Doc. 300.1.1

Date: 19/11/2021

External Evaluation Report

(Conventional-face-to-face programme of study)

- **Higher Education Institution:**

Cyprus Institute of Neurology and Genetics

- **Town:** Nicosia

- **School/Faculty (if applicable):**

- **Department/Sector:** School of Molecular Medicine

- **Programme of study- Name (Duration, ECTS, Cycle)**

  In Greek:

  Βιοτεχνολογία (13 μήνες, 90 ECTS, 1 Cycle)

  In English:

  MSc Biotechnology (13 months, 90 ECTS, 1 Cycle)

- **Language(s) of instruction:** English

- **Programme's status:** New

The present document has been prepared within the framework of the authority and competencies of the Cyprus Agency of Quality Assurance and Accreditation in Higher Education, according to the provisions of the "Quality Assurance and Accreditation of Higher Education and the Establishment and Operation of an Agency on Related Matters Laws" of 2015 to 2021 [L.136(I)/2015 – L.132(I)/2021].

A. Introduction

During the 2 days visit, the EEC members were introduced to the study program, the partners that will join in the education of the students and shown the labs at CING, as well as the premises of the ARI, who is a partner in the program. They also attended a site visit at the Charalambides Christis Dairy, one of the industrial partners that plan to host students for their master´s thesis. The shedule of the program was as follows:

DAY 1

The site visit will take place according to the following indicative schedule and it can change according to the EEC's suggestions:

** The times indicated below are in Cyprus Local time.*

10:00 – 10:10, BoD Conference Room (4th floor)

- A brief introduction of the members of the External Evaluation Committee
  [10 minutes]
- Chair: Professor Xaveer Van Ostade, University of Antwerp.
- Member: Professor Nicole Borth, The University of Natural Resources and Life Sciences, Vienna (BOKU)
- Member: Assoc. Professor Katherine M. Pappas, University of Athens
- Student Member: Mr Antonis Michanikou, University of Cyprus

10:10 – 10:40, BoD Conference Room (4th floor)

- A meeting with the Provost and the Dean of the Cyprus School of Molecular Medicine – short presentation of the Institution
  [15 minutes]

Participants

Name	Position
Prof. Leonidas A. Phylactou	Provost
Prof. Kyproula Christodoulou	Dean
Ms. Maria Lagou	Education Office Manager

- A meeting with the members of the Internal Quality Assurance Committee and the Academic Committee

[15 minutes]

Participants

Name	Position
Prof. Leonidas A. Phylactou	Provost
Prof. Kyproula Christodoulou	Dean
Mr. Marios Flouros	Finance and Administrative Director
Prof Christina Christodoulou	Program Coordinator of MSc in Biotechnology
Prof Carolina Sismani	Program Coordinator of MSc/PhD in Medical Genetics
Prof Marina Kleanthous	Program Coordinator of MSc/PhD in Molecular Medicine
Ms. Maria Lagou	Education Office Manager
Ms. Maria Theocharidou	Health & Safety and Quality Officer

10:40 – 11:00 Attendance to course MVI101 Lecture, Amphitheatre

- Coffee Break

[10 minutes]

1:00 – 12:00, BoD Conference Room (4th floor)

- A meeting with the Head of the relevant department and the programme's Coordinator.

Short presentations of:

- The School's / Department's structure [15 minutes]
- The Programme's standards, admission criteria for prospective students, the learning outcomes and ECTS, the content and the persons involved in the programme's design and development

[45 minutes]

Name	Position
Prof. Christina Christodoulou	Program Coordinator
Prof. Kyproula Christodoulou	Dean
Ms. Maria Lagou	Education Office Manager

12:00 – 13:00, Room 104 (Ground Floor)

- A meeting with members of the teaching staff on each course for all the years of study (QA session).
  - Discussion on the CVs (i.e. academic qualifications, publications, research interests, research activity, compliance with Staff ESG), on any other duties in the institution and teaching obligations in other programmes
  - Discussion on the content of each course and its implementation (i.e., methodologies, selected bibliography, students' workload, compliance with Teaching ESG
  - Discussion on the learning outcomes, the content and the assessment of each course and their compliance with the level of the programme according to the EQF.
  - Discussion on assessment criteria, samples of final exams or other teaching material and resources.

[60 minutes

Name	Position
Prof. Christina Christodoulou	Program Coordinator (Biotechnology) & Teaching Staff
Prof. Kyproula Christodoulou	Dean, Course Coordinator (MG103) & Teaching Staff
Dr George Krashias	Course Coordinator (BT101) & Teaching Staff
Dr. Dana Koptides	Course Coordinator (BT 102) & Teaching Staff
Dr Jan Richter	Course Coordinator (BT 103) & Teaching Staff
Prof Marios Cariolou	Course Coordinator (MG101) & Teaching Staff
Dr. Petros Petrou	Course Coordinator (MG104) & Teaching Staff
Prof. Kleopas Kleopa	Program Coordinator (NEURO), Course Coordinator (NEURO101) & Teaching Staff

Prof Marina Kleanthous	Program Coordinator (MOLMED), Course Coordinator (MM101) & Teaching Staff
Dr Carsten Lederer	Course Coordinator (Prep Course) & Teaching Staff
Dr Stavros Basiardes	Teaching Staff
Ms Pascale Bouzon	Teaching Staff (Quality Manager, Zorbas Group of Companies))
Dr Argyro Tsipa	Teaching Staff (University of Cyprus, Environmental Biotechnology)
Dr Yiannis Sarigiannis	Teaching Staff (University of Nicosia, Life and Health Sciences)
Mr Marek Reis	Environment Engineer, WTE

13:00 – 14:00, BoD Conference Room (4th floor) or CING Cafeteria (Ground Floor)

- *Working lunch of the EEC, with the CYQAA Officer only*

[60 minutes]

14:00 – 14:30, BoD Conference Room (4th floor)

- A meeting with students only or/and their representatives.

[30 minutes]

Name	Position
Ms. Irene Moutsouri	Students' Representative 2019 & 2020 – PhD MEDGEN
Ms. Sotiroula Afxenti	Student PhD NEURO
Ms Abu manneh Rana	Student PhD MOLMED
Ms Despina Matsentidou	Student MSc MOLMED
Mr Nabras Al-Mahrami	Student MSc MOLMED

Mr Paraskevaidis Ioannis	Student MSc BMR
Ms Elena Valianti	Student MSc MEDGEN

14:30 – 14:45, BoD Conference Room (4th floor)

- A meeting with members of the administrative staff.

[15 minutes]

Name	Position
Mr. Marios Flouros	Finance and Administrative Director
Ms. Maria Lagou	Education Office Manager
Ms. Andria Ioakem	Officer, PR and Promotions
Ms. Iris Vogazianou	Officer, Operations and Admissions

14:45 – 15:45

- Visit to the premises of the institution (i.e. library, computer labs, teaching rooms, research facilities, on site labs).

[60 minutes]

Library ~ Education Office ~ Room 104 ~ CING Amphitheatre

Suggested Labs:

1. Neuroscience Department
2. Molecular Genetics, Function and Therapy Department
3. Molecular Virology Department
4. Molecular Genetic Thalassaemia
5. Biochemical Genetics Department
6. Neurogenetics Department

DAY 2

09:00 – 15:00

Visit to the collaborating labs of the institution

The following CSMM/CING staff will accompany the committee to the visits:

Prof Kyproula Christodoulou, Dean

Prof Christina Christodoulou, Program Coordinator

Dr Dana Koptides

Dr George Krashias

Ms Maria Lagou, Education Office Manager

9:00-10:30 Agricultural Research Institute (*Aglantzia, *Nicosia)

Konstantinou Kavafi, Aglantzia, Lefkosia 2121

Participants:

Dr. Dionysia Fasoula

Dr. Georgia Hadjipavlou

***11:30 -13:00* Charalambides Christis *Dairy* Company (Limassol)**

Rodionos K. Riga, Agios Athanasios Industrial Area, P.O. Box 51148, 3502 Limassol, Cyprus

Participants:

Kleopatra Rousouli, Research and Development / Quality Control Manager

Yiannis Billis, Factory General Manager

B. External Evaluation Committee (EEC)

Name	*Position*	*University*
Xaveer Van Ostade	Professor	University of Antwerp, Belgium
Nicole Borth	Professor	Uni. Natural Resources and Life Sciences Vienna, Austria
Katherine M. Pappas	Assoc. Professor	National & Kapodistrian University of Athens, Greece
Antonis Michanikou	MSc student	University of Cyprus

1. Study programme and study programme's design and development

(ESG 1.1, 1.2, 1.7, 1.8, 1.9)

Sub-areas

1.1 Policy for quality assurance
1.2 Design, approval, on-going monitoring and review
1.3 Public information
1.4 Information management

1.1 Policy for quality assurance

Standards

- *Policy for quality assurance of the programme of study:*
  - *supports the organisation of the quality assurance system through appropriate structures, regulations and processes*
  - *supports teaching, administrative staff and students to take on their responsibilities in quality assurance*
  - *ensures academic integrity and freedom and is vigilant against academic fraud*
  - *guards against intolerance of any kind or discrimination against the students or staff*
  - *supports the involvement of external stakeholders*

1.2 Design, approval, on-going monitoring and review

Standards

- *The programme of study:*
  - *is designed with overall programme objectives that are in line with the institutional strategy and have explicit intended learning outcomes*
  - *is designed by involving students and other stakeholders*
  - *benefits from external expertise*
  - *reflects the four purposes of higher education of the Council of Europe (preparation for sustainable employment, personal development, preparation for life as active citizens in democratic societies, the development and maintenance, through teaching, learning and research, of a broad, advanced knowledge base)*
  - *is designed so that it enables smooth student progression*
  - *is designed so that the exams' and assignments' content corresponds to the level of the programme and the number of ECTS*
  - *defines the expected student workload in ECTS*
  - *includes well-structured placement opportunities where appropriate*

- *is subject to a formal institutional approval process*
- *results in a qualification that is clearly specified and communicated, and refers to the correct level of the National Qualifications Framework for Higher Education and, consequently, to the Framework for Qualifications of the European Higher Education Area*
- *is regularly monitored in the light of the latest research in the given discipline, thus ensuring that the programme is up-to-date*
- *is periodically reviewed so that it takes into account the changing needs of society, the students' workload, progression and completion, the effectiveness of procedures for assessment of students, student expectations, needs and satisfaction in relation to the programme*
- *is reviewed and revised regularly involving students and other stakeholders*

1.3 Public information

Standards

- *Regarding the programme of study, clear, accurate, up-to date and readily accessible information is published about:*
  - *selection criteria*
  - *intended learning outcomes*
  - *qualification awarded*
  - *teaching, learning and assessment procedures*
  - *pass rates*
  - *learning opportunities available to the students*
  - *graduate employment information*

1.4 Information management

Standards

- *Information for the effective management of the programme of study is collected, monitored and analysed:*
  - *key performance indicators*
  - *profile of the student population*
  - *student progression, success and drop-out rates*
  - *students' satisfaction with their programmes*
  - *learning resources and student support available*
  - *career paths of graduates*

- *Students and staff are involved in providing and analysing information and planning follow-up activities.*

Findings

The Cyprus School of Molecular Medicine is the postgraduate school of the Cyprus Institute of Neurology & Genetics. It is a private foundation that also receives governmental support and about half of the board members are appointed by the government. It functions as an international centre of Excellence in basic and applied research in biomedical and clinical sciences and as a regional reference centre. To accomplish this, the institute combines three pillars: services, research, and education. For the latter the institute has experience of 10 years of postgraduate teaching, next to training of scientists and doctors. Annual research is supported by local and international funding resulting in 34 research programs and an average of 81 peer-reviewed publications/year. Concerning service, the institute has accreditation for many quality controls and participates in several European Reference Networks. It provides many specialized services (>500) and has a high turnover (66.000 services or tests offered and treatment of 6000 patients in 2020). Overall, the External Evaluation committee (EEC) had an excellent impression of the institute and was pleasantly surprised by the professionalism, high scientific quality and scientific output, dedication and motivation of the personnel, and the general positive atmosphere.

The EEC wishes to thank the many people that provided it with lots of useful information. It appreciates the willingness of the staff and students resulting in a sense of cooperativity during the on-site visitation.

Strengths

The institute has a very good reputation nation-wide and internationally and collaborates with several other institutes, including the university of Cyprus. Many of the scientific staff members have had education in often prestigious institutes and universities abroad. As a result many international collaborations have been set up and incoming and outgoing students are frequently exchanged with European (e.g. via Erasmus programs) and non-European countries.

There are at the moment several MsC and PhD programs running in the institute, so next to the scientific excellence at the CING, the Biotechnology program can make use of a large expertise in student administration, teaching, student assistance and quality assessment that is already in house.

There is a very good ratio student-teacher, which results in interaction with each student on a regular and individual basis. This also results in good support for the students and close monitoring of student's progression, satisfaction, etc. . The system for collecting feedback for the students is well established, and suggestions by the students are readily taken up and implemented, as appropriate.

Areas of improvement and recommendations

Teaching at the institute is obviously focussed on medical applications. These cover only a part of the biotechnological applications that exist today. Although the attraction of scientists outside the institute has been initiated already, in order to develop a full biotechnology program, the team will have to include more non-medical scientists from other institutes and/or universities. The EEC learnt that new CING regulations allow course organizers to teach less than 50% of the course, thus such a strategy may now become feasible. The EEC acknowledges that due to administrative and organizational reasons it might be difficult to implement these changes immediately in the program. An alternative could therefore be an adaption of the title of the program, e.g. to "Medical Biotechnology" which is an appropriate title for the current program (see also below). This adaption could be kept for one or more years until the team has found new ways for extending the course towards more and other biotechnological items as outlined in our recommendations below. The EEC understood from the discussion with the academic staff that it was indeed the

intention to further develop and/or extend the program over the coming years into a full program that prepares graduates for work both in academia, in research centres but also in an industrial setting in Cyprus and around the world.

Please select what is appropriate for each of the following sub-areas:

Sub-area		***Non-compliant/ Partially Compliant/Compliant***
1.1	Policy for quality assurance	Compliant
1.2	Design, approval, on-going monitoring and review	Partially compliant
1.3	Public information	Compliant
1.4	Information management	Compliant

2. Student – centered learning, teaching and assessment *(ESG 1.3)*

Sub-areas

2.1 Process of teaching and learning and student-centred teaching methodology
2.2 Practical training
2.3 Student assessment

2.1 Process of teaching and learning and student-centred teaching methodology

Standards

- *The process of teaching and learning supports students' individual and social development.*
- *The process of teaching and learning is flexible, considers different modes of delivery, where appropriate, uses a variety of pedagogical methods and facilitates the achievement of planned learning outcomes.*
- *Students are encouraged to take an active role in creating the learning process.*
- *The implementation of student-centered learning and teaching encourages a sense of autonomy in the learner, while ensuring adequate guidance and support from the teacher.*
- *Teaching methods, tools and material used in teaching are modern, effective, support the use of modern educational technologies and are regularly updated.*
- *Mutual respect within the learner-teacher relationship is promoted.*
- *The implementation of student-centred learning and teaching respects and attends to the diversity of students and their needs, enabling flexible learning paths.*
- *Appropriate procedures for dealing with students' complaints regarding the process of teaching and learning are set.*

2.2 Practical training

Standards

- *Practical and theoretical studies are interconnected.*
- *The organisation and the content of practical training, if applicable, support achievement of planned learning outcomes and meet the needs of the stakeholders.*

2.3 Student assessment

Standards

- *Assessment is consistent, fairly applied to all students and carried out in accordance with the stated procedures.*

- *Assessment is appropriate, transparent, objective and supports the development of the learner.*
- *The criteria for the method of assessment, as well as criteria for marking, are published in advance.*
- *Assessment allows students to demonstrate the extent to which the intended learning outcomes have been achieved. Students are given feedback, which, if necessary, is linked to advice on the learning process.*
- *Assessment, where possible, is carried out by more than one examiner.*
- *A formal procedure for student appeals is in place.*
- *Assessors are familiar with existing testing and examination methods and receive support in developing their own skills in this field.*
- *The regulations for assessment take into account mitigating circumstances.*

Findings

The Cyprus School of Molecular Medicine has a 10-year experience in medical and biomedical postgraduate studies. The ECC committee was overwhelmed by the high standards that the school has according to student-centred learning, teaching and student assessment. This conclusion was taken after a meeting with the education office manager, the academic staff, the students and after the on-site visits of the different CING labs.

Strengths

As noted before, the ratio teacher/student is very high (near 1/1) which ensures a high-quality assistance for the students. The EEC also learnt from discussion with the teachers that new teaching methods are being implemented in the lessons and that workshops and sessions are organized for them (especially for starting teachers) in order to improve their teaching skills. As a result, modern student-centered education strategies and technologies are used, as well as different assessment methods, thereby facilitating the achievement of the planned learning outcomes. Overall, this is reflected in the positive student's comments, demonstrating a positive learner-student relationship and flexible learning paths that promote the autonomy of the students.

Areas of improvement and recommendations

The EEC acknowledges that the tutorials are an added value to the courses (see also 3). However, so far, the tutorials may be occupied by other items like questions from the students or journal clubs, which makes students have not many opportunities to develop their practical skills during the first two semesters. As a result, they may end up starting their master thesis by first learning the different operations that are required to perform basic biochemical/genetic work, which may slow down the progress of their master thesis. The first advice of the EEC is therefore to include more practical sessions into the program since practical and theoretical studies must be highly interconnected. However, as the EEC understood it was difficult to realize this, it is very important that students are selected who clearly have acquired the necessary practical skills during their Bachelor program (see 4.).

Please select what is appropriate for each of the following sub-areas:

Sub-area		***Non-compliant/ Partially Compliant/Compliant***
2.1	Process of teaching and learning and student-centred teaching methodology	Compliant
2.2	Practical training	Partially compliant
2.3	Student assessment	Compliant

3. Teaching staff *(ESG 1.5)*

Sub-areas

3.1 Teaching staff recruitment and development
3.2 Teaching staff number and status
3.3 Synergies of teaching and research

3.1 Teaching staff recruitment and development

Standards

- *Institutions ensure the competence of their teaching staff.*
- *Fair, transparent and clear processes for the recruitment and development of the teaching staff are set up.*
- *Teaching staff qualifications are adequate to achieve the objectives and planned learning outcomes of the study programme, and to ensure quality and sustainability of the teaching and learning.*
- *The teaching staff is regularly engaged in professional and teaching-skills training and development.*
- *Promotion of the teaching staff takes into account the quality of their teaching, their research activity, the development of their teaching skills and their mobility.*
- *Innovation in teaching methods and the use of new technologies is encouraged.*
- *Conditions of employment that recognise the importance of teaching are followed.*
- *Recognised visiting teaching staff participates in teaching the study programme.*

3.2 Teaching staff number and status

Standards

- *The number of the teaching staff is adequate to support the programme of study.*

- *The teaching staff status (rank, full/part time) is appropriate to offer a quality programme of study.*
- *Visiting staff number does not exceed the number of the permanent staff.*

3.3 Synergies of teaching and research

Standards

- *The teaching staff collaborate in the fields of teaching and research within the HEI and with partners outside (practitioners in their fields, employers, and staff members at other HEIs in Cyprus or abroad).*
- *Scholarly activity to strengthen the link between education and research is encouraged.*
- *The teaching staff publications are within the discipline.*
- *Teaching staff studies and publications are closely related to the programme's courses.*
- *The allocation of teaching hours compared to the time for research activity is appropriate.*

Findings

Teaching staff is highly qualified and performs high level experiments in the area of biomedical research. For the present application, the responsible team has initiated collaborations with other research centers in Nicosia, such as the University of Cyprus and the Agricultural Research Institute, where highly qualified researchers will contribute to the teaching with their expertise. However, for a full program in Biotechnology that covers a broad range of topics relevant to biotechnology, additional expertise will be required. The organising institution is excellently qualified to cover the topic of medical biotechnology and research, and there are collaborators that are competent in agricultural biotechnology and environmental biotechnology, however, many other fields of biotechnological research are missing. These include large scale production of proteins both for therapeutical applications and other purposes such as enzymes, production of chemicals by microbial organisms including biofuels and fine chemicals as well as newer applications such as synthetic biology and all –omics applications. These topics should definitely be covered at least in the theoretical courses of the program. While hiring new staff may be difficult, these experts could be pulled in for a hybrid course where they provide their expertise via online tools.

Strengths

The lecturers so far selected are all of the highest level of competence in their respective field. The CING has an established procedure and ongoing resources dedicated to improving the teaching skills of their staff. The applicants have also invested both time and effort in generating new courses specifically for this program.

The existing scheme of course structures that consist of lectures and associated tutorials is excellent and provides the students with detailed instructions, enabling rapid resolution of any unclear topics and providing relevant answers to questions that may have remained open. The ability for teachers to introduce some hands on or practical exposure to relevant methods along with the theory in these tutorials should be exploited to a maximum because of the high need for developing practical skills before starting the master thesis (see also 2.).

Areas of improvement and recommendations

As outlined above, to fully cover the field of Biotechnology, additional expertise needs to be pulled in some areas. For instance, the topics of white biotechnology including production of fine chemicals along with the required genetic and pathway engineering of cells is hardly touched on, nor is the topic of biofuels, an important tool in achieving goals of sustainability in the future. As another example, while 'Plant breeding applications for improved nutrition' are not core Biotechnology, there is an expert on microbial ecology, bioremediation, agricultural microbiology and biotechnology at ARI (Michalis Omirou), among several other ARI researchers involved in core-biotech fields, who is currently not involved in the teaching. This comes to contrast with the fact that adequacy in microbiological foundations is an important objective for students of this course, according to course coordinators. Additionally, in Red Biotechnology, while the medical and clinical parts are well covered, the area of actual production of such therapeutics is not, including cell line development, large scale bioprocessing, downstream purification and quality attributes important for biological entities. Additional lectures need to be found that cover these topics. With the recent pandemics, it should now be possible to find such lecturers across Europe or even the world who are willing to present their expertise online, so that hybrid courses are set up. We also noted there is only minor collaboration between CING researchers and external participants in the program, except for noted synergies in bioinformatics research between CING and ARI. Hence teaching/research synergy is largely missing for the other biotechnological disciplines. Lastly, the EEC was surprised that the course for Bioinformatics was not taken up in the program, although it is present at the CING. We consider incorporation of Bioinformatics into the program at least as an elective course as an absolute must, preferentially as an elective course out of only two from which the student can choose. We have provided more detailed suggestions at the end of this document.

Please select what is appropriate for each of the following sub-areas:

Sub-area		***Non-compliant/ Partially Compliant/Compliant***
3.1	Teaching staff recruitment and development	Partially compliant
3.2	Teaching staff number and status	Partially compliant
3.3	Synergies of teaching and research	Partially compliant

4. Student admission, progression, recognition and certification *(ESG 1.4)*

Sub-areas

4.1 Student admission, processes and criteria
4.2 Student progression
4.3 Student recognition
4.4 Student certification

4.1 Student admission, processes and criteria

Standards

- *Pre-defined and published regulations regarding student admission are in place.*
- *Access policies, admission processes and criteria are implemented consistently and in a transparent manner.*

4.2 Student progression

Standards

- *Pre-defined and published regulations regarding student progression are in place.*
- *Processes and tools to collect, monitor and act on information on student progression, are in place.*

4.3 Student recognition

Standards

- *Pre-defined and published regulations regarding student recognition are in place.*
- *Fair recognition of higher education qualifications, periods of study and prior learning, including the recognition of non-formal and informal learning, are essential components for ensuring the students' progress in their studies, while promoting mobility.*
- *Appropriate recognition procedures are in place that rely on:*
  - *institutional practice for recognition being in line with the principles of the Lisbon Recognition Convention*
  - *cooperation with other institutions, quality assurance agencies and the national ENIC/NARIC centre with a view to ensuring coherent recognition across the country*

4.4 Student certification

Standards

- *Pre-defined and published regulations regarding student certification are in place.*
- *Students receive certification explaining the qualification gained, including achieved learning outcomes and the context, level, content and status of the studies that were pursued and successfully completed.*

Findings

To be admitted a student must hold a bachelor's degree from a recognized accredited institution in a related field, and although the institution is more medical oriented, students from other fields such as physics and computer science have been admitted in other MSc programs of the institute. In general, the EEC committee was satisfied by the procedures and policies that are being followed by the institute regarding already established MSc Programmes and that are going to be incorporated in the study programme under evaluation.

Strengths

The institute has prepared a very intensive and well organized preparatory course, mandatory for students without a biological background, and also available for students who wish to strengthen their knowledge. This appears to be much appreciated by the students. An exam following this introductory course ensures that the students have met the expected criteria. In addition, students are interviewed for their knowledge, background and motivation, ensuring a good selection of a small group of highly motivated, well-prepared students.

Areas of improvement and recommendations

In light of the changes we suggest for the Biotechnology program, the institute may have to (slightly) adapt the preparatory course towards non-medical subjects. The institute must assure that students are selected who have a good background in the exact sciences (mathematics, physics, biology, chemistry) and also have acquired practical skills. The latter is important since besides the tutorials (which are more like "demonstrations") the only practical work the students will do is during their thesis.

Please select what is appropriate for each of the following sub-areas:

Sub-area		***Non-compliant/ Partially Compliant/Compliant***
4.1	Student admission, processes and criteria	Partially compliant
4.2	Student progression	Compliant
4.3	Student recognition	Compliant
4.4	Student certification	Compliant

5. Learning resources and student support *(ESG 1.6)*

Sub-areas

5.1 Teaching and Learning resources
5.2 Physical resources
5.3 Human support resources
5.4 Student support

5.1 Teaching and Learning resources

Standards

- *Adequate and readily accessible teaching and learning resources (teaching and learning environments, materials, aids and equipment) are provided to students and support the achievement of objectives in the study programme.*
- *Adequacy of resources is ensured for changing circumstances (change in student numbers, etc.).*
- *All resources are fit for purpose.*
- *Student-centred learning and flexible modes of learning and teaching, are taken into account when allocating, planning and providing the learning resources.*

5.2 Physical resources

Standards

- *Physical resources, i.e. premises, libraries, study facilities, IT infrastructure, are adequate to support the study programme.*
- *Adequacy of resources is ensured for changing circumstances (change in student numbers, etc.).*
- *All resources are fit for purpose and students are informed about the services available to them.*

5.3 Human support resources

Standards

- *Human support resources, i.e. tutors/mentors, counsellors, other advisers, qualified administrative staff, are adequate to support the study programme.*
- *Adequacy of resources is ensured for changing circumstances (change in student numbers, etc.).*

- *All resources are fit for purpose and students are informed about the services available to them.*

5.4 Student support

Standards

- *Student support is provided covering the needs of a diverse student population, such as mature, part-time, employed and international students and students with special needs.*
- *Students are informed about the services available to them.*
- *Student-centred learning and flexible modes of learning and teaching, are taken into account when allocating, planning and providing student support.*
- *Students' mobility within and across higher education systems is encouraged and supported.*

Findings

Much useful information was obtained from the administrative staff and from the education office manager such as admission and support of students (finances and scholarships, housing, assistance in learning and other activities outside the program).

According to the student feedback, the Cyprus School of Molecular Medicine provides the students with adequate resources to achieve their thesis objective and overall completing their study program. The support they receive from the teaching staff and the institute is excellent and much appreciated by all the students. An on-site visit of the laboratories showed the environments wherein students can follow experimental procedures during the tutorial sessions and where they can perform their master thesis. These were all found to be of the latest state of the art, equipped with excellent infrastructure.

Strengths

Overall, the students were very positive about the CING education programs. Every MSc student receives a budget for consumables. The laboratories in the institute are well organized and provide the necessary equipment and services to conduct high quality research mainly in medical applications. The collaboration with the Agricultural Research Institute (ARI) is a step in the right direction to expand into areas beyond medical biotechnology, providing the necessary infrastructure and highly qualified research personnel for applications in disciplines such as plant improvement, animal production, plant protection and rural development.

Students have not only their thesis supervisor but also an academic supervisor. A student representative is also involved to gather feedback from the students and provide suggestions for positive improvements. Changes to the program based on student's suggestions are later communicated to the students so they know that students in the coming years will not experience the same problems.

The entire scope of services that is available to the students is a very strong point of the program. Together with the scientific programs it makes the CING programs very attractive, which is reflected in the high number of applications coming from more than 40 countries.

All information is easily accessible via the institutions website for students that are applying or are registered.

The organizers currently plan to accommodate between 5 and 10 students for the program. There is a new building planned which could provide more space in case the program grows and more students are attracted.

Areas of improvement and recommendations

The EEC has no further suggestions concerning this subject and encourages the institute to continue this way.

Please select what is appropriate for each of the following sub-areas:

Sub-area		***Non-compliant/ Partially Compliant/Compliant***
5.1	Teaching and Learning resources	Compliant
5.2	Physical resources	Compliant
5.3	Human support resources	Compliant
5.4	Student support	Compliant

6. Additional for doctoral programmes *(ALL ESG)*

Sub-areas

6.1 Selection criteria and requirements
6.2 Proposal and dissertation
6.3 Supervision and committees

6.1 Selection criteria and requirements

Standards

- *Specific criteria that the potential students need to meet for admission in the programme, as well as how the selection procedures are made, are defined.*
- *The following requirements of the doctoral degree programme are analysed and published:*
  - *the stages of completion*
  - *the minimum and maximum time of completing the programme*
  - *the examinations*
  - *the procedures for supporting and accepting the student's proposal*
  - *the criteria for obtaining the Ph.D. degree*

6.2 Proposal and dissertation

Standards

- *Specific and clear guidelines for the writing of the proposal and the dissertation are set regarding:*
  - *the chapters that are contained*
  - *the system used for the presentation of each chapter, sub-chapters and bibliography*
  - *the minimum word limit*
  - *the binding, the cover page and the prologue pages, including the pages supporting the authenticity, originality and importance of the dissertation, as well as the reference to the committee for the final evaluation*
- *There is a plagiarism check system. Information is provided on the detection of plagiarism and the consequences in case of such misconduct.*
- *The process of submitting the dissertation to the university library is set.*

6.3 Supervision and committees

Standards

- *The composition, the procedure and the criteria for the formation of the advisory committee (to whom the doctoral student submits the research proposal) are determined.*
- *The composition, the procedure and the criteria for the formation of the examining committee (to whom the doctoral student defends his/her dissertation), are determined.*
- *The duties of the supervisor-chairperson and the other members of the advisory committee towards the student are determined and include:*
  - *regular meetings*

- *reports per semester and feedback from supervisors*
- *support for writing research papers*
- *participation in conferences*

- *The number of doctoral students that each chairperson supervises at the same time are determined.*

Findings

Not applicable

Strengths

Not applicable

Areas of improvement and recommendations

Not applicable

Please select what is appropriate for each of the following sub-areas:

Sub-area		***Non-compliant/ Partially Compliant/Compliant***
6.1	Selection criteria and requirements	Not applicable
6.2	Proposal and dissertation	Not applicable
6.3	Supervision and committees	Not applicable

C. Conclusions and final remarks

The EEC was highly impressed with the quality of education found at CING; in particular, with the outstanding level of personal interaction and high-quality training that students receive. The quality of the courses, both with respect to their content and delivery, is of the highest standard. However, the EEC wishes to remark the following:

Biotechnology is the discipline that describes the implementation of technology to create new products: molecular, cellular, organismal. Implemented in the environment, it aims to offer solutions in organismal community dynamics, energy conservation, recycling and bioremediation. In the food and feed industry, it focuses on the development of new crops, animal feedstocks and consumable products with desirable traits using biotechnological tools such as recombinant DNA technology or cell/pathway engineering. In the pharmaceutical industry, it addresses the design and manufacturing of new medicines, vaccines and novel therapeutic regimes. In the chemical, biomolecular and biofuel industries, it tends to the production of new economically important compounds using methods that are sustainable and require lower energy input than in the traditional chemical industry.

As the program now stands it is a program in “Medical Biotechnology” that does not cover quite a wide range of topics that are accepted and acknowledged parts of biotechnology by the current state of the art. As such it could remain largely unchanged if it were indeed called a program in “Medical Biotechnology”. However, the presented aim is the generation of graduates who “have acquired the necessary skills... to meet the requirements for working in an industrial setting” and have a “broad knowledge of the use of microorganisms in pharmaceutical industry, agricultural industry, beverage/wine industry and industrial wastewater management” (copied from slide 16 from Prof. Christodoulou´s presentation). While the program currently covers a wide range of topics from medical research and some red biotechnology, it only touches on a few of the above topics and does not present many others that are of high importance now and will be even more so in the future.

In view of this, the EEC is of the opinion that, if the program remains to be one on Biotechnology and aims to prepare students for work in applied areas of biotechnology and the industry, then a number of changes in the curriculum should be implemented to equip students with the necessary skills, including a detailed understanding of the methods used in biotechnological research today, as well as a good knowledge base for (most) relevant topics in biotechnology.

Skills to be familiar with include the principles of molecular biotechnology (ie, recombinant DNA technology, genetic and genomic engineering, enzyme technology and engineering, molecular recognition, gene and genome editing, synthetic biology and omics technologies), an understanding of the role of microbes in biotechnology as the core toolbox that is exploited for the production of important compounds, for use as bioremediation and bioleaching vehicles, for their exploitation as cell-factories or in food/feed production per se (single cell protein, probiotics), and as vectors in novel therapies against human disease.

With respect to the main areas of biotechnology that should at least be mentioned in the respective courses, we refer to the UNESCO definition of the Colours in Biotechnology (The Colours of Biotechnology: Science, Development and Humankind | DaSilva | Electronic Journal of Biotechnology (ejbiotechnology.info), according to Edgar J. DaSilva, Former Director, Division of Life Sciences, UNESCO, Paris, France (further supplemented in the text herein):

Red - Health, Medical, Diagnostics: centers on the production of therapeutic biological molecules such as antibodies and vaccines - including their development, purification and quality assurance - as well as cellular and tissue engineering procedures, CAR-T cell development technologies and all methodologies in general contributing to regenerative medicine, gene therapy and cell therapy.

Yellow - Food Biotechnology and Nutrition Science: overlooks the production of fermented or modified food, feed and drinks, in manners relevant to the food industry, to winemaking and brewing establishments, as well as processes addressing insect and pesticide control in the fields. Transgenic plant technology is a major contributor to this field.

Blue - Aquaculture, Coastal and Marine Biotechnology: seeks to explore and use marine biodiversity as a source of new products, bioprospect the environment and implement the fundamentals of molecular biology and microbial ecology in marine organisms to obtain beneficial advances for humanity.

Green - Agricultural and Environmental Biotechnology, Biofuels, Biofertilizers, Bioremediation, Geomicrobiology: seeks to reduce the dependence of agriculture on mechanical and chemical innovations by using less aggressive practices to the environment and contribute to the emergence of better food, increased productivity and reduced production costs. Biofuels are also an object of grey biotechnology.

White - Gene-based Bioindustries: a major part of biotechnology that focuses on the production and processing of chemicals, materials and energy using living cells, such as yeast, fungi, bacteria, plants and enzymes for the industrial scale synthesis of products.

Gold - Bioinformatics and Nanobiotechnology: addresses the handling and processing of big data pertaining biological systems, the storing, accessing and exploitation of high-throughput analyses, and the implementation of bioinformatics and nanotechnology in developing the new fields of nano informatics, nano sciences and nanoengineering

Grey - Classical Fermentation and Bioprocess Technology: involved in balancing the environment by the removal of contaminants and the disposal of substances using microorganisms and plants. It includes the major field of waste management, which is conventionally carried out with the use of microorganisms.

Brown - Arid Zone and Desert Biotechnology: focuses on management of arid lands and deserts; highly relevant to soil science and water cycle management.

Purple - Patents, Publications, Inventions, IPRs.

The EEC therefore suggests the following changes to the curriculum. These may not be implementable within the first year(s) of the course; however, they should definitely be addressed and resolved over the next years to turn this into a program that indeed covers the full scope of Biotechnology and prepares students for both academic research in the field and industrial careers.

1) The mandatory course on Microbial Biochemistry starts with an excellent overview over microorganisms, their metabolism and function, but also contains a number of lectures that would better fit into the Lecture on Biotechnology. We suggest further strengthening the biochemical part of this by adding several lectures on the metabolic pathways important in microorganisms, including mammalian cells as important cell factories. The required expertise is available and is currently presented in the course on “Biochemical Basis of Genetic Diseases”, where the main focus is on human disease. However, some of the lectures, such as Overview of Carbohydrate metabolism, Overview of amino acid metabolism, Overview of mitochondrial function, Nucleotide metabolism, Mitochondrial fatty acid oxidation (all with a reduced part on the related disorders) would be highly beneficial to provide students with a solid basis to appreciate the diverse use of microorganisms in biotechnology and their diverse capacities.

2) The mandatory course “Fundamentals in Biotechnology” aims to provide an overview of biotechnology, but given the importance of the topic for this syllabus, we consider the current length of 10 ECTS too short. This course should therefore be supplemented with a second mandatory course, i.e., “Advanced Biotechnology”. Both courses together should be structured in a logical way to provide a) an introduction to biotechnology (from the current course this would include e.g. the lectures on Introduction to Biotechnology, Recombinant DNA/RNA technologies, Recombinant protein expression, Protein engineering, Nonbacterial expression systems, Non-viral delivery systems, Modern Techniques in Peptide Synthesis, Bioprocessing, Bioethics in biotechnology) and b) cover the different fields in Biotechnology as outlined above. Not all fields need to receive the same focus, however, students should at least receive an overview over most of these topics, and particular attendance to the industrially most relevant fields, such as White, Grey, Yellow, Green and Red biotechnology should be given. In view of the fact that Cyprus is an Island, blue biotechnology may also be of interest. Red Biotechnology currently misses important topics such as bioprocessing of therapeutic proteins, vaccine production on an industrial scale, down-stream processing and quality attributes for

therapeutic entities. This part should also contain lectures on the immune system, how it functions, how antibody therapies and vaccines interact with the immune system and how CAR-T cells work, as the basis for many of the biopharmaceutical therapies.

3) To make room for this second biotechnology course, we suggest that the Molecular Virology and Immunology course be one of the Elective courses. Nevertheless, as explained above, some aspects covered in this course, such as basic innate and adaptive immunological processes, basic virology and the viral mechanisms to circumvent these immune processes could be integrated into the Red biotechnology chapter in the main Biotechnology course(s).

4) Amongst the elective courses, there is one that appears to us to contain the fundamental tools and handycraft of a biotechnologist, namely the course on "Methodologies and Technologies in Applied Genetics" (renaming 'Medical Genetics' would be crucial). Further, a course in Bioinformatics is of immense importance to provide graduates with the skills and crafts required for their trade and therefore is a must to be amongst the elective courses for this curriculum. We even suggest that these two are elective courses where students have to choose at least one, whatever their second choice is. It should also be possible for students to select both of them. For those that pick only one, the second elective course can then be taken from the remaining suggested courses.

Overall, as already outlined above, we consider the current curriculum to be excellent for the topic of Medical Biotechnology. However, if the aim of providing graduates that are "industry ready" is to be pursued - to adopt the course directors' phrase - the above suggestions need to be adapted and implemented.

D. Signatures of the EEC

Name	*Signature*
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Date: 19/11/2021