



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
HELLENIC REPUBLIC



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for Higher Education

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Accreditation Report
for the New Postgraduate Study Programme of:

Erasmus Mundus Master in Biomedical Engineering

Institution: University of Patras

Date: 29 July 2023



Επιχειρησιακό Πρόγραμμα
Ανάπτυξη Ανθρώπινου Δυναμικού,
Εκπαίδευση και Διά Βίου Μάθηση
Με τη συγχρηματοδότηση της Ελλάδας και της Ευρωπαϊκής Ένωσης



Report of the Panel appointed by the HAHE to undertake the review of the New Postgraduate Study Programme of **Erasmus Mundus Master in Biomedical Engineering** of the **University of Patras** for the purposes of granting accreditation.

ACRONYMS

EC:	European Commission
ECTS:	European Credit Transfer and Accumulation System
EEAP:	External Evaluation & Accreditation Panel
EMMBIOME:	Erasmus Mundus Master in Biomedical Engineering
EU:	European Union
HAHE:	Hellenic Authority for Higher Education
HEIs:	Higher Education Institutions
IT:	Information Technology
KPIs:	Key Performance Indicators
PSP:	Postgraduate Study Programme
QAU:	Quality Assurance Unit
RTD:	Research and Technological Development
UoP:	University of Patras

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PART A: BACKGROUND AND CONTEXT OF THE REVIEW

I. THE EXTERNAL EVALUATION & ACCREDITATION PANEL

The Panel responsible for the Accreditation Review of the New Postgraduate Study Programme of **Erasmus Mundus Master in Biomedical Engineering** of the **University of Patras** comprised the following four (4) members, drawn from the HAHE Register, in accordance with Laws 4009/2011 & 4653/2020:

- 1. Prof. George Aggidis (Chair)**
Lancaster University, Lancaster, United Kingdom
- 2. Dist. Prof. Styliani-Anna Tsirka**
Stony Brook University, New York, USA
- 3. Dr. Fivos Andritsos**
European Commission, Joint Research Centre, Ispra, Varese, Italy
- 4. Mr. Georgios Petmezas**
PhD Candidate, Department of Medicine, Aristotle University of Thessaloniki, Thessaloniki, Greece

II. REVIEW PROCEDURE AND DOCUMENTATION

The External Evaluation and Accreditation Panel (EEAP) met for the first time on 24 July 2023, following the first official meeting on the 21 July 2023 of the EEAP for the HAHE training and orientation session, in order to provide the required introductions of the team members and discuss the approach for the visit, the roles of the EEAP members, and the process to be followed. The EEAP Chair identified a series of documents to be reviewed prior to the site visit, and the members agreed to review the documents provided before the first meeting on Tuesday, 25 July 2023.

The onsite visit was conducted in an online mode although one EEAP member was in-person at the University of Patras and the other three EEAP members via online conference meetings. The visit took place on 25 July 2023. The Panel wrote the report over the following days (in total started 24 July 2023 and completed 30 July 2023) through collaborative meetings held online.

Initially, the EEAP met Prof. Antonio Alexandridis (Head of the Department), who delivered a brief greeting. Unfortunately, EEAP was not offered the possibility to meet with the UoP Vice Rector for Academic and International Affairs Prof. Dionisios Mantzavinos. Then the EEAP had a meeting with Prof. Konstantinos Moustakas (Director of Postgraduate Programme). During this “welcome meeting” Prof. Moustakas provided the EEAP a short overview of the postgraduate programme (history, academic profile) current status, strengths and weaknesses.

The next session involved EEAP meeting members of the faculty charged with the accreditation efforts (OMEA) and those at the University level (MODIP), and Steering Committee representatives. MODIP members included Prof. Ioannis Giannikos and Prof. Konstantinos Nikolakopoulos. OMEA member present was Assoc. Prof. Kyriakos Sgarbas. The Steering Committee members included Prof. Nenad Filipovic, Prof. Konstantinos Moustakas and Prof. Liliana Verestiuc. The MODIP staff present at the meeting was Fieroula Papadatou (Acting Director). The discussion focused on the degree of compliance of the Programme to the Standards for Quality Accreditation.

This was followed by a detailed presentation of the strategic plan developed for the New Postgraduate Study Programme (PSP) of “Erasmus Mundus Master in Biomedical Engineering” (EMMBIOME) of the University of Patras (UoP) regarding the curriculum, the teaching staff and the research activities of the members of the teaching staff. The members of the teaching staff that met the EEAP included: Prof. Athanasios Skodras, Assoc. Prof. Dimitrios Alexandropoulos, Prof. Emeritus Nicolas Pallikarakis, Prof. Kostas Berberidis and Assoc. Prof. Evangelos Dermatas. The main topics of the discussion were professional development opportunities, mobility, competence and adequacy of the teaching staff to ensure learning outcomes, workload, and evaluation by students. Other topics discussed were the linkage between teaching and research, the teaching staff involvement in applied research, projects and research activities directly related to the Programme, and possible areas of weakness.

Then EEAP met with administrative staff member Ms. Niki Gkoloni and teaching staff member Prof. Konstantinos Moustakas who provided an online tour of the facilities, visiting classrooms, lecture halls, library and other facilities (labs, computer rooms, etc.). This occurred through a pre-recorded video and photos. A review and discussion regarding the available facilities and learning resources, which allowed EEAP to assess whether the learning materials, equipment and facilities are adequate to ensure the successful delivery of the new EMMBIOME PSP of UoP.

The following session involved EEAP meeting with employers and social partners of the program Dr. Aris Lalos, Research Director, Athena Research Centre and Dr. Aris Dermitzakis, ELEVIT Secretary, INBIT CEO, aiming to address the readiness of the graduates for the market, as well as to identify areas of cooperation between the EMMBIOME PSP of UoP and the employers, and also the significance of the Programme to external stakeholders from the private and public sectors.

The day closed with two additional meetings.

On the first meeting EEAP met with MODIP, OMEA and Steering Committee representatives. MODIP members included Prof. Ioannis Giannikos and Prof. Konstantinos Nikolakopoulos, OMEA member present was Assoc. Prof. Kyriakos Sgarbas, Steering Committee representative was Prof. Konstantinos Moustakas and MODIP staff member present was Fieroula Papadatou, Acting Director. During this meeting EEAP addressed further outstanding questions.

Finally, on the second (“closure”) meeting EEAP met with the Director of Postgraduate Programme & Steering Committee Member Prof. Konstantinos Moustakas, MODIP members, Prof. Ioannis Giannikos and Prof. Konstantinos Nikolakopoulos, OMEA member Assoc. Prof. Kyriakos Sgarbas and MODIP staff Fieroula Papadatou, Acting Director. EEAP did not meet with the UoP Vice Rector for Academic and International Affairs Prof. Dionisios Mantzavinos and Prof. Antonio Alexandridis (Head of the Department). During this meeting additional questions were addressed and finally a brief summary of the key findings was presented by the Chair of the EEAP.

Overall, the faculty and staff prepared a comprehensive visit program with well-organized presentations and exchanges. Everyone was open to discussion, eager to answer questions and show the EEAP both the strengths and the weaknesses of the programme.

A series of reports and other documents were provided to the EEAP prior to and during the visit.

It is apparent that the online discussion and meetings worked well and allowed for the completion of the EEAP assessment in a succinct manner. Having one EEAP member present at the UoP premises provides the opportunity for further social interactions during this in-person visit and can only improve further the overall approach, by offering additional insight on the various aspects of the Programme and allowing further, sometime informal, feedback and discussions.

III. STUDY PROGRAMME PROFILE

The EMMBIOME PSP proposed by UoP for this Accreditation Report, is a new PSP, in application of Article 89 of Law 4957/2022 entitled "New Horizons in Higher Education Institutions: Strengthening of the quality, functionality and connection of HEIs with society and other provisions".

The EMMBIOME is funded by the European Union (EU), the activities being supported by the European Education and Cultural Executive Agency (EACEA) under grant agreement No 101082688 – EMMBIOME.

The Consortium includes the University of Kragujevac in Serbia, as Project Coordinators, UoP in Greece for Dissemination Activities, and the University of Medicine and Pharmacy Grigore T. Popa in Iasi, Romania for Quality Assurance.

The EMMBIOME PSP is a two-year master programme focused on academic skills and specific knowledge acquisition in line with the current world practice for biomedical engineering studies.

EMMBIOME offers in-depth training and development of research skills that ensure both expertise in state-of-the-art topics and future involvement in the field, but also encourages students in the formulation and promotion of scientific thought, as well as their enrolment in industry.

The Project Objectives include:

1. To offer students courses that will allow them to obtain practical skills needed to work on innovative problems and solving complex interdisciplinary and multidisciplinary problems in the field of biomedical engineering with key performance indicators (KPI) at least 75% of enrolled students finish their studies during 2-year period and, at least, 60% of students are able to find job in related industry within 3 years (not including students who start PhD).
2. To enable students to upgrade knowledge gained at bachelor academic studies and to acquire knowledge and skills for further education at doctoral studies with KPI at least 15% of enrolled students will enrol in a PhD programme after they finish the EMMBIOME PSP.
3. To achieve the EMMBIOME sustainability by the end of the project with KPI to increase the number of self-funded students each year by 10%.
4. To widen the EMMBIOME network and continually improve the programme quality with KPI to add three more associated partners within 5 years and the quality of the programme to be improved each year by at least 10% (based on surveys completed by students and associated partners).

The Mobility Plan of the EMMBIOME PSP for the first year includes 30 ECTS on the first semester in Serbia, and 30 ECTS on the second semester in Greece while on the second year

30 ECTS in the third semester in Romania and 30 ECTS on the fourth semester for the Master Thesis in Serbia, Greece or Romania.

The EMMBIOME industry and research partners include the Bioengineering Research and Development Centre (BioIRC) and the Centre for Research and Technology Hellas (CERTH).

The duration of operation of the PSP is planned for five (5) academic years, namely from the academic year 2023-2024 to the academic year 2027-2028. It is estimated that 75 Master students will enrol to the EMMBIOME over its 5-year duration over 4 student intakes.

The EMMBIOME PSP is subject to all the policies, rules, procedures and controls established and implemented by the UoP during the conduct of its Master's Programs.

The EMMBIOME PSP of UoP involves 21 faculty members and teaching assistants with administrative support provided by the Secretariat of the Department of Electrical Engineering and Computer Technology. The Head of the Secretariat of the Department of Computer Science and Engineering acts as the Secretary of the EMMBIOME PSP with the assistance of the Head of the postgraduate studies of UoP. All courses take place on the infrastructure of the Department of Electrical Engineering and Computer Technology for the interdisciplinary coverage of all the subjects included.

The EMMBIOME is building on the UoP experience and background on similar courses since the 1980s like the COMAC-BME. Now from 2022 onwards following the success in the EMJMD application in 2022, the EMMBIOME era begins with Partner Universities (University of Kragujevac in Serbia and the University of Medicine and Pharmacy Grigore T. Popa in Iasi, Romania) that provide excellence and educational infrastructures in BME and the initiation of a PSP with up to 75 scholarships to students over 5 years for 4 intakes and systematic collaboration among partner universities, collaborating universities, research centres and companies.

According to the 2018 Accreditation Report, the UoP founded in 1964, and it is the 3rd largest University in Greece. It had 1,245 members of staff, 654/821 engaging with academic/teaching, 66 facilitating laboratory activities and 358 for administrative duties. It had also 21,855 domestic students, 1,055 foreign students, 1,713 postgraduate students and 2,030 PhD candidates. UoP occupied 2,656 m² with two campuses (one of them in Agrinio), more than 100 buildings, and 156 teaching classes, computer centres, workshops, construction units. In addition, it had the University Hospital, the Central Library & Information Service, the Conference & Cultural Centre, 4 museums, a sports Centre and 6 primary & secondary schools.

In 2021, UoP had trained 30,644 undergraduate students, 1,746 master students and 2,058 doctoral candidates in 6 campuses, 35 departments, 180 labs and 17 clinics. UoP employed 934 instructional faculty and 2,131 administrative personnel.

PART B: COMPLIANCE WITH THE PRINCIPLES

PRINCIPLE 1: QUALITY ASSURANCE POLICY AND QUALITY GOAL SETTING FOR THE NEW POSTGRADUATE STUDY PROGRAMMES

INSTITUTIONS SHOULD HAVE INCLUDED IN THEIR STRATEGY THE DEVELOPMENT, ORGANIZATION, AND IMPLEMENTATION OF NEW POSTGRADUATE STUDY PROGRAMMES IN SPECIFIC SCIENTIFIC FIELDS AFTER INVESTIGATING THEIR FEASIBILITY AND SUSTAINABILITY.

INSTITUTIONS SHOULD IMPLEMENT A QUALITY ASSURANCE POLICY FOR THE NEW POSTGRADUATE STUDY PROGRAMMES AS PART OF THEIR STRATEGIC PLANNING.

THE QUALITY POLICY SHOULD BE DEVELOPED AND SPECIALIZED (WITH THE PARTICIPATION OF EXTERNAL BODIES) IN THE POSTGRADUATE STUDY PROGRAMMES OF THE INSTITUTION AND THE ACADEMIC UNIT. THIS POLICY SHOULD BE PUBLISHED AND ENFORCED BY ALL INTERESTED PARTIES.

By decision/s of the Senate, the Institutions should include in their strategy the issues of development of new postgraduate study programmes, which support the character, vision, mission, and strategic objectives of the Institution. The Institutional strategy should identify the potential benefits and possible difficulties or risks for the establishment of new graduate study programmes and plan all the necessary actions to achieve the goals as set. The Institution's strategic choices should be documented by specific feasibility and sustainability studies, especially for new postgraduate programmes.

In the case of offering PSP by distance methods, the Institution prepares and implements an e-learning strategy. The Institution's e-learning strategy is integrated into its overall strategy and identifies educational goals adapting to rapid technological changes and changes in pedagogical models. The Institution should include in its strategy the justification and feasibility as to why e-learning has been chosen as an appropriate learning strategy for the particular programmes of study in which it is applied.

In the context of e-learning, innovation strategies, the possibility of revising the program, the connection between research and learning (requiring knowledge of the latest innovations in order to choose the most appropriate means to achieve the learning outcomes) should be taken into account.

The academic unit's quality policy for new postgraduate programmes is harmonized with the Institution's strategy and is formulated in the form of a statement, which is made public and implemented with the participation of all interested parties. It bears the pursuit of specific goals, related to the assurance and improvement of the quality of the postgraduate study programmes offered by the academic unit. Indicatively, the academic unit's quality policy statement includes its commitment to the implementation of a quality policy, which will promote the academic character and orientation of the new postgraduate study program, its purpose and objectives, implement the goals and determine the means and the ways of achieving them, and will apply the indicated quality procedures, with the final aim of its continuous improvement.

For the implementation of this policy, the academic unit undertakes to implement quality procedures that will demonstrate:

- a) the appropriateness of the structure and organization of new postgraduate study programmes*
- b) the pursuit of learning outcomes and qualifications in line with the European and National Higher Education Qualifications Framework level 7.*
- c) the promotion of the quality and effectiveness of the teaching work at the PSP.*
- d) the suitability of the qualifications and the availability of the teaching staff for the PSP.*
- e) the drafting, implementation, and review of specific annual quality objectives for the improvement of PSP.*
- f) the level of demand for the acquired qualifications of the graduates in the labour market.*
- g) the quality of support services, such as administrative services, libraries, and student welfare services for the PSP.*
- h) the efficient utilization of the financial resources of the PSP that may come from tuition.*
- i) carrying out the annual internal evaluation and review of the quality assurance system for PSP with the cooperation of OMEA and MODIP of the Foundation.*

Relevant documentation

- The Institutional strategy for postgraduate studies, which includes a special strategy for e-learning as long as it is applied to the Institution's PSP
- Feasibility and sustainability studies for the new PSP
- Quality Policy of the academic unit for the development and improvement of PSP
- Quality Targeting of the academic unit for the PSP

Study Programme Compliance

▪ Findings

One of UoP goals (document A4) is the participation in International University Networks. In this context, this new PSP (EMMBIOME) fulfils these goals, as it is supported by Erasmus and involves two additional universities [(University of Kragujevac (Serbia) και University of Medicine and Pharmacy Grigore T. Popa (Iasi, Romania)]. Another goal of the UoP is the increase of PSPs, especially the support of PSPs where the students do not pay tuition, as well as the increase of PSPs where students do pay tuition. The latter is one of the aspirations of the EMMBIOME PSP as well.

To ascertain the quality of EMMBIOME, a committee of Programme Study has been formed within the department, which is responsible and assesses the quality of the PSP. An annual review of the program (courses, faculty, students) is done by OMEA and is submitted to MODIP. The outcomes of these evaluations also contribute to the national and international ranking of the department.

The PSP is supported administratively by the department, and students have access to IT and library support.

As evident in document A7 (please also see below in Principle 6), specific metrics have been set to assess the performance: to increase the number of enrolled students (to 25); to increase the percentage of students who provide course evaluations to 70%; to increase the research-focused master theses to 50%; to increase the annual publications resulting from this research to 3; and, to increase the visibility of the PSP.

Although the facilities for e-learning are in place, the PSP will be taking place almost exclusively in-person (with the ability to resort to e-learning, if needed, by guest lecturers).

Based on the coursework outlined in Document A9, the competencies and learning outcomes of the EMMBIOME PSP are in line with the European and National Higher Education Qualifications Framework level 7. The faculty included in the instructional curriculum are well qualified to teach the coursework necessary. Some of the faculty have collaborations with the faculty in the other two institutions that would make them appropriate mentors for the subsequent required experimental master theses carried out by the students.

Discussion with industrial and social partners revealed that there is a need for additional, trained BME graduates, both in Greece and in the rest of Europe.

▪ **Analysis of judgement**

Based on the information provided in the various documents and presentations, it would seem that the assurances and infrastructure necessary for a level 7 PSP are in place.

There is stated support for students with disabilities.

Student welfare services are provided, including visa services and health insurance.

Income from tuition-paying students in the future will help expand the programme and facilitate travelling of trainees among partnering institutions.

▪ **Conclusions**

The EMMBIOME PSP complies fully with the requirements of Principle 1.

Panel Judgement

Principle 1: Quality Assurance Policy and Quality Goal Setting for the New Postgraduate Study Programmes	
Fully compliant	X
Substantially compliant	
Partially compliant	
Non-compliant	

Panel Recommendations

- R1.1. Target objectives could include longer-term plans, preferably over the next 5 to 10 years, to clearly articulate the programme's strategic plan and adjust it as needed.
- R1.2. Additional industry partners could be identified to ascertain multitude of options for the trainees' internships.
- R1.3. Further collaborations with the PSP's international partners will provide research and publication opportunities for the trainees.
- R1.4. Links with other UoP Departments (e.g., School of Medicine) and relevant/interested faculty should be encouraged, and maybe added to the curriculum as electives.

PRINCIPLE 2: DESIGN AND APPROVAL OF NEW POSTGRADUATE STUDY PROGRAMMES

INSTITUTIONS SHOULD DEVELOP THEIR NEW POSTGRADUATE STUDY PROGRAMMES FOLLOWING A DEFINED WRITTEN PROCESS WHICH WILL INVOLVE THE PARTICIPANTS, INFORMATION SOURCES, AND THE APPROVAL COMMITTEES FOR THE NEW POSTGRADUATE STUDY PROGRAMMES. THE OBJECTIVES, THE EXPECTED LEARNING OUTCOMES, AND THE EMPLOYMENT PROSPECTS ARE SET OUT IN THE PROGRAMME DESIGN. DURING THE IMPLEMENTATION OF THE NEW POSTGRADUATE STUDY PROGRAMMES, THE DEGREE OF ACHIEVEMENT OF THE LEARNING OUTCOMES SHOULD BE ASSESSED. THE ABOVE DETAILS, AS WELL AS INFORMATION ON THE PROGRAMME'S STRUCTURE ARE PUBLISHED IN THE STUDENT GUIDE.

The academic units develop their postgraduate study programmes following a well-defined procedure. The academic profile and orientation of the programme, the research character, the scientific objectives, the specific subject areas, and specialisations are described at this stage.

The structure, content and organisation of courses and teaching methods should be oriented towards deepening knowledge and acquiring the corresponding skills to apply the said knowledge (e.g. courses on research methodology, participation in research projects, thesis with a research component).

The expected learning outcomes must be determined based on the European and National Qualifications Framework (EQF, NQF), and the Dublin Descriptors for level 7. During the implementation of the programme, the degree of achievement of the expected learning outcomes and the feedback of the learning process must be assessed with the appropriate tools. For each learning outcome that is designed and made public, it is necessary that its evaluation criteria are also designed and made public.

In addition, the design of PSP must consider:

- the Institutional strategy
- the active involvement of students
- the experience of external stakeholders from the labour market
- the anticipated student workload according to the European Credit Transfer and Accumulation System (ECTS) for level 7
- the option of providing work experience to students
- the linking of teaching and research
- the relevant regulatory framework and the official procedure for the approval of the PSP by the Institution

The procedure of approval or revision of the programmes provides for the verification of compliance with the basic requirements of the Standards by the Institution's Quality Assurance Unit (QAU).

Relevant documentation

- Senate decision for the establishment of the PSP.
- PSP curriculum structure: courses, course categories, ECTS awarded, expected learning outcomes according to the EQF, internship, mobility opportunities.

Study Programme Compliance

▪ Findings

The EMMBIOME PSP is the continuation, in the form of the ERASMUS Mundus, of a postgraduate programme (COMAC-BME) started back in the 80s by Prof Proimos of the Patras Medical School as an inter-university cooperation programme. EMMBIOME has thus built on the strong experience of COMAC-BME and the feedback it has received from numerous alumni, many of them in prominent academic positions all over Europe.

The main claimed objective is to offer its students courses allowing them to obtain practical skills needed for working on innovative problems and solving complex interdisciplinary and multidisciplinary problems in the field of biomedical engineering and, in parallel, enable them to upgrade knowledge gained at bachelor level by acquiring knowledge and skills for further education at doctoral studies.

In addition, the PSP aims towards its medium/long term sustainability through a further improved offering and the widening of the EMMBIOME network.

EMMBIOME, like its predecessor PSPs, is based primarily on the experience and work of a small number of motivated, competent academic staff across 3 departments of UoP. The study programme and all the supporting procedures and infrastructure are adequate, especially if considered that the PSP has to comply both to national and EC regulations.

▪ Analysis of judgement

The value of such highly interdisciplinary programmes such as biomedical engineering can never be underestimated. Without any doubt, the cross fertilization between such diverse disciplines such as the medicine and the engineering has a value in itself. Its stimulating, fascinating and can open new perspectives to graduates of both disciplines. Moreover, the UoP document on strategic development (Doc A4) states among its priorities:

- Encouragement of postgraduate course interdisciplinarity
- Establishment of inter-departmental programmes
- Gradual introduction of programmes/courses in English
- Attraction of foreign post-graduate students

EEAP acknowledges that EMMBIOME is well-aligned with all the above generic priorities. However, no document has been furnished on the specific topical priorities concerning the formation of young scientists or the university Research and Technological Development (RTD). EEAP understands that the PSP is now focusing on the research interest of the founding faculty, however, the field of biomedical engineering is vast. In future cycles it would be recommended that the PSP would consider the inclusion of additional biomedical engineering directions and faculty.

EEAP is of the opinion that in order to achieve sustainability and further enhance its academic offering beyond the 5-year EC support, EMMBIOME PSP along with UoP have to take some steps towards:

- Focusing its objectives to specific fields of biomedical engineering.
- Focusing, in terms of student ingress, to the graduate engineering or to the graduate medical students; in alternative, offer two parallel directions, one for each graduate category.
- Significantly enhance collaborative interdisciplinary research activities pertinent to the EMMBIOME objectives; these research activities may provide a valuable input on where to focus the PSP, as per the first bullet.
- Emphasize innovation aspects both regarding the above quoted research and the teaching activities.
- Finally, take all necessary steps both with UoP and the National authorities towards including biomedical PSPs and research as part of a comprehensive strategic university/national development plan.

It is clear that all the above-mentioned points cannot be tackled at short term. They should, however, been tackled within the next 5-year period and verified during the next evaluation/accreditation procedures.

▪ Conclusions

EEAP praises the EMMBIOME staff for their enthusiasm and perseverance. The PSP meets fully most Principle 2 requirements as per the HAHE guidelines. It is fully in-line with the University priorities concerning the evolution of its post graduate offerings. The only two points with ample room for improvement concern the somewhat generic scientific PSP objectives and the lack of integration within a larger University or National strategic development plan concerning the topical academic and research priorities. EEAP is aware that these points depend, specially the second one, on factors outside EMMBIOME's control.

In no case these two points must compromise the timely start of the PSP. Corrective actions have to do rather with the sustainability and further development of EMMBIOME rather than the quality of the currently proposed academic offering. Hence, all recommendations below are meant to be considered within the next 5 years in line with the EC-proposed objectives and KPIs.

Panel Judgement

Principle 2: Design and Approval of New Postgraduate Study Programmes	
Fully compliant	
Substantially compliant	X
Partially compliant	
Non-compliant	

Panel Recommendations

- R2.1. Initiate, within EMMBIOME, a set of activities with the scope of focusing future PSPs to specific fields rather than the generic biomedical engineering. Such activities could include workshops, invited lectures, talks etc. Future focus should take into account ongoing or future RTD activities.
- R2.2. Establish, early in the project, an external advisory board, consisting of alumni and other leaders in the biomedical engineering field, which will advise in regular intervals mutually decided on the sustainability and the next steps of the PSP.
- R2.3. Enhance its participation to collaborative biomedical engineering RTD activities and link/network with relevant existing research in Patras, Greece and abroad.
- R2.4. Emphasize the innovation aspects, both in what concerns the RTD output and the teaching activities. Possibly introduce innovation and certification procedures within the PSP lectures.
- R2.5. Take steps with the UoP authorities towards including biomedical PSPs and research as part of a comprehensive strategic UoP development plan.

PRINCIPLE 3: STUDENT ADMISSION, PROGRESSION, RECOGNITION OF POSTGRADUATE STUDIES, AND DEGREE AWARD

INSTITUTIONS SHOULD DEVELOP AND APPLY PUBLISHED REGULATIONS COVERING ALL ASPECTS AND PHASES OF STUDIES (ADMISSION, PROGRESSION, THESIS DRAFTING, RECOGNITION AND DEGREE AWARD).

The Institution should have drawn up and published the internal regulations prescribed by law which, among other things, should regulate all matters of postgraduate studies from the beginning to the end of the studies.

Indicatively:

- Students' selection procedures and required supporting documents.
- The rights, obligations, and monitoring of student progress.
- Internship matters (if applicable) and scholarship matters.
- The procedures and conditions for preparing theses and dissertations.
- The process of awarding and recognizing degrees, the duration of studies, the conditions for promotion and ensuring the progress of students in their studies.
- The terms and conditions for enhancing their mobility.

In the case of offering the PSP with distance learning methods, the Institution should have a regulation for e-learning, which includes in particular the following topics:

- Services of the Institution to support e-learning.
- Course development and implementation methodology.
- Ways of providing the teaching work and variety of forms of teaching and assessment of the students
- General standard of course structure.
- Student support system.
- Supporting faculty/teachers with mandatory e-learning training for new staff members.
- Offered technological infrastructures of the Foundation.
- Student identity confirmation system (student identity check, assignment and exam writing process, security, and degree award issues).
- The institution should establish rules to provide appropriate access and ensure the participation of students affected by disability, illness, and other special circumstances.
- With the regulation on e-learning, ethical issues are regulated, such as those of protecting data privacy or intellectual property rights and rules to deal with fraud.

All of the above must be made public in the context of the Study Guide.

Relevant documentation

- Internal regulation for the operation of the Postgraduate Study Programme.
- Special regulation for the implementation of e-learning if the PSP is offered by distance methods.
- Research Ethics Regulation.
- Regulation of studies, internship, mobility, and student assignments.
- Degree award template.

Study Programme Compliance

▪ Findings

Based on EEAP's findings, the selection procedure can be divided into three steps:

- document check,
- applicant ranking, and
- applicant interview.

Document check is performed by the Admission Committee during and immediately after the closure of the Call for Applications. Also, the fulfilment of the minimum requirements (academic and language) is verified. Applicants who fail to meet the minimum requirements are considered ineligible and are excluded. The Coordinating Institution notifies ineligible participants about the reasons of their exclusion and the appeal procedure within one month after the closure of the call. Each eligible application is evaluated on a 100-point scale by the Admission Committee and the selection criteria are as follows:

- previous academic records account for 60% of the grade,
- English language knowledge accounts for 15% of the grade,
- the cover letter and any recommendation letters account for 15% of the grade, and
- any additional academic, research or professional experience accounts for 10% of the grade.

This information can be found both on the PSP's website (<http://emmbiome.eu/>) and the PSP's Grant Agreement (document A11 as provided to EEAP). Following the applications scoring process, top-ranked applicants are invited for an online selection interview. Interviews are conducted via video conferencing by the Admission Committee and candidates are assessed based on their:

- ability to understand questions and provide adequate and concise answers,
- ability to demonstrate the adequacy and consistency between the objectives of the PSP and the applicants' background and/or professional project, and
- motivation and professional project.

All candidates are informed by email for the selection outcome and the overall score of their application.

The PSP provides scholarships under contract to students and the continuation of the scholarship in subsequent semesters depends only on the performance of the scholar. Moreover, the PSP funds student mobility for studies, so that students may move for a total of up to 18 months during their postgraduate studies by receiving a monthly grant.

Overall, a total of about 75 students are expected to enter the PSP over the next 5 years, which translates to 15-20 students per year. A particularly interesting finding is that the demand for the first year of the PSP was around 400 applicants interested to attend the PSP, out of which 150 proceeded to the interview stage, which is very encouraging. During the first week of the academic semester, a meeting entitled "Welcome and Orientation Event" is

hosted by the university in order that all incoming students and lecturers are welcomed to the PSP and meet each other.

The PSP in total corresponds to 120 ECTS, 30 per academic semester, and the PSP Committee analyses the performance of the students at the end of each semester. The thesis is compulsory and is carried out at one of the three host universities at the student's choice during the last semester under the supervision of an experienced academic research supervisor. It is written in English and is worth 30 ECTS. A transparent assessment process for the dissertation is outlined.

Furthermore, the PSP does not include an internship, but students are encouraged to work on their thesis in a company that will offer them the opportunity to work in the field of study. Finally, a Diploma Supplement is issued in English at no cost to all graduates of the PSP.

▪ **Analysis of judgement**

Based on EEAP's assessment, the PSP has established a comprehensive and clear procedure for the selection and admission of new students to the PSP. The selection criteria for students are considered satisfactory. Very pleasing is the fact that special care has been taken in order that students and teachers are welcomed to the PSP. The PSP has an encouragingly high demand from students interested in joining it. Also, important is the fact that students do not pay tuition fees, instead they receive a scholarship to support their studies throughout the duration of the PSP. The same applies to students' travel between the contracting countries for the purposes of the PSP. Additionally, the regulations and the framework for the preparation of the thesis can be considered sufficient. Finally, the duration of the studies is appropriate to the content and needs of the PSP, and the monitoring of the students' progress as well as the procedure for the recognition of the title awarded ensure the sustainability of the PSP based on the predefined horizon of the next 5 years.

▪ **Conclusions**

All relevant documents/information have been provided to EEAP. Overall, the PSP as a whole fully complies with this principle.

Panel Judgement

Principle 3: Student Admission, Progression, Recognition of Postgraduate Studies, and Degree Award	
Fully compliant	X
Substantially compliant	
Partially compliant	
Non-compliant	

Panel Recommendations

- R3.1. Increase the current 10% relative weight of the academic, research or professional experience in the admission evaluation criteria with a concomitant decrease of the previous academic records relative weight.
- R3.2. Ensure that appropriate steps are taken for the sustainability of the PSP beyond the planned 5-year period.

PRINCIPLE 4: TEACHING STAFF OF NEW POSTGRADUATE STUDY PROGRAMMES

INSTITUTIONS SHOULD ASSURE THEMSELVES OF THE LEVEL OF KNOWLEDGE AND SKILLS OF THEIR TEACHING STAFF, AND APPLY FAIR AND TRANSPARENT PROCESSES FOR THEIR RECRUITMENT, TRAINING, AND FURTHER DEVELOPMENT.

The Institution should attend to the adequacy of the teaching staff of the academic unit teaching at the PSP, the appropriate staff-student ratio, the appropriate staff categories, the appropriate subject areas, the fair and objective recruitment process, the high research performance, the training, and staff development policy (including participation in mobility schemes, conferences, and educational leaves-as mandated by law).

More specifically, the academic unit should set up and follow clear, transparent, and fair processes for the recruitment of properly qualified staff for the PSP and offer them conditions of employment that recognise the importance of teaching and research; offer opportunities and promote the professional development of the teaching staff; encourage scholarly activity to strengthen the link between education and research; encourage innovation in teaching methods and the use of new technologies; promote the increase of the volume and quality of the research output within the academic unit; follow quality assurance processes for all staff (with respect to attendance requirements, performance, self-assessment, training, etc.); develop policies to attract highly qualified academic staff.

Relevant documentation

- Procedures and criteria for teaching staff recruitment and retention, and obligations of the teaching staff.
- List of teaching staff including subject areas, employment relationship, Institution of origin, Department of origin.

Study Programme Compliance

▪ Findings

All presentations and material provided point towards the full compliance of EMMBIOME staff to the HAHE as well as the national and international academic standards. The lecture hours of the staff are counted as part of the minimum overall weekly lecture hours, according to the position of the particular staff.

What is not accounted for is the considerable effort required to fully address the reporting and other administrative requirements of the European and National regulations.

The PSP, also due to its specific nature (ERASMUS) does not seem to have any problems in ensuring the mobility of students or staff. On the contrary, it promotes such mobility.

▪ Analysis of judgement

EEAP was positively impressed by the enthusiasm and perseverance of the EMMBIOME staff.

The strength of the rather generic EMMBIOME PSP rests mainly on the interdisciplinarity of the curriculum and the complementarity of the participating laboratories and staff rather than the individual research or scientific capacity of some staff or laboratories. While this is attractive and fascinating for many young graduates, as stated in Principle 2 above, future such PSPs must be more focused and linked with relevant theoretical or applied research.

▪ **Conclusions**

The EMMBIOME teaching and support staff is up to the HAHE, national and international standards. In addition, most of them seem passionate for their work and EMMBIOME, and thus have all the prerequisites for a successful PSP.

However, in the perspective of sustainability and further development, there is room for improvement with the inclusion of additional biomedical engineering topics and links to relevant activities in other Departments and Universities.

Panel Judgement

Principle 4: Teaching Staff of New Postgraduate Study Programmes	
Fully compliant	X
Substantially compliant	
Partially compliant	
Non-compliant	

Panel Recommendations

R4.1. Link to existing biomedical engineering activities in UoP, so as to be able to include, in the future, a more expansive biomedical engineering offering.

PRINCIPLE 5: LEARNING RESOURCES AND STUDENT SUPPORT

INSTITUTIONS SHOULD HAVE ADEQUATE FUNDING TO COVER THE TEACHING AND LEARNING NEEDS OF THE POSTGRADUATE STUDY PROGRAMME. THEY SHOULD –ON THE ONE HAND- PROVIDE SATISFACTORY INFRASTRUCTURE AND SERVICES FOR LEARNING AND STUDENT SUPPORT, AND – ON THE OTHER HAND- FACILITATE DIRECT ACCESS TO THEM BY ESTABLISHING INTERNAL RULES TO THIS END (E.G. LECTURE ROOMS, LABORATORIES, LIBRARIES, NETWORKS, NETWORKS, CAREER AND SOCIAL POLICY SERVICES ETC.).

Institutions and their academic units must have sufficient resources and means, on a planned and long-term basis, to support learning and academic activity in general, to offer PSP students the best possible level of studies. The above means include facilities such as the necessary general and more specialised libraries and possibilities for access to electronic databases, study rooms, educational and scientific equipment, IT and communication services, support, and counselling services.

When allocating the available resources, the needs of all students must be taken into consideration (e.g., whether they are full-time or part-time students, employed students, students with disabilities), in addition to the shift towards student-centered learning and the adoption of flexible modes of learning and teaching. Support activities and facilities may be organized in various ways, depending on the institutional context. However, the internal quality assurance proves -on the one hand- the quantity and quality of the available facilities and services, and -on the other hand- that students are aware of all available services.

In delivering support services, the role of support and administration staff is crucial and therefore this segment of staff needs to be qualified and have opportunities to develop its competences.

Relevant documentation

- Detailed description of the infrastructure and services made available by the Institution to the academic unit for the PSP, to support learning and academic activity (human resources, infrastructure, services, etc.) and the corresponding firm commitment of the Institution to financially cover these infrastructure-services from state or other resources.
- Administrative support staff of the PSP (job descriptions, qualifications, and responsibilities).
- Informative / promotional material given to students with reference to the available services.
- Tuition utilisation plan (if applicable).

Study Programme Compliance

▪ Findings

Based on the list of teaching staff provided to EEAP (document A10), the PSP involves 21 faculty members and teaching assistants. The administrative support of the PSP is provided by the competent team of the Secretariat of the Department of Electrical Engineering and Computer Technology, where the Head of the Secretariat of the Department of Computer Science and Engineering acts as the Secretary of the PSP with the assistance of the Head of the postgraduate studies of the UoP.

The courses will primarily take place in the Department of Electrical Engineering and Computer Technology. The Department has modern classrooms and laboratories, many of which are equipped with microphone facilities, computers, projectors, and wireless internet connection. Also, all classrooms except one, which, however, is used only to a limited extent, provide access to students with disabilities.

Moreover, the Department has full access to both the physical facilities of UoP (library, gym, etc.) and its digital infrastructure, including email, e-learning applications and platforms, electronic secretariat, academic ID, free textbook supply, and Employment, Career and Liaison Department among others. The PSP has its own modern website (<http://emmbiome.eu/>), which contains all the necessary information for students and any other interested parties.

The PSP is primarily based on scholarships given to students and no tuition fees are explicitly provided for scholarship holders. There is also a possibility that more students are admitted to the PSP beyond the scholarship holders. In this case, these students are required to pay a tuition fee of EUR 6000 for the entire duration of the PSP, corresponding to EUR 1500 per semester. A forecast of the inflow of tuition paying students potentially admitted for the next 4 admission periods (2023-2028) has been provided to EEAP. The tuition income will be subject to withholding by the university, which at the time of writing is 30%. The remaining amount will be distributed as follows:

- 30% for student mobility/awards,
- 20% for visiting professor mobility,
- 20% for equipment,
- 10% for consumables,
- 10% for secretarial support, and
- 10% for outreach/promotion costs.

▪ Analysis of judgement

Based on EEAP's assessment, the number, suitability and technical background of the educational staff are deemed satisfactory. Also, the available space and the provided infrastructure, both the physical and the digital facilities, are sufficient to support the PSP.

Moreover, adequate provision has been made for the admission of additional students, whose tuition fees will bring further funding to the PSP.

▪ **Conclusions**

The infrastructure and resources provided are adequate to support the PSP. The services provided for learning and student support are considered satisfactory. The tuition utilization plan seems efficient. Overall, the PSP fully complies with this principle.

Panel Judgement

Principle 5: Learning Resources and Student Support	
Fully compliant	X
Substantially compliant	
Partially compliant	
Non-compliant	

Panel Recommendations

- R5.1. Ensure that EMMBIOME PSP students with disabilities have access to all lecture theatres and labs.
- R5.2. Ensure prompt action following the feedback provided by the students and academic staff on their experience with the available resources.
- R5.3. Ensure that the PSP’s website is updated regularly throughout the year.
- R5.4. Ensure that all students can be easily informed about the available facilities/services during the orientation meeting and throughout the academic year/semester.

PRINCIPLE 6: INITIAL INTERNAL AND EXTERNAL EVALUATION AND MONITORING OF NEW POSTGRADUATE STUDY PROGRAMMES

INSTITUTIONS AND ACADEMIC UNITS SHOULD HAVE AN INTERNAL QUALITY ASSURANCE SYSTEM, IN WHICH THEY WILL INSTIGATE THE INTERNAL AND EXTERNAL EVALUATION OF THE NEW POSTGRADUATE PROGRAMMES, SO AS TO ENSURE COMPLIANCE WITH THE QUALITY REQUIREMENTS OF THE PRESENT STANDARD. IN THE CONTEXT OF THE ABOVE ACTIONS IT IS NECESSARY TO INFORM ALL INTERESTED PARTIES.

The internal evaluation of the new PSP includes the evaluation of the certification proposal as well as the documentation material in accordance with the requirements of this Standard and the quality procedures of the Institution's Internal Quality Assurance System.

The internal evaluation of new postgraduate degree programmes also aims to ensure the quality level of educational services and to create a supportive and effective learning environment for students.

The Institution, through its Quality Assurance Unit, and the corresponding academic units organizes and supports the external evaluation procedures of the new PSP according to the specific instructions and directions of the HAHE.

The above includes:

- The objectives, content, and structure of the curriculum, the knowledge offered and the level of science and technology in the subject, to ensure the modern nature of the PSP, in accordance with the relevant documentation listed in the decisions of the competent bodies.
- The evaluation of the workload for the development and completion of postgraduate studies.
- The satisfaction of student expectations and needs from their study programme.
- The learning environment, support services, and their appropriateness for the mentioned PSP.

Postgraduate study programmes are designed and established in accordance with the provisions of the Institution's internal regulations and with the participation of students and other interested parties.

Relevant documentation

- The Quality Assurance Unit (QAU) procedure for checking the requirements of the Standard for the quality of new PSP as well as a procedure for organizing and supporting their external evaluation procedures.
- Assessment and feedback mechanisms of the PSP quality strategy and targeting and relevant decision-making processes (students, external bodies).

Study Programme Compliance

▪ Findings

The UoP goals are listed in document A6 and include:

- aspiration to provide the highest level of education (based on annual assessment),
- increasing the relevance of trainees' education to the needs of the job market,
- generation of impactful scientific work that is applicable to the economy and to societal concerns,
- support and recognition of innovation,
- support of international activities and collaborations, and
- establishment of appropriate administrative structures that improve the PSP and support the trainees.

At the end of the period when each cohort of trainees complete their degree, the steering (management) committee is expected to produce a Quality Assessment Report, generated from feedback and evaluation of each of the courses taken by the students during the semesters (based on the EMMBIOME studies presentation).

The student evaluations will be based on digital anonymous surveys with questionnaires. At the end of each semester, the students will evaluate the courses taken (including content and workload imposed by each course), the instructors of each course, the practical applicability of the course, the infrastructure, and the possibility to lead to internships at the end of the semester). The surveys are accessible to PSP leadership and the instructors; it is not clear if the students have access to the feedback results.

The faculty are evaluated annually based on their publications, research data, teaching and service.

The specific goals of EMMBIOME PSP (document A7) are: to increase the number of enrolled students (to 25); to increase the percentage of students who provide course evaluations to 70%; to increase the research-focused master theses to 50%; to increase the annual publications resulting from this research to 3; and, to increase the visibility of the PSP.

In addition to the internal evaluation processes, the granting agency may also evaluate the impact of the PSP.

▪ Analysis of judgement

Appropriate annual evaluations of the PSP appear to be in place. Both trainees and faculty are to be evaluated.

Specific goals have been described (A7) that will form the basis of the evaluations.

Presumably the outcomes of the annual evaluations will guide changes in the PSP, as needed.

It would be recommended that an 'exit survey' is also administered to the trainees (upon completion of the PSP).

▪ **Conclusions**

Evaluation of the EMMBIOME PSP is available, and feedback is to be received from trainees, faculty and internship /social partners.

Panel Judgement

Principle 6: Initial Internal and External Evaluation and Monitoring of New Postgraduate Study Programmes	
Fully compliant	X
Substantially compliant	
Partially compliant	
Non-compliant	

Panel Recommendations

- R6.1. It would be recommended that an 'exit survey' is also administered to the trainees.
- R6.2. It is recommended that the PSP establishes methodology to track its own alumni.
- R6.3. It is recommended that a 'follow-up survey' is disseminated to alumni a couple of years after graduation to collect information on PSP outcomes.

PART C: CONCLUSIONS

I. FEATURES OF GOOD PRACTICE

- GP1. Exciting interdisciplinary and interinstitutional PSP that will expand the education and research experiences of the trainees in the three participating universities/countries.
- GP2. Flexible curriculum, providing important core courses and good choice of electives.
- GP3. Masters' thesis option to be advised by an international group of mentors.
- GP4. PSP students benefit by the involvement of visiting guest lecturers.
- GP5. Financial support of PSP selected trainees; optional additional tuition-paying trainees will contribute to the PSP's sustainability.
- GP6. The participating faculty are enthusiastic and committed to PSP's success.
- GP7. Consideration of the needs of students with physical disabilities.
- GP8. Appropriate teaching facilities.
- GP9. User-friendly website.
- GP10. Options to pursue internships with local industry and social partners.
- GP11. Course evaluation options are available to the students and instructors.
- GP12. Funded support for student and faculty mobility within the PSP.
- GP13. The duration of the studies is appropriate to the content and needs of the PSP.

II. AREAS OF WEAKNESS

- W1. Limited scientific/research scope of the current PSP within the field of biomedical engineering.
- W2. Lack of evidence of engagement of UoP senior administration with the PSP.
- W3. Lack of an external advisory board.

III. RECOMMENDATIONS FOR FOLLOW-UP ACTIONS

The following recommendations aim primarily at ensuring the sustainability and further development of EMMBIOME PSP beyond the planned 5-year period.

- R1. Establishment of an external advisory board, composed of alumni and leaders in the field, which meets frequently to assess and advise the PSP leadership.

- R2. Identification and engagement of additional private partners who will contribute to increased regional economic impact of the PSP.
- R3. Organization of career days by the PSP to familiarize the trainees with available job opportunities (academics, industry, hospitals, etc.) involving the active participation of entrepreneurs.
- R4. Interaction and collaboration with other relevant academic units of UoP including the School of Medicine.
- R5. Methodological tracking of the PSP alumni.
- R6. Emphasize academic, research or professional experience in the admission evaluation criteria.
- R7. Ensure that EMMBIOME PSP students with disabilities have access to all lecture theatres and labs.
- R8. Ensure prompt action following the feedback provided by the students and academic staff on their experience with the available resources.
- R9. Ensure that the PSP's website is updated regularly throughout the year.
- R10. Ensure that all students can be easily informed about the available facilities/services during the orientation meeting and throughout the academic year/semester.
- R11. Initiate, within EMMBIOME, a set of activities with the scope of focusing future PSPs to specific fields of biomedical engineering. Such activities could include workshops, invited lectures, talks, etc. Future focus should take into account ongoing or future RTD activities.
- R12. Participation in collaborative biomedical engineering RTD activities and networking with relevant existing research in Patras, Greece and abroad.
- R13. Promote the concept of innovation and regulatory processes.
- R14. Take steps with the UoP authorities towards including biomedical PSPs and research as part of a comprehensive strategic UoP development plan.
- R15. In later years, as the biomedical engineering field changes and progresses, the directions of the PSP should be re-evaluated and re-focused.

IV. SUMMARY & OVERALL ASSESSMENT

The Principles where full compliance has been achieved are: **1, 3, 4, 5, and 6.**

The Principles where substantial compliance has been achieved are: **2.**

The Principles where partial compliance has been achieved are: **None.**

The Principles where failure of compliance was identified are: **None.**

Overall Judgement	
Fully compliant	X
Substantially compliant	
Partially compliant	
Non-compliant	

The members of the External Evaluation & Accreditation Panel

Name and Surname

Signature

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- 2. Dist. Prof. Styliani-Anna Tsirka**
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