

Doc. 300.1.2

Higher Education Institution's Response

Date: Date.

• **Higher Education Institution:**
Cyprus University of Technology

• **Town:** Limassol

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

In Greek:

Βιοϊατρική Μηχανική

In English:

Biomedical Engineering

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

• **Programme's status:** Currently Operating

• **Concentrations (if any):**

In Greek: Concentrations

In English: Concentrations

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. Guidelines on content and structure of the report

- *The Higher Education Institution (HEI) based on the External Evaluation Committee’s (EEC’s) evaluation report (Doc.300.1.1 or 300.1.1/2 or 300.1.1/3 or 300.1.1/4) must justify whether actions have been taken in improving the quality of the programme of study in each assessment area.*
- *In particular, under each assessment area, the HEI must respond on, without changing the format of the report:*
 - *the findings, strengths, areas of improvement and recommendations of the EEC*
 - *the conclusions and final remarks noted by the EEC*
- *The HEI’s response must follow below the EEC’s comments, which must be copied from the external evaluation report (Doc.300.1.1 or 300.1.1/2 or 300.1.1/3 or 300.1.1/4).*
- *In case of annexes, those should be attached and sent on a separate document.*

1. Study programme and study programme's design and development (ESG 1.1, 1.2, 1.7, 1.8, 1.9)

The only issue identified was the lack of a close partnership with health sciences (e.g. school of nursing, medical school, etc.) and a lack of compulsory courses in anatomy and physiology, which will allow the engineering students to build a common “vocabulary” with the health sciences.

We have close relation with other related health-related departments. We have several common research grants with those departments. Regarding the courses of this program we have included the course Brain Imaging which is offered by the Rehabilitation department. We are monitoring regularly their curriculum and if a course is relevant to this master we will ask their permission to include it in our program.

Integration of the local hospitals into the relevant training programs was not clear, this should be an area for further improvement.

We have close relation with hospitals. Several medicals doctors gave lectures in this program (see list in section 3). We have several common research grants with at least 3 hospitals. We take our students for site visits for at least 3 courses.

In terms of the course content, there is a number of areas proposed for the development of the course:

- 1. In anticipation of the introduction of devices for molecular diagnostics, including next generation sequencing equipment in Medical Molecular Diagnostics Laboratories, it is worth to plan the development of courses that include, next to robotics, liquid handling system technology, fluidics/microfluidics and introduction to sequencing technology to prepare the next generation of bioengineers.**

Nice recommendation. We will include the above subjects in the Biosensors course as we discussed it during the evaluation of this program.

- 2. Manufacturing of therapeutics and bioprocessing is another area that needs to be considered.**

Nice recommendation. We will include the above subjects in the ‘Biomaterials’ course.

- 3. Overall, the course in terms of its development, needs to anticipate future needs, as well as research needs/employment opportunities in the international student's countries of origin, which will further attract such students.**

We agree with you. That's why we have introduced 2 new courses and update the material of many existing courses. Additionally, we recently hire a new faculty with specialization in Robotics and we hope that we will enhance the area of medical robotics.

4. Last, a mandatory course in anatomy and physiology for engineers must be introduced in the curriculum.

Although an anatomy and physiology course is offered by the department of Nursing we decided not to offer this course for our students for 2 main reasons: 1) We offer our courses after 5 pm since most of our students work. The department of Nursing offers this course in the morning. 2) The course is too much focused on Nursing (most of the practical sessions of this course are for nurses).

Therefore, we decided to offer a new course dedicated for biomedical engineers. The title of the course is 'Anatomy and Physiology for biomedical engineers. This course will be offered by a medical doctor thus fulfilling your recommendation for close collaboration with physicians and hospitals.

Below you will find the description of the course.

Course content

This course will introduce human anatomy and physiology by focusing on organ structure, function(s) and regulatory principles. The main subjects will cover: respiration, circulation, metabolism, endocrinology, neurology, senses, digestion, immunity, regulation of extracellular fluid and urine formation. The links between each of these systems will be discussed and how each of these systems respond to challenges such as disease and stress.

Learning outcome

On completion of the course the students should have good knowledge of general principles within human anatomy, physiology and regulatory mechanisms and apply this knowledge in a broader context to their own speciality.

To understand how the human body functions and how this information can be applied to specific careers, the student should obtain knowledge about:

- Human organ anatomy, physiology and regulatory mechanisms.
- How humans can cope with challenges such as disease and stress.
- Equipment and methods for studying human anatomy and physiology.

The student should apply, interpret and communicate this knowledge using their own ideas, which should result in the following skills:

- Operate relevant equipment and conduct experiments demonstrating human anatomy and physiology.
- Search for and effectively study the relevant literature.
- Analyse and interpret data to write a scientific report.
- Present and discuss orally and in writing anatomical and physiological data.

- Communicate information on human anatomy and physiology.

Learning methods and activities

Lectures: 52 hours: Final exam (50%), laboratory reports (20%) and endiamesi (30%).

Course materials

- Course textbook: Marieb & Hoehn: Human Anatomy and Physiology (11ed). Pearson. - Lecture handouts. - Lab manual.

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

No problem areas have been identified. We recommend the expansion and further development of the Biomechanics and Living Systems Analysis Laboratory to include more in-depth training on Biomarker discovery and Biomarker analysis, tissue culture and organoid systems, as well as Bio-production methodologies. Requesting additional funding to expand in these areas is recommended and fully supported by the committee.

We will include in the course Biomechanics more in-depth training on Biomarker discovery and Biomarker analysis, tissue culture and organoid systems, as well as Bio-production methodologies.

We will send your comments to the school of Engineering hoping to get additional funding for expanding the infrastructure of the Biomechanics and Living Systems Analysis Laboratory.

3. Teaching staff (ESG 1.5)

We propose to engage staff from either the affiliated Hospitals or the Department of Nursing to teach/contribute to the teaching of medical subjects. We also recommend focussing on attracting female instructor candidates.

We agree with the committee. In the last five years the following physicians provided lectures either in the class or on the site. We plan to expand this list. We recently identify a physician in the General hospital of Cyprus with specialization in Nuclear medicine.

List of Physicians that provided lectures for the biomedical engineering master

- 1) Nicolas Zamboglou (Oncologist)-German Oncology Center
- 2) Kleanthis Ioannides (Radiologist)- German Oncology Center

- 3) L.eonidas Ioannou (Radiologist)-Polyclinic Ygia
- 4) Alexis Vrahimis (Nuclear medicine)- German Oncology Center
- 5) Rena Demetriadou(Nuclear medicine)- General Hospital of Limassol

Additionally, the course that you recommended (Anatomy and Physiology) will be taught by a medical doctor, thus fulfilling your recommendation.

We agree about attracting female faculty, but unfortunately, we have no control over this issue since by Law the hiring of faculty is control by a committee of five people (3 of them are professors outside the university) and therefore the committee decides based on academic criteria to select the best.

Fortunately, recently the newly-hired faculty who will teach the course Robotic applications for biomedical engineering (EEN513) is female.

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

One area identified is the omission of information on optimal grades (GPA) that need to have been obtained in order to be successfully submitted.

The department has decided in 2014 the following criteria for student acceptance:

From university with scoring up to 10, the minimum score is 6.5.

From US universities the minimum is 3 out 4.

From universities from Great Britain we require that the student has finished the degree at least with ‘second class’.

5. Learning resources and student support (ESG 1.6)

There were no serious problem areas found. However, one important point has been raised in terms of the planned expansion of infrastructure, laboratories and teaching areas, which is in hold since 2013. It is important for funds to be released in order to continue the expansion and capitalise on the success of the course by allowing an increase in student admissions at national and international level.

Since the Limassol living costs are high, an increase in the financial assistance given to students will be critical.

- **A minor recommendation is to improve the information that is available on-line about scholarship opportunities and any other form of support (accommodation etc) for international students, in English.**

Every year the enrolment of students is between 8-10. We have the capacity to accept around 15. Therefore, the low number has nothing to do with the expansion of infrastructure. Of course, having a better infrastructure will certainly help the enrolment. Unfortunately, funding for infrastructure depends on the amount of funds allocated to the University. This is dictated by the ministry of Finance and by the ministry of Education and is approved by Law by the Parliament. Therefore, we have no control about it. As a department what we can do is to convince the University to ask more money for this program. Therefore, your recommendation will be sent to the relevant university boards.

The best students have the opportunity to work in different labs for funded research projects. This is an indirect form of scholarship to the students. In addition, local organisations (e.g. state scholarships organisation <http://www.cyscholarships.gov.cy/>) are *giving the opportunity for scholarships to the best students*

We already ask the Student services department to clearly post in the website the opportunities for scholarships.

6. Additional for doctoral programmes (ALL ESG)

No improvement was suggested here.

7. Eligibility (Joint programme) (ALL ESG)

No improvement was suggested here.

B. Conclusions and final remarks

Recommendations:

To include medically qualified staff in the teaching of relevant subjects (potentially as guest lecturers) and to add a compulsory course of anatomy-physiology for engineers.

This already answered (see section 3).

We support the further expansion of the facilities to allow more students to be admitted.

This already answered (see section 5).

We recommend to plan ahead a further development of the course, based on developments in the field at international level, so that the course is also more relevant and attractive to international students.

This already answered (see section 5).

We support an effort to increase the level of scholarships to meet increased living costs.

This already answered (see section 5).

We recommend an effort to increase the percentage of female instructors amongst staff.

This already answered (see section 3).

C. Higher Education Institution academic representatives

<i>Name</i>	<i>Position</i>	<i>Signature</i>
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Date: 16/4/2022