian regulatory framework allows for programmes reviewed within the European Approach to be accepted, the Consortium should start processing the relevant changes in the programme in order for students to benefit from the extended recognition of the degree.

1.2. Joint Design and Delivery

- The Consortium should make additional efforts to involve students, administrative staff, associate partners and stakeholders in the design, development and delivery of the programme. Documentary evidence of those efforts should be produced.
- The roles of all partners as part of the Consortium, particularly University of Barcelona and Complutense University of Madrid, should be clarified in the official documentation of the programme, including the Student Handbook and the academic calendar (Annex 16).
- Further efforts should be made to integrate financial information, including participation of each partner in funding and financial management, as well as at offering information to students about financial support across all institutions.

1.3. Cooperation Agreement

- The Cooperation Agreement should be completed and signed before the programme starts.
- The programme website should integrate all of the relevant information about the Joint European Master Degree in Nuclear Physics, including all actual participating institutions, and avoid any confusion with the previous/current Master Erasmus Mundus. All partners should include links in their website to the official programme website.

STANDARD 2: LEARNING OUTCOMES

2.1. Level

- Learning outcomes must explicitly reflect their advanced nature in the domain of Nuclear Physics, and it must be clear that they exceed undergraduate, bachelor level, emphasizing their alignment with master's level expectations.
- All the LOs have to demonstrate their connection with Nuclear Physics, rather than adjacent technical competencies, and their acquisition must be supported by the programme's contents.

2.2. Disciplinary field

N/A.

2.3. Achievement

- It should be clarified how the learning outcomes will be achieved, and all of the information regarding how they will be achieved, such as the Guidebooks, must be published on the website.

2.4. Regulated Professions

N/A.



STANDARD 3: STUDY PROGRAMME

3.1. Curriculum

- The guidebooks for each of the courses must be fully developed in terms of detailed contents, bibliography, teaching staff for each module and evaluation procedures including the relative weight of each evaluation modality for each course.

3.2. Credits

N/A.

3.3. Workload

- The workload in terms of ECTS and number of hours of study should be clearly stated for each of the courses and modules, as well as the distribution among all of the six participating universities.

STANDARD 4: ADMISSION AND RECOGNITION

4.1. Admission

- The admission criteria should include affirmative action rules based on gender, diversity and inclusiveness. Moreover, applicants with migration background and from low-income families should be considered as well, taking into account that the total cost of the master is 18.000€.
- The academic criteria of academic excellence (up to 30 points) and interview (up to 50 points) have to specify how these scores can be acquired with a clear relation on how the subcriteria are ranked. Special attention should be paid to the evaluation of the academic suitability of applicants with Majors other than Physics. The details should be published on the website.
- The student handbook has to contain detailed information on all six universities, and not just on USE. Moreover, it should contain detailed information on the selection procedure where each of the admission criteria has to be detailed and ranked.

4.2. Recognition

- The Cooperation Agreement has to include the number of ECTS recognized in each case as in Table 1 and Table 2 of Annex III this crucial information is missing. At least, the maximum number of credits to be recognized by all participating universities should be established.

STANDARD 5: LEARNING, TEACHING AND ASSESSMENT

5.1. Learning and teaching

- The Student's Handbook should include detailed information on the content of each course. The guidebooks have to be provided describing the context within NucPhys and the overall objectives. According to the Bologna strategy, the guidebooks should include the workload, intended learning outcomes, and aligned contents, teaching and learning methodology, assessment methods and criteria, as well as any other necessary information.
- How students from different academic backgrounds will be helped to reach the same level of expertise to follow the courses should be explained.
- A calendar should be provided to see when the visits to Associate centers can take place and their compatibility with other courses/assignments.
- The use of digital learning technology to allow all the master's partners to be present throughout the programme delivery is recommended.



- Regular coordination meetings between the teaching staff in order to align the content of the modules and other aspects are recommended.

5.2. Assessment of students

- The relative weights of the different assessment methods (written/oral examinations, assignments, projects, continuous assessment) have to be specified in the different modules.

STANDARD 6: STUDENT SUPPORT

- Further coordination and centralization of the information provided to students about student support services is recommended, in particular concerning the mobility support services, that should play a central role in this master. A guidance for visa should be implemented beforehand, as well as a single guidebook for students regarding mobility.
- Detailed information on the professional orientation services available in all the six universities is desirable.

STANDARD 7: RESOURCES

7.1. Academic, administration and services staff

- Information about the faculty who will teach each course (faculty CVs with links to their ORCID profiles) should be accessible on the website.
- Information about the administrative team to meet the organizational, monitoring and logistical needs of the Master should be provided.

7.2. Facilities and material resources

- It would be desirable to give an exhaustive information about laboratories and facilities available for each course, including libraries, computer centers and specific software.

STANDARD 8: TRANSPARENCY AND DOCUMENTATION

- A website with all the programme information should be available online, as stated in the SER.
- The programme website should include the Student Handbook and might also show the profiles of alumni, to provide prospective students with an idea of career opportunities.
- The composition of all committees should also be made public, including contact information.

STANDARD 9: QUALITY ASSURANCE

- The public policy for quality assurance of the Consortium, as part of its strategic management, should be developed in writing.
- It is desirable that quality assurance considers not only strong and weak points, but also points to be improved to follow up the progress of the master evolution.
- It is recommended to establish clear indicators to follow up the programme evolution, and to consider indicators to evaluate the progress of the alumni, for instance employment rate.
- All of the procedures within the Quality system should be developed in writing.



11.2. The Review Panel Assessment per Standard

STANDARD		ACHIEVED	PARTIALLY ACHIEVED	NOT ACHIEVED
STANDARD 1. ELIGIBILITY	Status	X		
	Joint Design and Delivery	X		
	Cooperation Agreement			X
STANDARD 2. LEARNING OUTCOMES	Level		X	
	Disciplinary field	X		
	Achievement		X	
	Regulated Professions (if applicable)	Not applicable		
STANDARD 3. STUDY PROGRAMME	Curriculum		X	
	Credits	X		
	Workload	X		
STANDARD 4. ADMISSION AND RECOGNITION	Admission		X	
	Recognition		X	
STANDARD 5. LEARNING, TEACHING AND ASSESSMENT	Learning and Teaching		X	
	Assessment of Students		X	
STANDARD 6. STUDENT SUPPORT		X		
STANDARD 7. RESOURCES	Academic, Administration and Services Staff	X		
	Facilities and material resources	X		
STANDARD 8. TRANSPARENCY AND DOCUMENTATION			X	
STANDARD 9. QUALITY ASSURANCE			X	

Final evaluation proposal:

FAVOURABLE

The panel proposes that the recommendations included in this report be followed up after the first cohort of students completes the programme (two academic years).



ANNEXES

REVIEW PANEL

Alberto Oleaga is Full Professor of Applied Physics at the University of the Basque Country (UPV/EHU, Bilbao, Spain) as well as Vicedean for Relations with Companies at Bilbao School of Engineering (UPV/EHU). His research interests fall on Applied Physics and Condensed Matter, dealing with thermal, magnetic and magnetocaloric properties of materials of technological interest, mainly for energy applications. He has published about 100 papers in peer-reviewed international journals, most of them in collaboration with research groups from all over the world. He has trained many young scientists and engineers, regularly supervising Master and PhD thesis, being the Head of the doctoral programme “Physics” at UPV/EHU. He has experience in university management as former Vicedean for International Relations, coordinator of 4 Erasmus Mundus programmes and Head of the Applied Physics Department, as well as in Quality and Accreditation programmes, both as proposer of Degrees and evaluator in different agencies.

Canio Noce (PhD in Physics, University of Napoli). Associate Professor of Theoretical Condensed Matter Physics at the University of Salerno. He was a Marie Curie fellow as winner of a European grant. His scientific activity concerns the physics of strongly correlated electronic systems; the theoretical study of tunneling junctions with unconventional superconductors and normal or ferromagnetic materials; the search for exact results in models of condensed matter physics, and quantum computing for solid-state physics. He is the author of about 200 publications in international referred scientific journals with a high impact factor, author of 3 physics textbooks and editor of 3 international conference proceedings. He got the National Scientific Habilitation (ASN) to apply for permanent positions of Full Professor in Italian Universities. Responsible for Quality Assurance of the Department of Physics ‘E. R. Caianiello’, University of Salerno, 2005-2006. Since 2019 he has been a member of the technical committee of the University of Salerno Quality Centre and from 2020 to 2021, he was member of the University Quality Presidium. Deputy Director of the Department of Physics ‘E R Caianiello’, University of Salerno, for two terms (2006-2008 and 2016-2018). Dean of PhD school in Physics (XII, XIII and XIV cycles).

Kiara Hervella Seoane is currently student of 1st cycle Doctoral Study Programme at Computational Astrophysics at the Universitat de València (Spain); with an MSc in Astrophysics from the Universidad de la Laguna (Spain), and a BSc on Physics from the Universidade de Santiago de Compostela (Spain). She has experience as member of the Student Council of the Faculty of Physics, Universidade de Santiago de Compostela.

Robert Jacqmin (PhD in nuclear engineering, MIT) is research director at CEA, the French Atomic Energy Commission. He is specialized in reactor physics, nuclear data, core calculation methods and validation experiments. He has 25+ years of experience in light-water reactor and fast reactor core neutronics. In his current position, he is responsible for the scientific activities of the Department of reactor studies (140 researchers, 40 PhD students) at CEA Cadarache. R. Jacqmin is an official French representative and former chair of the JEFF nuclear data file, a collaborative project hosted by the OECD Nuclear Energy Agency. R. Jacqmin is also director of the Frédéric Joliot – Otto Hahn post-doctoral summer school on nuclear reactors. Since 2022, he is an expert for the CTI (Commission des Titres d’Ingénieurs), an independent body responsible for evaluating engineering courses at French institutions.

María Dolores Rodríguez Frías is Full Professor of Atomic, Molecular and Nuclear Physics at University of Alcalá (UAH, Madrid) since 2016 with six *sexenios*, the maximum of six years research periods approved by CNEAI. About 200 scientific papers in international high impact journals and an h index of 42. Her experience in Q&A programmes comprises at the national and international level ANECA where she served (2008-2014) in the master accreditation committee, ANVUR, ARACIS, ACCUEE, UNIBASQ, AGAUR, AQUIB, ACPUA, ACSUCYL, Madrid+d. In ACCUA (former DEVA) she has served as President of the Doctorate Science Accreditation Programme (2017-2021) and President of the Physics Research Committee (2021-2023).



VISIT PROGRAMME

1st Day online site visit. 13th of May 2024

Time	Activity
15:00-15:30	Internal meeting of the panel.
15:30-16:15	Meeting with programme coordinators
16:15-16:30	Internal meeting of the panel
16:30-17:15	Meeting with teaching staff
17:15-17:30	Internal meeting of the panel.
17:30-18:15	Meeting with students.
18:15-18:30	Internal meeting of the panel.
18:30-19:00	Meeting with employers/external stakeholders
19:00-19:15	Internal meeting of the panel.
19:15-19:45	Meeting with consortium coordinators
19:45-20:00	Internal meeting of the panel. End of day 1

2nd Day online site visit. 15th of May 2024

Time	Activity
15:00-15:30	Internal meeting of the panel.
15:30-16:15	Meeting with students support services
16:15-16:30	Internal meeting of the panel
16:30-17:00	Meeting with quality assurance representatives
17:00-17:45	Internal meeting of the panel.
17:45-18:15	Final meeting visit conclusions. End of the visit

The panel was assisted by ACCUA's technical staff.

An officer from the Italian National Agency for the Evaluation of the University and Research Systems (ANVUR) attended the site visit as an observer. Permission was granted by panel members and consortium coordinators and a non-disclosure declaration was signed by ANVUR's representative.

Type of visit: Online, through Cisco Webex System.



LIST OF EVALUATED DOCUMENTARY EVIDENCE AND OTHER ADDITIONAL EVIDENCE

- Self-Evaluation Report (version 04/07/2023).
- Annex 1 to Annex 19.
- Additional information provided by the Consortium ahead of the site visit: links to available course syllabus.
- Additional evidence gathered by the panel members through the participant institutions websites.

THE PRESIDENCY ´S SIGNATURE

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