Doc. 300.3.2

Higher Education Institution's Response

(Departmental)

Date: 06/06/2024

- **Higher Education Institution: University of Cyprus**
- **Town: Nicosia**
- **School/Faculty: Faculty of Engineering**
- **Department: Mechanical and Manufacturing Engineering**
- **Programme(s) of study under evaluation Name (Duration, ECTS, Cycle)**

Programme 1 - BSc

In Greek:
Πτυχίο Μηχανολόγου Μηχανικού (8 εξάμηνα, 240 πμ)
In English:
B.Sc. in Mechanical Engineering (8 semesters, 240 ECTS)

Programme 2 – MSc, MEng

In Greek:
Μηχανικού Μηχανολογίας και Κατασκευαστικής
In English:
Mechanical and Manufacturing Engineering (M.Sc. 4 Semesters-120 ECTS and M.Eng. 3 Semesters-96 ECTS)

Programme 3 - PhD

In Greek:
Μηχανικού Μηχανολογίας και Κατασκευαστικής (8 εξάμηνα, 240 πμ)
In English:
Mechanical and Manufacturing Engineering (8 semesters, 240 ECTS)

- **Department's Status: Currently Operating**

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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.300.3.1) must justify whether actions have been taken in improving the quality of the department 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 deficiencies noted under the quality indicators (criteria)*
    - *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. 300.3.1).*

- *In case of annexes, those should be attached and sent on a separate document.*

1. Department's academic profile and orientation

Sub-areas

1.1 Mission and strategic planning
1.2 Connecting with society
1.3 Development processes

Mission and short-term strategic planning (by 2025) are available publicly for the University only. The MME Department seems to be aligned with these but does not have their own mission and plans publicly available. Mission and strategic objectives presented to the committee do not have timeline for implementation, including short-, mid- and long-term priorities. The same can also be said about monitoring and periodic revisions.

Our response: Following the suggestion of the Special Committee, the Departmental Council on the 17th of April 2024 unanimously decided to have the Department's mission, vision and strategic objectives (as these appear in the 2021-2025 Strategic Plan of the Department of Mechanical and Manufacturing Engineering) publicly available in the Department's website. This information can be found under the following link: https://www.ucy.ac.cy/mme/mission-and-vision/?lang=en.
In the Department's 2021-2025 Strategic Plan (full version available upon request - in Greek), short-, mid-, (i.e. by 2022) and long-term (i.e. by 2025) goals are clearly described. Moreover, in 2023 the department has prepared and submitted a document to the **Internal Quality Assurance Committee** (after being approved by the Departmental Council - 08/2023, November 8 2023), in which short-term actions are clearly defined for improving the undergraduate and postgraduate programs of Study (available upon request - in Greek).
For the continuous monitoring (once per year) of the departmental goals set in the Strategic Plan related to its mission and vision, the Department at its meeting that was held on the 16th of May 2024, re-appointed the Strategic Plan Committee (consisting of 4 faculty members) (https://www.ucy.ac.cy/mme/home/the-department/?lang=en). The outcome of the evaluation will be included in a report to be further presented/discussed at the departmental council for possible actions.

There seems to be some struggle in aligning local and European regulations in terms of ECTS score requirements for MEng and MSc programmes. These appear to be aligned more with the US system, rather than the EU equivalent, and local needs.

Our response: The Department is currently in the process of revising its MEng and MSc graduate programs. At the departmental meeting that was held on the 27th of March 2024, the department unanimously decided to reduce the ECTS units from 120 ECTS to 96 ECTS for the MSc program (in line with the MEng program). This decision facilitates the completion of the graduate programs in 3 semesters, in line with National Qualifications Framework for Master Programs. It is expected that the revising process will be completed by the end of 2024.

The Department does not seem to have any formal mechanisms for involving academic personnel, students and professional associations in shaping and actively participating in the implementation of the MME's strategy. The only formal mechanism for actively collecting Department performance indicators presented to the committee was course evaluation surveys by students. Upon request, course failure and dropout rates were provided to EEC, but evaluating such does not seem to be the part of a formal procedure for Departmental development.

Our response: The Departmental Council (08/2024 meeting; May 16, 2024) decided to establish an External Advisory Board (EAB). The EAB will be teamed by 11 distinguished academics and investigators from abroad as well as investigators / executive personnel from the industry (to be confirmed by September 2024). The EAB will meet bi-annually to internally assess the Department and suggest actions in order to meet the goals of the Department's Strategic Plan. The EAB will also foster links between the Department and the local (and international) industry while it will also serve to bridge the gap between the academia, the society and the market. It is expected that the EAB will be finalized/confirmed by September 2024.

The students' involvement in the improvement of the educational procedures is realized *via* their representatives (5 in total - elected through student elections and may include both undergraduate and postgraduate students) in the Departmental Council. For further participation and involvement in the improvement of the educational process on a fundamental level thus enhancing its efficacy, the Undergraduate and Postgraduate Studies Committees organize annual meetings with the undergraduate and postgraduate students respectively and discuss possible issues that need the Department's attention so as to improve the educational process. The next meetings are planned for September 2024. Moreover, the Undergraduate Studies committee organizes meetings with the Teaching Assistants at the beginning of each semester and applies procedures for their evaluation. The latter is also included in the students' evaluation reports.

The departmental council at its meeting that was held on the 16th of May 2024, has unanimously decided that (with the support of the Centre of Teaching and Learning, University of Cyprus, https://www.ucy.ac.cy/ctl/?lang=en), the failure statistics (per course – presented in a Table eliminating course codes), statistical analysis of the final marks (per course) and analysis of the students' evaluations (per course and per question – presented in a Table eliminating course codes) will be made available within the Department (Faculty Members) and will be assessed annually. Drop-outs will be evaluated every 2 years. It is noteworthy to mention that most B.Sc. student dropout (>80% of total) happens during the first 2 years of their studies. The aim of the assessment is to identify any unusually high dropout or failure rates, as well as an excessive number of students achieving unusually high grades. Corrective measures to address any of these issues will be taken by the Head of the department in collaboration with the instructors. Furthermore, at the end of each semester, the Head of the Department has access to the students' evaluations and in the cases where high failure rates and/or negative evaluation reports are systematically observed, he/she discusses the evaluation outcome with the corresponding Academic(s)/Instructor(s).

The MME faculty members been actively involved in shaping the MME strategy. More precisely, the Departmental Meeting that was held on the 23rd of September 2020, the department's academic personnel worked effectively and collaboratively on the finalization of the 2021-2025 Departmental Strategic Plan that was drafted by the members of the Strategic Plan Committee. For the continuous monitoring and periodic revisions (once per year) of the departmental goals set in the Strategic Plan related to its mission and vision, the Department at the meeting that was held on the 16th of May, re-appointed the Strategic Plan Committee (consisting of 4 faculty members) (https://www.ucy.ac.cy/mme/home/the-department/?lang=en).

In 2023, the MME Undergraduate and Postgraduate Studies committees evaluated the outcome of the **Study Program evaluation results.** Based on that and upon approval by the Departmental Council (November 8 2023), a document was submitted to the **Internal Quality Assurance Committee** for the implementation of improvement actions in the B.Sc. and Master programs of study.

The BSc programme appears to be the most coherent on its own merits, fulfilling the requirements of ETEK. However, the coherence and compatibility of the MSc and MEng programmes with the BSc and PhD programmes, as well as the benefits of offering these degrees for local job market needs, are unclear.

Our response: Due to the size of the department and the small number of admitted postgraduate students in MSc and MEng programs, the latter have a wider scope and cannot be specialized in areas that the local industry might need. Regardless, these are designed to provide the students with the necessary knowledge and skills to cope with the needs of the industry. It is noteworthy to mention that the MME department is involved in the MSc. and MEng. Interdepartmental Postgraduate Programme «Energy Technologies and Sustainable Design» (IPP-ETSD) that offers specialization in the discipline of Energy Technologies within the frame of Sustainable Design (https://etsd.ucy.ac.cy/en/). Graduate students enrolled in this program are exposed to multidisciplinary topics related to Energy Technologies and Sustainable Design, in line with both, local and international job market needs. In recognition of the entry of emerging technologies into the market, the department is currently involved in a joined effort with other colleagues from the School of Engineering, in introducing a new interdepartmental M.Sc. programme in "Autonomous and Networked Systems" at the University of Cyprus.

MME is coherent and has ongoing collaborations with other Departments with engineering orientations. However, compatibility with basic science Departments, e.g. Mathematics and Physics, was found to be limited.

Our response: Besides the ongoing collaborations of the MME faculty members with other Engineering departments, they also retain strong collaborations (through joined research programs, co-supervision of diploma theses, co-supervision of graduate students, etc.) with the Medical School and basic Science Departments within the University of Cyprus, including the Departments of Chemistry, Physics, Computer Science, Mathematics and Statistics. Such collaborations are summarized in the following Table:

Department of Computer Science Prof Constantinos Pattichis Prof. Marios Dikaiakos Assoc. Prof. George Pallis	**Department of Chemistry** Dr. Sotirios Christodoulou Prof. Ioannis Pashalidis Prof. Panayiotis Koutentis Prof. Epameinondas Leontides
Department of Physics Assoc. Prof. Grigorios itskos	**Department of Biology** Assoc. Prof. Katerina Strati
Department of Mathematics and Statistics Prof. Georgios Georgiou	**Medical School** Dr. Panayiotis Yiallouros Dr. Anastasia Constantinidou Dr. Pinelopi Anagnostopoulou

In addition, MME faculty members retain collaborations with basic science departments in other local and foreign universities.

Suggestions for changes in case of incompatibility: Enforce the alignment of Mathematics and Physics curricula with the needs of MME in engineering education. Specifically, MME must have stronger influence on the number and content of courses offered by such science Departments within MME programmes, including potential delivery of those courses internally by MME.

Our response: The department already decided that the mathematics courses must be taught by the School of Engineering personnel (Departmental Meeting, 08/11/2023). The request has been already submitted and it is under discussion by the University bodies. In addition, traditional science topics are already covered within a number of our courses during the first year taught by MME faculty, for example:
MME105 – Experimental and Statistical Analysis:
https://applications.ucy.ac.cy/pub_programs/courses_pck.show_course_info?p_course_id=6802
MME156 - Chemistry for Engineers:
https://applications.ucy.ac.cy/pub_programs/courses_pck.show_course_info?p_course_id=6814
MME107 – Introduction to electromagnetism:
https://applications.ucy.ac.cy/pub_programs/courses_pck.show_course_info?p_course_id=6806

The Department has open days for prospective students, but seems to have no formalized procedures for communication with professional bodies and alumni, as well as for soliciting the impact of their teaching and research activities on society.

Our response: At the departmental meeting that was held on the 16th of May 2024, the Department decided to prepare and publish an Annual Newsletter that will be send to alumni, local industries and professional bodies. The report will highlight teaching and research accomplishments of the Department, along with significant changes on the Department's academic programs and personnel. The Department is also in the process of forming an External Advisory Board with members from the local industry and academics from abroad (decision at meeting, that was held on the 16th of May 2024, where 11 names were proposed). The Board will meet bi-annually to internally assess the Department and suggest actions in order to meet the goals of the Department's Strategic Plan. The Board will also serve as the means to support the relations with the local industry.

Furthermore, at the departmental meeting (13/03/2024), it was decided that students from the MME department will be actively involved in visits/presentations addressed to high school students. Finally, MME faculty and their team members soliciting the impact of their teaching and research to the general society, are actively involved in events such as The European Researchers' Night, an EC-driven activity that is organized annually by the Cyprus Research and Innovation Foundation, and it attracts hundreds of visitors from high schools and the general public and the UCY podcast series "Science Talks" and "Science Talks – Kids version".

The Department has a strong research profile in selected areas and as a consequence enjoys premium status in Cyprus, which attracts students, young researchers and teaching staff. However, EEC did not find existing strategies, nor formalized procedures, for attracting teaching staff and enabling continuous professional development of faculty.

Our response: During the last 5 years the department announced 5 new hiring positions that were filled in the following areas:
- Autonomous systems
- Biomedical Engineering
- Manufacturing
- Rheology and non-Newtonian fluids dynamics
- Energy systems and/or energy devices engineering

Based on the UCY recruitment policy and the allocation of faculty positions within the departments, at the present stage the department has almost reached its steady-state with respect to the number of faculty members and therefore limited hiring possibilities and hence further professional development of the faculty are expected in the forthcoming years. Nevertheless, the relocation of the Department to the new and modern facilities is expected to strengthen the continuous professional development of the existing faculty members.

MME has the plan for teaching selected courses in English, which should attract more students from abroad. However, there seem to be internal challenges for implementing such plans. Recent financial investments in building new laboratories are encouraging but still need to be organized in a form of a strategic plan for continuous monitoring and further investment in equipment for teaching and research.

Our response: The current spread of the Department in 4 different sites and the lack of adequate teaching laboratory space prevented the sufficient development of teaching labs for core engineering subjects taught in the first 3 years of study. The department has set a strategic plan for the continuous monitoring and further investment in equipment, prioritizing upgrading of existing and purchasing of new teaching equipment. More precisely, the Department has put into force a strategic plan for the significant improvement of all teaching labs, but with emphasis to laboratories linked to fluid mechanics, thermodynamics and solid mechanics. It is noteworthy to mention at this point that the maintenance and development needs of the laboratories are included in the Department's annual budget, and consequently there is supervision and periodicity once per year.
For the development of the teaching laboratories, the Department has secured a total funding of €722,000, targeting 60 new laboratory exercises as follows:

- 9 for thermodynamics (MME 215 & MME 318)
- 8 for fluid dynamics (MME 216 & MME 316)
- 2 for heat transfer, MME 217
- 1 for thermal engines, MME 318
- 4 for strength of materials, MME 256 & MME 257
- 36 in all other courses

We have already purchased the equipment for the implementation for most of the above laboratories which are taught. However, for the completion of the aforementioned strategic plan set on teaching equipment the following equipment should be purchased:

Table 1. Pending teaching equipment and related MME courses

	Main Course	Laboratory Exercises
2	**MME 215** Thermodynamics I	Operation of Heat Engine / Otto Cycle
3	**MME 216** Fluid Mechanics I	Manometry and Bernoulli's principle
4	**MME 216** Fluid Mechanics I	Reynolds experiment
5	**MME 315** Thermodynamics II	Thermodynamics of the refrigeration circuit
6	**MME 315** Thermodynamics II	Vapor pressure of water Boiling process
7	**MME 315** Thermodynamics II	Heat pump for cooling / heating operation
8	**MME 414** Energy Systems	solar thermal - collector performance
9	**MME 4XX** Aerosols and Air Quality (Could be part of Biomedical minor)	Characterization of indoor and outdoor air quality through aerosol measuremens
10	**MME 227** Vibrations	Responses of free undamped and damped
11	**MME 325** Modeling and Analysis of Dynamic Systems	Two-tank fluid system
12	**MME 420** Robotics	Motion planning and programming of basic
13	**MME 420** Robotics	Industrial application simulation using a belt
14	**MME 256** Solid Mechanics	Compression test
15	**MME 257** Strength of Materials	Photo-elasticity (stress flow, stress
16	**MME 346** Mechanical Design	Belt drive and belt friction
17	**MME 346** Mechanical Design	Determination of gear efficiency
18	**MME 443** Advanced Metal Working Processes	Cold and hot forging
19	**MME 443** Advanced Metal Working Processes	Material strengthening
20	**MME 456** Properties of Polymers and Polymer Processing	Thermomechanical testing by Dynamic Mechanical Analysis

The expected number of entering Cypriot students in undergraduate programme is around 50 per year according to local regulations. The number of students from other countries is limited because the dominant language of instructions is Greek. The introduction of courses in English will create the potential for attracting more students from abroad.

Our response: The planned number of students admitted annually in the MME department is 40-50 and no significant expansion in student numbers is expected in the future. Nevertheless, the department and the university in general are pushing for a change in the legislation such that undergraduate programs can be taught in English. Moreover, since January 2023 the department offers all of its graduate programs in English, thus creating the potential for attracting more students from abroad.

Areas of improvement and recommendations. A list of problem areas followed by or linked to the recommendations of how to improve the situation.

There is a clear need to establish formalized strategic plans for development. This should take into account the current challenges faced by Mechanical Engineering as a discipline globally and consider the ambition to lead the development of local economy and integration with society. There is a clear need to establish formalized procedures for every aspect of the Department's activities that can be followed, monitored, and revised as necessary.

Our response: In the Department's 2021-2025 Strategic Plan, short-, mid- (i.e. by 2022) and long-term (i.e. by 2025) goals are clearly described (full version available upon request - in Greek). For the continuous monitoring and periodic revisions of the departmental goals set in the Strategic Plan related to its mission and vision concerning teaching, research and interconnection to the industry, the local economy and the society, the Department at the 08/2024 meeting that was held on the 16th of May 2024 re-appointed the Strategic Plan Committee (consisting of 4 faculty members) (https://www.ucy.ac.cy/mme/home/the-department/?lang=en). The Strategic Plan Committee will meet once per year for evaluating the departmental goals set and through effective communication in cooperation with the other internal committees, decisions will be made and implemented. Moreover, as mentioned above, the Department is also in the process of forming an External Advisory Board with members from the local industry and academics from abroad.

The introduction of English in all educational programmes will attract larger number of students from abroad and promote MME globally.

Our response: The department and the university in general are pushing for a change in the legislation such that undergraduate programs can be taught in English. Moreover, since January 2023, the department offers all of its graduate programs in English, thus creating the potential for attracting more students from abroad.

The EEC recommends to consider renaming the Department to 'Mechanical Engineering'.

Our response: At the MME departmental meeting that was held on the 10th of April 2023, the members of the Departmental Council unanimously decided to rename the Department to "Department of Mechanical Engineering". This decision was forwarded on the 11th of March 2024 at a School level for approval. (approved on the 20th of March 2024 at the School of Engineering council meeting). At this stage, the Dean of the School of Engineering on the 21st of March 2023 sent a positive recommendation for renaming the Department to 'Mechanical Engineering' to the UCY Planning and Development Committee for approval. The latter unanimously approved renaming at its 3/2024 meeting that was held on the 27th of March 2024. The final decision will be taken by the Senate.

2. Quality Assurance

Sub-areas

2.1 System and quality assurance strategy
2.2 Quality assurance for the programmes of study

The EEC was presented with the list of quality assurance committees (upon request). However, it remains unclear how these committees function, communicate between each other, make and implement decisions that are consistently followed up. This is linked to the lack of formalized procedures described in the previous section.

Our response: The internal committees handle their respective topics and their decision is presented to the departmental council for final approval and implementation. Interconnection between the Strategic Plan committee and the rest of the Committees will ensure the continuous monitoring, evaluation and development of the department's strategic plan and implementation of its mission and vision. Moreover, the Department is also in the process of forming an External Advisory Board with members from the local industry and academics from abroad, as described above.

The dominant majority of partially compliant scores relate again to the lack of formalized procedures. For instance, although the mechanism of course evaluation by students exists, the procedures for acting on those to provide improvements are not clear.

Our response: The departmental council at its meeting that was held on the 16th of May 2024, has unanimously decided that (with the support of the Centre of Teaching and Learning, University of Cyprus, https://www.ucy.ac.cy/ctl/?lang=en), the failure statistics (per course – presented in a Table eliminating course codes), statistical analysis of the final marks (per course) and analysis of the students' evaluations (per course and per question – presented in a Table eliminating course codes) will be made available within the Department (Faculty Members) and will be assessed annually. Drop-outs will be evaluated every 2 years. It is noteworthy to mention that most B.Sc. student dropout (>80% of total) happens during the first 2 years of their studies. The aim of the assessment is to identify any unusually high dropout or failure rates, as well as an excessive number of students achieving unusually high grades. Corrective measures to address any of these issues will be taken by the head of the department in collaboration with the instructors. Furthermore, at the end of each semester, the Head of the Department has access to the students' evaluations and in the cases where high failure rates and/or negative evaluation reports are systematically observed, he/she discusses the evaluation outcome with the corresponding Academic(s)/Instructor(s).
In addition, following a decision made by the UCY Internal Quality committee at its 1/2024 meeting, all academics/instructors will submit their updated syllabus to the Coordinator of the Undergraduate Studies Committee before the beginning of each academic year.
For further participation and involvement in the improvement of the educational process on a fundamental level thus enhancing its efficacy, the Undergraduate Studies Committee organizes an annual meeting with the undergraduate students from all years and discusses possible issues that need the Department's attention so as to improve the educational process. The next meeting is planned for September 2024. Moreover, the undergraduate studies committee organizes meetings with the Teaching Assistants at the beginning of each semester and applies procedures for their evaluation. The latter is also included in the students' evaluation reports. Feeback from students at a graduate level is also received annually through a meeting that takes place between the graduate students and the members of the Postgraduate Studies Committee. The next meeting will also take place in September 2024.

Some of the other partially compliant scores relate to the present state of available infrastructure. However, it is acknowledged that infrastructure is expected to significantly improve with the commissioning of new buildings in the near future, as mentioned above.

Our response: The current spread of the Department in 4 different sites and the lack of adequate teaching laboratory space prevented the sufficient development of teaching labs for core engineering subjects taught in the first 3 years of study. It is expected that by 2025, the strategic plan set by the MME department on further investment in teaching equipment along with the relocation of the department at the new facilities will significantly improve everyday activities and functions of the department, faculty members, administration staff and students.

Findings

A short description of the situation in the Department based on evidence from the Department's application and the site - visit.

As mentioned already, the majority of 'partially compliant' evaluation reflects the current situation of the Department in relevance to the lack of formalized procedures and scattered infrastructure. While the admission criteria for the BSc programme are clear, such must be clarified and formalized for the graduate and postgraduate programmes.

Our response: The department follows the University regulations concerning the admission criteria set for postgraduate studies, as appearing under the following link:
https://www.ucy.ac.cy/graduateschool/research/admission-requirements/?lang=en

Strengths. A list of strengths, e.g. examples of good practices, achievements, innovative solutions etc. Excellent library facilities and flexibility in teaching methods, as well as the availability of information about all study programmes.

Areas of improvement and recommendations A list of problem areas followed by or linked to the recommendations of how to improve the situation.

As mentioned above, the Department needs to develop formalized structured procedures for quality assurance, implemented and closely monitored by respective committees.

Our response: As stated above, the internal committees handle their respective topics and their decision is presented to the departmental council for final approval and implementation. Interconnection between the Strategic Plan Committee and the rest of the Committees will ensure the continuous monitoring, evaluation and development of the department's strategic plan and implementation of its mission and vision. Moreover, The Department is also in the process of forming an External Advisory Board with members from the local industry and academics from abroad, as previously mentioned.

3. Administration

EEC scores are based on the assumption that the successful operation of the MME Department already has some procedures compliant with overall UCY policies. However, the existing procedures within MME itself remain unclear to the EEC.

Findings

A short description of the situation in the Department based on evidence from the Department's application and the site - visit. See statement above. Information provided to the EEC was found to be insufficient for adequate assessment.

Strengths

A list of strengths, e.g. examples of good practices, achievements, innovative solutions etc. The Department operates thanks to the devotion and hard work of all academic and non-academic personnel, as well as students, involved in Departmental activities and committees. **Areas of improvement and recommendations A list of problem areas followed by or linked to the recommendations of how to improve the situation**. Similar to the above, the Department needs to develop formalized structured procedures for administrative operations.

EEC scores are based on the assumption that the successful operation of the MME Department already has some procedures compliant with overall UCY policies. However, the existing procedures within MME itself remain unclear to the EEC.

Our response: The administrative personnel support the day-to-day operation of the MME Department by adopting procedures that are compliant with the overall UCY policies and formal procedures. The day-to-day operational needs are implemented through formal procedures which determine how and who will handle a specific need. More precisely, specific duties are allocated to the secretarial and technical staff, whereas a meeting of the Chair with the administrative personnel is carried out on an annual basis to discuss in detail the effectiveness of their support, the allocation of their duties and their implementation throughout the year, the setting of goals/duties for the next year as well as their assessment. This is part of the evaluation process of the administrative personnel that is carried out annually by the Department Chair, following the regulations of the University.

4. Learning and Teaching

Sub-areas

4.1 Planning the programmes of study
4.2 Organisation of teaching

Learning outcomes correspond to EQF, while exceed the minimum necessary level to comply with local legislations at Cyprus. The programmes taught by MME apparently integrate theory and practice but it remains unclear to the EEC how the Department ensures that.

Findings A short description of the situation in the Department based on evidence from the Department's application and the site - visit. While planning and follow-up procedures on teaching courses are not sufficiently formalized, feedback from student and teachers indicate general satisfaction and healthy relationships.

Strengths A list of strengths, e.g. examples of good practices, achievements, innovative solutions etc. Teaching practices in the Department and communication with students are very good, revealing the existence of rapport between teachers and students. This can also be related to the good balance in student to staff ratio.

Areas of improvement and recommendations A list of problem areas followed by or linked to the recommendations of how to improve the situation. The planning of all educational programmes and the integration of theory and practice can be improved, e.g. through the introduction of hands-on projects and activities with practical outcomes within existing courses. This could be facilitated by exploiting the new buildings and by introducing recommended specialization study streams for students.

Our response: Since the last evaluation of our Study Programs (11th and 12th of February 2019), the MME department has given high emphasis on the continuous monitoring and further investment in equipment, prioritizing upgrading of existing and purchasing of new teaching equipment. For this purpose, the department has put into force a strategic plan for the significant improvement of all teaching labs aiming to reinforce the integration of theory and practice and provide the opportunity to students to get more involved with hands-on projects and activities with practical outcomes. This need was also stated in students' evaluation reports and it was seriously considered by the Department. For the development of the teaching laboratories, the Department has secured a total funding of €722,000, targeting 60 new laboratory exercises as follows:

- 9 for thermodynamics (MME 215 & MME 318)
- 8 for fluid dynamics (MME 216 & MME 316)
- 2 for heat transfer, MME 217
- 1 for thermal engines, MME 318
- 4 for strength of materials, MME 256 & MME 257
- 36 in all other courses

The Undergraduate Studies Committee, in cooperation with the instructors, oversees the content of courses and their related laboratories. It also monitors them and identifies possible issues that need to be resolved, to have a harmonic integration of theory and practice. We have already purchased the equipment for the implementation of most of the above laboratories which are taught.

In addition, the exposure of our undergraduate students to the local industry through visits, joined diploma thesis projects, etc. introduces further mechanisms that reinforce hands-on activities with practical outcomes within existing undergraduate courses. Moreover, project-oriented learning is offered through the support of student teams such as the Formula Racing Team UCY (FRTUCY) (https://www.ucy.ac.cy/frtucy/?lang=en) and participation of our students in international and national competitions (e.g. NASA Space Apps Challenge, Robotex Cyprus, etc.)

Teaching Staff

Teaching resources appear adequate. According to information obtained by the EEC during interviews, it is difficult for the Department to attract visiting professors

Findings A short description of the situation in the Department based on evidence from the Department's application and the site - visit. The EEC found the Department well-staffed with academic and technical support personnel for the number of students at present.

Strengths A list of strengths, e.g. examples of good practices, achievements, innovative solutions etc. Well qualified and highly motivated personnel.

Areas of improvement and recommendations A list of problem areas followed by or linked to the recommendations of how to improve the situation. The EEC found that professional development for the teaching staff would benefit from the implementation of a mentorship programme in the Department to facilitate the academic promotion procedures.

Our response: Informally faculty seeks mentoring from other faculty members on a voluntary basis. Moreover, the Department Chair ensures that new faculty members have accurate information on academic personnel processes, obligations related to teaching, research and administration and clear guidelines on promotion procedures. As far as teaching mentoring is concerned, the Centre for Teaching and Learning is working towards the implementation of the UCY policy for Quality Assurance in Teaching, has under Area II: "Initial training, ongoing faculty professional development, and networking" in Action: B. "Ongoing professional development for faculty and teaching staff", developed a "Mentors" policy. The policy was approved by the Senate (16/2019) to be applied on a voluntary basis. More information can be found under: https://www.ucy.ac.cy/ctl/mentors/?lang=en.

5. Research

MME has very strong research activities and outcomes in selected areas, but not within an internal policy framework.
Findings A short description of the situation in the Department based on evidence from the Department's application and the site - visit. The Department has a very strong research profile and adequate facilities in selected areas. Transfer of research outcomes to teaching exists, but respective procedures are not formalized.
Strengths A list of strengths, e.g. examples of good practices, achievements, innovative solutions etc. Enthusiastic and dedicated researchers create consistently good reputation for the Department. The success in soliciting research funding in specific areas is well above average among corresponding Departments, at least within Cyprus.
Areas of improvement and recommendations A list of problem areas followed by or linked to the recommendations of how to improve the situation. MME must elaborate strategy and procedures to encourage the development across all areas in the Department's research portfolio. This could be facilitated by the establishment of a dedicated research committee, chaired by an academic acting in the capacity of director of research.

Our response: Due to the small size of the MME Department, a Research Committee and a Research Director are not considered practical. The Department is responsible for taking strategic decisions regarding new positions through its Strategic Planning and the final decisions are reached at a Departmental level. During the last 5 years the department announced 5 new hiring positions that were filled in the following areas:

- Autonomous systems
- Biomedical Engineering
- Manufacturing
- Rheology and non-Newtonian fluids dynamics
- Energy systems and/or energy devices engineering

Although at the present stage the department has almost reached a steady-state in respect to the number of faculty members and therefore limited hiring possibilities and hence further professional development of the faculty are expected in the forthcoming years, the Department of Mechanical and Manufacturing Engineering has unanimously decided (Council 04/2022, date: 13/4/2022) to request a position at the level of Lecturer/Assistant Professor with subject: Artificial Intelligence with emphasis in Mechanical and/or Manufacturing and/or Marine Engineering. This position is related to the strategic priority of the Department in the area of artificial intelligence (AI) and its applications, in general in engineering and especially in Mechanical and Manufacturing Engineering and Marine Engineering. Among other innovations, artificial intelligence can tackle major problems of modern society such as climate change and environmental degradation through the autonomy it can give to mechanical systems. Examples of this type of autonomy may include autonomy to optimally operate power/propulsion equipment to reduce consumption or pollutant emissions, autonomy to monitor the efficiency of mechanical or marine systems, autonomy to locate, identify, assess risks as well as manage mechanical failures, or autonomy in manufacturing processes. The Department wishes to recruit an individual active in one of these areas to contribute to the strategic goal of developing innovative research and teaching of artificial intelligence in engineering to address contemporary technological challenges. Considering the different criteria set by the Planning and Development Committee of the University of Cyprus for allocating of 20% of the total new faculty positions based on the departments' Strategic Planning (e.g., cutting-edge research, development of new areas), the Department may also consider research excellence and satisfaction of societal needs when claiming new positions. Moreover, to facilitate further actions towards the development across all areas in the Department's research portfolio, new funding calls and encouragement for new synergies/collaborations among the MME Faculty members will be thoroughly discussed at the Departmental Council, at least once a year or whenever the need arises.

6. Resources

The partially compliant scores refer to the limited extent of strategies in the Department which could be more directly linked to budgeting and other financial matters.

Findings A short description of the situation in the Department based on evidence from the Department's application and the site - visit. The resources appear to be rather adequate, but EEC found them not directly linked to a formalized strategy and unequally distributed through the years.

Our response: Since the last evaluation of our Study Programs (11th and 12th of February 2019), the MME department has given high emphasis on the continuous monitoring and further investment in equipment, prioritizing upgrading of existing and purchasing of new teaching equipment. For this purpose, the department has put into force a strategic plan for the significant improvement of all teaching labs aiming to reinforce the integration of theory and practice and provide the opportunity to students to get more involved with hands-on projects and activities with practical outcomes. This need was also stated in students' evaluation reports and it was seriously considered by the Department. For the development of the teaching laboratories, the Department has secured a total funding of €722,000, targeting 60 new laboratory exercises as follows:

- 9 for thermodynamics (MME 215 & MME 318)
- 8 for fluid dynamics (MME 216 & MME 316)
- 2 for heat transfer, MME 217
- 1 for thermal engines, MME 318
- 4 for strength of materials, MME 256 & MME 257
- 36 in all other courses

We have already purchased the equipment for the implementation of most of the above laboratories which are taught. However, for the completion of the aforementioned strategic plan set on teaching equipment the following equipment should be purchased:

Table 1. Pending teaching equipment and related MME courses

	Main Course	Laboratory Exercises
2	**MME 215** Thermodynamics I	Operation of Heat Engine / Otto Cycle
3	**MME 216** Fluid Mechanics I	Manometry and Bernoulli's principle
4	**MME 216** Fluid Mechanics I	Reynolds experiment
5	**MME 315** Thermodynamics II	Thermodynamics of the refrigeration circuit
6	**MME 315** Thermodynamics II	Vapor pressure of water Boiling process
7	**MME 315** Thermodynamics II	Heat pump for cooling / heating operation
8	**MME 414** Energy Systems	solar thermal - collector performance
9	**MME 4XX** Aerosols and Air Quality (Could be part of Biomedical minor)	Characterization of indoor and outdoor air quality through aerosol measuremens
10	**MME 227** Vibrations	Responses of free undamped and damped
11	**MME 325** Modeling and Analysis of Dynamic Systems	Two-tank fluid system
12	**MME 420** Robotics	Motion planning and programming of basic
13	**MME 420** Robotics	Industrial application simulation using a belt
14	**MME 256** Solid Mechanics	Compression test
15	**MME 257** Strength of Materials	Photo-elasticity (stress flow, stress
16	**MME 346** Mechanical Design	Belt drive and belt friction
17	**MME 346** Mechanical Design	Determination of gear efficiency
18	**MME 443** Advanced Metal Working Processes	Cold and hot forging
19	**MME 443** Advanced Metal Working Processes	Material strengthening
20	**MME 456** Properties of Polymers and Polymer Processing	Thermomechanical testing by Dynamic Mechanical Analysis

Strengths A list of strengths, e.g. examples of good practices, achievements, innovative solutions etc. Strong research areas in the Department make excellent financial contributions to research resources that significantly exceed internal funding for research.

Areas of improvement and recommendations A list of problem areas followed by or linked to the recommendations of how to improve the situation. The EEC recommends applying strategic effort to homogenize research activities across all thematic areas in the Department and encourage further collaborations with industry. This would enable a more balanced distribution of external research funding through the years and facilitate financial planning and resources. The Department can also elaborate tools (financial means) for reaching out to external stakeholders for potential collaborations.

Our response: As previously mentioned, in an effort to homogenize research activities across all thematic areas in the Department during the last 5 years 5 new positions were announced and filled in the following areas:
- Autonomous systems
- Biomedical Engineering
- Manufacturing
- Rheology and non-Newtonian fluids dynamics
- Energy systems and/or energy devices engineering

Even though at the present stage the department has almost reached a steady-state in respect to the number of faculty members and therefore limited hiring possibilities and hence further professional development of the faculty are expected in the forthcoming years, the Department of Mechanical and Manufacturing Engineering has unanimously decided (Council 04/2022, date: 13/4/2022) to request a position at the level of Lecturer/Assistant Professor with subject: Artificial Intelligence with emphasis in Mechanical and/or Manufacturing and/or Marine Engineering, as mentioned above. Considering the different criteria set by the Planning and Development Committee of the University of Cyprus for allocating of 20% of the total new faculty positions based on the departments' Strategic Planning (e.g., cutting-edge research, development of new areas), the Department may also consider research excellence and satisfaction of societal needs when claiming new positions. Moreover, to facilitate further actions towards the development across all areas in the Department's research portfolio, new funding calls and encouragement for new synergies/collaborations among the MME Faculty members will be thoroughly discussed at the Departmental Council, at least once a year or whenever the need arises.

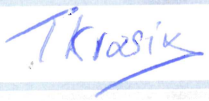
The Department is also in the process of forming an External Advisory Board with members from the local industry and academics from abroad (decision reached at the 08/2024 meeting, May 16 2024). The Board will meet bi-annually to internally assess the Department and suggest actions in order to meet the goals of the Department's Strategic Plan. The Board will also serve as the means to encourage and support further collaborations with the industry. Concerning the latter, the MME department has developed strong collaborations with the local industrial sector. More precisely, a number of Cooperation Agreements were signed between the MME Department and local companies (examples include Nicolaides & Kountouris Metal Company Ltd., CYPET Technologies Ltd., Elysee, Multimarine Services Limited (MMS), etc.), whereas cooperation with the local industry is further reinforced *via* student visits, preparation and submission of joined research proposals, implementation of joined research projects and diploma theses, workshop organization on Industrial Design, and presentations by representatives from the local industry addressed to our students (e.g. under "Horizons in Engineering" presentation series - MME106).

Conclusions and final remarks

Please provide constructive conclusions and final remarks, which may form the basis upon which improvements of the quality of the Department under review may be achieved. The EEC found that the Department operates thanks to the devotion and hard work of all academic and non-academic personnel and students involved in day-to-day activities. The academic personnel carry the skills necessary for good teaching and research. The Department is successful in attracting some of the best student talent in Cyprus interested in mechanical engineering. Recent investments in aggregating all available facilities and infrastructure within one campus is expected to give a major boost to the Department's coherence and the development of a community research and teaching culture in mechanical engineering. At the same time, the efficiency of the Department operations would be significantly enhanced through the elaboration of a solid strategic plan with short-, medium- and long-term objectives. This would need to be supported by the development of formalized procedures that are to be strictly followed, monitored and systematically reviewed. The latter should be implemented and carried out by existing and new committees, as necessary.

Our response: The points appearing in Conclusions and Final Remarks have already been addressed in previous sections.

B. Higher Education Institution academic representatives

Name	*Position*	*Signature*
Theodora Krasia	Chairperson	
FullName	Position	
FullName	Position	
FullName	Position	
FullName	Position	
FullName	Position	

Date: June 6, 2024